

**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  
 8,803.9    3,399.2    103

**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	20	23	Increase	20	23	Very Good	4	5	Likely	2	2
Hickory	4			Medium	33	49	No Change	11	10	Good	14	16	Infill	33	35
Maple	5	Abundant	2	Low	30	12	Decrease	20	18	Fair	12	11	Migrate	14	12
Oak	12	Common	22	FIA	6		New	27	28	Poor	11	11			
Pine	3	Rare	33				Unknown	11	10	Very Poor	9	7			
Other	30	Absent	30							FIA Only	1	1			
	<b>57</b>		<b>87</b>		<b>89</b>	<b>84</b>		<b>89</b>	<b>89</b>	Unknown	5	4			
											<b>56</b>	<b>55</b>			

**Potential Changes in Climate Variables**

**Temperature (°F)**

	Scenario	2009	2039	2069	2099	
Annual Average	CCSM45	55.3	57.0	59.1	59.4	
	CCSM85	55.3	57.3	59.8	62.9	
	GFDL45	55.3	59.9	60.8	61.9	
	GFDL85	55.3	58.5	62.0	66.0	
	HAD45	55.3	57.8	61.2	62.6	
Growing Season (May-Sep)	CCSM45	71.2	72.9	74.7	75.1	
	CCSM85	71.2	73.1	75.7	79.4	
	GFDL45	71.2	76.5	77.5	79.1	
	GFDL85	71.2	75.2	79.0	83.5	
	HAD45	71.2	74.1	77.2	79.0	
Coldest Month (Average)	CCSM45	31.5	33.5	35.0	35.4	
	CCSM85	31.5	33.9	35.2	36.9	
	GFDL45	31.5	34.7	35.3	35.9	
	GFDL85	31.5	34.4	35.6	37.0	
	HAD45	31.5	33.2	35.4	35.6	
Warmest Month (Average)	CCSM45	77.0	79.1	79.9	80.2	
	CCSM85	77.0	79.2	81.0	82.5	
	GFDL45	77.0	80.0	81.7	83.1	
	GFDL85	77.0	81.4	83.6	86.3	
	HAD45	77.0	80.3	82.2	83.2	
HAD85	77.0	80.5	83.3	86.7		

**Precipitation (in)**

	Scenario	2009	2039	2069	2099	
Annual Total	CCSM45	44.5	47.9	50.2	52.0	
	CCSM85	44.5	48.6	50.1	56.3	
	GFDL45	44.5	49.9	53.6	53.9	
	GFDL85	44.5	46.5	53.4	54.5	
	HAD45	44.5	47.1	48.5	47.5	
Growing Season (May-Sep)	CCSM45	19.9	23.3	24.5	25.6	
	CCSM85	19.9	23.1	23.5	26.6	
	GFDL45	19.9	21.1	23.2	23.6	
	GFDL85	19.9	19.7	22.6	22.9	
	HAD45	19.9	21.3	20.1	18.9	
HAD85	19.9	22.2	18.7	19.5		

**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
yellow-poplar	Liriodendron tulipifera	WDH	High	53.3	743.6	19.6	Lg. dec.	Lg. dec.	High	Abundant	Good	Good	Infill ++	Infill ++	1	1
red maple	Acer rubrum	WDH	High	61.8	703.8	16.3	Sm. dec.	Sm. dec.	High	Abundant	Good	Good	Infill ++	Infill ++	1	2
sweetgum	Liquidambar styraciflua	WDH	High	28.2	255.6	14.4	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good	Infill ++	Infill ++	1	3
black cherry	Prunus serotina	WDL	Medium	42	242.3	9.3	No change	No change	Low	Common	Poor	Poor	Infill +	Infill +	0	4
black oak	Quercus velutina	WDH	High	38.8	201.3	8.3	Sm. inc.	Sm. inc.	Medium	Common	Good	Good	Infill ++	Infill ++	1	5
blackgum	Nyssa sylvatica	WDL	Medium	60	185.2	7.0	No change	Sm. inc.	High	Common	Good	Very Good	Infill ++	Infill ++	1	6
American beech	Fagus grandifolia	WDH	High	30.2	178.9	8.9	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor	Infill +	Infill +	0	7
white oak	Quercus alba	WDH	Medium	54.6	173.5	7.1	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good	Infill ++	Infill ++	1	8
Virginia pine	Pinus virginiana	NDH	High	14.7	171.3	16.2	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor	Infill +	Infill +	0	9
chestnut oak	Quercus prinus	NDH	High	31.9	168.1	20.5	Lg. dec.	Lg. dec.	High	Common	Fair	Fair	Infill +	Infill +	1	10
black locust	Robinia pseudoacacia	NDH	Low	26.8	163.5	11.5	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor	Infill +	Infill +	0	11
mockernut hickory	Carya alba	WDL	Medium	21.8	118.3	6.5	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good	Infill ++	Infill ++	1	12
northern red oak	Quercus rubra	WDH	Medium	37.1	117.6	6.5	No change	No change	High	Common	Good	Good	Infill ++	Infill ++	1	13
scarlet oak	Quercus coccinea	WDL	Medium	27.6	113.9	6.8	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor	Infill +	Infill +	0	14
pignut hickory	Carya glabra	WDL	Medium	31.4	112.2	6.9	No change	No change	Medium	Common	Fair	Fair	Infill +	Infill +	1	15
white ash	Fraxinus americana	WDL	Medium	25.6	104.4	7.7	No change	No change	Low	Common	Poor	Poor	Infill +	Infill +	0	16
sassafras	Sassafras albidum	WSL	Low	35.9	100.5	5.0	Lg. dec.	Sm. dec.	Medium	Common	Poor	Poor	Infill +	Infill +	0	17
black walnut	Juglans nigra	WDH	Low	20.4	91.6	6.8	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor	Infill +	Infill +	0	18
loblolly pine	Pinus taeda	WDH	High	12.7	84.5	15.7	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good	Infill ++	Infill ++	2	19
sycamore	Platanus occidentalis	NSL	Low	16	81.1	9.5	Sm. inc.	Sm. inc.	Medium	Common	Good	Good	Infill ++	Infill ++	2	20
boxelder	Acer negundo	WSH	Low	19.5	77.2	6.0	No change	No change	High	Common	Good	Good	Infill ++	Infill ++	1	21
eastern cottonwood	Populus deltoides	NSH	Low	2.8	68.6	28.0	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor			0	22
Norway spruce	Picea abies	NSH	FIA	1.1	61.3	50.0	Unknown	Unknown	NA	Common	NNIS	NNIS			0	23
cherrybark oak; swamp red o	Quercus pagoda	NSL	Medium	1	61.3	45.9	No change	No change	Medium	Common	Fair	Fair	Infill +	Infill +	2	24
eastern white pine	Pinus strobus	WDH	High	1.1	44.9	36.7	Lg. dec.	Lg. dec.	Low	Rare	Very Poor	Very Poor			0	25
slippery elm	Ulmus rubra	WSL	Low	3.4	42.0	11.4	Sm. dec.	No change	Medium	Rare	Very Poor	Poor		Infill +	2	26
southern red oak	Quercus falcata	WDL	Medium	12.5	37.4	6.6	Lg. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	2	27
silver maple	Acer saccharinum	NSH	Low	6.8	35.0	13.9	Sm. dec.	No change	High	Rare	Poor	Fair		Infill +	2	28
pin oak	Quercus palustris	NSH	Low	4.5	33.8	6.9	Sm. dec.	Sm. dec.	Low	Rare	Very Poor	Very Poor			2	29
ailanthus	Ailanthus altissima	NSL	FIA	8	31.4	6.5	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	30
bitternut hickory	Carya cordiformis	WSL	Low	6.6	29.6	7.2	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	2	31
American elm	Ulmus americana	WDH	Medium	15.8	24.3	7.7	Sm. inc.	Lg. inc.	Medium	Rare	Fair	Good	Infill +		2	32
flowering dogwood	Cornus florida	WDL	Medium	16.6	19.5	1.6	Sm. inc.	Sm. inc.	Medium	Rare	Fair	Fair	Infill +	Infill +	1	33
American hornbeam; muscle	Carpinus caroliniana	WSL	Low	7.4	19.1	2.6	Sm. inc.	Sm. inc.	Medium	Rare	Fair	Fair	Infill +	Infill +	1	34
green ash	Fraxinus pennsylvanica	WSH	Low	4	18.7	5.2	Sm. inc.	Sm. inc.	Medium	Rare	Fair	Fair	Infill +	Infill +	2	35
willow oak	Quercus phellos	NSL	Low	3.8	16.6	4.5	Sm. inc.	Sm. inc.	Medium	Rare	Fair	Fair	Infill +	Infill +	2	36
Norway maple	Acer platanoides	NSL	FIA	7.9	14.1	3.9	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	37
shingle oak	Quercus imbricaria	NDH	Medium	2.3	12.7	5.2	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	38
white mulberry	Morus alba	NSL	FIA	10.4	10.7	5.5	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	39
pawpaw	Asimina triloba	NSL	Low	6.4	9.8	2.8	Sm. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	40
American holly	Ilex opaca	NSL	Medium	13.1	9.0	2.4	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	1	41
black willow	Salix nigra	NSH	Low	2.3	9.0	3.7	No change	Lg. inc.	Low	Rare	Very Poor	Fair		Infill +	2	42
paulownia	Paulownia tomentosa	NSL	FIA	2.3	8.2	3.4	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	43
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	2.3	6.9	2.8	Sm. inc.	Lg. inc.	High	Rare	Good	Good			2	44
eastern redcedar	Juniperus virginiana	WDH	Medium	3.4	6.0	1.6	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	2	45
common persimmon	Diospyros virginiana	NSL	Low	5.5	5.6	1.2	No change	Lg. inc.	High	Rare	Fair	Good	Infill +	Infill ++	2	46
quaking aspen	Populus tremuloides	WDH	High	1.1	2.3	1.9	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			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
American chestnut	Castanea dentata	NSLX	FIA	2.3	2.1	0.9	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	48
black ash	Fraxinus nigra	WSH	Medium	1.1	2.1	1.7	Sm. dec.	Sm. dec.	Low	Rare	Very Poor	Very Poor			0	49
red mulberry	Morus rubra	NSL	Low	1.1	2.1	1.7	No change	No change	Medium	Rare	Poor	Poor	Infill +		2	50
swamp chestnut oak	Quercus michauxii	NSL	Low	1.1	2.0	1.6	Sm. inc.	Lg. inc.	Medium	Rare	Fair	Good	Infill +		2	51
bigtooth aspen	Populus grandidentata	NSL	Medium	1.1	1.5	1.2	Very Lg. dec.	Very Lg. dec.	Medium	Rare	Lost	Lost			0	52
swamp white oak	Quercus bicolor	NSL	Low	3.6	1.4	3.5	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	53
shagbark hickory	Carya ovata	WSL	Medium	4.5	1.3	4.3	Sm. inc.	Sm. inc.	Medium	Rare	Fair	Fair			2	54
sugar maple	Acer saccharum	WDH	High	3.6	0.5	1.3	Lg. inc.	Lg. inc.	High	Rare	Good	Good			2	55
sweetbay	Magnolia virginiana	NSL	Medium	4.2	0.4	1.3	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	56
hackberry	Celtis occidentalis	WDH	Medium	4.5	0.1	0.3	Lg. inc.	Lg. inc.	High	Rare	Good	Good			2	57
ashe juniper	Juniperus ashei	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	58
red spruce	Picea rubens	NDH	High	0	0	0	Unknown	Unknown	Low	Absent	Unknown	Unknown			0	59
shortleaf pine	Pinus echinata	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	60
slash pine	Pinus elliotii	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat				61
longleaf pine	Pinus palustris	NSH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	62
bald cypress	Taxodium distichum	NSH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	63
pond cypress	Taxodium ascendens	NSH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	64
mountain maple	Acer spicatum	NSL	Low	0	0	0	Unknown	Unknown	High	Absent	Unknown	Unknown			0	65
serviceberry	Amelanchier spp.	NSL	Low	0	0	0	Unknown	Unknown	Medium	Modeled	Unknown	Unknown			0	66
river birch	Betula nigra	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Likely +	Likely +	3	67
cittamwood/gum bumelia	Sideroxylon lanuginosum ssp.	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			0	68
water hickory	Carya aquatica	NSL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	69
pecan	Carya illinoensis	NSH	Low	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat			3	70
black hickory	Carya texana	NDL	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	71
sugarberry	Celtis laevigata	NDH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	72
eastern redbud	Cercis canadensis	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate ++	Migrate ++	3	73
honeylocust	Gleditsia triacanthos	NSH	Low	0	0	0	Unknown	New Habitat	High	Absent	Unknown	New Habitat			3	74
cucumbertree	Magnolia acuminata	NSL	Low	0	0	0	Unknown	Unknown	Medium	Modeled	Unknown	Unknown			0	75
water tupelo	Nyssa aquatica	NSH	Medium	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	76
swamp tupelo	Nyssa biflora	NDH	Medium	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat	Migrate ++	Migrate +	3	77
sourwood	Oxydendrum arboreum	NDL	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +		3	78
redbay	Persea borbonia	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +		3	79
water elm	Planera aquatica	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	80
turkey oak	Quercus laevis	NSH	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			3	81
laurel oak	Quercus laurifolia	NDH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	82
overcup oak	Quercus lyrata	NSL	Medium	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	83
blackjack oak	Quercus marilandica	NSL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	84
water oak	Quercus nigra	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Likely +	Likely +	3	85
post oak	Quercus stellata	WDH	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate ++	Migrate ++	3	86
live oak	Quercus virginiana	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	87
winged elm	Ulmus alata	WDL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	88
cedar elm	Ulmus crassifolia	NDH	Medium	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat			0	89