

**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	8,400.0	3,243.3	306

**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				
				High	22	25	Increase	29	31	Very Good	10	11	Likely	1	1
Ash	2			Medium	32	53	No Change	10	11	Good	18	21	Infill	13	13
Hickory	6			Low	37	15	Decrease	28	25	Fair	10	7	Migrate	1	10
Maple	6	Abundant	5	FIA	5		New	16	16	Poor	16	15			
Oak	13	Common	25				Unknown	13	13	Very Poor	13	11			
Pine	6	Rare	42							FIA Only	3	3			
Other	39	Absent	21							Unknown	8	8			
	<b>72</b>		<b>93</b>		<b>96</b>	<b>93</b>		<b>96</b>	<b>96</b>		<b>78</b>	<b>76</b>		<b>15</b>	<b>24</b>

**Potential Changes in Climate Variables**

**Temperature (°F)**

	Scenario	2009	2039	2069	2099	
Annual Average	CCSM45	59.0	60.8	63.0	63.1	
	CCSM85	59.0	61.2	63.7	66.4	
	GFDL45	59.0	61.8	63.9	64.7	
	GFDL85	59.0	61.7	65.0	68.5	
	HAD45	59.0	61.2	64.2	65.5	
	HAD85	59.0	61.6	65.9	69.7	
Growing Season (May—Sep)	CCSM45	73.1	74.8	76.7	77.2	
	CCSM85	73.1	75.1	77.7	81.2	
	GFDL45	73.1	76.1	78.5	79.9	
	GFDL85	73.1	76.1	80.1	84.1	
	HAD45	73.1	76.2	78.9	80.5	
	HAD85	73.1	76.2	82.5	86.0	
Coldest Month Average	CCSM45	37.9	40.2	41.1	41.1	
	CCSM85	37.9	40.6	41.6	42.8	
	GFDL45	37.9	41.2	41.3	41.7	
	GFDL85	37.9	39.7	40.8	41.3	
	HAD45	37.9	37.6	39.6	40.0	
	HAD85	37.9	38.9	40.3	41.8	
Warmest Month Average	CCSM45	77.9	79.9	80.8	80.8	
	CCSM85	77.9	80.0	81.6	83.4	
	GFDL45	77.9	80.8	82.0	82.9	
	GFDL85	77.9	81.0	83.3	85.3	
	HAD45	77.9	82.0	84.0	84.7	
	HAD85	77.9	82.6	86.9	88.4	

**Precipitation (in)**

	Scenario	2009	2039	2069	2099	
Annual Total	CCSM45	55.2	58.0	61.4	60.6	
	CCSM85	55.2	59.1	60.9	66.8	
	GFDL45	55.2	62.6	64.8	69.2	
	GFDL85	55.2	62.1	65.5	67.6	
	HAD45	55.2	53.7	59.0	60.2	
	HAD85	55.2	59.2	53.0	58.0	
Growing Season (May—Sep)	CCSM45	21.6	22.8	23.7	24.0	
	CCSM85	21.6	22.7	22.2	24.7	
	GFDL45	21.6	26.4	27.2	28.4	
	GFDL85	21.6	25.6	27.8	28.7	
	HAD45	21.6	21.0	22.0	21.9	
	HAD85	21.6	23.4	17.5	20.0	

**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
loblolly pine	Pinus taeda	WDH	High	63.1	1237.1	20.4	Sm. inc.	Sm. inc.	Medium	Abundant	Very Good	Very Good			1	1
chestnut oak	Quercus prinus	NDH	High	61.9	1006.1	15.7	Sm. dec.	Sm. dec.	High	Abundant	Good	Good			1	2
virginia pine	Pinus virginiana	NDH	High	83.3	921.4	11.2	Lg. dec.	Lg. dec.	Medium	Abundant	Fair	Fair			0	3
yellow-poplar	Liriodendron tulipifera	WDH	High	71.4	569.7	7.7	Sm. dec.	Lg. dec.	High	Abundant	Good	Good			1	4
red maple	Acer rubrum	WDH	High	78.6	565.6	7.3	Sm. dec.	Sm. dec.	High	Abundant	Good	Good			1	5
white oak	Quercus alba	WDH	Medium	72.6	485.1	6.4	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	6
sweetgum	Liquidambar styraciflua	WDH	High	63.1	438.2	7.2	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	7
sourwood	Oxydendrum arboreum	NDL	High	63.1	309.2	4.7	Sm. dec.	Lg. dec.	High	Common	Fair	Fair			1	8
pignut hickory	Carya glabra	WDL	Medium	66.7	298.5	4.7	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor			0	9
shortleaf pine	Pinus echinata	WDH	High	58.3	278.9	4.6	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	10
eastern white pine	Pinus strobus	WDH	High	22.6	238.9	10.2	Sm. dec.	Sm. dec.	Low	Common	Poor	Poor			0	11
mockernut hickory	Carya alba	WDL	Medium	66.7	218.1	3.5	Sm. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	12
scarlet oak	Quercus coccinea	WDL	Medium	57.1	214.6	3.9	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	13
southern red oak	Quercus falcata	WDL	Medium	47.6	209.9	4.3	Sm. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	14
post oak	Quercus stellata	WDH	High	50	188.4	4.1	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	15
blackgum	Nyssa sylvatica	WDL	Medium	69	181.2	2.5	Sm. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	16
eastern redcedar	Juniperus virginiana	WDH	Medium	28.6	162.8	6.3	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	17
black cherry	Prunus serotina	WDL	Medium	60.7	156.9	2.8	Sm. inc.	Sm. inc.	Low	Common	Fair	Fair			1	18
black oak	Quercus velutina	WDH	High	54.8	155.7	2.7	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	19
northern red oak	Quercus rubra	WDH	Medium	51.2	144.7	2.7	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	20
red mulberry	Morus rubra	NSL	Low	7.1	128.7	17.4	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	21
winged elm	Ulmus alata	WDL	Medium	34.5	128.0	4.0	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	22
green ash	Fraxinus pennsylvanica	WSH	Low	33.3	112.9	3.7	Sm. inc.	Lg. inc.	Medium	Common	Good	Very Good			1	23
flowering dogwood	Cornus florida	WDL	Medium	63.1	112.8	1.7	No change	No change	Medium	Common	Fair	Fair			1	24
sugarberry	Celtis laevigata	NDH	Medium	7.1	112.4	15.2	No change	No change	Medium	Common	Fair	Fair			1	25
boxelder	Acer negundo	WSH	Low	8.3	81.8	9.5	No change	No change	High	Common	Good	Good			1	26
eastern hemlock	Tsuga canadensis	NSH	High	15.5	63.7	4.0	No change	No change	Low	Common	Poor	Poor	Infill +	Infill +	0	27
sassafras	Sassafras albidum	WSL	Low	33.3	54.7	1.6	Sm. dec.	Sm. inc.	Medium	Common	Poor	Good			1	28
shagbark hickory	Carya ovata	WSL	Medium	19	51.4	2.6	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor			0	29
black walnut	Juglans nigra	WDH	Low	10.7	51.3	4.6	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	30
hackberry	Celtis occidentalis	WDH	Medium	10.7	48.2	6.6	Sm. inc.	Sm. inc.	High	Rare	Good	Good	Infill ++	Infill ++	1	31
common persimmon	Diospyros virginiana	NSL	Low	10.7	42.4	3.8	No change	Lg. inc.	High	Rare	Fair	Good			1	32
black locust	Robinia pseudoacacia	NDH	Low	17.9	41.1	2.2	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	33
sugar maple	Acer saccharum	WDH	High	9.5	38.2	3.9	Lg. dec.	Very Lg. dec.	High	Rare	Poor	Lost			1	34
silver maple	Acer saccharinum	NSH	Low	1.2	36.1	29.2	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor			0	35
American elm	Ulmus americana	WDH	Medium	13.1	36.0	2.7	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	1	36
water oak	Quercus nigra	WDH	High	19	34.3	2.3	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	1	37
sweet birch	Betula lenta	NDH	High	15.5	33.9	2.1	Sm. dec.	Sm. dec.	Low	Rare	Very Poor	Very Poor			0	38
slippery elm	Ulmus rubra	WSL	Low	9.5	31.6	3.2	Sm. dec.	No change	Medium	Rare	Very Poor	Poor			1	39
eastern redbud	Cercis canadensis	NSL	Low	14.3	22.8	1.5	Lg. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	40
florida maple	Acer barbatum	NSL	Low	13.1	22.0	1.6	Sm. inc.	Lg. inc.	High	Rare	Good	Good			1	41
American beech	Fagus grandifolia	WDH	High	15.5	20.9	1.3	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	1	42
sycamore	Platanus occidentalis	NSL	Low	11.9	20.6	2.9	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	1	43
white ash	Fraxinus americana	WDL	Medium	15.5	17.7	1.1	Lg. inc.	Lg. inc.	Low	Rare	Fair	Fair			1	44
American basswood	Tilia americana	WSL	Medium	8.3	17.6	2.0	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	45
chinkapin oak	Quercus muehlenbergii	NSL	Medium	2.4	12.8	5.2	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	46
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	10.7	9.6	0.9	Lg. inc.	Lg. inc.	High	Rare	Good	Good			1	47

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Common Name	Scientific Name	Range	MR	%Cell	FIAsum	FIAiv	ChngCl45	ChngCl85	Adap	Abund	Capabil45	Capabil85	SHIFT45	SHIFT85	SSO	N
paulownia	Paulownia tomentosa	NSL	FIA	2.4	8.5	3.4	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	48
black willow	Salix nigra	NSH	Low	7.1	7.0	4.7	Sm. dec.	No change	Low	Rare	Very Poor	Very Poor			0	49
blackjack oak	Quercus marilandica	NSL	Medium	9.5	6.4	0.7	Lg. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	1	50
river birch	Betula nigra	NSL	Low	6	6.2	3.0	Sm. inc.	Lg. inc.	Medium	Rare	Fair	Good	Infill +	Infill ++	1	51
yellow birch	Betula alleghaniensis	NDL	High	3.6	6.0	1.6	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	52
American hornbeam; musclev	Carpinus caroliniana	WSL	Low	6	5.7	0.9	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			1	53
pitch pine	Pinus rigida	NSH	High	1.2	5.6	4.5	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	54
sand hickory	Carya pallida	NSL	FIA	1.2	4.6	3.7	Unknown	Unknown	NA	Rare	FIA Only	FIA Only			0	55
American holly	Ilex opaca	NSL	Medium	8.3	3.8	0.4	No change	No change	Medium	Rare	Poor	Poor		Infill +	1	56
serviceberry	Amelanchier spp.	NSL	Low	8.3	3.5	0.4	Lg. dec.	Very Lg. dec.	Medium	Rare	Very Poor	Lost			0	57
mountain or Fraser magnolia	Magnolia fraseri	NSL	Low	3.6	3.0	0.8	No change	No change	Low	Rare	Very Poor	Very Poor			0	58
swamp chestnut oak	Quercus michauxii	NSL	Low	1.2	2.6	2.1	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	59
bitternut hickory	Carya cordiformis	WSL	Low	3.6	2.5	0.7	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor			0	60
willow oak	Quercus phellos	NSL	Low	2.4	2.4	1.0	No change	Sm. inc.	Medium	Rare	Poor	Fair	Infill +	Infill +	2	61
ailanthus	Ailanthus altissima	NSL	FIA	2.4	2.1	0.9	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	62
cherrybark oak; swamp red o	Quercus pagoda	NSL	Medium	1.2	1.2	1.0	Sm. inc.	Lg. inc.	Medium	Rare	Fair	Good	Infill +		2	63
honeylocust	Gleditsia triacanthos	NSH	Low	1.2	1.0	0.8	Lg. inc.	Lg. inc.	High	Rare	Good	Good			2	64
longleaf pine	Pinus palustris	NSH	Medium	1.2	0.9	0.7	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	65
black maple	Acer nigrum	NSH	Low	1.2	0.6	0.5	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor			0	66
yellow buckeye	Aesculus flava	NSL	Low	2.4	0.6	0.2	Lg. dec.	Lg. dec.	Low	Rare	Very Poor	Very Poor			0	67
butternut	Juglans cinerea	NSLX	FIA	1.2	0.5	0.4	Unknown	Unknown	Low	Rare	FIA Only	FIA Only			0	68
cucumbertree	Magnolia acuminata	NSL	Low	1.2	0.5	0.4	Sm. inc.	No change	Medium	Rare	Fair	Poor	Infill +	Infill +	2	69
shellbark hickory	Carya laciniosa	NSL	Low	1.2	0.5	0.4	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	70
American chestnut	Castanea dentata	NSLX	FIA	1.2	0.2	0.2	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	71
bigleaf magnolia	Magnolia macrophylla	NSL	Low	1.2	0.2	0.2	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	72
ashe juniper	Juniperus ashei	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	73
slash pine	Pinus elliottii	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate ++	3	74
pond cypress	Taxodium ascendens	NSH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	75
striped maple	Acer pensylvanicum	NSL	Medium	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	76
mountain maple	Acer spicatum	NSL	Low	0	0	0	Unknown	Unknown	High	Absent	Unknown	Unknown			0	77
Ohio buckeye	Aesculus glabra	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	78
pawpaw	Asimina triloba	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	79
cittamwood/gum bumelia	Sideroxylon lanuginosum ssp.	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate ++	3	80
pecan	Carya illinoensis	NSH	Low	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat		Migrate +	3	81
black hickory	Carya texana	NDL	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	82
black ash	Fraxinus nigra	WSH	Medium	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat			3	83
blue ash	Fraxinus quadrangulata	NSL	Low	0	0	0	Unknown	Unknown	Low	Absent	Unknown	Unknown			0	84
Osage-orange	Maclura pomifera	NDH	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate +	3	85
southern magnolia	Magnolia grandiflora	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	86
sweetbay	Magnolia virginiana	NSL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	87
swamp tupelo	Nyssa biflora	NDH	Medium	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat			3	88
bigtooth aspen	Populus grandidentata	NSL	Medium	0	0	0	Unknown	Unknown	Medium	Modeled	Unknown	Unknown			0	89
pin cherry	Prunus pensylvanica	NSL	Low	0	0	0	Unknown	Unknown	Medium	Modeled	Unknown	Unknown			0	90
laurel oak	Quercus laurifolia	NDH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	91
overcup oak	Quercus lyrata	NSL	Medium	0	0	0	Unknown	Unknown	Low	Modeled	Unknown	Unknown			0	92
Shumard oak	Quercus shumardii	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Likely +	Likely +	3	93
live oak	Quercus virginiana	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate ++	3	94

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Common Name	Scientific Name	Range	MR	%Cell	FIAsum	FIaiv	ChngCl45	ChngCl85	Adap	Abund	Capabil45	Capabil85	SHIFT45	SHIFT85	SSO	N
bluejack oak	Quercus incana	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	95
cedar elm	Ulmus crassifolia	NDH	Medium	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat			3	96