

**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 8,059.4 3,111.7 171

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	Abundant 4 Common 17 Rare 28 Absent 27 76	High	23	19	Increase	12	14	Very Good	1	4	Likely	1	1
Hickory	3		Medium	26	42	No Change	9	8	Good	12	10	Infill	10	10
Maple	5		Low	25	15	Decrease	24	23	Fair	9	7	Migrate	8	16
Oak	4		FIA	4		New	24	25	Poor	10	11		19	27
Pine	3					Unknown	9	8	Very Poor	11	11			
Other	31								FIA Only	2	2			
	49			78	76		78	78	Unknown	5	4			
									50	49				

Potential Changes in Climate Variables

Temperature (°F)

Scenario	2009	2039	2069	2099		
Annual	CCSM45	46.6	48.5	51.1	51.1	
Average	CCSM85	46.6	49.0	51.7	54.9	
	GFDL45	46.6	50.3	53.0	54.3	
	GFDL85	46.6	50.2	54.3	59.1	
	HAD45	46.6	49.8	53.2	55.0	
	HAD85	46.6	49.9	54.2	59.8	
Growing Season	CCSM45	63.8	65.9	67.9	68.3	
	CCSM85	63.8	66.1	68.6	72.5	
May—Sep	GFDL45	63.8	67.9	71.3	72.8	
	GFDL85	63.8	68.2	72.8	78.0	
	HAD45	63.8	67.2	70.0	72.5	
	HAD85	63.8	66.8	71.6	77.8	
Coldest Month	CCSM45	19.7	21.7	24.0	24.1	
	CCSM85	19.7	23.0	24.3	26.5	
Average	GFDL45	19.7	22.7	24.8	25.6	
	GFDL85	19.7	23.5	25.4	28.1	
	HAD45	19.7	21.7	25.0	25.2	
	HAD85	19.7	23.2	25.8	29.5	
Warmest Month	CCSM45	69.9	72.1	73.4	73.6	
	CCSM85	69.9	72.6	74.3	76.5	
Average	GFDL45	69.9	72.9	75.3	76.3	
	GFDL85	69.9	74.1	76.8	79.7	
	HAD45	69.9	73.6	75.1	77.0	
	HAD85	69.9	73.6	76.7	81.2	

Precipitation (in)

Scenario	2009	2039	2069	2099		
Annual	CCSM45	43.6	43.1	41.8	45.6	
Total	CCSM85	43.6	44.4	44.4	45.1	
	GFDL45	43.6	47.6	49.2	48.4	
	GFDL85	43.6	45.1	48.3	50.0	
	HAD45	43.6	45.0	46.6	46.1	
	HAD85	43.6	46.2	45.0	49.1	
Growing Season	CCSM45	19.4	19.1	17.8	19.6	
	CCSM85	19.4	19.1	18.8	17.7	
May—Sep	GFDL45	19.4	20.4	19.6	19.3	
	GFDL85	19.4	19.2	19.0	18.4	
	HAD45	19.4	19.6	18.2	19.0	
	HAD85	19.4	19.3	17.8	18.9	

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
red maple	Acer rubrum	WDH	High	68.3	1375.2	21.9	Sm. dec.	Sm. dec.	High	Abundant	Good	Good			1	1
sugar maple	Acer saccharum	WDH	High	69.7	1019.9	16.9	Sm. dec.	Sm. dec.	High	Abundant	Good	Good			1	2
white ash	Fraxinus americana	WDL	Medium	75.8	861.6	12.7	Sm. dec.	Sm. dec.	Low	Abundant	Fair	Fair			0	3
eastern hemlock	Tsuga canadensis	NSH	High	49	504.6	11.5	Lg. dec.	Lg. dec.	Low	Abundant	Poor	Poor			0	4
black cherry	Prunus serotina	WDL	Medium	61.3	456.8	8.1	Sm. inc.	No change	Low	Common	Fair	Poor			1	5
quaking aspen	Populus tremuloides	WDH	High	38.5	399.4	10.2	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	6
eastern white pine	Pinus strobus	WDH	High	24.4	326.3	12.5	No change	Sm. dec.	Low	Common	Poor	Poor			0	7
green ash	Fraxinus pennsylvanica	WDH	Low	31	267.8	12.1	Sm. inc.	Lg. inc.	Medium	Common	Good	Very Good			1	8
American elm	Ulmus americana	WDH	Medium	58.5	258.2	4.9	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	9
American beech	Fagus grandifolia	WDH	High	54.2	238.3	5.4	No change	No change	Medium	Common	Fair	Fair			1	10
American basswood	Tilia americana	WSL	Medium	36.3	234.9	8.1	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor			0	11
silver maple	Acer saccharinum	NSH	Low	16.1	184.5	14.5	No change	Sm. inc.	High	Common	Good	Very Good			1	12
yellow birch	Betula alleghaniensis	NDL	High	36.8	175.2	5.2	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	13
bitternut hickory	Carya cordiformis	WSL	Low	30.4	149.5	7.1	Sm. dec.	No change	High	Common	Fair	Good			1	14
Norway spruce	Picea abies	NSH	FIA	12.4	147.2	16.3	Unknown	Unknown	NA	Common	NNIS	NNIS			0	15
boxelder	Acer negundo	WSH	Low	17.4	133.6	9.5	No change	Sm. inc.	High	Common	Good	Very Good			1	16
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	26.9	117.6	6.3	Sm. dec.	Sm. dec.	High	Common	Fair	Fair			1	17
northern red oak	Quercus rubra	WDH	Medium	19.6	109.6	9.4	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	18
northern white-cedar	Thuja occidentalis	WSH	High	5	78.7	15.3	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	19
white spruce	Picea glauca	NSL	Medium	7.4	66.4	17.5	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	20
eastern cottonwood	Populus deltoides	NSH	Low	8.7	55.3	13.2	No change	No change	Medium	Common	Fair	Fair			1	21
American hornbeam; musclev	Carpinus caroliniana	WDL	Low	27.2	46.2	2.3	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	22
black walnut	Juglans nigra	WDL	Low	5	44.1	8.6	No change	Sm. inc.	Medium	Rare	Poor	Fair			1	23
blackgum	Nyssa sylvatica	WDL	Medium	6.2	39.0	6.1	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	1	24
red pine	Pinus resinosa	NSH	Medium	6.2	38.3	5.9	Sm. dec.	Sm. dec.	Low	Rare	Very Poor	Very Poor			0	25
butternut	Juglans cinerea	NSLX	FIA	7	37.8	4.8	Unknown	Unknown	Low	Rare	FIA Only	FIA Only			0	26
serviceberry	Amelanchier spp.	NSL	Low	19.6	35.1	1.7	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	27
Scots pine	Pinus sylvestris	NSH	FIA	3.7	33.2	8.6	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	28
swamp white oak	Quercus bicolor	NSL	Low	9.9	30.6	5.3	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	29
black ash	Fraxinus nigra	WSH	Medium	12.4	28.4	2.2	Lg. dec.	Lg. dec.	Low	Rare	Very Poor	Very Poor			0	30
gray birch	Betula populifolia	NSL	Low	6.2	28.1	4.4	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	31
balsam fir	Abies balsamea	NDH	High	1.2	26.4	20.5	Very Lg. dec.	Very Lg. dec.	Low	Rare	Lost	Lost			0	32
black willow	Salix nigra	NSH	Low	7.4	25.4	10.1	Sm. dec.	No change	Low	Rare	Very Poor	Very Poor			0	33
striped maple	Acer pensylvanicum	NSL	Medium	12.4	22.5	2.6	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	34
slippery elm	Ulmus rubra	WSL	Low	6.2	20.6	3.2	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	1	35
shagbark hickory	Carya ovata	WSL	Medium	14.9	20.3	3.1	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	1	36
black spruce	Picea mariana	NSH	High	1.2	19.7	15.3	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	37
red spruce	Picea rubens	NDH	High	7.4	15.9	2.1	Lg. dec.	Lg. dec.	Low	Rare	Very Poor	Very Poor			0	38
tamarack (native)	Larix laricina	NSH	High	1.2	13.3	10.4	Sm. dec.	Sm. dec.	Low	Rare	Very Poor	Very Poor			0	39
cucumbertree	Magnolia acuminata	NSL	Low	6.2	6.2	2.7	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	40
yellow-poplar	Liriodendron tulipifera	WDH	High	13.6	6.1	1.5	Lg. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	1	41
black locust	Robinia pseudoacacia	NDH	Low	7.4	6.1	3.8	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	1	42
sweet birch	Betula lenta	NDH	High	2.5	5.3	2.1	Lg. inc.	Sm. inc.	Low	Rare	Fair	Poor	Infill +	Infill +	2	43
white oak	Quercus alba	WDH	Medium	2.5	4.5	1.8	Lg. inc.	Lg. inc.	High	Rare	Good	Good			2	44
bigtooth aspen	Populus grandidentata	NSL	Medium	1	2.5	1.6	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	2	45
bur oak	Quercus macrocarpa	NDH	Medium	1.2	2.0	1.6	Very Lg. dec.	Very Lg. dec.	High	Rare	Lost	Lost			0	46
paper birch	Betula papyrifera	WDH	High	1.2	1.0	0.8	Sm. inc.	Sm. inc.	Medium	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
pignut hickory	<i>Carya glabra</i>	WDL	Medium	9.9	1.0	1.5	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	2	48
chokecherry	<i>Prunus virginiana</i>	NSLX	FIA	1.2	0.5	0.4	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	49
eastern redcedar	<i>Juniperus virginiana</i>	WDH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Likely +	Likely +	3	50
shortleaf pine	<i>Pinus echinata</i>	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	51
pitch pine	<i>Pinus rigida</i>	NSH	High	0	0	0	Unknown	Unknown	Medium	Modeled	Unknown	Unknown			0	52
loblolly pine	<i>Pinus taeda</i>	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate ++	3	53
Ohio buckeye	<i>Aesculus glabra</i>	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	54
black hickory	<i>Carya texana</i>	NDL	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	55
mockernut hickory	<i>Carya alba</i>	WDL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	56
hackberry	<i>Celtis occidentalis</i>	WDH	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	57
eastern redbud	<i>Cercis canadensis</i>	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	58
flowering dogwood	<i>Cornus florida</i>	WDL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	59
common persimmon	<i>Diospyros virginiana</i>	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate +	3	60
American holly	<i>Ilex opaca</i>	NSL	Medium	0	0	0	Unknown	Unknown	Medium	Modeled	Unknown	Unknown			0	61
sweetgum	<i>Liquidambar styraciflua</i>	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate ++	3	62
bigleaf magnolia	<i>Magnolia macrophylla</i>	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	63
mountain or Fraser magnolia	<i>Magnolia fraseri</i>	NSL	Low	0	0	0	Unknown	Unknown	Low	Absent	Unknown	Unknown			0	64
sycamore	<i>Platanus occidentalis</i>	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate ++	Migrate ++	3	65
scarlet oak	<i>Quercus coccinea</i>	WDL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	66
southern red oak	<i>Quercus falcata</i>	WDL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate +	3	67
overcup oak	<i>Quercus lyrata</i>	NSL	Medium	0	0	0	Unknown	New Habitat	Low	Absent	Unknown	New Habitat			0	68
blackjack oak	<i>Quercus marilandica</i>	NSL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate +	3	69
chinkapin oak	<i>Quercus muehlenbergii</i>	NSL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	70
pin oak	<i>Quercus palustris</i>	NSH	Low	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	71
willow oak	<i>Quercus phellos</i>	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	72
chestnut oak	<i>Quercus prinus</i>	NDH	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate ++	Migrate ++	3	73
Shumard oak	<i>Quercus shumardii</i>	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			0	74
post oak	<i>Quercus stellata</i>	WDH	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			3	75
black oak	<i>Quercus velutina</i>	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate ++	Migrate ++	3	76
sassafras	<i>Sassafras albidum</i>	WSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	77
winged elm	<i>Ulmus alata</i>	WDL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	78