

**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	9,197.2	3,551.0	161

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	Scenario	Scenario	Scenario	SHIFT	SHIFT				
				High	Low	RCP45	RCP85	RCP45	RCP85	RCP45	RCP85				
Ash	3			14	17	Increase	15	17	Very Good	6	6	Likely	3	3	
Hickory	2			22	33	No Change	8	3	Good	9	11	Infill	25	23	
Maple	4	Abundant	1	Low	22	12	Decrease	18	21	Fair	9	5	Migrate	5	7
Oak	6	Common	23	FIA	6		New	17	17	Poor	6	7			
Pine	3	Rare	23				Unknown	6	6	Very Poor	6	7			
Other	29	Absent	17							FIA Only	4	4			
	47		64		64	62		64	64	Unknown	0	0		33	33
												40	40		

Potential Changes in Climate Variables

Temperature (°F)

	Scenario	2009	2039	2069	2099	
Annual Average	CCSM45	45.2	47.2	50.2	50.2	
	CCSM85	45.2	47.9	50.8	54.2	
	GFDL45	45.2	50.1	51.0	52.3	
	GFDL85	45.2	48.6	52.1	57.0	
	HAD45	45.2	48.3	51.7	53.6	
	HAD85	45.2	48.7	53.0	58.6	
Growing Season (May—Sep)	CCSM45	64.4	66.3	68.8	69.0	
	CCSM85	64.4	67.1	69.6	73.6	
	GFDL45	64.4	70.5	71.4	73.4	
	GFDL85	64.4	68.5	72.7	78.4	
	HAD45	64.4	67.5	69.7	71.9	
	HAD85	64.4	67.3	71.3	76.6	
Coldest Month (Average)	CCSM45	15.2	16.8	19.8	19.7	
	CCSM85	15.2	17.8	20.1	22.4	
	GFDL45	15.2	18.2	20.0	20.3	
	GFDL85	15.2	19.2	20.7	23.2	
	HAD45	15.2	16.6	20.6	20.9	
	HAD85	15.2	19.5	23.1	26.9	
Warmest Month (Average)	CCSM45	70.6	73.0	74.4	74.9	
	CCSM85	70.6	74.1	75.8	77.9	
	GFDL45	70.6	74.2	75.8	77.3	
	GFDL85	70.6	75.1	77.4	80.6	
	HAD45	70.6	73.7	74.8	76.3	
	HAD85	70.6	74.3	76.5	80.2	

Precipitation (in)

	Scenario	2009	2039	2069	2099	
Annual Total	CCSM45	30.7	30.5	30.2	31.0	
	CCSM85	30.7	31.1	31.3	31.8	
	GFDL45	30.7	32.8	35.6	34.6	
	GFDL85	30.7	33.9	36.7	36.5	
	HAD45	30.7	31.0	32.6	32.9	
	HAD85	30.7	32.2	32.5	34.4	
Growing Season (May—Sep)	CCSM45	17.8	17.5	17.0	18.0	
	CCSM85	17.8	17.9	17.9	17.1	
	GFDL45	17.8	18.3	19.9	19.0	
	GFDL85	17.8	19.4	19.5	18.8	
	HAD45	17.8	17.1	16.4	16.9	
	HAD85	17.8	17.7	15.4	15.9	

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
green ash	Fraxinus pennsylvanica	WSH	Low	75	1159.0	22.9	Sm. dec.	Sm. dec.	Medium	Abundant	Fair	Fair	Infill +	Infill +	2	1
red maple	Acer rubrum	WDH	High	40.7	388.6	10.6	No change	Sm. dec.	High	Common	Good	Fair	Infill ++	Infill +	2	2
American elm	Ulmus americana	WDH	Medium	72.4	384.9	8.0	No change	Sm. inc.	Medium	Common	Fair	Good	Infill +	Infill ++	2	3
quaking aspen	Populus tremuloides	WDH	High	33.7	351.2	11.6	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor	Infill +	Infill +	2	4
silver maple	Acer saccharinum	NSH	Low	27.2	327.4	14.1	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good	Infill ++	Infill ++	2	5
eastern white pine	Pinus strobus	WDH	High	23.9	322.4	16.1	Sm. dec.	Lg. dec.	Low	Common	Poor	Very Poor	Infill +		2	6
American basswood	Tilia americana	WSL	Medium	44.6	264.0	10.9	No change	Sm. dec.	Medium	Common	Fair	Poor	Infill +	Infill +	2	7
northern white-cedar	Thuja occidentalis	WSH	High	23.9	262.9	14.0	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor	Infill +	Infill +	2	8
boxelder	Acer negundo	WSH	Low	43.5	261.5	10.1	No change	No change	High	Common	Good	Good	Infill ++	Infill ++	2	9
black willow	Salix nigra	NSH	Low	32.2	255.7	25.9	Lg. dec.	Lg. dec.	Low	Common	Very Poor	Very Poor			2	10
black ash	Fraxinus nigra	WSH	Medium	41.8	255.3	7.5	Lg. dec.	Lg. dec.	Low	Common	Very Poor	Very Poor			2	11
tamarack (native)	Larix laricina	NSH	High	15.2	192.6	13.6	Lg. dec.	Lg. dec.	Low	Common	Very Poor	Very Poor			2	12
white spruce	Picea glauca	NSL	Medium	9.8	188.4	24.6	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	13
eastern cottonwood	Populus deltoides	NSH	Low	12	153.9	15.0	No change	Sm. inc.	Medium	Common	Fair	Good	Infill +		2	14
white ash	Fraxinus americana	WDL	Medium	44.1	135.0	5.9	Sm. inc.	Sm. inc.	Low	Common	Fair	Fair	Infill +	Infill +	2	15
sugar maple	Acer saccharum	WDH	High	23.9	126.9	7.9	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good	Infill ++	Infill ++	2	16
red pine	Pinus resinosa	NSH	Medium	15.2	103.1	11.9	Sm. dec.	Sm. dec.	Low	Common	Poor	Poor	Infill +	Infill +	2	17
paper birch	Betula papyrifera	WDH	High	28.3	101.6	4.4	No change	No change	Medium	Common	Fair	Fair	Infill +	Infill +	2	18
black cherry	Prunus serotina	WDL	Medium	37.6	95.0	4.1	Lg. inc.	Lg. inc.	Low	Common	Good	Good	Infill ++	Infill ++	2	19
northern red oak	Quercus rubra	WDH	Medium	22.8	92.4	5.1	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good	Infill ++	Infill ++	2	20
bur oak	Quercus macrocarpa	NDH	Medium	28.9	92.1	5.3	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good	Infill ++	Infill ++	2	21
bitternut hickory	Carya cordiformis	WDL	Low	15.2	63.1	4.7	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good	Infill ++	Infill ++	2	22
white oak	Quercus alba	WSL	Medium	26.1	61.2	4.2	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good	Infill ++	Infill ++	2	23
bigtooth aspen	Populus grandidentata	NSL	Medium	7	60.0	6.5	Sm. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	24
swamp white oak	Quercus bicolor	NSL	Low	10.9	47.4	7.7	Sm. inc.	Lg. inc.	Medium	Rare	Fair	Good	Infill +	Infill ++	2	25
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	16.3	46.9	3.3	Lg. inc.	Sm. inc.	High	Rare	Good	Good	Infill ++	Infill ++	2	26
American beech	Fagus grandifolia	WDH	High	15.2	46.7	5.4	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			2	27
northern pin oak	Quercus ellipsoidalis	NSH	Medium	11.3	41.2	4.1	No change	Sm. dec.	High	Rare	Fair	Poor	Infill +	Infill +	2	28
yellow birch	Betula alleghaniensis	NDL	High	15.2	37.0	2.7	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			2	29
hackberry	Celtis occidentalis	WDH	Medium	3.3	33.1	8.5	Sm. inc.	Sm. inc.	High	Rare	Good	Good			2	30
Siberian elm	Ulmus pumila	NDH	FIA	2.2	26.0	10.0	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	31
honeylocust	Gleditsia triacanthos	NSH	Low	2.2	25.7	9.9	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	2	32
shagbark hickory	Carya ovata	WSL	Medium	32.2	25.5	6.9	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	2	33
Scots pine	Pinus sylvestris	NSH	FIA	2.2	22.9	8.8	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	34
eastern hemlock	Tsuga canadensis	NSH	High	10.9	16.8	2.4	Very Lg. dec.	Very Lg. dec.	Low	Rare	Lost	Lost			0	35
slippery elm	Ulmus rubra	WSL	Low	14.1	16.5	2.9	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	2	36
eastern redcedar	Juniperus virginiana	WDH	Medium	5	14.8	15.0	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	37
peachleaf willow	Salix amygdaloides	NSLX	FIA	1.5	9.9	2.3	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	38
chokecherry	Prunus virginiana	NSLX	FIA	7.6	5.7	1.2	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	39
black oak	Quercus velutina	WDH	High	1.1	5.2	4.0	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	40
serviceberry	Amelanchier spp.	NSL	Low	3.3	4.2	1.1	Very Lg. dec.	Very Lg. dec.	Medium	Rare	Lost	Lost			0	41
balsam fir	Abies balsamea	NDH	High	1.1	4.0	3.1	Very Lg. dec.	Very Lg. dec.	Low	Rare	Lost	Lost			0	42
balsam poplar	Populus balsamifera	NSH	Medium	3.3	2.9	0.7	Very Lg. dec.	Very Lg. dec.	Medium	Rare	Lost	Lost			0	43
American hornbeam; muscle	Carpinus caroliniana	WSL	Low	7.6	2.8	0.6	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	44
butternut	Juglans cinerea	NSLX	FIA	1.1	2.0	1.5	Unknown	Unknown	Low	Rare	FIA Only	FIA Only			0	45
pin cherry	Prunus pensylvanica	NSL	Low	1.1	0.7	0.5	Very Lg. dec.	Very Lg. dec.	Medium	Rare	Lost	Lost			0	46
rock elm	Ulmus thomasii	NSLX	FIA	4.3	0.5	1.4	Unknown	Unknown	Low	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
Ohio buckeye	Aesculus glabra	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	48
pignut hickory	Carya glabra	WDL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	49
black hickory	Carya texana	NDL	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	50
mockernut hickory	Carya alba	WDL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			3	51
eastern redbud	Cercis canadensis	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	52
black walnut	Juglans nigra	WDH	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Likely +	Likely +	3	53
Osage-orange	Maclura pomifera	NDH	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	54
red mulberry	Morus rubra	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Likely +	Likely +	3	55
sycamore	Platanus occidentalis	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	56
shingle oak	Quercus imbricaria	NDH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	57
blackjack oak	Quercus marilandica	NSL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			0	58
chinkapin oak	Quercus muehlenbergii	NSL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	59
pin oak	Quercus palustris	NSH	Low	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat		Migrate +	3	60
Shumard oak	Quercus shumardii	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			3	61
post oak	Quercus stellata	WDH	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			3	62
black locust	Robinia pseudoacacia	NDH	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Likely +	Likely +	3	63
sassafras	Sassafras albidum	WSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	64