

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
 8,000.0 3,088.8 80

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	4			High	8	20	Increase	13	15	Very Good	0	0	Likely	3	3
Hickory	3			Medium	21	27	No Change	14	8	Good	12	11	Infill	27	23
Maple	5	Abundant	0	Low	25	8	Decrease	17	21	Fair	12	14	Migrate	1	3
Oak	7	Common	12	FIA	4		New	10	10	Poor	11	8			
Pine	3	Rare	36				Unknown	4	4	Very Poor	6	7			
Other	26	Absent	10							FIA Only	1	1			
	48		58		58	55		58	58	Unknown	0	0			
											42	41			

Potential Changes in Climate Variables

Temperature (°F)

	Scenario	2009	2039	2069	2099	
Annual Average	CCSM45	50.1	51.8	54.4	54.5	
	CCSM85	50.1	52.6	55.2	58.2	
	GFDL45	50.1	56.2	55.7	56.6	
	GFDL85	50.1	53.2	56.7	61.0	
	HAD45	50.1	53.0	56.6	58.2	
	HAD85	50.1	53.4	58.0	62.9	
	Growing Season (May—Sep)	CCSM45	67.7	69.4	71.7	72.3
CCSM85		67.7	70.4	72.9	76.6	
GFDL45		67.7	75.3	74.4	75.8	
GFDL85		67.7	71.6	75.7	80.8	
HAD45		67.7	71.1	74.1	76.3	
HAD85		67.7	71.0	76.7	81.9	
Coldest Month Average		CCSM45	22.3	23.8	25.9	26.0
	CCSM85	22.3	24.9	26.4	28.1	
	GFDL45	22.3	25.8	26.6	27.2	
	GFDL85	22.3	25.4	26.7	28.0	
	HAD45	22.3	23.7	27.0	27.0	
	HAD85	22.3	25.6	28.3	31.1	
	Warmest Month Average	CCSM45	73.5	75.2	76.8	77.4
CCSM85		73.5	76.9	78.6	80.5	
GFDL45		73.5	76.4	78.3	79.3	
GFDL85		73.5	77.5	79.6	82.7	
HAD45		73.5	77.3	79.7	80.9	
HAD85		73.5	78.4	82.4	85.8	

Precipitation (in)

	Scenario	2009	2039	2069	2099	
Annual Total	CCSM45	37.3	37.0	37.1	37.7	
	CCSM85	37.3	37.9	37.7	39.1	
	GFDL45	37.3	40.0	43.9	44.9	
	GFDL85	37.3	39.6	44.8	46.7	
	HAD45	37.3	38.2	40.2	39.7	
Growing Season (May—Sep)	CCSM45	18.7	18.8	18.3	17.8	
	CCSM85	18.7	17.7	17.8	17.3	
	GFDL45	18.7	19.5	20.6	21.5	
	GFDL85	18.7	19.7	20.9	20.9	
	HAD45	18.7	19.0	17.6	18.5	
HAD85	18.7	18.5	15.5	16.1		

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
American elm	Ulmus americana	WDH	Medium	88.7	148.6	9.0	No change	No change	Medium	Common	Fair	Fair	Infill +	Infill +	1	1
sugar maple	Acer saccharum	WDH	High	70	125.5	13.6	Sm. dec.	Sm. dec.	High	Common	Fair	Fair	Infill +	Infill +	1	2
black cherry	Prunus serotina	WDL	Medium	55	111.6	9.1	Sm. dec.	Lg. dec.	Low	Common	Poor	Very Poor	Infill +		0	3
white ash	Fraxinus americana	WDL	Medium	72.5	107.2	7.6	No change	Sm. dec.	Low	Common	Poor	Poor	Infill +	Infill +	0	4
black walnut	Juglans nigra	WDH	Low	55	93.6	9.9	No change	No change	Medium	Common	Fair	Fair	Infill +	Infill +	1	5
American basswood	Tilia americana	WSL	Medium	63.7	90.6	11.2	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor	Infill +	Infill +	0	6
hackberry	Celtis occidentalis	WDH	Medium	61.2	82.0	7.5	No change	No change	High	Common	Good	Good	Infill ++	Infill ++	1	7
shagbark hickory	Carya ovata	WSL	Medium	58.7	78.0	11.5	No change	Sm. dec.	Medium	Common	Fair	Poor	Infill +	Infill +	1	8
green ash	Fraxinus pennsylvanica	WSH	Low	57.5	76.0	13.6	No change	No change	Medium	Common	Fair	Fair	Infill +	Infill +	1	9
red maple	Acer rubrum	WDH	High	37.5	66.0	9.1	Lg. dec.	Lg. dec.	High	Common	Fair	Fair	Infill +	Infill +	1	10
northern red oak	Quercus rubra	WDH	Medium	60	64.7	7.9	Sm. dec.	Sm. dec.	High	Common	Fair	Fair	Infill +	Infill +	1	11
bitternut hickory	Carya cordiformis	WSL	Low	50	51.4	5.8	No change	Sm. dec.	High	Common	Good	Fair	Infill ++	Infill +	1	12
boxelder	Acer negundo	WSH	Low	33.8	45.8	4.5	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	1	13
silver maple	Acer saccharinum	NSH	Low	27.5	45.0	12.6	Sm. inc.	Sm. inc.	High	Rare	Good	Good	Infill ++	Infill ++	1	14
honeylocust	Gleditsia triacanthos	NSH	Low	11.2	36.8	13.5	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	2	15
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	43.8	35.9	4.1	Lg. dec.	Lg. dec.	High	Rare	Poor	Poor	Infill +	Infill +	1	16
slippery elm	Ulmus rubra	WSL	Low	51.3	23.1	2.7	No change	Sm. inc.	Medium	Rare	Poor	Fair	Infill +	Infill +	1	17
white oak	Quercus alba	WDH	Medium	31.2	19.7	8.0	Lg. inc.	Sm. inc.	High	Rare	Good	Good	Infill ++	Infill ++	2	18
American beech	Fagus grandifolia	WDH	High	27.5	16.6	4.0	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			2	19
pignut hickory	Carya glabra	WDL	Medium	27.5	16.4	6.0	No change	Sm. dec.	Medium	Rare	Poor	Very Poor	Infill +		2	20
black locust	Robinia pseudoacacia	NDH	Low	6.3	15.8	11.4	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	21
pin oak	Quercus palustris	NSH	Low	26.3	12.4	3.6	Sm. inc.	Lg. inc.	Low	Rare	Poor	Fair	Infill +	Infill +	2	22
Osage-orange	Maclura pomifera	NDH	Medium	6.2	10.8	4.8	No change	Sm. inc.	High	Rare	Fair	Good	Infill +		2	23
yellow-poplar	Liriodendron tulipifera	WDH	High	21.2	8.3	4.2	Sm. dec.	Lg. dec.	High	Rare	Poor	Poor			0	24
eastern white pine	Pinus strobus	WDH	High	15	7.5	7.7	Lg. dec.	Very Lg. dec.	Low	Rare	Very Poor	Lost			0	25
northern catalpa	Catalpa speciosa	NSHX	FIA	5	7.2	22.3	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	26
eastern cottonwood	Populus deltoides	NSH	Low	21.2	6.9	2.5	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	2	27
Siberian elm	Ulmus pumila	NDH	FIA	10	6.5	10.0	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	28
swamp white oak	Quercus bicolor	NSL	Low	15	5.3	5.4	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	29
bur oak	Quercus macrocarpa	NDH	Medium	20	5.1	3.9	Lg. inc.	Lg. inc.	High	Rare	Good	Good			2	30
sassafras	Sassafras albidum	WSL	Low	11.3	4.6	2.1	Sm. inc.	Lg. dec.	Medium	Rare	Fair	Very Poor	Infill +		1	31
chinkapin oak	Quercus muehlenbergii	NSL	Medium	16.2	4.4	1.6	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	32
white mulberry	Morus alba	NSL	FIA	6.3	4.0	2.2	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	33
Ohio buckeye	Aesculus glabra	NSL	Low	30	2.6	1.4	Lg. inc.	Sm. inc.	Medium	Rare	Good	Fair	Infill ++	Infill +	2	34
bigtooth aspen	Populus grandidentata	NSL	Medium	1.2	2.5	1.9	Very Lg. dec.	Very Lg. dec.	Medium	Rare	Lost	Lost			0	35
sycamore	Platanus occidentalis	NSL	Low	5	2.3	7.0	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	36
American hornbeam; musclev	Carpinus caroliniana	WSL	Low	20	2.1	1.6	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	37
black oak	Quercus velutina	WDH	High	10	2.0	3.0	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	2	38
red mulberry	Morus rubra	NSL	Low	5	1.8	5.5	No change	No change	Medium	Rare	Poor	Poor	Infill +		2	39
flowering dogwood	Cornus florida	WDL	Medium	11.2	1.6	0.7	Very Lg. dec.	Very Lg. dec.	Medium	Rare	Lost	Lost			0	40
black maple	Acer nigrum	NSH	Low	1.2	1.0	0.8	Very Lg. dec.	Very Lg. dec.	High	Rare	Lost	Lost			0	41
Scots pine	Pinus sylvestris	NSH	FIA	5	0.5	1.7	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	42
black ash	Fraxinus nigra	WSH	Medium	10	0.5	0.8	Lg. dec.	Lg. dec.	Low	Rare	Very Poor	Very Poor			0	43
eastern redcedar	Juniperus virginiana	WDH	Medium	5	0.5	1.5	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	44
blue ash	Fraxinus quadrangulata	NSL	Low	10	0.4	0.6	Lg. inc.	Lg. inc.	Low	Rare	Fair	Fair			0	45
black willow	Salix nigra	NSH	Low	5	0.3	1.0	Lg. dec.	Lg. inc.	Low	Rare	Very Poor	Fair		Infill +	2	46
jack pine	Pinus banksiana	NSH	Medium	5	0.2	0.7	Lg. dec.	Lg. dec.	High	Rare	Poor	Poor			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
pawpaw	Asimina triloba	NSL	Low	5	0.1	0.4	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	48
pecan	Carya illinoensis	NSH	Low	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat			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	Likely +	Likely +	3	51
sugarberry	Celtis laevigata	NDH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	52
eastern redbud	Cercis canadensis	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Likely +	Likely +	3	53
common persimmon	Diospyros virginiana	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate +	3	54
blackjack oak	Quercus marilandica	NSL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			3	55
Shumard oak	Quercus shumardii	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate +	3	56
post oak	Quercus stellata	WDH	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate ++	Migrate ++	3	57
winged elm	Ulmus alata	WDL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Likely +	Likely +	3	58