

**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  
 8,212.6    3,170.9    132

**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	3			High	18	20	Increase	10	11	Very Good	3	2	Likely	0	0
Hickory	3			Medium	29	38	No Change	18	14	Good	11	12	Infill	26	26
Maple	4	Abundant	3	Low	19	10	Decrease	21	24	Fair	11	10	Migrate	1	3
Oak	9	Common	22	FIA	7		New	14	15	Poor	11	11			
Pine	4	Rare	31				Unknown	10	9	Very Poor	12	13			
Other	33	Absent	16							FIA Only	2	2			
	<b>56</b>		<b>72</b>		<b>73</b>	<b>68</b>		<b>73</b>	<b>73</b>	Unknown	3	2			
											<b>53</b>	<b>52</b>			

**Potential Changes in Climate Variables**

**Temperature (°F)**

	Scenario	2009	2039	2069	2099	
Annual Average	CCSM45	47.7	49.6	52.5	52.5	
	CCSM85	47.7	50.3	53.2	56.4	
	GFDL45	47.7	51.0	53.3	54.4	
	GFDL85	47.7	50.9	54.4	58.8	
	HAD45	47.7	51.0	54.3	56.2	
	HAD85	47.7	51.2	55.7	61.1	
Growing Season (May—Sep)	CCSM45	65.1	66.9	69.3	69.6	
	CCSM85	65.1	67.6	70.1	74.1	
	GFDL45	65.1	69.3	72.1	73.8	
	GFDL85	65.1	69.2	73.4	78.6	
	HAD45	65.1	68.8	71.3	73.7	
	HAD85	65.1	68.4	73.5	79.2	
Coldest Month (Average)	CCSM45	21.5	23.2	26.0	25.8	
	CCSM85	21.5	24.2	26.4	28.5	
	GFDL45	21.5	24.0	25.4	25.7	
	GFDL85	21.5	24.8	26.0	28.0	
	HAD45	21.5	23.0	26.7	26.8	
	HAD85	21.5	25.2	28.0	31.6	
Warmest Month (Average)	CCSM45	71.2	73.4	74.9	75.3	
	CCSM85	71.2	74.6	76.2	78.3	
	GFDL45	71.2	74.6	76.3	77.4	
	GFDL85	71.2	75.5	77.5	80.5	
	HAD45	71.2	75.5	77.0	78.7	
	HAD85	71.2	76.0	79.2	83.2	

**Precipitation (in)**

	Scenario	2009	2039	2069	2099	
Annual Total	CCSM45	36.6	35.8	35.2	36.4	
	CCSM85	36.6	36.7	36.5	37.2	
	GFDL45	36.6	39.1	43.2	43.2	
	GFDL85	36.6	40.2	44.5	46.0	
	HAD45	36.6	37.6	39.7	39.2	
	HAD85	36.6	39.5	37.2	40.8	
Growing Season (May—Sep)	CCSM45	17.7	17.8	17.3	17.5	
	CCSM85	17.7	17.6	17.6	16.7	
	GFDL45	17.7	18.2	20.6	20.7	
	GFDL85	17.7	19.6	20.4	21.1	
	HAD45	17.7	17.1	16.3	16.9	
	HAD85	17.7	17.7	14.3	15.5	

**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
red maple	Acer rubrum	WDH	High	61.4	943.6	17.1	Sm. dec.	Sm. dec.	High	Abundant	Good	Good	Infill ++	Infill ++	1	1
black cherry	Prunus serotina	WDL	Medium	57.2	766.0	15.1	No change	Sm. dec.	Low	Abundant	Fair	Fair	Infill +	Infill +	0	2
black oak	Quercus velutina	WDH	High	26.8	530.3	19.2	No change	No change	Medium	Abundant	Good	Good	Infill ++	Infill ++	1	3
white oak	Quercus alba	WDH	Medium	32.9	484.7	16.5	No change	Sm. dec.	High	Common	Good	Fair	Infill ++	Infill +	1	4
silver maple	Acer saccharinum	NSH	Low	24.4	442.3	21.1	No change	No change	High	Common	Good	Good	Infill ++	Infill ++	1	5
northern red oak	Quercus rubra	WDH	Medium	44.6	366.0	7.8	No change	Sm. dec.	High	Common	Good	Fair	Infill ++	Infill +	1	6
sugar maple	Acer saccharum	WDH	High	31.7	363.3	13.0	No change	No change	High	Common	Good	Good	Infill ++	Infill ++	2	7
green ash	Fraxinus pennsylvanica	WDH	Low	41.4	356.8	12.4	Sm. inc.	Sm. inc.	Medium	Common	Good	Good	Infill ++	Infill ++	1	8
American elm	Ulmus americana	WDH	Medium	52.4	316.5	7.5	Sm. inc.	Sm. inc.	Medium	Common	Good	Good	Infill ++	Infill ++	1	9
quaking aspen	Populus tremuloides	WDH	High	24.4	310.4	12.4	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor	Infill +	Infill +	0	10
eastern white pine	Pinus strobus	WDH	High	38.5	290.3	7.8	Lg. dec.	Lg. dec.	Low	Common	Very Poor	Very Poor			2	11
red pine	Pinus resinosa	NSH	Medium	11.1	288.7	21.2	Lg. dec.	Lg. dec.	Low	Common	Very Poor	Very Poor			2	12
Scots pine	Pinus sylvestris	NSH	FIA	21.9	285.9	19.5	Unknown	Unknown	NA	Common	NNIS	NNIS			0	13
bigtooth aspen	Populus grandidentata	NSL	Medium	27.4	232.7	9.6	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor	Infill +		0	14
white ash	Fraxinus americana	WDL	Medium	30.4	218.5	8.3	No change	No change	Low	Common	Poor	Poor	Infill +	Infill +	0	15
American beech	Fagus grandifolia	WDH	High	19	138.9	5.7	No change	Sm. dec.	Medium	Common	Fair	Poor			0	16
northern pin oak	Quercus ellipsoidalis	NSH	Medium	13.4	121.8	8.8	Lg. dec.	Lg. dec.	High	Common	Fair	Fair	Infill +	Infill +	2	17
black locust	Robinia pseudoacacia	NDH	Low	6.1	113.2	18.1	No change	No change	Medium	Common	Fair	Fair	Infill +	Infill +	2	18
black ash	Fraxinus nigra	WSH	Medium	13.4	110.8	8.0	Lg. dec.	Lg. dec.	Low	Common	Very Poor	Very Poor			0	19
black willow	Salix nigra	NSH	Low	7.3	87.4	11.6	Sm. dec.	No change	Low	Common	Poor	Poor		Infill +	2	20
jack pine	Pinus banksiana	NSH	Medium	8.7	81.3	4.6	Sm. dec.	Sm. dec.	High	Common	Fair	Fair			0	21
eastern hemlock	Tsuga canadensis	NSH	High	6.1	79.2	12.6	Sm. dec.	Lg. dec.	Low	Common	Poor	Very Poor			0	22
American basswood	Tilia americana	WSL	Medium	17	69.4	5.2	Lg. inc.	Sm. inc.	Medium	Common	Very Good	Good	Infill ++	Infill ++	1	23
eastern cottonwood	Populus deltoides	NSH	Low	12.2	68.6	14.0	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good	Infill ++	Infill ++	2	24
boxelder	Acer negundo	WSH	Low	13.4	61.9	9.1	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good	Infill ++	Infill ++	2	25
black walnut	Juglans nigra	WDH	Low	4.9	49.3	9.8	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	26
shagbark hickory	Carya ovata	WSL	Medium	8.5	43.9	5.0	No change	No change	Medium	Rare	Poor	Poor	Infill +		2	27
sassafras	Sassafras albidum	WSL	Low	28	39.2	1.9	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	1	28
bitternut hickory	Carya cordiformis	WSL	Low	6.1	34.6	5.5	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	2	29
serviceberry	Amelanchier spp.	NSL	Low	11	29.2	2.6	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	30
Norway spruce	Picea abies	NSH	FIA	1.2	28.2	22.5	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	31
swamp white oak	Quercus bicolor	NSL	Low	8.5	27.6	3.2	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	32
yellow birch	Betula alleghaniensis	NDL	High	7.3	27.4	3.6	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	33
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	17	25.6	2.0	Lg. dec.	Lg. dec.	High	Rare	Poor	Poor	Infill +		1	34
white spruce	Picea glauca	NSL	Medium	2.4	25.6	10.2	Very Lg. dec.	Very Lg. dec.	Medium	Rare	Lost	Lost			0	35
pignut hickory	Carya glabra	WDL	Medium	2.4	23.8	9.5	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	36
paper birch	Betula papyrifera	WDH	High	7.3	22.9	3.0	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	37
slippery elm	Ulmus rubra	WSL	Low	6.1	19.7	3.2	No change	No change	Medium	Rare	Poor	Poor		Infill +	2	38
hackberry	Celtis occidentalis	WDH	Medium	2.4	17.7	7.0	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	2	39
American hornbeam; musclev	Carpinus caroliniana	WSL	Low	9.7	17.5	1.7	Sm. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	40
Siberian elm	Ulmus pumila	NDH	FIA	2.4	14.1	5.6	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	41
blackgum	Nyssa sylvatica	WDL	Medium	7.3	13.0	6.5	No change	No change	High	Rare	Fair	Fair		Infill +	2	42
yellow-poplar	Liriodendron tulipifera	WDH	High	2.4	11.9	4.8	Lg. inc.	Sm. inc.	High	Rare	Good	Good			2	43
scarlet oak	Quercus coccinea	WDL	Medium	1.2	10.4	8.3	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	44
tamarack (native)	Larix laricina	NSH	High	2.4	9.2	3.7	Sm. dec.	Sm. dec.	Low	Rare	Very Poor	Very Poor			0	45
northern white-cedar	Thuja occidentalis	WSH	High	1.2	5.2	4.1	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	46
pin oak	Quercus palustris	NSH	Low	1.2	4.0	3.2	Lg. inc.	Lg. inc.	Low	Rare	Fair	Fair	Infill +	Infill +	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		
flowering dogwood	Cornus florida	WDL	Medium	3.7	3.9	1.1	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor				0	48	
sycamore	Platanus occidentalis	NSL	Low	1.2	3.8	3.0	Sm. inc.	Lg. inc.	Medium	Rare	Fair	Good					2	49
peachleaf willow	Salix amygdaloides	NSLX	FIA	1.2	3.7	3.0	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only					0	50
bur oak	Quercus macrocarpa	NDH	Medium	2.4	2.5	1.0	No change	Lg. inc.	High	Rare	Fair	Good					2	51
eastern redcedar	Juniperus virginiana	WDH	Medium	2.4	2.4	1.0	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good					2	52
white mulberry	Morus alba	NSL	FIA	1.2	2.1	1.7	Unknown	Unknown	NA	Rare	NNIS	NNIS					0	53
ailanthus	Ailanthus altissima	NSL	FIA	4.9	1.4	4.4	Unknown	Unknown	NA	Rare	NNIS	NNIS					0	54
chokecherry	Prunus virginiana	NSLX	FIA	2.4	1.0	0.4	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only					0	55
chinkapin oak	Quercus muehlenbergii	NSL	Medium	4.9	0.4	1.3	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor					0	56
shortleaf pine	Pinus echinata	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat					3	57
loblolly pine	Pinus taeda	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat					3	58
Virginia pine	Pinus virginiana	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat					3	59
black hickory	Carya texana	NDL	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat					3	60
mockernut hickory	Carya alba	WDL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate +			3	61
sugarberry	Celtis laevigata	NDH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat					0	62
common persimmon	Diospyros virginiana	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate +			3	63
sweetgum	Liquidambar styraciflua	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat					3	64
Osage-orange	Maclura pomifera	NDH	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate +			3	65
red mulberry	Morus rubra	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat					3	66
balsam poplar	Populus balsamifera	NSH	Medium	0	0	0	Unknown	Unknown	Medium	Modeled	Unknown	Unknown					0	67
southern red oak	Quercus falcata	WDL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat					0	68
laurel oak	Quercus laurifolia	NDH	Medium	0	0	0	Unknown	New Habitat	Medium	Absent	Unknown	New Habitat					0	69
blackjack oak	Quercus marilandica	NSL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat					0	70
post oak	Quercus stellata	WDH	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat					3	71
American mountain-ash	Sorbus americana	NSL	Low	0	0	0	Unknown	Unknown	Low	Absent	Unknown	Unknown					0	72
winged elm	Ulmus alata	WDL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat					3	73