

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	8,246.4	3,184.0	120

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	11	17	Increase	20	26	Very Good	4	4	Likely	1	1
Hickory	4			Medium	30	43	No Change	18	14	Good	12	18	Infill	33	35
Maple	2	Abundant	1	Low	30	11	Decrease	13	11	Fair	14	10	Migrate	0	2
Oak	13	Common	11	FIA	1		New	8	9	Poor	10	11			
Pine	4	Rare	40				Unknown	13	12	Very Poor	9	8			
Other	26	Absent	16							FIA Only	1	1			
	52		68		72	71		72	72	Unknown	12	11			
											62	63			

Potential Changes in Climate Variables

Temperature (°F)

	Scenario	2009	2039	2069	2099	
Annual Average	CCSM45	68.2	69.7	71.3	71.4	
	CCSM85	68.2	70.0	72.3	74.3	
	GFDL45	68.2	72.3	72.2	73.2	
	GFDL85	68.2	70.6	73.5	76.6	
	HAD45	68.2	70.2	72.7	73.7	
	HAD85	68.2	70.5	73.6	76.9	
Growing Season (May—Sep)	CCSM45	79.9	81.2	82.2	82.5	
	CCSM85	79.9	81.4	83.5	85.8	
	GFDL45	79.9	84.7	84.1	86.0	
	GFDL85	79.9	82.7	85.7	89.5	
	HAD45	79.9	82.2	84.3	84.9	
	HAD85	79.9	82.4	85.9	88.6	
Coldest Month Average	CCSM45	50.1	52.5	53.5	53.5	
	CCSM85	50.1	52.7	53.9	55.2	
	GFDL45	50.1	53.3	53.4	53.5	
	GFDL85	50.1	51.3	52.3	52.9	
	HAD45	50.1	51.1	52.7	53.5	
	HAD85	50.1	52.6	54.0	55.8	
Warmest Month Average	CCSM45	83.2	84.3	84.7	84.8	
	CCSM85	83.2	84.7	85.3	86.5	
	GFDL45	83.2	86.5	86.7	88.1	
	GFDL85	83.2	86.5	87.9	90.1	
	HAD45	83.2	85.8	86.7	86.8	
	HAD85	83.2	86.1	87.9	88.9	

Precipitation (in)

	Scenario	2009	2039	2069	2099	
Annual Total	CCSM45	58.9	61.5	67.3	65.1	
	CCSM85	58.9	61.9	64.9	64.6	
	GFDL45	58.9	62.6	72.3	61.7	
	GFDL85	58.9	61.2	63.3	62.3	
	HAD45	58.9	57.7	57.4	63.1	
	HAD85	58.9	62.2	55.7	58.2	
Growing Season (May—Sep)	CCSM45	27.9	30.1	31.9	30.2	
	CCSM85	27.9	28.8	29.3	27.8	
	GFDL45	27.9	31.3	38.3	30.8	
	GFDL85	27.9	30.5	32.5	33.1	
	HAD45	27.9	27.1	26.8	29.6	
	HAD85	27.9	27.8	24.9	25.0	

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.

Cite as: Iverson, L.R.; Prasad, A.M.; Peters, M.P.; Matthews, S.N. 2019. Facilitating Adaptive Forest Management under Climate Change: A Spatially Specific Synthesis of 125 Species for Habitat Changes and Assisted Migration over the Eastern United States. *Forests*. 10(11): 989. <https://doi.org/10.3390/f10110989>.

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
loblolly pine	Pinus taeda	WDH	High	64.3	1663.7	32.5	No change	No change	Medium	Abundant	Good	Good	Infill ++	Infill ++	1	1
slash pine	Pinus elliotii	NDH	High	14.6	457.4	23.6	No change	No change	Medium	Common	Fair	Fair	Infill +	Infill +	1	2
water oak	Quercus nigra	WDH	High	67.9	442.1	10.0	Sm. inc.	Sm. inc.	Medium	Common	Good	Good	Infill ++	Infill ++	1	3
sweetgum	Liquidambar styraciflua	WDH	High	66.7	417.4	9.1	Sm. inc.	Sm. inc.	Medium	Common	Good	Good	Infill ++	Infill ++	1	4
laurel oak	Quercus laurifolia	NDH	Medium	57	314.5	7.7	No change	No change	Medium	Common	Fair	Fair	Infill +	Infill +	1	5
blackgum	Nyssa sylvatica	WDL	Medium	46.1	248.7	5.9	No change	No change	High	Common	Good	Good	Infill ++	Infill ++	1	6
red maple	Acer rubrum	WDH	High	49.7	114.9	2.9	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good	Infill ++	Infill ++	1	7
sweetbay	Magnolia virginiana	NSL	Medium	21.8	104.4	4.4	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor	Infill +	Infill +	0	8
longleaf pine	Pinus palustris	NSH	Medium	8.5	100.7	8.9	No change	No change	Medium	Common	Fair	Fair	Infill +	Infill +	1	9
willow oak	Quercus phellos	NSL	Low	19.4	93.9	4.6	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good	Infill ++	Infill ++	1	10
bald cypress	Taxodium distichum	NSH	Medium	12.1	64.6	6.9	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good	Infill ++	Infill ++	1	11
southern red oak	Quercus falcata	WDL	Medium	21.8	55.6	3.1	Sm. inc.	Lg. inc.	High	Common	Very Good	Very Good	Infill ++	Infill ++	1	12
American holly	Ilex opaca	NSL	Medium	31.5	45.6	1.6	Sm. inc.	Sm. inc.	Medium	Rare	Fair	Fair	Infill +	Infill +	1	13
American elm	Ulmus americana	WDH	Medium	26.7	41.2	2.9	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	1	14
American hornbeam; muscley	Carpinus caroliniana	WSL	Low	12.1	36.6	2.3	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	1	15
post oak	Quercus stellata	WDH	High	10.9	35.4	2.4	Lg. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	2	16
green ash	Fraxinus pennsylvanica	WSH	Low	21.8	34.3	1.6	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	1	17
water tupelo	Nyssa aquatica	NSH	Medium	4.9	33.8	5.2	No change	No change	Low	Rare	Very Poor	Very Poor			2	18
sugarberry	Celtis laevigata	NDH	Medium	17	28.9	13.4	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	2	19
swamp chestnut oak	Quercus michauxii	NSL	Low	12.1	28.1	3.2	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	1	20
live oak	Quercus virginiana	NDH	High	6.1	25.7	9.0	No change	Lg. inc.	Medium	Rare	Poor	Good	Infill +		2	21
water hickory	Carya aquatica	NSL	Medium	8.5	23.0	2.0	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	22
overcup oak	Quercus lyrata	NSL	Medium	7.3	21.0	2.2	No change	Sm. inc.	Low	Rare	Very Poor	Poor		Infill +	2	23
black willow	Salix nigra	NSH	Low	12.1	19.6	5.4	Lg. inc.	Lg. inc.	Low	Rare	Fair	Fair	Infill +	Infill +	2	24
redbay	Persea borbonia	NSL	Low	19.4	17.7	1.3	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	1	25
shortleaf pine	Pinus echinata	WDH	High	2.4	17.6	5.5	No change	No change	Medium	Rare	Poor	Poor		Infill +	2	26
cherrybark oak; swamp red o	Quercus pagoda	NSL	Medium	20.6	17.5	1.9	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	1	27
white oak	Quercus alba	WDH	Medium	8.5	17.1	1.5	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	2	28
southern magnolia	Magnolia grandiflora	NSL	Low	13.3	16.1	1.7	Sm. inc.	Sm. inc.	Medium	Rare	Fair	Fair	Infill +	Infill +	1	29
mockernut hickory	Carya alba	WDL	Medium	13.3	9.2	2.1	Sm. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	1	30
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	3.6	8.0	1.7	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	2	31
sassafras	Sassafras albidum	WSL	Low	8.5	7.4	0.7	No change	Sm. dec.	Medium	Rare	Poor	Very Poor	Infill +		1	32
blackjack oak	Quercus marilandica	NSL	Medium	4.9	5.6	0.9	Lg. dec.	Sm. dec.	High	Rare	Poor	Poor			0	33
black cherry	Prunus serotina	WDL	Medium	13.3	5.4	1.6	Sm. dec.	Sm. inc.	Low	Rare	Very Poor	Poor		Infill +	1	34
slippery elm	Ulmus rubra	WSL	Low	12.1	5.3	1.3	Sm. dec.	Lg. inc.	Medium	Rare	Very Poor	Good		Infill ++	2	35
swamp tupelo	Nyssa biflora	NDH	Medium	1.2	5.3	3.3	No change	No change	Low	Rare	Very Poor	Very Poor			2	36
water elm	Planera aquatica	NSL	Low	2.4	4.8	1.5	Sm. inc.	Lg. inc.	Medium	Rare	Fair	Good	Infill +		2	37
Carolina ash	Fraxinus caroliniana	NSL	FIA	6.1	4.2	4.9	Unknown	Unknown	NA	Rare	FIA Only	FIA Only			0	38
white ash	Fraxinus americana	WDL	Medium	3.6	4.0	0.8	Sm. dec.	Sm. dec.	Low	Rare	Very Poor	Very Poor			2	39
winged elm	Ulmus alata	WDL	Medium	3.6	3.8	0.8	Sm. inc.	Lg. inc.	Medium	Rare	Fair	Good		Infill ++	2	40
common persimmon	Diospyros virginiana	NSL	Low	7.3	3.8	1.6	Lg. dec.	Lg. dec.	High	Rare	Poor	Poor			0	41
bluejack oak	Quercus incana	NSL	Low	1.2	3.2	2.0	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	42
black hickory	Carya texana	NDL	High	3.6	3.0	0.6	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	43
cedar elm	Ulmus crassifolia	NDH	Medium	6.1	2.5	1.0	Lg. inc.	Lg. inc.	Low	Rare	Fair	Fair	Infill +	Infill +	2	44
river birch	Betula nigra	NSL	Low	2.4	1.4	0.4	Very Lg. dec.	No change	Medium	Rare	Lost	Poor		Infill +	2	45
flowering dogwood	Cornus florida	WDL	Medium	1.2	1.1	0.7	Very Lg. dec.	Sm. dec.	Medium	Rare	Lost	Very Poor			0	46
bitternut hickory	Carya cordiformis	WSL	Low	4.9	0.9	2.2	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor			0	47

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
Nuttall oak	Quercus texana	NSH	Medium	4.9	0.7	1.6	No change	Lg. inc.	High	Rare	Fair	Good			0	48
cittamwood/gum bumelia	Sideroxylon lanuginosum ssp.	NSL	Low	1.2	0.6	0.3	No change	Lg. inc.	High	Rare	Fair	Good	Infill +		2	49
black locust	Robinia pseudoacacia	NDH	Low	1.2	0.6	0.3	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	50
eastern redcedar	Juniperus virginiana	WDH	Medium	4.9	0.4	1.1	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	51
florida maple	Acer barbatum	NSL	Low	1.2	0.4	0.2	Lg. dec.	Lg. dec.	High	Rare	Poor	Poor			0	52
Atlantic white-cedar	Chamaecyparis thyoides	NSH	Low	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat			3	53
striped maple	Acer pensylvanicum	NSL	Medium	0	0	0	Unknown	New Habitat	Medium	Absent	Unknown	New Habitat			3	54
serviceberry	Amelanchier spp.	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	55
pawpaw	Asimina triloba	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	56
pecan	Carya illinoensis	NSH	Low	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat		Migrate ++	3	57
eastern redbud	Cercis canadensis	NSL	Low	0	0	0	Unknown	Unknown	Medium	Modeled	Unknown	Unknown			0	58
black ash	Fraxinus nigra	WSH	Medium	0	0	0	Unknown	Unknown	Low	Absent	Unknown	Unknown			0	59
blue ash	Fraxinus quadrangulata	NSL	Low	0	0	0	Unknown	Unknown	Low	Modeled	Unknown	Unknown			0	60
honeylocust	Gleditsia triacanthos	NSH	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate +	3	61
silverbell	Halesia spp.	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	62
bigleaf magnolia	Magnolia macrophylla	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	63
red mulberry	Morus rubra	NSL	Low	0	0	0	Unknown	Unknown	Medium	Modeled	Unknown	Unknown			0	64
sourwood	Oxydendrum arboreum	NDL	High	0	0	0	Unknown	Unknown	High	Modeled	Unknown	Unknown			0	65
sycamore	Platanus occidentalis	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Likely +	Likely +	3	66
pin cherry	Prunus pensylvanica	NSL	Low	0	0	0	Unknown	New Habitat	Medium	Absent	Unknown	New Habitat			3	67
chinkapin oak	Quercus muehlenbergii	NSL	Medium	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	68
northern red oak	Quercus rubra	WDH	Medium	0	0	0	Unknown	Unknown	High	Absent	Unknown	Unknown			0	69
black oak	Quercus velutina	WDH	High	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	70
cabbage palmetto	Sabal palmetto	NDH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	71
American basswood	Tilia americana	WSL	Medium	0	0	0	New Habitat	Unknown	Medium	Absent	New Habitat	Unknown			3	72