

**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  
 8,300.0    3,204.6    247

**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	Medium	Low	FIA	RCP45	RCP85	RCP45	RCP85	
Ash	2			21	25	Increase		22	27	Very Good	11	13
Hickory	3			28	48	No Change		14	10	Good	13	14
Maple	3	Abundant	4	36	13	Decrease		18	17	Fair	4	6
Oak	11	Common	20	2		New		22	23	Poor	15	11
Pine	5	Rare	32			Unknown		11	10	Very Poor	10	9
Other	32	Absent	29	<b>87</b>	<b>86</b>			<b>87</b>	<b>87</b>	FIA Only	1	1
	<b>56</b>		<b>85</b>							Unknown	9	8
											<b>63</b>	<b>62</b>
											<b>18</b>	<b>25</b>

**Potential Changes in Climate Variables**

**Temperature (°F)**

Scenario	2009	2039	2069	2099	
Annual	59.7	61.5	63.6	63.6	
Average	59.7	61.9	64.3	67.0	
GFDL45	59.7	62.5	64.6	65.3	
GFDL85	59.7	62.5	65.8	69.3	
HAD45	59.7	61.9	64.8	66.2	
HAD85	59.7	62.2	66.4	70.3	
Growing Season	73.2	74.9	76.8	77.2	
May—Sep	73.2	75.1	77.7	81.2	
GFDL45	73.2	76.3	78.6	79.9	
GFDL85	73.2	76.4	80.2	84.2	
HAD45	73.2	76.3	78.9	80.5	
HAD85	73.2	76.2	82.2	85.9	
Coldest Month	39.6	42.1	42.9	42.9	
Average	39.6	42.2	43.2	44.4	
GFDL45	39.6	42.8	43.0	43.4	
GFDL85	39.6	41.4	42.5	42.9	
HAD45	39.6	39.6	41.5	41.9	
HAD85	39.6	40.8	41.9	43.5	
Warmest Month	77.9	79.9	80.8	80.7	
Average	77.9	80.1	81.6	83.3	
GFDL45	77.9	81.0	81.9	82.8	
GFDL85	77.9	81.3	83.2	85.3	
HAD45	77.9	81.8	83.6	84.2	
HAD85	77.9	82.2	86.1	87.9	

**Precipitation (in)**

Scenario	2009	2039	2069	2099	
Annual	54.6	57.4	60.9	61.0	
Total	54.6	57.8	60.7	67.7	
GFDL45	54.6	61.1	64.1	68.4	
GFDL85	54.6	60.5	65.2	66.2	
HAD45	54.6	53.6	58.2	60.1	
HAD85	54.6	60.5	54.4	58.4	
Growing Season	22.2	24.0	25.7	26.2	
May—Sep	22.2	23.7	24.2	27.2	
GFDL45	22.2	27.1	29.0	30.2	
GFDL85	22.2	26.1	29.7	30.5	
HAD45	22.2	21.9	22.6	23.0	
HAD85	22.2	25.0	19.3	20.9	

**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
yellow-poplar	Liriodendron tulipifera	WDH	High	90.4	1363.9	15.3	Lg. dec.	Lg. dec.	High	Abundant	Good	Good			1	1
loblolly pine	Pinus taeda	WDH	High	65.1	1205.9	19.3	Lg. inc.	Lg. inc.	Medium	Abundant	Very Good	Very Good			1	2
sweetgum	Liquidambar styraciflua	WDH	High	75.9	902.3	12.2	Sm. inc.	Sm. inc.	Medium	Abundant	Very Good	Very Good			1	3
white oak	Quercus alba	WDH	Medium	79.5	837.6	10.2	No change	Sm. dec.	High	Abundant	Very Good	Good			1	4
Virginia pine	Pinus virginiana	NDH	High	48.2	457.8	9.2	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	5
red maple	Acer rubrum	WDH	High	67.5	421.8	6.0	No change	Sm. inc.	High	Common	Good	Very Good			1	6
water oak	Quercus nigra	WDH	High	54.2	411.6	7.9	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	7
sourwood	Oxydendrum arboreum	NDL	High	61.4	400.1	6.3	Sm. dec.	Sm. dec.	High	Common	Fair	Fair			1	8
shortleaf pine	Pinus echinata	WDH	High	63.9	394.1	6.0	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	9
chestnut oak	Quercus prinus	NDH	High	30.1	347.0	11.1	No change	No change	High	Common	Good	Good			1	10
southern red oak	Quercus falcata	WDL	Medium	73.5	343.7	5.0	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	11
pignut hickory	Carya glabra	WDL	Medium	65.1	276.6	4.1	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor			0	12
black cherry	Prunus serotina	WDL	Medium	66.3	272.5	4.5	No change	Sm. inc.	Low	Common	Poor	Fair			1	13
scarlet oak	Quercus coccinea	WDL	Medium	44.6	248.4	5.4	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor			0	14
flowering dogwood	Cornus florida	WDL	Medium	66.3	179.9	2.6	No change	No change	Medium	Common	Fair	Fair			1	15
black oak	Quercus velutina	WDH	High	39.8	164.2	4.0	Sm. inc.	No change	Medium	Common	Good	Fair			1	16
blackgum	Nyssa sylvatica	WDL	Medium	62.7	137.4	2.3	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	17
post oak	Quercus stellata	WDH	High	44.6	120.5	2.9	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	18
northern red oak	Quercus rubra	WDH	Medium	30.1	114.8	3.7	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	19
eastern white pine	Pinus strobus	WDH	High	16.9	112.0	6.4	No change	Sm. dec.	Low	Common	Poor	Poor	Infill +	Infill +	0	20
mockernut hickory	Carya alba	WDL	Medium	45.8	99.9	2.1	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	21
green ash	Fraxinus pennsylvanica	WSH	Low	20.5	90.9	4.3	Sm. inc.	Lg. inc.	Medium	Common	Good	Very Good			1	22
American beech	Fagus grandifolia	WDH	High	39.8	79.9	1.9	Sm. inc.	Lg. inc.	Medium	Common	Good	Very Good			1	23
eastern redcedar	Juniperus virginiana	WDH	Medium	16.9	55.4	3.2	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	24
American hornbeam; muscley	Carpinus caroliniana	WSL	Low	12	46.3	3.7	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			1	25
black walnut	Juglans nigra	WDH	Low	4.8	45.6	9.1	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	26
winged elm	Ulmus alata	WDL	Medium	19.3	44.9	2.3	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			1	27
common persimmon	Diospyros virginiana	NSL	Low	22.9	40.0	2.1	Sm. inc.	Lg. inc.	High	Rare	Good	Good			1	28
blackjack oak	Quercus marilandica	NSL	Medium	6	38.9	6.2	Sm. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	1	29
sycamore	Platanus occidentalis	NSL	Low	6	37.2	6.0	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	1	30
boxelder	Acer negundo	WSH	Low	7.2	32.6	4.3	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor			1	31
river birch	Betula nigra	NSL	Low	8.4	24.5	2.8	No change	Sm. inc.	Medium	Rare	Poor	Fair			1	32
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	8.4	24.0	2.7	No change	Sm. inc.	High	Rare	Fair	Good			1	33
black locust	Robinia pseudoacacia	NDH	Low	10.8	18.3	1.6	No change	No change	Medium	Rare	Poor	Poor			1	34
American holly	Ilex opaca	NSL	Medium	14.5	18.0	1.2	Sm. inc.	Lg. inc.	Medium	Rare	Fair	Good			1	35
bitternut hickory	Carya cordiformis	WSL	Low	1.2	14.8	11.9	Lg. dec.	Sm. dec.	High	Rare	Poor	Poor		Infill +	2	36
Table Mountain pine	Pinus pungens	NSL	Low	3.6	13.2	3.5	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor	Infill +	Infill +	2	37
eastern hemlock	Tsuga canadensis	NSH	High	7.2	12.6	1.7	No change	No change	Low	Rare	Very Poor	Very Poor			2	38
sassafras	Sassafras albidum	WSL	Low	14.5	11.4	0.8	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			1	39
serviceberry	Amelanchier spp.	NSL	Low	10.8	10.5	0.9	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	40
eastern redbud	Cercis canadensis	NSL	Low	4.8	9.9	2.0	Sm. dec.	No change	Medium	Rare	Very Poor	Poor		Infill +	1	41
slippery elm	Ulmus rubra	WSL	Low	3.6	7.0	1.9	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	42
black willow	Salix nigra	NSH	Low	3.6	6.7	1.8	No change	Lg. inc.	Low	Rare	Very Poor	Fair		Infill +	1	43
florida maple	Acer barbatum	NSL	Low	4.8	5.6	1.1	Lg. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	1	44
sweet birch	Betula lenta	NDH	High	4.8	5.0	1.0	No change	No change	Low	Rare	Very Poor	Very Poor			2	45
paulownia	Paulownia tomentosa	NSL	FIA	2.4	3.8	1.5	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	46
white ash	Fraxinus americana	WDL	Medium	2.4	3.5	1.4	Sm. dec.	No change	Low	Rare	Very Poor	Very Poor			2	47

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

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Common Name	Scientific Name	Range	MR	%Cell	FIAsum	FIAiv	ChngCl45	ChngCl85	Adap	Abund	Capabil45	Capabil85	SHIFT45	SHIFT85	SSO	N
swamp chestnut oak	Quercus michauxii	NSL	Low	1.2	3.4	2.8	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor				0 48
red mulberry	Morus rubra	NSL	Low	4.8	3.3	0.7	No change	Lg. inc.	Medium	Rare	Poor	Good	Infill ++			1 49
hackberry	Celtis occidentalis	WDH	Medium	1.2	1.6	1.3	Very Lg. dec.	Very Lg. dec.	High	Rare	Lost	Lost				0 50
sugarberry	Celtis laevigata	NDH	Medium	1.2	0.9	0.7	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good				2 51
honeylocust	Gleditsia triacanthos	NSH	Low	1.2	0.7	0.5	Sm. dec.	Sm. inc.	High	Rare	Poor	Good				2 52
Nuttall oak	Quercus texana	NSH	Medium	1.2	0.5	0.4	Lg. dec.	Lg. dec.	High	Rare	Poor	Poor				0 53
American chestnut	Castanea dentata	NSLX	FIA	1.2	0.3	0.3	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only				0 54
mountain or Fraser magnolia	Magnolia fraseri	NSL	Low	1.2	0.3	0.3	Sm. inc.	No change	Low	Rare	Poor	Very Poor				0 55
yellow buckeye	Aesculus flava	NSL	Low	1.2	0.3	0.2	Lg. dec.	Sm. dec.	Low	Rare	Very Poor	Very Poor				0 56
ashe juniper	Juniperus ashei	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat				0 57
slash pine	Pinus elliottii	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate ++		3 58
longleaf pine	Pinus palustris	NSH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate ++		3 59
pitch pine	Pinus rigida	NSH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Likely +	Likely +		3 60
black maple	Acer nigrum	NSH	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat				0 61
striped maple	Acer pensylvanicum	NSL	Medium	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown				0 62
mountain maple	Acer spicatum	NSL	Low	0	0	0	Unknown	Unknown	High	Absent	Unknown	Unknown				0 63
pawpaw	Asimina triloba	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown				0 64
yellow birch	Betula alleghaniensis	NDL	High	0	0	0	Unknown	New Habitat	Medium	Absent	Unknown	New Habitat				3 65
cittamwood/gum bumelia	Sideroxylon lanuginosum ssp.	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat				3 66
pecan	Carya illinoensis	NSH	Low	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat	Likely +	Likely +		3 67
shellbark hickory	Carya laciniosa	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown				0 68
black hickory	Carya texana	NDL	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat				3 69
black ash	Fraxinus nigra	WSH	Medium	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat				3 70
silverbell	Halesia spp.	NSL	Low	0	0	0	New Habitat	Unknown	Medium	Absent	New Habitat	Unknown				3 71
Osage-orange	Maclura pomifera	NDH	Medium	0	0	0	Unknown	New Habitat	High	Absent	Unknown	New Habitat		Migrate +		3 72
cucumbertree	Magnolia acuminata	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Likely +	Likely +		3 73
southern magnolia	Magnolia grandiflora	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Likely +	Likely +		3 74
sweetbay	Magnolia virginiana	NSL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate ++	Migrate +		3 75
bigleaf magnolia	Magnolia macrophylla	NSL	Low	0	0	0	Unknown	Unknown	Medium	Modeled	Unknown	Unknown				0 76
swamp tupelo	Nyssa biflora	NDH	Medium	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat	Migrate ++	Migrate ++		3 77
cherrybark oak; swamp red o.	Quercus pagoda	NSL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +		3 78
laurel oak	Quercus laurifolia	NDH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Likely +	Likely +		3 79
pin oak	Quercus palustris	NSH	Low	0	0	0	Unknown	Unknown	Low	Absent	Unknown	Unknown				0 80
willow oak	Quercus phellos	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Likely +	Likely +		3 81
Shumard oak	Quercus shumardii	NSL	Low	0	0	0	Unknown	Unknown	High	Modeled	Unknown	Unknown				0 82
live oak	Quercus virginiana	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate ++	Migrate ++		3 83
bluejack oak	Quercus incana	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +		3 84
American basswood	Tilia americana	WSL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Likely +	Likely +		3 85
American elm	Ulmus americana	WDH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Likely +	Likely +		3 86
cedar elm	Ulmus crassifolia	NDH	Medium	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat				3 87