

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

	sq. km	sq. mi	FIA Plots
Area of Region	8,900.0	3,436.3	51

**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	Scenario	Scenario	Scenario	SHIFT	SHIFT		
						RCP45	RCP85	RCP45	RCP85	RCP45	RCP85		
Ash	2			High	10	20	20	Very Good	0	0	Likely	4	4
Hickory	4			Medium	23	7	6	Good	14	15	Infill	29	27
Maple	5	Abundant	0	Low	25	18	19	Fair	12	10	Migrate	3	6
Oak	8	Common	6	FIA	5	11	12	Poor	6	5			
Pine	3	Rare	44			Unknown	7	6	Very Poor	11	12		
Other	28	Absent	13						FIA Only	1	1		
	<b>50</b>		<b>63</b>		<b>63</b>		<b>63</b>		<b>46</b>	<b>44</b>		<b>36</b>	<b>37</b>

**Potential Changes in Climate Variables**

**Temperature (°F)**

	Scenario	2009	2039	2069	2099	
Annual Average	CCSM45	51.6	53.2	55.8	55.9	
	CCSM85	51.6	53.9	56.4	59.6	
	GFDL45	51.6	58.0	57.3	58.2	
	GFDL85	51.6	54.8	58.3	62.5	
	HAD45	51.6	54.4	58.0	59.5	
	HAD85	51.6	54.8	59.5	64.1	
Growing Season (May—Sep)	CCSM45	68.3	70.0	72.3	72.7	
	CCSM85	68.3	70.7	73.3	77.2	
	GFDL45	68.3	76.3	75.3	76.6	
	GFDL85	68.3	72.3	76.6	81.5	
	HAD45	68.3	71.7	75.0	77.1	
	HAD85	68.3	71.9	77.9	82.8	
Coldest Month Average	CCSM45	25.3	26.7	28.4	28.7	
	CCSM85	25.3	27.9	28.9	30.7	
	GFDL45	25.3	28.9	29.6	30.4	
	GFDL85	25.3	28.3	29.6	30.7	
	HAD45	25.3	26.3	29.2	29.2	
	HAD85	25.3	27.7	30.1	32.4	
Warmest Month Average	CCSM45	73.9	75.6	77.0	77.5	
	CCSM85	73.9	76.5	78.3	80.3	
	GFDL45	73.9	77.0	79.1	80.0	
	GFDL85	73.9	77.8	80.3	83.1	
	HAD45	73.9	77.7	80.4	81.7	
	HAD85	73.9	79.1	83.4	86.6	

**Precipitation (in)**

	Scenario	2009	2039	2069	2099	
Annual Total	CCSM45	38.8	40.5	41.4	42.3	
	CCSM85	38.8	40.8	41.8	44.2	
	GFDL45	38.8	42.7	45.2	46.8	
	GFDL85	38.8	40.4	45.9	48.3	
	HAD45	38.8	40.2	40.5	40.7	
	HAD85	38.8	40.3	37.5	41.3	
Growing Season (May—Sep)	CCSM45	18.8	19.6	19.4	19.9	
	CCSM85	18.8	18.5	18.8	18.6	
	GFDL45	18.8	20.6	20.4	21.2	
	GFDL85	18.8	19.0	20.0	20.4	
	HAD45	18.8	19.8	17.1	18.4	
	HAD85	18.8	18.5	15.4	16.0	

**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
white ash	Fraxinus americana	WDL	Medium	75.3	176.8	16.1	Lg. dec.	Lg. dec.	Low	Common	Very Poor	Very Poor			0	1
sugar maple	Acer saccharum	WDH	High	48.3	137.5	18.6	Sm. dec.	Sm. dec.	High	Common	Fair	Fair	Infill +	Infill +	1	2
black willow	Salix nigra	NSH	Low	10.1	119.4	35.3	Lg. dec.	Lg. dec.	Low	Common	Very Poor	Very Poor			2	3
black walnut	Juglans nigra	WDH	Low	60.7	82.3	12.9	No change	Sm. dec.	Medium	Common	Fair	Poor	Infill +	Infill +	1	4
boxelder	Acer negundo	WSH	Low	59.6	77.8	12.8	Sm. dec.	Sm. dec.	High	Common	Fair	Fair	Infill +	Infill +	1	5
American elm	Ulmus americana	WDH	Medium	74.2	50.9	7.6	Sm. inc.	Sm. inc.	Medium	Common	Good	Good	Infill ++	Infill ++	1	6
Osage-orange	Maclura pomifera	NDH	Medium	28.1	38.5	17.8	No change	Sm. inc.	High	Rare	Fair	Good	Infill +	Infill ++	1	7
silver maple	Acer saccharinum	NSH	Low	22.5	37.7	25.6	Lg. dec.	Lg. dec.	High	Rare	Poor	Poor	Infill +	Infill +	2	8
ailanthus	Ailanthus altissima	NSL	FIA	1.1	36.8	31.3	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	9
black cherry	Prunus serotina	WDL	Medium	48.3	35.0	7.1	Sm. inc.	No change	Low	Rare	Poor	Very Poor	Infill +		1	10
green ash	Fraxinus pennsylvanica	WSH	Low	37.1	33.4	6.6	Sm. inc.	Sm. inc.	Medium	Rare	Fair	Fair	Infill +	Infill +	1	11
honeylocust	Gleditsia triacanthos	NSH	Low	36	28.1	12.0	Sm. inc.	Sm. inc.	High	Rare	Good	Good	Infill ++	Infill ++	1	12
Norway spruce	Picea abies	NSH	FIA	1.1	27.5	23.4	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	13
sycamore	Platanus occidentalis	NSL	Low	19.1	25.4	9.5	Sm. inc.	Sm. inc.	Medium	Rare	Fair	Fair	Infill +	Infill +	2	14
hackberry	Celtis occidentalis	WDH	Medium	40.4	24.6	9.3	Lg. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	1	15
shagbark hickory	Carya ovata	WSL	Medium	23.6	19.3	9.9	Sm. inc.	Sm. inc.	Medium	Rare	Fair	Fair	Infill +	Infill +	1	16
white oak	Quercus alba	WDH	Medium	14.6	18.8	8.5	Lg. inc.	Sm. inc.	High	Rare	Good	Good	Infill ++	Infill ++	2	17
northern red oak	Quercus rubra	WDH	Medium	31.5	18.6	9.0	Sm. inc.	Sm. inc.	High	Rare	Good	Good	Infill ++	Infill ++	1	18
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	2.2	18.5	7.9	Lg. dec.	Lg. dec.	High	Rare	Poor	Poor	Infill +	Infill +	2	19
red maple	Acer rubrum	WDH	High	22.5	15.7	10.7	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	1	20
American beech	Fagus grandifolia	WDH	High	15.7	14.2	6.5	No change	Sm. dec.	Medium	Rare	Poor	Very Poor	Infill +		2	21
white mulberry	Morus alba	NSL	FIA	19.1	12.4	3.3	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	22
scarlet oak	Quercus coccinea	WDL	Medium	10.1	11.2	8.4	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	23
eastern cottonwood	Populus deltoides	NSH	Low	18	10.9	9.3	Sm. inc.	Sm. inc.	Medium	Rare	Fair	Fair	Infill +	Infill +	2	24
bur oak	Quercus macrocarpa	NDH	Medium	18	10.2	8.7	No change	Sm. inc.	High	Rare	Fair	Good			2	25
black locust	Robinia pseudoacacia	NDH	Low	10.1	9.8	10.3	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	1	26
pin cherry	Prunus pensylvanica	NSL	Low	1.1	9.5	8.1	Very Lg. dec.	Lg. dec.	Medium	Rare	Lost	Very Poor			0	27
Ohio buckeye	Aesculus glabra	NSL	Low	31.5	9.3	4.5	Sm. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	28
pin oak	Quercus palustris	NSH	Low	9	8.5	14.4	No change	No change	Low	Rare	Very Poor	Very Poor			2	29
slippery elm	Ulmus rubra	WSL	Low	14.6	6.0	2.2	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	1	30
American basswood	Tilia americana	WSL	Medium	14.6	5.7	3.8	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			2	31
black oak	Quercus velutina	WDH	High	18	4.6	3.9	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	1	32
eastern white pine	Pinus strobus	WDH	High	9	4.3	7.3	Very Lg. dec.	Very Lg. dec.	Low	Rare	Lost	Lost			0	33
bigtooth aspen	Populus grandidentata	NSL	Medium	13.5	3.9	4.4	Lg. dec.	Very Lg. dec.	Medium	Rare	Very Poor	Lost			0	34
pignut hickory	Carya glabra	WDL	Medium	31.5	3.5	1.7	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	1	35
yellow-poplar	Liriodendron tulipifera	WDH	High	9	3.3	5.7	Sm. inc.	No change	High	Rare	Good	Fair	Infill ++	Infill +	1	36
red pine	Pinus resinosa	NSH	Medium	4.5	3.3	11.2	Lg. dec.	Lg. dec.	Low	Rare	Very Poor	Very Poor			0	37
Scots pine	Pinus sylvestris	NSH	FIA	4.5	2.1	7.3	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	38
sassafras	Sassafras albidum	WSL	Low	13.5	2.1	2.3	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	1	39
mockernut hickory	Carya alba	WDL	Medium	18	1.7	1.4	Lg. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	2	40
blackgum	Nyssa sylvatica	WDL	Medium	9	1.7	2.9	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	2	41
bitternut hickory	Carya cordiformis	WSL	Low	9	1.3	2.1	Lg. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	2	42
shingle oak	Quercus imbricaria	NDH	Medium	4.5	1.1	3.6	Sm. inc.	Sm. inc.	Medium	Rare	Fair	Fair	Infill +	Infill +	2	43
sourwood	Oxydendrum arboreum	NDL	High	4.5	0.9	3.0	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor			0	44
chokecherry	Prunus virginiana	NSLX	FIA	4.5	0.9	2.9	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	45
black maple	Acer nigrum	NSH	Low	4.5	0.7	2.5	Lg. dec.	Very Lg. dec.	High	Rare	Poor	Lost			0	46
swamp white oak	Quercus bicolor	NSL	Low	4.5	0.6	2.0	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			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
yellow buckeye	Aesculus flava	NSL	Low	4.5	0.4	1.3	Sm. dec.	Sm. dec.	Low	Rare	Very Poor	Very Poor			0	48
flowering dogwood	Cornus florida	WDL	Medium	4.5	0.2	0.6	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	2	49
American hornbeam; musclev	Carpinus caroliniana	WSL	Low	4.5	0.2	0.6	Lg. dec.	No change	Medium	Rare	Very Poor	Poor			0	50
eastern redcedar	Juniperus virginiana	WDH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate ++	Migrate ++	3	51
pecan	Carya illinoensis	NSH	Low	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat		Migrate ++	3	52
black hickory	Carya texana	NDL	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	53
sugarberry	Celtis laevigata	NDH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate ++	3	54
eastern redbud	Cercis canadensis	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Likely +	Likely +	3	55
common persimmon	Diospyros virginiana	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Likely +	Likely +	3	56
sweetgum	Liquidambar styraciflua	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Likely +	Likely +	3	57
blackjack oak	Quercus marilandica	NSL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			3	58
chinkapin oak	Quercus muehlenbergii	NSL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	59
Shumard oak	Quercus shumardii	NSL	Low	0	0	0	Unknown	New Habitat	High	Absent	Unknown	New Habitat		Migrate +	3	60
post oak	Quercus stellata	WDH	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Likely +	Likely +	3	61
bluejack oak	Quercus incana	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	62
winged elm	Ulmus alata	WDL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	63