

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
 8,100.0 3,127.4 171

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			High	17	23	Increase	30	29	Very Good	16	17	Likely	4	4
Hickory	4			Medium	24	41	No Change	7	8	Good	15	14	Infill	14	15
Maple	4	Abundant	2	Low	31	9	Decrease	20	20	Fair	6	6	Migrate	1	3
Oak	13	Common	32	FIA	3		New	10	11	Poor	11	11			
Pine	3	Rare	26				Unknown	8	7	Very Poor	8	8			
Other	33	Absent	13							FIA Only	1	1			
	60		73		75	73		75	75	Unknown	5	4			
											62	61			

Potential Changes in Climate Variables

Temperature (°F)

	Scenario	2009	2039	2069	2099	
Annual Average	CCSM45	58.2	60.0	62.3	62.5	
	CCSM85	58.2	60.4	63.1	66.0	
	GFDL45	58.2	61.3	63.1	63.9	
	GFDL85	58.2	60.9	64.2	67.7	
	HAD45	58.2	60.6	63.9	65.1	
HAD85	58.2	61.1	65.6	69.4		
Growing Season (May—Sep)	CCSM45	73.1	74.7	76.8	77.3	
	CCSM85	73.1	75.1	78.0	81.7	
	GFDL45	73.1	76.5	78.6	79.9	
	GFDL85	73.1	76.0	80.2	84.1	
	HAD45	73.1	76.3	79.4	80.9	
HAD85	73.1	76.7	83.3	86.7		
Coldest Month (Average)	CCSM45	35.7	37.7	39.1	39.3	
	CCSM85	35.7	38.9	40.0	41.4	
	GFDL45	35.7	39.4	39.3	39.6	
	GFDL85	35.7	37.3	38.4	38.9	
	HAD45	35.7	35.9	38.1	38.5	
HAD85	35.7	37.3	39.0	40.6		
Warmest Month (Average)	CCSM45	78.2	79.8	80.9	81.0	
	CCSM85	78.2	80.1	81.8	83.6	
	GFDL45	78.2	81.0	82.5	83.4	
	GFDL85	78.2	81.2	83.7	85.8	
	HAD45	78.2	82.6	85.2	85.8	
HAD85	78.2	83.8	88.5	89.9		

Precipitation (in)

	Scenario	2009	2039	2069	2099	
Annual Total	CCSM45	52.7	54.7	59.7	57.5	
	CCSM85	52.7	58.6	58.8	63.5	
	GFDL45	52.7	59.8	62.4	65.9	
	GFDL85	52.7	60.0	63.2	66.4	
	HAD45	52.7	50.1	55.0	55.2	
HAD85	52.7	52.9	48.7	53.9		
Growing Season (May—Sep)	CCSM45	21.4	20.9	22.1	21.7	
	CCSM85	21.4	22.4	20.2	22.2	
	GFDL45	21.4	24.9	25.2	26.2	
	GFDL85	21.4	24.9	25.8	26.6	
	HAD45	21.4	20.2	20.1	20.0	
HAD85	21.4	21.2	16.1	17.9		

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
eastern redcedar	Juniperus virginiana	WDH	Medium	80.2	2025.7	27.8	Sm. dec.	Sm. dec.	Medium	Abundant	Fair	Fair			0	1
hackberry	Celtis occidentalis	WDH	Medium	70.4	622.5	9.3	No change	No change	High	Abundant	Very Good	Very Good			1	2
white ash	Fraxinus americana	WDL	Medium	61.7	446.1	7.8	Sm. dec.	Sm. dec.	Low	Common	Poor	Poor			0	3
shagbark hickory	Carya ovata	WSL	Medium	59.3	439.6	8.8	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	4
winged elm	Ulmus alata	WDL	Medium	74.1	388.4	5.9	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	5
sassafras	Sassafras albidum	WSL	Low	27.2	312.6	12.5	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	6
chinkapin oak	Quercus muehlenbergii	NSL	Medium	63	255.0	4.7	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor			0	7
black walnut	Juglans nigra	WDH	Low	54.3	241.5	5.0	No change	No change	Medium	Common	Fair	Fair			1	8
sugar maple	Acer saccharum	WDH	High	50.6	240.7	5.2	Lg. dec.	Lg. dec.	High	Common	Fair	Fair			1	9
American elm	Ulmus americana	WDH	Medium	53.1	228.5	4.7	Sm. inc.	Lg. inc.	Medium	Common	Good	Very Good	Infill ++	Infill ++	1	10
black locust	Robinia pseudoacacia	NDH	Low	37	191.1	6.2	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	11
blue ash	Fraxinus quadrangulata	NSL	Low	33.3	188.2	6.0	Sm. dec.	Sm. dec.	Low	Common	Poor	Poor	Infill +	Infill +	0	12
sugarberry	Celtis laevigata	NDH	Medium	35.8	172.0	5.0	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	13
Osage-orange	Maclura pomifera	NDH	Medium	28.4	168.2	5.5	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good	Infill ++	Infill ++	1	14
post oak	Quercus stellata	WDH	High	24.7	167.1	9.5	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good	Infill ++	Infill ++	1	15
yellow-poplar	Liriodendron tulipifera	WDH	High	21	156.4	8.7	No change	No change	High	Common	Good	Good			1	16
boxelder	Acer negundo	WSH	Low	23.5	144.4	6.8	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	17
scarlet oak	Quercus coccinea	WDL	Medium	30.9	133.1	5.6	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	18
mockernut hickory	Carya alba	WDL	Medium	29.6	125.6	5.5	Sm. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	19
white oak	Quercus alba	WDH	Medium	24.7	125.3	7.4	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	20
sweetgum	Liquidambar styraciflua	WDH	High	17.3	121.1	14.1	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	21
honeylocust	Gleditsia triacanthos	NSH	Low	29.6	118.1	3.7	Sm. inc.	Lg. inc.	High	Common	Very Good	Very Good	Infill ++	Infill ++	1	22
green ash	Fraxinus pennsylvanica	WSH	Low	30.9	115.8	4.1	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	23
southern red oak	Quercus falcata	WDL	Medium	13.6	109.7	11.5	Sm. inc.	Lg. inc.	High	Common	Very Good	Very Good	Infill ++	Infill ++	1	24
red maple	Acer rubrum	WDH	High	16	106.9	8.7	No change	No change	High	Common	Good	Good	Infill ++	Infill ++	1	25
ailanthus	Ailanthus altissima	NSL	FIA	24.7	104.0	4.7	Unknown	Unknown	NA	Common	NNIS	NNIS			0	26
pignut hickory	Carya glabra	WDL	Medium	35.8	102.6	3.6	No change	No change	Medium	Common	Fair	Fair			1	27
slippery elm	Ulmus rubra	WSL	Low	34.6	82.1	2.5	Sm. inc.	Lg. inc.	Medium	Common	Good	Very Good			1	28
black cherry	Prunus serotina	WDL	Medium	16	79.2	4.6	Sm. inc.	Sm. inc.	Low	Common	Fair	Fair			1	29
chestnut oak	Quercus prinus	NDH	High	12.3	71.6	8.2	Sm. inc.	No change	High	Common	Very Good	Good	Infill ++	Infill ++	1	30
northern red oak	Quercus rubra	WDH	Medium	33.3	65.5	2.5	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	31
blackgum	Nyssa sylvatica	WDL	Medium	16	56.6	4.5	Sm. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	32
loblolly pine	Pinus taeda	WDH	High	3.7	53.5	13.4	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good	Infill ++	Infill ++	2	33
common persimmon	Diospyros virginiana	NSL	Low	30.9	50.7	2.1	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	34
sourwood	Oxydendrum arboreum	NDL	High	17.3	48.1	3.5	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor			1	35
black oak	Quercus velutina	WDH	High	19.8	46.5	3.7	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	1	36
bitternut hickory	Carya cordiformis	WSL	Low	16	46.0	3.5	Sm. inc.	Sm. inc.	High	Rare	Good	Good	Infill ++	Infill ++	1	37
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	28.4	43.0	1.7	Lg. inc.	Lg. inc.	High	Rare	Good	Good			1	38
eastern redbud	Cercis canadensis	NSL	Low	39.5	37.5	1.3	Sm. inc.	Sm. inc.	Medium	Rare	Fair	Fair			1	39
American beech	Fagus grandifolia	WDH	High	9.9	36.4	3.4	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	40
Shumard oak	Quercus shumardii	NSL	Low	13.6	36.0	3.6	Lg. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	1	41
red mulberry	Morus rubra	NSL	Low	17.3	33.8	2.4	Lg. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	42
sycamore	Platanus occidentalis	NSL	Low	16	28.4	3.6	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	1	43
flowering dogwood	Cornus florida	WDL	Medium	18.5	23.4	1.6	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			1	44
silver maple	Acer saccharinum	NSH	Low	1.2	22.3	16.8	Lg. dec.	Lg. dec.	High	Rare	Poor	Poor			0	45
American hornbeam; musclev	Carpinus caroliniana	WSL	Low	12.3	16.3	2.0	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			1	46
eastern cottonwood	Populus deltoides	NSH	Low	2.5	15.5	5.8	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very 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	
pitch pine	Pinus rigida	NSH	High	1.2	8.5	6.3	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor				0	48
pin oak	Quercus palustris	NSH	Low	1.2	7.8	5.9	Sm. dec.	Sm. dec.	Low	Rare	Very Poor	Very Poor				0	49
willow oak	Quercus phellos	NSL	Low	7.4	7.1	2.7	No change	No change	Medium	Rare	Poor	Poor		Infill +		2	50
yellow buckeye	Aesculus flava	NSL	Low	3.7	7.0	1.8	Sm. dec.	Sm. dec.	Low	Rare	Very Poor	Very Poor				0	51
serviceberry	Amelanchier spp.	NSL	Low	2.5	5.1	1.9	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor				0	52
wild plum	Prunus americana	NSLX	FIA	1.2	4.8	3.6	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only				0	53
pawpaw	Asimina triloba	NSL	Low	2.5	3.7	1.4	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor				0	54
blackjack oak	Quercus marilandica	NSL	Medium	1.2	2.9	2.2	Lg. inc.	Lg. inc.	High	Rare	Good	Good				2	55
white mulberry	Morus alba	NSL	FIA	2.5	2.7	1.0	Unknown	Unknown	NA	Rare	NNIS	NNIS				0	56
American basswood	Tilia americana	WSL	Medium	2.5	2.3	0.9	Very Lg. dec.	Very Lg. dec.	Medium	Rare	Lost	Lost				0	57
pin cherry	Prunus pensylvanica	NSL	Low	1.2	0.7	0.5	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor				0	58
shortleaf pine	Pinus echinata	WDH	High	1.2	0.6	0.5	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good				2	59
cherrybark oak; swamp red o.	Quercus pagoda	NSL	Medium	4.9	0.6	1.7	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good				2	60
ashe juniper	Juniperus ashei	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat				0	61
Virginia pine	Pinus virginiana	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Likely +	Likely +		3	62
florida maple	Acer barbatum	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Likely +	Likely +		3	63
striped maple	Acer pensylvanicum	NSL	Medium	0	0	0	Unknown	New Habitat	Medium	Absent	Unknown	New Habitat				3	64
Ohio buckeye	Aesculus glabra	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown				0	65
cittamwood/gum bumelia	Sideroxylon lanuginosum ssp.	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate ++		3	66
pecan	Carya illinoensis	NSH	Low	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat	Likely +	Likely +		3	67
black hickory	Carya texana	NDL	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +		3	68
black ash	Fraxinus nigra	WSH	Medium	0	0	0	Unknown	Unknown	Low	Absent	Unknown	Unknown				0	69
cucumbertree	Magnolia acuminata	NSL	Low	0	0	0	Unknown	Unknown	Medium	Modeled	Unknown	Unknown				0	70
bigleaf magnolia	Magnolia macrophylla	NSL	Low	0	0	0	Unknown	Unknown	Medium	Modeled	Unknown	Unknown				0	71
water oak	Quercus nigra	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Likely +	Likely +		3	72
live oak	Quercus virginiana	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat				3	73
black willow	Salix nigra	NSH	Low	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat		Migrate +		3	74
cedar elm	Ulmus crassifolia	NDH	Medium	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat				3	75