

**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  
 8,200.0    3,166.0    245

**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	22	18	Increase	19	21	Very Good	4	5	Likely	2	3
Hickory	3			Medium	22	36	No Change	7	6	Good	13	15	Infill	5	8
Maple	5	Abundant	5	Low	20	12	Decrease	17	16	Fair	6	7	Migrate	1	7
Oak	7	Common	13	FIA	5		New	14	15	Poor	12	8		8	18
Pine	4	Rare	30				Unknown	12	11	Very Poor	3	4			
Other	26	Absent	20							FIA Only	2	2			
	<b>48</b>		<b>68</b>		<b>69</b>	<b>66</b>		<b>69</b>	<b>69</b>	Unknown	7	6			
											<b>47</b>	<b>47</b>			

**Potential Changes in Climate Variables**

**Temperature (°F)**

	Scenario	2009	2039	2069	2099	
Annual Average	CCSM45	48.3	50.2	52.2	52.5	
	CCSM85	48.3	50.6	53.0	56.0	
	GFDL45	48.3	51.0	53.9	55.1	
	GFDL85	48.3	51.4	55.2	59.4	
	HAD45	48.3	50.9	54.2	55.8	
	HAD85	48.3	50.9	55.2	60.1	
Growing Season (May—Sep)	CCSM45	64.9	66.9	68.6	69.0	
	CCSM85	64.9	67.1	69.5	72.9	
	GFDL45	64.9	67.6	70.9	72.2	
	GFDL85	64.9	68.1	72.3	76.7	
	HAD45	64.9	67.4	70.4	72.6	
	HAD85	64.9	66.8	71.6	76.8	
Coldest Month Average	CCSM45	23.1	24.5	26.2	26.8	
	CCSM85	23.1	25.6	26.7	28.8	
	GFDL45	23.1	26.5	28.0	29.1	
	GFDL85	23.1	26.8	28.5	30.8	
	HAD45	23.1	25.1	27.6	27.9	
	HAD85	23.1	26.1	28.2	31.1	
Warmest Month Average	CCSM45	71.2	73.5	74.4	74.5	
	CCSM85	71.2	73.7	75.2	76.9	
	GFDL45	71.2	73.9	75.5	76.6	
	GFDL85	71.2	74.6	77.1	79.6	
	HAD45	71.2	73.9	75.4	76.6	
	HAD85	71.2	73.1	75.6	79.1	

**Precipitation (in)**

	Scenario	2009	2039	2069	2099	
Annual Total	CCSM45	48.9	48.2	47.0	53.0	
	CCSM85	48.9	48.8	51.2	55.1	
	GFDL45	48.9	52.7	55.6	53.8	
	GFDL85	48.9	51.3	54.4	57.0	
	HAD45	48.9	50.1	53.7	52.8	
	HAD85	48.9	52.5	53.2	54.5	
Growing Season (May—Sep)	CCSM45	19.8	21.3	19.6	21.4	
	CCSM85	19.8	20.1	21.3	21.4	
	GFDL45	19.8	19.6	19.0	19.5	
	GFDL85	19.8	20.0	19.0	19.3	
	HAD45	19.8	20.7	20.6	20.3	
	HAD85	19.8	19.9	20.0	20.7	

**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	91.5	2336.6	24.3	Sm. dec.	Sm. dec.	High	Abundant	Good	Good			1	1
eastern white pine	Pinus strobus	WDH	High	80.5	2045.1	24.2	Lg. dec.	Lg. dec.	Low	Abundant	Poor	Poor			0	2
northern red oak	Quercus rubra	WDH	Medium	80.5	1073.3	12.7	Sm. dec.	Sm. dec.	High	Abundant	Good	Good			1	3
white oak	Quercus alba	WDH	Medium	76.8	627.7	7.8	Sm. inc.	No change	High	Abundant	Very Good	Very Good			1	4
black oak	Quercus velutina	WDH	High	73.2	583.7	7.6	Sm. inc.	Sm. inc.	Medium	Abundant	Very Good	Very Good			1	5
scarlet oak	Quercus coccinea	WDL	Medium	46.3	465.6	9.6	Sm. inc.	No change	Medium	Common	Good	Fair			1	6
sweet birch	Betula lenta	NDH	High	69.5	450.9	6.2	No change	No change	Low	Common	Poor	Poor			0	7
eastern hemlock	Tsuga canadensis	NSH	High	41.5	356.9	8.2	Sm. dec.	Sm. dec.	Low	Common	Poor	Poor			0	8
white ash	Fraxinus americana	WDL	Medium	48.8	273.5	5.3	Sm. inc.	Sm. inc.	Low	Common	Fair	Fair			1	9
yellow birch	Betula alleghaniensis	NDL	High	42.7	236.9	5.3	No change	No change	Medium	Common	Fair	Fair			1	10
black cherry	Prunus serotina	WDL	Medium	42.7	226.4	5.0	Lg. inc.	Lg. inc.	Low	Common	Good	Good			1	11
sugar maple	Acer saccharum	WDH	High	31.7	168.5	5.1	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	12
pignut hickory	Carya glabra	WDL	Medium	32.9	135.1	3.9	Sm. inc.	Lg. inc.	Medium	Common	Good	Very Good			1	13
black walnut	Juglans nigra	WDH	Low	1.2	128.2	100.0	Very Lg. dec.	Lg. dec.	Medium	Common	Lost	Poor	Infill +		0	14
gray birch	Betula populifolia	NSL	Low	19.5	68.3	3.3	No change	Sm. inc.	Medium	Common	Fair	Good			1	15
paper birch	Betula papyrifera	WDL	High	24.4	59.4	2.3	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	16
American beech	Fagus grandifolia	WDH	High	24.4	59.3	2.3	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	17
quaking aspen	Populus tremuloides	WDH	High	13.4	53.4	3.8	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	18
shagbark hickory	Carya ovata	WSL	Medium	22	49.9	2.2	Sm. inc.	Lg. inc.	Medium	Rare	Fair	Good			1	19
pitch pine	Pinus rigida	NSH	High	6.1	49.7	7.8	No change	Sm. dec.	Medium	Rare	Poor	Very Poor			1	20
American elm	Ulmus americana	WDH	Medium	19.5	49.6	2.4	No change	Sm. inc.	Medium	Rare	Poor	Fair			1	21
blackgum	Nyssa sylvatica	WDL	Medium	18.3	38.1	2.0	Lg. inc.	Lg. inc.	High	Rare	Good	Good			1	22
bigtooth aspen	Populus grandidentata	NSL	Medium	15.9	34.8	2.1	Lg. inc.	Sm. inc.	Medium	Rare	Good	Fair			1	23
mockernut hickory	Carya alba	WDL	Medium	12.2	31.6	2.5	Lg. inc.	Lg. inc.	High	Rare	Good	Good			1	24
eastern redcedar	Juniperus virginiana	WDH	Medium	9.8	30.3	3.0	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	1	25
chestnut oak	Quercus prinus	NDH	High	6.1	28.5	4.4	Lg. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	2	26
green ash	Fraxinus pennsylvanica	WSH	Low	4.9	25.6	5.0	No change	Sm. inc.	Medium	Rare	Poor	Fair	Infill +	Infill +	1	27
Norway spruce	Picea abies	NSH	FIA	2.4	25.1	9.8	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	28
sassafras	Sassafras albidum	WSL	Low	15.9	22.5	1.4	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			1	29
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	12.2	17.7	1.4	Lg. dec.	Lg. inc.	High	Rare	Poor	Good			1	30
red pine	Pinus resinosa	NSH	Medium	2.4	17.4	6.8	Very Lg. dec.	Very Lg. dec.	Low	Rare	Lost	Lost			0	31
American hornbeam; musclev	Carpinus caroliniana	WSL	Low	11	14.5	1.3	Sm. inc.	Lg. inc.	Medium	Rare	Fair	Good			1	32
silver maple	Acer saccharinum	NSH	Low	1.2	10.3	8.0	Sm. dec.	No change	High	Rare	Poor	Fair	Infill +		2	33
balsam fir	Abies balsamea	NDH	High	1.2	9.5	7.4	Sm. dec.	Sm. dec.	Low	Rare	Very Poor	Very Poor			0	34
American chestnut	Castanea dentata	NSLX	FIA	8.5	6.7	0.8	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	35
Atlantic white-cedar	Chamaecyparis thyoides	NSH	Low	1.2	6.2	4.8	Sm. dec.	Sm. dec.	Low	Rare	Very Poor	Very Poor			0	36
swamp white oak	Quercus bicolor	NSL	Low	2.4	6.1	2.4	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	37
pin cherry	Prunus pensylvanica	NSL	Low	2.4	4.8	1.9	Very Lg. dec.	Very Lg. dec.	Medium	Rare	Lost	Lost			0	38
eastern cottonwood	Populus deltoides	NSH	Low	1.2	2.8	2.2	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	39
boxelder	Acer negundo	WSH	Low	1.2	2.7	2.1	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor			0	40
Norway maple	Acer platanoides	NSL	FIA	1.2	1.6	1.2	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	41
flowering dogwood	Cornus florida	WDL	Medium	2.4	1.3	0.5	Sm. inc.	Lg. inc.	Medium	Rare	Fair	Good	Infill ++	Infill ++	2	42
American basswood	Tilia americana	WSL	Medium	1.2	1.0	0.8	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	2	43
yellow-poplar	Liriodendron tulipifera	WDH	High	1.2	1.0	0.8	Lg. inc.	Lg. inc.	High	Rare	Good	Good			2	44
black ash	Fraxinus nigra	WSH	Medium	1.2	0.9	0.7	Very Lg. dec.	Very Lg. dec.	Low	Rare	Lost	Lost			0	45
serviceberry	Amelanchier spp.	NSL	Low	1.2	0.7	0.5	Very Lg. dec.	Very Lg. dec.	Medium	Rare	Lost	Lost			0	46
bear oak; scrub oak	Quercus ilicifolia	NSLX	FIA	1.2	0.6	0.5	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			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
Scots pine	<i>Pinus sylvestris</i>	NSH	FIA	1.2	0.5	0.4	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	48
tamarack (native)	<i>Larix laricina</i>	NSH	High	0	0	0	Unknown	Unknown	Low	Modeled	Unknown	Unknown			0	49
shortleaf pine	<i>Pinus echinata</i>	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate ++	3	50
loblolly pine	<i>Pinus taeda</i>	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate ++	3	51
Virginia pine	<i>Pinus virginiana</i>	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	52
striped maple	<i>Acer pensylvanicum</i>	NSL	Medium	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	53
mountain maple	<i>Acer spicatum</i>	NSL	Low	0	0	0	Unknown	Unknown	High	Absent	Unknown	Unknown			0	54
cittamwood/gum bumelia	<i>Sideroxylon lanuginosum ssp.</i>	NSL	Low	0	0	0	New Habitat	Unknown	High	Absent	New Habitat	Unknown			0	55
bitternut hickory	<i>Carya cordiformis</i>	WSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Likely +	Likely +	3	56
black hickory	<i>Carya texana</i>	NDL	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	57
sugarberry	<i>Celtis laevigata</i>	NDH	Medium	0	0	0	Unknown	New Habitat	Medium	Absent	Unknown	New Habitat			0	58
American holly	<i>Ilex opaca</i>	NSL	Medium	0	0	0	Unknown	New Habitat	Medium	Absent	Unknown	New Habitat		Likely +	3	59
sweetgum	<i>Liquidambar styraciflua</i>	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	60
mountain or Fraser magnolia	<i>Magnolia fraseri</i>	NSL	Low	0	0	0	Unknown	Unknown	Low	Absent	Unknown	Unknown			0	61
sourwood	<i>Oxydendrum arboreum</i>	NDL	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			3	62
southern red oak	<i>Quercus falcata</i>	WDL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate +	3	63
blackjack oak	<i>Quercus marilandica</i>	NSL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			3	64
willow oak	<i>Quercus phellos</i>	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	65
post oak	<i>Quercus stellata</i>	WDH	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate ++	3	66
black locust	<i>Robinia pseudoacacia</i>	NDH	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Likely +	Likely +	3	67
American mountain-ash	<i>Sorbus americana</i>	NSL	Low	0	0	0	Unknown	Unknown	Low	Absent	Unknown	Unknown			0	68
winged elm	<i>Ulmus alata</i>	WDL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	69