

**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  
 8,060.3    3,112.1    230

**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	21	Increase	22	29	Very Good	7	11	Likely	0	0
Hickory	4		Medium	33	No Change	13	10	Good	17	17	Infill	13	13
Maple	3	Abundant	Low	30	Decrease	28	24	Fair	12	14	Migrate	7	9
Oak	14	Common	FIA	2	New	15	17	Poor	13	8		<b>20</b>	<b>22</b>
Pine	6	Rare			Unknown	8	6	Very Poor	11	10			
Other	36	Absent						FIA Only	0	0			
	<b>65</b>	<b>85</b>		<b>86</b>	<b>84</b>		<b>86</b>	<b>86</b>	Unknown	6	4		
									<b>66</b>	<b>64</b>			

**Potential Changes in Climate Variables**

**Temperature (°F)**

Scenario	2009	2039	2069	2099	
Annual	56.4	58.1	60.3	60.5	
Average	56.4	58.5	61.0	64.0	
GFDL45	56.4	59.0	61.8	62.8	
GFDL85	56.4	59.6	62.9	66.8	
HAD45	56.4	58.8	62.1	63.4	
HAD85	56.4	59.0	62.9	67.3	
Growing Season	71.7	73.5	75.4	75.9	
May—Sep	71.7	73.8	76.4	80.2	
GFDL45	71.7	74.7	77.9	79.5	
GFDL85	71.7	75.6	79.4	83.7	
HAD45	71.7	74.5	77.6	79.3	
HAD85	71.7	74.5	79.2	84.0	
Coldest Month	33.4	35.5	36.7	37.1	
Average	33.4	36.0	37.2	37.8	
GFDL45	33.4	36.7	37.2	37.8	
GFDL85	33.4	36.0	37.0	38.4	
HAD45	33.4	34.9	36.8	37.0	
HAD85	33.4	35.2	36.8	38.6	
Warmest Month	77.4	79.5	80.5	80.7	
Average	77.4	79.6	81.6	83.0	
GFDL45	77.4	80.5	82.1	83.4	
GFDL85	77.4	81.8	83.9	86.5	
HAD45	77.4	80.6	82.6	83.5	
HAD85	77.4	80.9	83.9	87.1	

**Precipitation (in)**

Scenario	2009	2039	2069	2099	
Annual	42.8	46.8	50.1	49.7	
Total	42.8	47.6	49.1	56.4	
GFDL45	42.8	47.8	51.1	52.1	
GFDL85	42.8	44.8	51.2	52.4	
HAD45	42.8	45.5	46.7	45.2	
HAD85	42.8	49.3	45.0	47.9	
Growing Season	19.4	23.2	24.8	24.7	
May—Sep	19.4	23.0	23.7	27.4	
GFDL45	19.4	20.8	22.6	23.1	
GFDL85	19.4	19.3	22.4	22.9	
HAD45	19.4	21.7	20.5	18.9	
HAD85	19.4	22.0	19.1	19.9	

**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	83.1	1346.6	14.4	Lg. dec.	Lg. dec.	High	Abundant	Good	Good			1	1
loblolly pine	Pinus taeda	WDH	High	46	1234.7	24.1	Lg. inc.	Lg. inc.	Medium	Abundant	Very Good	Very Good			1	2
white oak	Quercus alba	WDH	Medium	79.5	1176.3	13.8	Sm. dec.	Lg. dec.	High	Abundant	Good	Good			1	3
Virginia pine	Pinus virginiana	NDH	High	78.1	904.0	10.6	Lg. dec.	Lg. dec.	Medium	Abundant	Fair	Fair			0	4
sweetgum	Liquidambar styraciflua	WDH	High	62.5	760.1	10.4	Sm. inc.	Sm. inc.	Medium	Abundant	Very Good	Very Good			1	5
red maple	Acer rubrum	WDH	High	80.5	705.6	7.9	No change	No change	High	Abundant	Very Good	Very Good			1	6
southern red oak	Quercus falcata	WDL	Medium	61.1	506.5	7.0	No change	Sm. inc.	High	Abundant	Very Good	Very Good			1	7
American beech	Fagus grandifolia	WDH	High	59.6	425.1	6.0	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	8
pignut hickory	Carya glabra	WDL	Medium	69.7	327.2	4.5	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	9
blackgum	Nyssa sylvatica	WDL	Medium	72.1	277.1	3.2	No change	Sm. inc.	High	Common	Good	Very Good			1	10
eastern redcedar	Juniperus virginiana	WDH	Medium	59.5	267.7	4.3	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	11
black oak	Quercus velutina	WDH	High	55.9	256.9	4.1	No change	No change	Medium	Common	Fair	Fair			1	12
American holly	Ilex opaca	NSL	Medium	51.8	243.2	3.6	Sm. dec.	No change	Medium	Common	Poor	Fair			1	13
mockernut hickory	Carya alba	WDL	Medium	60.6	219.3	3.4	No change	Sm. inc.	High	Common	Good	Very Good			1	14
chestnut oak	Quercus prinus	NDH	High	23	198.1	7.3	Lg. dec.	Lg. dec.	High	Common	Fair	Fair			1	15
northern red oak	Quercus rubra	WDH	Medium	46.2	161.7	3.3	Sm. dec.	Sm. dec.	High	Common	Fair	Fair			1	16
scarlet oak	Quercus coccinea	WDL	Medium	45.9	156.3	3.2	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	17
black cherry	Prunus serotina	WDL	Medium	40.2	110.4	2.6	Lg. inc.	Lg. inc.	Low	Common	Good	Good			1	18
willow oak	Quercus phellos	NSL	Low	32.7	104.3	2.8	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	19
black locust	Robinia pseudoacacia	NDH	Low	16.6	103.9	5.7	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	20
post oak	Quercus stellata	WDH	High	25.3	102.7	3.7	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good	Infill ++	Infill ++	1	21
green ash	Fraxinus pennsylvanica	WSL	Low	17.4	98.6	5.6	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	22
American hornbeam; muscle	Carpinus caroliniana	WSL	Low	33.5	91.8	2.6	Sm. inc.	Lg. inc.	Medium	Common	Good	Very Good			1	23
white ash	Fraxinus americana	WDL	Medium	23.2	83.2	3.4	No change	Sm. inc.	Low	Common	Poor	Fair			1	24
black walnut	Juglans nigra	WDH	Low	9.9	58.1	5.8	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor			0	25
bigtooth aspen	Populus grandidentata	NSL	Medium	18.6	55.2	2.9	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	26
river birch	Betula nigra	NSL	Low	19.8	51.0	2.5	Sm. inc.	Lg. inc.	Medium	Common	Good	Very Good			1	27
American elm	Ulmus americana	WDH	Medium	17.4	49.0	2.8	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	1	28
flowering dogwood	Cornus florida	WDL	Medium	40.9	48.1	1.1	Sm. inc.	Sm. inc.	Medium	Rare	Fair	Fair			1	29
eastern redbud	Cercis canadensis	NSL	Low	6.2	47.2	7.5	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	30
pin oak	Quercus palustris	NSH	Low	7.4	43.6	5.8	Sm. dec.	Sm. dec.	Low	Rare	Very Poor	Very Poor			0	31
hackberry	Celtis occidentalis	WDH	Medium	9.7	38.4	3.8	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	2	32
sycamore	Platanus occidentalis	NSL	Low	9.9	31.2	3.1	Sm. inc.	Sm. inc.	Medium	Rare	Fair	Fair	Infill +	Infill +	1	33
bitternut hickory	Carya cordiformis	WSL	Low	7.4	28.3	3.8	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	2	34
sassafras	Sassafras albidum	WSL	Low	15.1	25.6	1.4	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	35
boxelder	Acer negundo	WSL	Low	3.7	25.0	6.6	Sm. dec.	No change	High	Rare	Poor	Fair	Infill +	Infill +	1	36
shortleaf pine	Pinus echinata	WDH	High	14.9	21.2	1.4	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	1	37
ailanthus	Ailanthus altissima	NSL	FIA	6.2	19.2	3.1	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	38
cherrybark oak; swamp red o	Quercus pagoda	NSL	Medium	4	18.9	2.1	Sm. inc.	Lg. inc.	Medium	Rare	Fair	Good	Infill +	Infill ++	2	39
common persimmon	Diospyros virginiana	NSL	Low	14.1	17.8	1.1	No change	Lg. inc.	High	Rare	Fair	Good			1	40
eastern white pine	Pinus strobus	WDH	High	3.7	14.7	3.9	Lg. dec.	Very Lg. dec.	Low	Rare	Very Poor	Lost			0	41
slippery elm	Ulmus rubra	WSL	Low	7.4	12.3	1.6	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	42
pin cherry	Prunus pennsylvanica	NSL	Low	1.2	9.3	7.4	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	43
sourwood	Oxydendrum arboreum	NDL	High	2.5	8.6	3.4	Sm. inc.	No change	High	Rare	Good	Fair	Infill ++	Infill +	2	44
shagbark hickory	Carya ovata	WSL	Medium	5	6.6	1.3	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	45
paulownia	Paulownia tomentosa	NSL	FIA	4.6	6.2	1.1	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	46
red mulberry	Morus rubra	NSL	Low	2.5	6.2	2.5	Sm. dec.	Sm. dec.	Medium	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 tupelo	Nyssa biflora	NDH	Medium	2.5	6.1	2.5	Lg. inc.	Lg. inc.	Low	Rare	Fair	Fair	Infill +	Infill +	2	48
serviceberry	Amelanchier spp.	NSL	Low	5	6.1	1.2	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	49
pawpaw	Asimina triloba	NSL	Low	4.6	5.7	0.9	Lg. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	50
water oak	Quercus nigra	WDH	High	2.5	4.1	1.6	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	51
sweetbay	Magnolia virginiana	NSL	Medium	2.5	3.1	1.3	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	52
honeylocust	Gleditsia triacanthos	NSH	Low	2.5	2.9	1.2	Lg. dec.	Sm. inc.	High	Rare	Poor	Good			2	53
blackjack oak	Quercus marilandica	NSL	Medium	2.5	2.8	1.1	No change	Lg. inc.	High	Rare	Fair	Good			2	54
swamp chestnut oak	Quercus michauxii	NSL	Low	2.5	2.7	1.1	No change	Lg. inc.	Medium	Rare	Poor	Good	Infill +		2	55
winged elm	Ulmus alata	WDL	Medium	3.7	1.8	0.5	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	56
Osage-orange	Maclura pomifera	NDH	Medium	1.2	1.6	1.3	Very Lg. dec.	No change	High	Rare	Lost	Fair		Infill +	2	57
cucumbertree	Magnolia acuminata	NSL	Low	1.2	1.6	1.3	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	58
sugar maple	Acer saccharum	WDH	High	1.2	1.5	1.2	Lg. inc.	Lg. inc.	High	Rare	Good	Good			2	59
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	1.2	1.4	1.1	Lg. inc.	Lg. inc.	High	Rare	Good	Good			2	60
pond pine	Pinus serotina	NSH	Medium	1.2	1.3	1.0	Very Lg. dec.	Very Lg. dec.	Low	Rare	Lost	Lost			0	61
sweet birch	Betula lenta	NDH	High	1.2	1.2	1.0	Lg. dec.	Lg. dec.	Low	Rare	Very Poor	Very Poor			0	62
quaking aspen	Populus tremuloides	WDH	High	1.2	1.2	0.9	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	63
pitch pine	Pinus rigida	NSH	High	1.2	0.7	0.6	Very Lg. dec.	Very Lg. dec.	Medium	Rare	Lost	Lost			0	64
laurel oak	Quercus laurifolia	NDH	Medium	1.2	0.7	0.6	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	65
slash pine	Pinus elliotii	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate ++	3	66
longleaf pine	Pinus palustris	NSH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	67
bald cypress	Taxodium distichum	NSH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	68
yellow buckeye	Aesculus flava	NSL	Low	0	0	0	Unknown	Unknown	Low	Absent	Unknown	Unknown			0	69
yellow birch	Betula alleghaniensis	NDL	High	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	70
cittamwood/gum bumelia	Sideroxylon lanuginosum ssp.	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			0	71
water hickory	Carya aquatica	NSL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	72
pecan	Carya illinoensis	NSH	Low	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat		Migrate +	3	73
shellbark hickory	Carya laciniosa	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	74
black hickory	Carya texana	NDL	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	75
sugarberry	Celtis laevigata	NDH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	76
black ash	Fraxinus nigra	WSH	Medium	0	0	0	Unknown	New Habitat	Low	Absent	Unknown	New Habitat			3	77
loblolly-bay	Gordonia lasianthus	NSH	Medium	0	0	0	Unknown	Unknown	Medium	Modeled	Unknown	Unknown			0	78
water tupelo	Nyssa aquatica	NSH	Medium	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	79
redbay	Persea borbonia	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +		3	80
water elm	Planera aquatica	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	81
overcup oak	Quercus lyrata	NSL	Medium	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	82
live oak	Quercus virginiana	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	83
bluejack oak	Quercus incana	NSL	Low	0	0	0	Unknown	New Habitat	Medium	Absent	Unknown	New Habitat			3	84
black willow	Salix nigra	NSH	Low	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	85
cedar elm	Ulmus crassifolia	NDH	Medium	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat			0	86