

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
 8,200.0 3,166.0 150

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	18	23	Increase	18	17	Very Good	9	8	Likely	0	0
Hickory	5			Medium	26	37	No Change	8	9	Good	10	12	Infill	9	8
Maple	5	Abundant	3	Low	26	11	Decrease	25	25	Fair	7	5	Migrate	7	13
Oak	9	Common	26	FIA	4		New	17	17	Poor	10	11		16	21
Pine	3	Rare	26				Unknown	6	6	Very Poor	8	7			
Other	30	Absent	19					74	74	FIA Only	1	1			
	55		74		74	71				Unknown	2	2			
											47	46			

Potential Changes in Climate Variables

Temperature (°F)

Scenario	2009	2039	2069	2099		
Annual	CCSM45	49.2	51.0	53.6	53.7	
Average	CCSM85	49.2	51.6	54.1	57.4	
	GFDL45	49.2	52.6	55.1	56.2	
	GFDL85	49.2	52.5	56.2	60.5	
	HAD45	49.2	52.2	55.8	57.4	
	HAD85	49.2	52.4	57.0	62.1	
Growing Season	CCSM45	65.6	67.4	69.7	70.1	
	CCSM85	65.6	67.9	70.4	74.4	
May—Sep	GFDL45	65.6	69.6	72.8	74.3	
	GFDL85	65.6	69.8	74.1	79.0	
	HAD45	65.6	69.2	72.2	74.5	
	HAD85	65.6	68.9	74.5	80.0	
Coldest Month	CCSM45	23.7	25.5	27.5	27.6	
	CCSM85	23.7	26.5	27.8	29.7	
Average	GFDL45	23.7	26.7	27.7	28.5	
	GFDL85	23.7	27.2	28.4	30.1	
	HAD45	23.7	24.9	28.0	28.1	
	HAD85	23.7	26.1	28.6	31.4	
Warmest Month	CCSM45	71.4	73.4	74.7	75.2	
	CCSM85	71.4	74.1	75.7	78.0	
Average	GFDL45	71.4	74.5	76.7	77.8	
	GFDL85	71.4	75.8	78.1	80.9	
	HAD45	71.4	75.4	77.5	79.1	
	HAD85	71.4	76.1	79.9	83.8	

Precipitation (in)

Scenario	2009	2039	2069	2099		
Annual	CCSM45	39.8	41.1	40.6	42.6	
Total	CCSM85	39.8	41.1	42.2	43.6	
	GFDL45	39.8	44.0	46.4	46.7	
	GFDL85	39.8	41.9	46.9	48.7	
	HAD45	39.8	40.7	41.5	41.0	
	HAD85	39.8	42.0	38.8	41.9	
Growing Season	CCSM45	19.5	20.0	19.5	20.1	
	CCSM85	19.5	19.1	19.8	19.2	
May—Sep	GFDL45	19.5	21.4	21.8	21.8	
	GFDL85	19.5	20.1	21.4	21.5	
	HAD45	19.5	20.0	18.2	18.8	
	HAD85	19.5	19.8	16.3	16.9	

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.

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
red maple	Acer rubrum	WDH	High	80.5	2016.4	26.7	Lg. dec.	Lg. dec.	High	Abundant	Good	Good			1	1
black cherry	Prunus serotina	WDL	Medium	74.4	824.1	12.5	Sm. dec.	Sm. dec.	Low	Abundant	Fair	Fair			0	2
sugar maple	Acer saccharum	WDH	High	50	553.7	12.0	No change	No change	High	Abundant	Very Good	Very Good			1	3
pin oak	Quercus palustris	NSH	Low	42.7	493.7	13.0	Sm. dec.	Sm. dec.	Low	Common	Poor	Poor			0	4
American elm	Ulmus americana	WDH	Medium	62.2	407.2	7.5	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	5
American beech	Fagus grandifolia	WDH	High	39	308.6	9.0	Sm. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	6
black willow	Salix nigra	NSH	Low	9.8	262.5	24.3	Lg. dec.	Sm. dec.	Low	Common	Very Poor	Poor			0	7
northern red oak	Quercus rubra	WDH	Medium	52.4	249.7	5.8	Sm. inc.	No change	High	Common	Very Good	Good			1	8
shagbark hickory	Carya ovata	WSL	Medium	39	243.6	7.0	No change	No change	Medium	Common	Fair	Fair			1	9
white ash	Fraxinus americana	WDL	Medium	47.6	201.8	5.9	Lg. inc.	Lg. inc.	Low	Common	Good	Good			1	10
silver maple	Acer saccharinum	NSH	Low	17.1	184.9	12.7	Sm. dec.	No change	High	Common	Fair	Good			1	11
white oak	Quercus alba	WDH	Medium	14.6	173.6	10.7	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	12
quaking aspen	Populus tremuloides	WDH	High	20.7	145.0	7.8	Very Lg. dec.	Very Lg. dec.	Medium	Common	Lost	Lost			0	13
bigtooth aspen	Populus grandidentata	NSL	Medium	26.8	143.4	7.1	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	14
green ash	Fraxinus pennsylvanica	WSH	Low	30.5	138.9	5.7	Sm. inc.	Lg. inc.	Medium	Common	Good	Very Good			1	15
yellow-poplar	Liriodendron tulipifera	WDH	High	29.3	137.3	6.1	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	16
bitternut hickory	Carya cordiformis	WSL	Low	25.6	137.2	7.2	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	17
blackgum	Nyssa sylvatica	WDL	Medium	35.4	129.4	4.5	No change	No change	High	Common	Good	Good			1	18
black locust	Robinia pseudoacacia	NDH	Low	15.9	92.7	7.4	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	19
sassafras	Sassafras albidum	WSL	Low	25.6	81.8	4.1	Lg. inc.	Sm. inc.	Medium	Common	Very Good	Good			1	20
black oak	Quercus velutina	WDH	High	11	78.7	6.5	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good	Infill ++	Infill ++	1	21
swamp white oak	Quercus bicolor	NSL	Low	24.4	77.6	4.5	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	22
Scots pine	Pinus sylvestris	NSH	FIA	4.9	73.9	13.7	Unknown	Unknown	NA	Common	NNIS	NNIS			0	23
black walnut	Juglans nigra	WDH	Low	13.4	69.8	6.7	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	24
American basswood	Tilia americana	WSL	Medium	20.7	61.1	4.5	Sm. inc.	Sm. dec.	Medium	Common	Good	Poor			1	25
eastern white pine	Pinus strobus	WDH	High	3.7	57.7	14.2	Sm. dec.	Lg. dec.	Low	Common	Poor	Very Poor	Infill +		0	26
gray birch	Betula populifolia	NSL	Low	1.2	57.4	42.5	Very Lg. dec.	Very Lg. dec.	Medium	Common	Lost	Lost			0	27
yellow birch	Betula alleghaniensis	NDL	High	9.8	53.7	8.0	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	28
Norway spruce	Picea abies	NSH	FIA	3.7	52.6	13.0	Unknown	Unknown	NA	Common	NNIS	NNIS			0	29
cucumber tree	Magnolia acuminata	NSL	Low	14.6	49.7	3.1	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	30
sycamore	Platanus occidentalis	NSL	Low	7.3	33.2	8.3	Sm. inc.	Sm. inc.	Medium	Rare	Fair	Fair	Infill +	Infill +	1	31
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	18.3	32.9	2.2	Lg. inc.	Lg. inc.	High	Rare	Good	Good			1	32
shingle oak	Quercus imbricaria	NDH	Medium	9.8	32.8	5.0	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	1	33
boxelder	Acer negundo	WSH	Low	6.1	31.0	4.6	No change	Sm. inc.	High	Rare	Fair	Good	Infill +	Infill ++	1	34
slippery elm	Ulmus rubra	WSL	Low	15.9	30.7	2.3	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			1	35
American hornbeam; muscle	Carpinus caroliniana	WSL	Low	14.6	28.2	1.7	Lg. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	36
ailanthus	Ailanthus altissima	NSL	FIA	3.7	19.5	4.8	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	37
sweet birch	Betula lenta	NDH	High	3.7	16.2	4.0	Lg. dec.	Lg. dec.	Low	Rare	Very Poor	Very Poor			0	38
pignut hickory	Carya glabra	WDL	Medium	9.8	16.1	2.4	Sm. inc.	Sm. inc.	Medium	Rare	Fair	Fair	Infill +	Infill +	1	39
butternut	Juglans cinerea	NSLX	FIA	2.4	16.0	5.9	Unknown	Unknown	Low	Rare	FIA Only	FIA Only			0	40
eastern hemlock	Tsuga canadensis	NSH	High	1.2	15.9	11.8	Lg. dec.	Lg. dec.	Low	Rare	Very Poor	Very Poor			0	41
mockernut hickory	Carya alba	WDL	Medium	2.4	14.5	5.4	Sm. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	2	42
eastern cottonwood	Populus deltoides	NSH	Low	13.4	10.6	2.8	No change	No change	Medium	Rare	Poor	Poor			1	43
red pine	Pinus resinosa	NSH	Medium	1.2	10.2	7.6	Very Lg. dec.	Very Lg. dec.	Low	Rare	Lost	Lost			0	44
balsam fir	Abies balsamea	NDH	High	1.2	6.9	5.1	Lg. dec.	Lg. dec.	Low	Rare	Very Poor	Very Poor			0	45
serviceberry	Amelanchier spp.	NSL	Low	4.9	6.7	1.3	Lg. dec.	Very Lg. dec.	Medium	Rare	Very Poor	Lost			0	46
chestnut oak	Quercus prinus	NDH	High	1.2	6.7	5.0	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	2	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
scarlet oak	Quercus coccinea	WDL	Medium	3.7	5.5	1.3	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	48
flowering dogwood	Cornus florida	WDL	Medium	3.7	4.7	1.2	Very Lg. dec.	Very Lg. dec.	Medium	Rare	Lost	Lost			0	49
black maple	Acer nigrum	NSH	Low	2.4	4.2	1.5	Lg. dec.	Lg. dec.	High	Rare	Poor	Poor			0	50
bur oak	Quercus macrocarpa	NDH	Medium	1.2	4.0	3.0	Very Lg. dec.	Very Lg. dec.	High	Rare	Lost	Lost			0	51
shellbark hickory	Carya laciniosa	NSL	Low	1.2	2.0	1.5	Very Lg. dec.	Very Lg. dec.	Medium	Rare	Lost	Lost			0	52
pin cherry	Prunus pensylvanica	NSL	Low	1.2	1.8	1.4	Very Lg. dec.	Very Lg. dec.	Medium	Rare	Lost	Lost			0	53
hackberry	Celtis occidentalis	WDH	Medium	1.2	0.8	0.6	Lg. inc.	Lg. inc.	High	Rare	Good	Good			2	54
black ash	Fraxinus nigra	WSH	Medium	1.2	0.5	0.3	Lg. dec.	Lg. dec.	Low	Rare	Very Poor	Very Poor			0	55
eastern redcedar	Juniperus virginiana	WDH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate ++	Migrate ++	3	56
jack pine	Pinus banksiana	NSH	Medium	0	0	0	Unknown	Unknown	High	Absent	Unknown	Unknown			0	57
shortleaf pine	Pinus echinata	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate ++	3	58
Virginia pine	Pinus virginiana	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	59
black hickory	Carya texana	NDL	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	60
sugarberry	Celtis laevigata	NDH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	61
eastern redbud	Cercis canadensis	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	62
common persimmon	Diospyros virginiana	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate +	3	63
honeylocust	Gleditsia triacanthos	NSH	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	64
sweetgum	Liquidambar styraciflua	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	65
Osage-orange	Maclura pomifera	NDH	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	66
red mulberry	Morus rubra	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	67
sourwood	Oxydendrum arboreum	NDL	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			3	68
southern red oak	Quercus falcata	WDL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate ++	3	69
blackjack oak	Quercus marilandica	NSL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			3	70
chinkapin oak	Quercus muehlenbergii	NSL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	71
post oak	Quercus stellata	WDH	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	72
bluejack oak	Quercus incana	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	73
winged elm	Ulmus alata	WDL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate ++	3	74