

**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  
 8,500.0    3,281.9    158

**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	4			High	17	23	Increase	20	24	Very Good	7	9	Likely	1	1
Hickory	5			Medium	27	43	No Change	14	9	Good	14	12	Infill	10	12
Maple	5	Abundant	2	Low	31	11	Decrease	23	24	Fair	9	10	Migrate	4	7
Oak	10	Common	26	FIA	5		New	13	14	Poor	14	14			
Pine	5	Rare	34				Unknown	10	9	Very Poor	9	8			
Other	33	Absent	17							FIA Only	2	2			
	<b>62</b>		<b>79</b>		<b>80</b>	<b>77</b>		<b>80</b>	<b>80</b>	Unknown	5	4			
											<b>60</b>	<b>59</b>			

**Potential Changes in Climate Variables**

**Temperature (°F)**

Scenario	2009	2039	2069	2099		
Annual	CCSM45	53.6	55.2	57.6	57.8	
Average	CCSM85	53.6	55.8	58.4	61.5	
	GFDL45	53.6	57.9	59.1	60.0	
	GFDL85	53.6	56.7	60.1	64.2	
	HAD45	53.6	56.3	59.9	61.2	
	HAD85	53.6	56.8	61.4	65.9	
Growing Season	CCSM45	70.0	71.6	73.8	74.4	
	CCSM85	70.0	72.3	75.0	78.9	
May—Sep	GFDL45	70.0	75.3	76.8	78.1	
	GFDL85	70.0	73.9	78.2	82.8	
	HAD45	70.0	73.3	76.7	78.6	
	HAD85	70.0	73.7	79.9	84.4	
Coldest Month	CCSM45	27.7	29.0	30.8	31.2	
Average	CCSM85	27.7	30.5	31.4	33.2	
	GFDL45	27.7	31.6	32.0	32.6	
	GFDL85	27.7	30.5	31.6	32.4	
	HAD45	27.7	28.7	31.3	31.4	
	HAD85	27.7	30.1	32.4	34.5	
Warmest Month	CCSM45	75.6	77.0	78.3	78.9	
Average	CCSM85	75.6	78.0	79.7	81.7	
	GFDL45	75.6	78.9	80.9	81.8	
	GFDL85	75.6	79.5	82.1	84.8	
	HAD45	75.6	79.4	82.3	83.4	
	HAD85	75.6	81.2	85.6	88.3	

**Precipitation (in)**

Scenario	2009	2039	2069	2099		
Annual	CCSM45	42.3	43.2	45.8	45.4	
Total	CCSM85	42.3	43.7	45.3	48.1	
	GFDL45	42.3	47.1	49.2	51.8	
	GFDL85	42.3	44.4	50.4	53.1	
	HAD45	42.3	44.5	45.7	45.0	
	HAD85	42.3	44.1	41.6	45.4	
Growing Season	CCSM45	19.2	19.2	19.9	19.7	
May—Sep	CCSM85	19.2	18.3	18.4	18.8	
	GFDL45	19.2	21.4	20.4	21.5	
	GFDL85	19.2	19.6	20.3	20.8	
	HAD45	19.2	19.9	17.7	18.6	
	HAD85	19.2	19.0	15.7	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	87.1	763.5	13.0	Sm. dec.	Lg. dec.	Low	Abundant	Fair	Poor			0	1
sugar maple	Acer saccharum	WDH	High	81.2	721.3	14.2	Sm. dec.	Sm. dec.	High	Abundant	Good	Good			1	2
black walnut	Juglans nigra	WDH	Low	78.8	405.8	8.8	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor			0	3
eastern redcedar	Juniperus virginiana	WDH	Medium	52.9	398.7	11.5	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	4
black locust	Robinia pseudoacacia	NDH	Low	63.5	320.1	7.9	Sm. dec.	No change	Medium	Common	Poor	Fair			1	5
red maple	Acer rubrum	WDH	High	22.4	252.1	15.3	Lg. dec.	Lg. dec.	High	Common	Fair	Fair			1	6
Osage-orange	Maclura pomifera	NDH	Medium	49.4	251.1	9.1	No change	Sm. inc.	High	Common	Good	Very Good			1	7
hackberry	Celtis occidentalis	WDH	Medium	68.2	235.5	5.6	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	8
black cherry	Prunus serotina	WDL	Medium	67.1	218.8	5.5	No change	Sm. dec.	Low	Common	Poor	Poor			0	9
American elm	Ulmus americana	WDH	Medium	65.9	181.6	5.1	Sm. inc.	Lg. inc.	Medium	Common	Good	Very Good			1	10
boxelder	Acer negundo	WSH	Low	56.5	178.8	6.9	No change	No change	High	Common	Good	Good			1	11
slippery elm	Ulmus rubra	WSL	Low	49.4	149.0	3.6	No change	Sm. inc.	Medium	Common	Fair	Good			1	12
Ohio buckeye	Aesculus glabra	NSL	Low	40	146.5	4.8	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	13
chinkapin oak	Quercus muehlenbergii	NSL	Medium	34.1	139.3	5.7	No change	No change	Medium	Common	Fair	Fair			1	14
green ash	Fraxinus pennsylvanica	WSH	Low	48.2	125.1	5.9	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	15
shagbark hickory	Carya ovata	WSL	Medium	30.6	105.0	5.1	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	16
bitternut hickory	Carya cordiformis	WSL	Low	32.9	91.9	4.1	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	17
eastern cottonwood	Populus deltoides	NSH	Low	16.5	90.3	9.8	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor			0	18
sycamore	Platanus occidentalis	NSL	Low	40	86.1	6.4	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	19
shellbark hickory	Carya laciniosa	NSL	Low	5.9	75.9	11.7	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor	Infill +	Infill +	2	20
white oak	Quercus alba	WDH	Medium	21.2	73.5	5.1	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	21
white mulberry	Morus alba	NSL	FIA	27.1	71.8	11.3	Unknown	Unknown	NA	Common	NNIS	NNIS			0	22
yellow buckeye	Aesculus flava	NSL	Low	5.9	67.5	10.4	Lg. dec.	Lg. dec.	Low	Common	Very Poor	Very Poor			0	23
northern red oak	Quercus rubra	WDH	Medium	29.4	66.4	3.5	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	24
yellow-poplar	Liriodendron tulipifera	WDH	High	25.9	64.9	4.6	No change	Sm. dec.	High	Common	Good	Fair			1	25
honeylocust	Gleditsia triacanthos	NSH	Low	41.2	64.6	3.2	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	26
pin oak	Quercus palustris	NSH	Low	5.9	63.1	9.7	No change	No change	Low	Common	Poor	Poor	Infill +	Infill +	0	27
sassafras	Sassafras albidum	WSL	Low	17.6	59.9	3.9	No change	Sm. dec.	Medium	Common	Fair	Poor			1	28
eastern redbud	Cercis canadensis	NSL	Low	41.2	48.0	2.2	Sm. inc.	Sm. inc.	Medium	Rare	Fair	Fair			1	29
blue ash	Fraxinus quadrangulata	NSL	Low	25.9	45.3	2.8	Lg. dec.	Lg. dec.	Low	Rare	Very Poor	Very Poor			0	30
pignut hickory	Carya glabra	WDL	Medium	23.5	41.7	3.5	Sm. inc.	No change	Medium	Rare	Fair	Poor			1	31
mockernut hickory	Carya alba	WDL	Medium	17.6	39.3	2.8	Sm. inc.	Lg. inc.	High	Rare	Good	Good			1	32
black maple	Acer nigrum	NSH	Low	2.4	36.2	14.0	Lg. dec.	Lg. dec.	High	Rare	Poor	Poor			0	33
black oak	Quercus velutina	WDH	High	11.8	32.0	3.8	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	1	34
Norway spruce	Picea abies	NSH	FIA	1.2	30.5	23.5	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	35
American basswood	Tilia americana	WSL	Medium	23.5	26.9	3.1	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	36
shingle oak	Quercus imbricaria	NDH	Medium	5.9	25.7	4.0	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	1	37
American beech	Fagus grandifolia	WDH	High	10.6	25.5	3.3	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			2	38
Shumard oak	Quercus shumardii	NSL	Low	4.7	23.6	4.6	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	1	39
pawpaw	Asimina triloba	NSL	Low	16.5	19.7	1.4	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	40
eastern white pine	Pinus strobus	WDH	High	3.5	19.0	4.9	Very Lg. dec.	Very Lg. dec.	Low	Rare	Lost	Lost			0	41
blackgum	Nyssa sylvatica	WDL	Medium	3.5	16.9	4.4	Sm. dec.	No change	High	Rare	Poor	Fair	Infill +	Infill +	1	42
ailanthus	Ailanthus altissima	NSL	FIA	14.1	14.6	3.5	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	43
scarlet oak	Quercus coccinea	WDL	Medium	12.9	13.0	2.4	Sm. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	44
sweetgum	Liquidambar styraciflua	WDH	High	3.5	11.4	2.9	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	2	45
flowering dogwood	Cornus florida	WDL	Medium	18.8	9.6	0.8	Sm. inc.	No change	Medium	Rare	Fair	Poor			1	46
bur oak	Quercus macrocarpa	NDH	Medium	3.5	7.8	2.0	Lg. dec.	Sm. dec.	High	Rare	Poor	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
silver maple	Acer saccharinum	NSH	Low	8.2	6.6	1.4	Sm. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	2	48
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	8.2	6.5	1.4	Sm. inc.	Sm. inc.	High	Rare	Good	Good	Infill ++	Infill ++	1	49
Kentucky coffeetree	Gymnocladus dioicus	NSLX	FIA	1.2	6.4	5.0	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	50
Virginia pine	Pinus virginiana	NDH	High	2.4	4.7	1.8	Very Lg. dec.	Very Lg. dec.	Medium	Rare	Lost	Lost			0	51
black willow	Salix nigra	NSH	Low	5.9	4.2	2.2	No change	Sm. inc.	Low	Rare	Very Poor	Poor		Infill +	2	52
red mulberry	Morus rubra	NSL	Low	2.4	2.8	1.1	No change	Sm. inc.	Medium	Rare	Poor	Fair	Infill +	Infill +	2	53
American hornbeam; musclev	Carpinus caroliniana	WSL	Low	8.2	2.7	0.6	No change	Sm. inc.	Medium	Rare	Poor	Fair			1	54
post oak	Quercus stellata	WDH	High	1.2	2.0	1.6	Lg. inc.	Lg. inc.	High	Rare	Good	Good			2	55
shortleaf pine	Pinus echinata	WDH	High	1.2	1.5	1.2	No change	Sm. inc.	Medium	Rare	Poor	Fair		Infill +	2	56
red pine	Pinus resinosa	NSH	Medium	1.2	1.5	1.2	Very Lg. dec.	Very Lg. dec.	Low	Rare	Lost	Lost			0	57
northern catalpa	Catalpa speciosa	NSHX	FIA	1.2	1.3	1.0	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	58
sugarberry	Celtis laevigata	NDH	Medium	1.2	1.2	0.9	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	59
black ash	Fraxinus nigra	WSH	Medium	1.2	0.8	0.6	Lg. dec.	Lg. dec.	Low	Rare	Very Poor	Very Poor			0	60
sourwood	Oxydendrum arboreum	NDL	High	1.2	0.7	0.5	Very Lg. dec.	Very Lg. dec.	High	Rare	Lost	Lost			0	61
pitch pine	Pinus rigida	NSH	High	1.2	0.7	0.5	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	62
ashe juniper	Juniperus ashei	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	63
loblolly pine	Pinus taeda	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate ++	3	64
striped maple	Acer pensylvanicum	NSL	Medium	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	65
serviceberry	Amelanchier spp.	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	66
cittamwood/gum bumelia	Sideroxylon lanuginosum ssp.	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			3	67
pecan	Carya illinoensis	NSH	Low	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat		Migrate ++	3	68
black hickory	Carya texana	NDL	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	69
common persimmon	Diospyros virginiana	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Likely +	Likely +	3	70
cucumbertree	Magnolia acuminata	NSL	Low	0	0	0	Unknown	Unknown	Medium	Modeled	Unknown	Unknown			0	71
bigleaf magnolia	Magnolia macrophylla	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	72
pin cherry	Prunus pensylvanica	NSL	Low	0	0	0	Unknown	New Habitat	Medium	Absent	Unknown	New Habitat			3	73
southern red oak	Quercus falcata	WDL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	74
cherrybark oak; swamp red o.	Quercus pagoda	NSL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	75
blackjack oak	Quercus marilandica	NSL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	76
water oak	Quercus nigra	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate ++	3	77
live oak	Quercus virginiana	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	78
winged elm	Ulmus alata	WDL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate ++	Migrate ++	3	79
cedar elm	Ulmus crassifolia	NDH	Medium	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat			0	80