

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	8,100.0	3,127.4	243

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	21	25	Increase	26	34	Very Good	8	9	Likely	3	3
Hickory	4		Medium	27	52	No Change	13	10	Good	15	21	Infill	8	10
Maple	4	Abundant	Low	36	12	Decrease	19	14	Fair	14	14	Migrate	4	11
Oak	11	Common	FIA	9		New	15	19	Poor	13	8		15	24
Pine	7	Rare				Unknown	20	16	Very Poor	7	5			
Other	38	Absent					93	93	FIA Only	5	5			
	67	93		93	89				Unknown	11	7			
										73	69			

Potential Changes in Climate Variables

Temperature (°F)

	Scenario	2009	2039	2069	2099	
Annual Average	CCSM45	54.3	56.2	58.4	58.5	
	CCSM85	54.3	56.6	59.0	62.1	
	GFDL45	54.3	57.2	59.7	60.6	
	GFDL85	54.3	57.5	60.8	64.7	
	HAD45	54.3	56.7	60.0	61.2	
	HAD85	54.3	57.0	61.1	65.4	
Growing Season (May—Sep)	CCSM45	68.9	70.8	72.9	73.4	
	CCSM85	68.9	71.1	73.8	77.7	
	GFDL45	68.9	72.2	75.2	76.5	
	GFDL85	68.9	72.8	76.7	81.0	
	HAD45	68.9	71.9	75.0	76.5	
	HAD85	68.9	71.9	77.2	81.9	
Coldest Month (Average)	CCSM45	32.5	34.4	35.5	35.9	
	CCSM85	32.5	34.9	36.0	37.1	
	GFDL45	32.5	35.9	36.3	36.9	
	GFDL85	32.5	34.8	35.7	36.9	
	HAD45	32.5	33.4	35.3	35.5	
	HAD85	32.5	33.8	35.3	36.9	
Warmest Month (Average)	CCSM45	74.3	76.5	77.6	77.8	
	CCSM85	74.3	76.7	78.4	80.2	
	GFDL45	74.3	77.7	79.4	80.4	
	GFDL85	74.3	78.8	81.1	83.6	
	HAD45	74.3	77.7	79.8	80.7	
	HAD85	74.3	78.5	81.9	84.8	

Precipitation (in)

	Scenario	2009	2039	2069	2099	
Annual Total	CCSM45	42.9	46.6	48.6	48.8	
	CCSM85	42.9	47.9	49.0	54.0	
	GFDL45	42.9	47.7	49.9	52.0	
	GFDL85	42.9	45.1	50.3	51.3	
	HAD45	42.9	45.6	46.2	45.7	
	HAD85	42.9	47.2	45.4	47.4	
Growing Season (May—Sep)	CCSM45	19.8	23.2	24.1	24.2	
	CCSM85	19.8	23.2	22.8	25.3	
	GFDL45	19.8	22.1	22.9	23.9	
	GFDL85	19.8	20.3	23.0	23.3	
	HAD45	19.8	22.0	20.9	20.8	
	HAD85	19.8	22.4	21.3	21.9	

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
chestnut oak	Quercus prinus	NDH	High	75.3	1588.6	22.2	Sm. dec.	Sm. dec.	High	Abundant	Good	Good			1	1
yellow-poplar	Liriodendron tulipifera	WDH	High	79	1170.1	15.4	Sm. dec.	Lg. dec.	High	Abundant	Good	Good			1	2
red maple	Acer rubrum	WDH	High	93.8	741.1	8.2	No change	Sm. dec.	High	Abundant	Very Good	Good			1	3
Virginia pine	Pinus virginiana	NDH	High	75.3	662.3	9.2	Sm. dec.	Sm. dec.	Medium	Abundant	Fair	Fair			0	4
white oak	Quercus alba	WDH	Medium	80.2	517.0	6.8	Sm. inc.	Sm. inc.	High	Abundant	Very Good	Very Good			1	5
eastern white pine	Pinus strobus	WDH	High	60.5	453.7	7.9	Sm. dec.	Sm. dec.	Low	Common	Poor	Poor			0	6
scarlet oak	Quercus coccinea	WDL	Medium	64.2	441.7	7.2	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor			0	7
northern red oak	Quercus rubra	WDH	Medium	74.1	360.7	5.1	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	8
blackgum	Nyssa sylvatica	WDL	Medium	85.2	300.6	3.7	No change	No change	High	Common	Good	Good			1	9
black locust	Robinia pseudoacacia	NDH	Low	65.4	257.0	3.9	No change	No change	Medium	Common	Fair	Fair			1	10
black oak	Quercus velutina	WDH	High	71.6	253.8	3.8	Sm. inc.	Lg. inc.	Medium	Common	Good	Very Good			1	11
sourwood	Oxydendrum arboreum	NDL	High	64.2	248.7	4.1	No change	Sm. dec.	High	Common	Good	Fair			1	12
pitch pine	Pinus rigida	NSH	High	40.7	211.2	5.7	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor			0	13
black cherry	Prunus serotina	WDL	Medium	49.4	190.7	4.2	Sm. inc.	Sm. inc.	Low	Common	Fair	Fair			1	14
Table Mountain pine	Pinus pungens	NSL	Low	23.5	157.0	8.0	Lg. dec.	Lg. dec.	High	Common	Fair	Fair			1	15
mockernut hickory	Carya alba	WDL	Medium	60.5	152.5	2.7	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	16
pignut hickory	Carya glabra	WDL	Medium	48.1	129.1	2.9	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	17
eastern redcedar	Juniperus virginiana	WDH	Medium	28.4	126.5	4.4	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	18
ailanthus	Ailanthus altissima	NSL	FIA	30.9	116.6	3.7	Unknown	Unknown	NA	Common	NNIS	NNIS			0	19
sugar maple	Acer saccharum	WDH	High	25.9	116.4	4.4	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	20
black walnut	Juglans nigra	WDH	Low	29.6	114.0	3.8	No change	Sm. inc.	Medium	Common	Fair	Good			1	21
sweet birch	Betula lenta	NDH	High	34.6	100.2	3.3	No change	No change	Low	Common	Poor	Poor			0	22
loblolly pine	Pinus taeda	WDH	High	9.9	94.7	9.5	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	23
white ash	Fraxinus americana	WDL	Medium	29.6	90.9	3.0	Sm. inc.	Lg. inc.	Low	Common	Fair	Good			1	24
flowering dogwood	Cornus florida	WDL	Medium	46.9	76.0	1.6	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	25
American beech	Fagus grandifolia	WDH	High	21	70.5	3.3	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	26
sassafras	Sassafras albidum	WSL	Low	34.6	70.1	2.0	No change	No change	Medium	Common	Fair	Fair			1	27
green ash	Fraxinus pennsylvanica	WSL	Low	35.8	66.0	2.2	Sm. inc.	Lg. inc.	Medium	Common	Good	Very Good			1	28
American hornbeam; musclev	Carpinus caroliniana	WSL	Low	14.8	59.8	4.0	Sm. dec.	Sm. inc.	Medium	Common	Poor	Good			1	29
cucumber tree	Magnolia acuminata	NSL	Low	33.3	58.7	2.1	Lg. dec.	Sm. dec.	Medium	Common	Poor	Poor			0	30
eastern hemlock	Tsuga canadensis	NSH	High	27.2	49.8	2.1	Lg. inc.	Lg. inc.	Low	Rare	Fair	Fair			1	31
southern red oak	Quercus falcata	WDL	Medium	13.6	48.6	3.5	Lg. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	1	32
American basswood	Tilia americana	WSL	Medium	19.8	46.0	3.0	Sm. inc.	Sm. inc.	Medium	Rare	Fair	Fair			1	33
eastern redbud	Cercis canadensis	NSL	Low	24.7	37.5	1.5	Sm. inc.	Sm. inc.	Medium	Rare	Fair	Fair			1	34
sycamore	Platanus occidentalis	NSL	Low	9.9	37.3	3.7	No change	Sm. inc.	Medium	Rare	Poor	Fair			1	35
common persimmon	Diospyros virginiana	NSL	Low	12.3	33.8	2.7	Sm. dec.	Lg. inc.	High	Rare	Poor	Good			1	36
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	12.3	27.9	2.2	Sm. inc.	Lg. inc.	High	Rare	Good	Good			1	37
yellow birch	Betula alleghaniensis	NDL	High	1.2	22.0	17.6	Sm. dec.	No change	Medium	Rare	Very Poor	Poor		Infill +	2	38
American elm	Ulmus americana	WDH	Medium	9.9	21.4	2.1	No change	Sm. inc.	Medium	Rare	Poor	Fair	Infill +	Infill +	1	39
serviceberry	Amelanchier spp.	NSL	Low	24.7	19.6	0.9	Sm. dec.	No change	Medium	Rare	Very Poor	Poor			1	40
chokecherry	Prunus virginiana	NSLX	FIA	1.2	17.8	14.3	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	41
striped maple	Acer pensylvanicum	NSL	Medium	17.3	15.7	1.4	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	42
boxelder	Acer negundo	WSH	Low	8.6	13.8	1.6	Sm. dec.	No change	High	Rare	Poor	Fair		Infill +	1	43
slippery elm	Ulmus rubra	WSL	Low	16	12.6	1.2	Sm. inc.	Lg. inc.	Medium	Rare	Fair	Good			1	44
pin cherry	Prunus pensylvanica	NSL	Low	3.7	12.3	3.3	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	45
bitternut hickory	Carya cordiformis	WSL	Low	13.6	11.6	1.4	Lg. inc.	Lg. inc.	High	Rare	Good	Good			1	46
shagbark hickory	Carya ovata	WSL	Medium	8.6	10.1	1.2	Sm. inc.	Sm. inc.	Medium	Rare	Fair	Fair	Infill +	Infill +	1	47

U.S. Census Bureau Urban Areas
Climate Change Atlas Tree Species

USDA Forest Service
Northern Research Station
Landscape Change Research Group
Iverson, Peters, Prasad, Matthews

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
shortleaf pine	Pinus echinata	WDH	High	7.4	9.5	1.3	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	1	48
post oak	Quercus stellata	WDH	High	6.2	8.8	1.4	Lg. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	2	49
Siberian elm	Ulmus pumila	NDH	FIA	1.2	8.5	6.8	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	50
American chestnut	Castanea dentata	NSLX	FIA	12.3	7.5	0.6	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	51
hackberry	Celtis occidentalis	WDH	Medium	7.4	7.4	1.0	No change	Sm. inc.	High	Rare	Fair	Good	Infill +	Infill ++	2	52
river birch	Betula nigra	NSL	Low	1.2	6.0	4.8	No change	Sm. inc.	Medium	Rare	Poor	Fair	Infill +	Infill +	2	53
paulownia	Paulownia tomentosa	NSL	FIA	3.7	5.6	1.5	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	54
bear oak; scrub oak	Quercus ilicifolia	NSLX	FIA	4.9	5.5	1.1	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	55
Scots pine	Pinus sylvestris	NSH	FIA	1.2	2.8	2.2	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	56
chinkapin oak	Quercus muehlenbergii	NSL	Medium	2.5	2.4	1.0	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	57
yellow buckeye	Aesculus flava	NSL	Low	1.2	2.3	1.9	No change	No change	Low	Rare	Very Poor	Very Poor			2	58
shingle oak	Quercus imbricaria	NDH	Medium	1.2	2.1	1.7	Sm. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	59
blackjack oak	Quercus marilandica	NSL	Medium	2.5	1.4	0.6	Lg. inc.	Lg. inc.	High	Rare	Good	Good			2	60
pawpaw	Asimina triloba	NSL	Low	2.5	1.3	0.5	Very Lg. dec.	Very Lg. dec.	Medium	Rare	Lost	Lost			0	61
butternut	Juglans cinerea	NSLX	FIA	1.2	1.0	0.8	Unknown	Unknown	Low	Rare	FIA Only	FIA Only			0	62
honeylocust	Gleditsia triacanthos	NSH	Low	1.2	0.8	0.7	Lg. dec.	Lg. inc.	High	Rare	Poor	Good			2	63
red mulberry	Morus rubra	NSL	Low	1.2	0.7	0.6	Sm. inc.	Lg. inc.	Medium	Rare	Fair	Good	Infill +	Infill ++	2	64
rock elm	Ulmus thomasii	NSLX	FIA	1.2	0.5	0.4	Unknown	Unknown	Low	Rare	FIA Only	FIA Only			0	65
black ash	Fraxinus nigra	WSH	Medium	1.2	0.3	0.3	Sm. dec.	No change	Low	Rare	Very Poor	Very Poor			0	66
southern magnolia	Magnolia grandiflora	NSL	Low	1.2	0.3	0.2	No change	No change	Medium	Rare	Poor	Poor			0	67
longleaf pine	Pinus palustris	NSH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	68
northern white-cedar	Thuja occidentalis	WSH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	69
florida maple	Acer barbatum	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	70
black maple	Acer nigrum	NSH	Low	0	0	0	Unknown	Unknown	High	Absent	Unknown	Unknown			0	71
mountain maple	Acer spicatum	NSL	Low	0	0	0	Unknown	Unknown	High	Absent	Unknown	Unknown			0	72
cittamwood/gum bumelia	Sideroxylon lanuginosum ssp.	NSL	Low	0	0	0	Unknown	New Habitat	High	Absent	Unknown	New Habitat			0	73
pecan	Carya illinoensis	NSH	Low	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat		Migrate +	3	74
shellbark hickory	Carya laciniosa	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	75
black hickory	Carya texana	NDL	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	76
sugarberry	Celtis laevigata	NDH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	77
silverbell	Halesia spp.	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	78
American holly	Ilex opaca	NSL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate ++	Migrate ++	3	79
sweetgum	Liquidambar styraciflua	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Likely +	Likely +	3	80
bigleaf magnolia	Magnolia macrophylla	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	81
mountain or Fraser magnolia	Magnolia fraseri	NSL	Low	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat			0	82
redbay	Persea borbonia	NSL	Low	0	0	0	Unknown	Unknown	High	Absent	Unknown	Unknown			0	83
bigtooth aspen	Populus grandidentata	NSL	Medium	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	84
cherrybark oak; swamp red o.	Quercus pagoda	NSL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	85
laurel oak	Quercus laurifolia	NDH	Medium	0	0	0	Unknown	New Habitat	Medium	Absent	Unknown	New Habitat		Migrate +	3	86
water oak	Quercus nigra	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	87
willow oak	Quercus phellos	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Likely +	Likely +	3	88
Shumard oak	Quercus shumardii	NSL	Low	0	0	0	Unknown	New Habitat	High	Absent	Unknown	New Habitat		Migrate +	3	89
live oak	Quercus virginiana	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	90
bluejack oak	Quercus incana	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	91
black willow	Salix nigra	NSH	Low	0	0	0	Unknown	New Habitat	Low	Absent	Unknown	New Habitat		Migrate ++	3	92
winged elm	Ulmus alata	WDL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Likely +	Likely +	3	93