

**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	8,600.0	3,320.5	242

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	24	20	Increase	18	21	Very Good	6	6	Likely	0	1
Hickory	4		Medium	25	40	No Change	10	8	Good	10	15	Infill	13	13
Maple	6	Abundant	Low	24	14	Decrease	19	18	Fair	10	9	Migrate	2	11
Oak	7	Common	FIA	5		New	20	22	Poor	10	8		15	25
Pine	4	Rare				Unknown	11	9	Very Poor	7	5			
Other	28	Absent					78	78	FIA Only	1	1			
	52	78		78	74				Unknown	6	4			
										50	48			

Potential Changes in Climate Variables

Temperature (°F)

	Scenario	2009	2039	2069	2099	
Annual Average	CCSM45	47.5	49.4	51.5	51.8	
	CCSM85	47.5	49.8	52.3	55.4	
	GFDL45	47.5	50.4	53.3	54.5	
	GFDL85	47.5	50.7	54.6	58.9	
	HAD45	47.5	50.2	53.5	55.1	
	HAD85	47.5	50.2	54.5	59.5	
Growing Season (May–Sep)	CCSM45	64.4	66.5	68.2	68.7	
	CCSM85	64.4	66.7	69.2	72.8	
	GFDL45	64.4	67.4	70.8	72.1	
	GFDL85	64.4	67.9	72.2	76.7	
	HAD45	64.4	67.2	70.0	72.2	
	HAD85	64.4	66.5	71.3	76.8	
Coldest Month Average	CCSM45	21.7	23.4	25.2	25.7	
	CCSM85	21.7	24.3	25.4	27.6	
	GFDL45	21.7	25.2	26.8	27.8	
	GFDL85	21.7	25.5	27.2	29.6	
	HAD45	21.7	23.8	26.5	26.8	
	HAD85	21.7	24.8	27.1	30.2	
Warmest Month Average	CCSM45	70.6	73.1	74.0	74.1	
	CCSM85	70.6	73.4	74.9	76.7	
	GFDL45	70.6	73.4	75.2	76.4	
	GFDL85	70.6	74.4	76.9	79.6	
	HAD45	70.6	73.5	75.0	76.2	
	HAD85	70.6	72.9	75.4	79.2	

Precipitation (in)

	Scenario	2009	2039	2069	2099	
Annual Total	CCSM45	49.3	48.9	47.5	53.3	
	CCSM85	49.3	49.4	52.0	55.4	
	GFDL45	49.3	53.7	56.3	54.4	
	GFDL85	49.3	52.0	55.1	58.3	
	HAD45	49.3	50.7	53.4	52.6	
	HAD85	49.3	52.9	53.4	55.1	
Growing Season (May–Sep)	CCSM45	21.3	22.8	21.3	23.0	
	CCSM85	21.3	21.6	23.2	22.8	
	GFDL45	21.3	21.3	20.6	21.2	
	GFDL85	21.3	21.5	20.9	21.2	
	HAD45	21.3	22.4	21.5	21.8	
	HAD85	21.3	21.5	21.5	22.2	

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	97.7	1942.9	20.4	No change	Sm. dec.	High	Abundant	Very Good	Good			1	1
eastern hemlock	Tsuga canadensis	NSH	High	69.8	1257.9	17.4	Lg. dec.	Lg. dec.	Low	Abundant	Poor	Poor			0	2
eastern white pine	Pinus strobus	WDH	High	84.9	1169.9	13.9	Sm. dec.	Lg. dec.	Low	Abundant	Fair	Poor			0	3
northern red oak	Quercus rubra	WDH	Medium	84.9	958.6	11.4	No change	Sm. dec.	High	Abundant	Very Good	Good			1	4
sweet birch	Betula lenta	NDH	High	72.1	557.1	7.5	No change	Sm. dec.	Low	Abundant	Fair	Fair			0	5
sugar maple	Acer saccharum	WDH	High	58.1	536.1	8.9	No change	No change	High	Abundant	Very Good	Very Good			1	6
black oak	Quercus velutina	WDH	High	60.5	386.7	6.7	Sm. inc.	Lg. inc.	Medium	Common	Good	Very Good			1	7
white oak	Quercus alba	WDH	Medium	61.6	365.6	6.1	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	8
white ash	Fraxinus americana	WDL	Medium	64	336.6	5.1	Sm. inc.	Sm. inc.	Low	Common	Fair	Fair			1	9
yellow birch	Betula alleghaniensis	NDL	High	53.5	292.3	5.3	No change	No change	Medium	Common	Fair	Fair			1	10
American beech	Fagus grandifolia	WDH	High	46.5	271.5	5.6	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	11
black cherry	Prunus serotina	WDL	Medium	61.6	262.9	4.4	Sm. inc.	Sm. inc.	Low	Common	Fair	Fair			1	12
paper birch	Betula papyrifera	WDH	High	54.7	154.5	2.7	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	13
scarlet oak	Quercus coccinea	WDL	Medium	32.6	150.7	5.1	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	14
pignut hickory	Carya glabra	WDL	Medium	33.7	146.5	4.2	Sm. inc.	Lg. inc.	Medium	Common	Good	Very Good			1	15
eastern redcedar	Juniperus virginiana	WDH	Medium	8.1	138.3	16.4	No change	No change	Medium	Common	Fair	Fair	Infill +	Infill +	1	16
quaking aspen	Populus tremuloides	WDH	High	16.3	102.0	6.0	Sm. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	17
American elm	Ulmus americana	WDH	Medium	25.6	95.5	4.2	Sm. dec.	No change	Medium	Common	Poor	Fair			1	18
bigtooth aspen	Populus grandidentata	NSL	Medium	18.6	88.4	5.9	No change	Sm. dec.	Medium	Common	Fair	Poor			1	19
shagbark hickory	Carya ovata	WSL	Medium	20.9	69.9	3.9	Sm. inc.	Sm. inc.	Medium	Common	Good	Good	Infill ++	Infill ++	1	20
chestnut oak	Quercus prinus	NDH	High	12.8	67.8	5.1	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good	Infill ++	Infill ++	1	21
red spruce	Picea rubens	NDH	High	5.8	51.5	8.5	Sm. dec.	Sm. dec.	Low	Common	Poor	Poor	Infill +	Infill +	0	22
yellow-poplar	Liriodendron tulipifera	WDH	High	5.8	45.6	7.6	Sm. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	2	23
silver maple	Acer saccharinum	NSH	Low	5.8	41.2	18.4	Sm. dec.	No change	High	Rare	Poor	Fair		Infill +	2	24
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	19.8	34.0	1.7	Sm. dec.	Lg. inc.	High	Rare	Poor	Good			1	25
mockernut hickory	Carya alba	WDL	Medium	8.1	26.6	3.2	Sm. inc.	Sm. inc.	High	Rare	Good	Good	Infill ++	Infill ++	2	26
American hornbeam; musclev	Carpinus caroliniana	WSL	Low	17.4	22.9	1.3	Sm. dec.	Lg. inc.	Medium	Rare	Very Poor	Good			1	27
gray birch	Betula populifolia	NSL	Low	17.4	22.6	1.3	No change	Sm. inc.	Medium	Rare	Poor	Fair			1	28
balsam fir	Abies balsamea	NDH	High	3.5	18.3	5.1	Lg. dec.	Sm. dec.	Low	Rare	Very Poor	Very Poor			0	29
pitch pine	Pinus rigida	NSH	High	5.8	16.1	2.7	No change	Sm. dec.	Medium	Rare	Poor	Very Poor	Infill +		1	30
sassafras	Sassafras albidum	WSL	Low	10.5	15.6	2.4	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	2	31
American chestnut	Castanea dentata	NSLX	FIA	12.8	15.5	2.0	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	32
American basswood	Tilia americana	WSL	Medium	5.8	14.8	2.5	Sm. inc.	Lg. inc.	Medium	Rare	Fair	Good	Infill +	Infill ++	1	33
blackgum	Nyssa sylvatica	WDL	Medium	8.1	11.7	1.4	Lg. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	1	34
Norway spruce	Picea abies	NSH	FIA	2.3	11.6	4.8	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	35
serviceberry	Amelanchier spp.	NSL	Low	4.7	7.9	1.6	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	36
striped maple	Acer pensylvanicum	NSL	Medium	9.3	7.7	0.8	Sm. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	37
ailanthus	Ailanthus altissima	NSL	FIA	1.2	7.2	6.0	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	38
green ash	Fraxinus pennsylvanica	WSH	Low	2.3	6.9	2.9	Sm. inc.	Lg. inc.	Medium	Rare	Fair	Good	Infill +		2	39
red pine	Pinus resinosa	NSH	Medium	8.1	6.1	1.7	Very Lg. dec.	Very Lg. dec.	Low	Rare	Lost	Lost			0	40
eastern cottonwood	Populus deltoides	NSH	Low	2.3	5.3	2.2	No change	No change	Medium	Rare	Poor	Poor			0	41
slippery elm	Ulmus rubra	WSL	Low	2.3	5.2	2.2	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	42
Scots pine	Pinus sylvestris	NSH	FIA	1.2	3.3	2.7	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	43
swamp chestnut oak	Quercus michauxii	NSL	Low	1.2	2.5	2.1	Sm. dec.	No change	Medium	Rare	Very Poor	Poor		Infill +	2	44
black ash	Fraxinus nigra	WSH	Medium	1.2	2.3	1.9	Sm. dec.	Very Lg. dec.	Low	Rare	Very Poor	Lost			2	45
black locust	Robinia pseudoacacia	NDH	Low	1.2	2.2	1.8	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	2	46
pin cherry	Prunus pensylvanica	NSL	Low	2.3	2.1	0.9	Very Lg. dec.	Very Lg. dec.	Medium	Rare	Lost	Lost			0	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
bitternut hickory	<i>Carya cordiformis</i>	WSL	Low	1.2	1.7	1.4	Sm. inc.	Lg. inc.	High	Rare	Good	Good			2	48
Norway maple	<i>Acer platanoides</i>	NSL	FIA	5.8	1.2	0.7	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	49
swamp white oak	<i>Quercus bicolor</i>	NSL	Low	1.2	1.1	0.9	Sm. inc.	Lg. inc.	Medium	Rare	Fair	Good	Infill +		2	50
boxelder	<i>Acer negundo</i>	WSH	Low	1.2	0.9	0.8	Very Lg. dec.	No change	High	Rare	Lost	Fair		Infill +	2	51
tamarack (native)	<i>Larix laricina</i>	NSH	High	1.2	0.8	0.7	Very Lg. dec.	Very Lg. dec.	Low	Rare	Lost	Lost			0	52
shortleaf pine	<i>Pinus echinata</i>	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate ++	3	53
loblolly pine	<i>Pinus taeda</i>	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate ++	3	54
Virginia pine	<i>Pinus virginiana</i>	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate ++	3	55
florida maple	<i>Acer barbatum</i>	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			0	56
mountain maple	<i>Acer spicatum</i>	NSL	Low	0	0	0	Unknown	Unknown	High	Absent	Unknown	Unknown			0	57
cittamwood/gum bumelia	<i>Sideroxylon lanuginosum</i> ssp.	NSL	Low	0	0	0	Unknown	Unknown	High	Absent	Unknown	Unknown			0	58
black hickory	<i>Carya texana</i>	NDL	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	59
sugarberry	<i>Celtis laevigata</i>	NDH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	60
eastern redbud	<i>Cercis canadensis</i>	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	61
flowering dogwood	<i>Cornus florida</i>	WDL	Medium	0	0	0	Unknown	New Habitat	Medium	Absent	Unknown	New Habitat		Likely +	3	62
common persimmon	<i>Diospyros virginiana</i>	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			3	63
American holly	<i>Ilex opaca</i>	NSL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	64
sweetgum	<i>Liquidambar styraciflua</i>	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	65
mountain or Fraser magnolia	<i>Magnolia fraseri</i>	NSL	Low	0	0	0	Unknown	Unknown	Low	Absent	Unknown	Unknown			0	66
swamp tupelo	<i>Nyssa biflora</i>	NDH	Medium	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat			3	67
sourwood	<i>Oxydendrum arboreum</i>	NDL	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			3	68
sycamore	<i>Platanus occidentalis</i>	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	69
southern red oak	<i>Quercus falcata</i>	WDL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate +	3	70
cherrybark oak; swamp red o.	<i>Quercus pagoda</i>	NSL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	71
blackjack oak	<i>Quercus marilandica</i>	NSL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			3	72
chinkapin oak	<i>Quercus muehlenbergii</i>	NSL	Medium	0	0	0	Unknown	New Habitat	Medium	Absent	Unknown	New Habitat		Migrate +	3	73
water oak	<i>Quercus nigra</i>	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	74
pin oak	<i>Quercus palustris</i>	NSH	Low	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat		Migrate +	3	75
post oak	<i>Quercus stellata</i>	WDH	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	76
American mountain-ash	<i>Sorbus americana</i>	NSL	Low	0	0	0	Unknown	Unknown	Low	Absent	Unknown	Unknown			0	77
winged elm	<i>Ulmus alata</i>	WDL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	78