

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	8,010.4	3,092.8	137

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	Scenario	Scenario	Scenario	SHIFT	SHIFT				
						RCP45	RCP85	RCP45	RCP85	RCP45	RCP85				
Ash	2			High	25	20	Increase	16	18	Very Good	6	3	Likely	0	0
Hickory	4			Medium	29	48	No Change	14	11	Good	11	15	Infill	0	0
Maple	4	Abundant	4	Low	27	16	Decrease	19	20	Fair	5	6	Migrate	0	0
Oak	10	Common	16	FIA	8		New	29	30	Poor	12	11		0	0
Pine	3	Rare	37				Unknown	11	10	Very Poor	13	12		0	0
Other	34	Absent	32							FIA Only	3	3			
	57		89		89	84		89	89	Unknown	3	2			
											53	52			

Potential Changes in Climate Variables

Temperature (°F)

	Scenario	2009	2039	2069	2099	
Annual Average	CCSM45	51.2	53.0	55.1	55.4	
	CCSM85	51.2	53.4	55.9	58.9	
	GFDL45	51.2	55.4	56.8	57.9	
	GFDL85	51.2	54.3	58.0	62.0	
	HAD45	51.2	53.6	57.0	58.6	
HAD85	51.2	53.5	57.7	62.4		
Growing Season (May—Sep)	CCSM45	67.4	69.4	71.0	71.5	
	CCSM85	67.4	69.6	72.0	75.6	
	GFDL45	67.4	72.0	73.6	74.9	
	GFDL85	67.4	70.9	75.0	79.1	
	HAD45	67.4	70.0	73.0	75.0	
HAD85	67.4	69.2	73.9	78.7		
Coldest Month Average	CCSM45	26.7	28.4	30.0	30.5	
	CCSM85	26.7	29.3	30.4	32.4	
	GFDL45	26.7	30.2	31.4	32.3	
	GFDL85	26.7	30.1	31.6	33.7	
	HAD45	26.7	28.0	30.6	30.9	
HAD85	26.7	29.1	31.1	33.9		
Warmest Month Average	CCSM45	73.6	75.9	76.9	76.9	
	CCSM85	73.6	76.1	77.6	79.4	
	GFDL45	73.6	76.5	78.2	79.3	
	GFDL85	73.6	77.4	79.8	82.4	
	HAD45	73.6	76.5	77.9	78.9	
HAD85	73.6	75.8	78.0	81.2		

Precipitation (in)

	Scenario	2009	2039	2069	2099	
Annual Total	CCSM45	49.5	50.6	50.7	55.7	
	CCSM85	49.5	51.5	54.5	57.5	
	GFDL45	49.5	55.0	59.0	56.9	
	GFDL85	49.5	53.5	57.1	60.7	
	HAD45	49.5	50.8	53.7	53.5	
HAD85	49.5	54.5	53.7	56.5		
Growing Season (May—Sep)	CCSM45	21.3	24.6	23.6	25.7	
	CCSM85	21.3	23.2	25.0	24.6	
	GFDL45	21.3	22.3	22.6	23.7	
	GFDL85	21.3	22.1	22.7	23.9	
	HAD45	21.3	22.0	21.1	21.1	
HAD85	21.3	22.4	21.2	21.8		

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	75.9	1262.5	20.5	Sm. dec.	Sm. dec.	High	Abundant	Good	Good			0	1
sweet birch	Betula lenta	NDH	High	61.2	724.4	13.8	Lg. dec.	Lg. dec.	Low	Abundant	Poor	Poor			0	2
sugar maple	Acer saccharum	WDH	High	52.6	553.9	12.6	No change	Sm. dec.	High	Abundant	Very Good	Good			0	3
northern red oak	Quercus rubra	WDH	Medium	69.3	530.5	10.7	No change	Sm. dec.	High	Abundant	Very Good	Good			0	4
white ash	Fraxinus americana	WDL	Medium	48.9	414.8	10.1	No change	Sm. dec.	Low	Common	Poor	Poor			0	5
black oak	Quercus velutina	WDH	High	59	401.7	9.7	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			0	6
American beech	Fagus grandifolia	WDH	High	43.6	242.3	6.3	Sm. inc.	No change	Medium	Common	Good	Fair			0	7
black cherry	Prunus serotina	WDL	Medium	48.6	204.2	11.1	Sm. inc.	Sm. inc.	Low	Common	Fair	Fair			0	8
yellow birch	Betula alleghaniensis	NDL	High	29.1	180.1	6.8	No change	No change	Medium	Common	Fair	Fair			0	9
chestnut oak	Quercus prinus	NDH	High	22.8	173.2	9.5	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			0	10
American elm	Ulmus americana	WDH	Medium	28.1	169.5	7.6	Sm. dec.	No change	Medium	Common	Poor	Fair			0	11
black locust	Robinia pseudoacacia	NDH	Low	24.5	147.6	14.4	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			0	12
white oak	Quercus alba	WDH	Medium	47.4	138.7	4.3	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			0	13
eastern hemlock	Tsuga canadensis	NSH	High	19.6	138.3	7.3	No change	No change	Low	Common	Poor	Poor			0	14
pignut hickory	Carya glabra	WDL	Medium	30.2	110.2	4.0	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			0	15
shagbark hickory	Carya ovata	WSL	Medium	31.9	104.9	4.0	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor			0	16
scarlet oak	Quercus coccinea	WDL	Medium	22.4	94.2	6.1	Lg. inc.	Sm. inc.	Medium	Common	Very Good	Good			0	17
yellow-poplar	Liriodendron tulipifera	WDH	High	26.3	81.0	5.6	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			0	18
American basswood	Tilia americana	WSL	Medium	9.6	74.7	8.4	No change	No change	Medium	Common	Fair	Fair			0	19
Norway maple	Acer platanoides	NSL	FIA	19.3	53.5	5.7	Unknown	Unknown	NA	Common	NNIS	NNIS			0	20
eastern white pine	Pinus strobus	WDH	High	16.4	45.7	7.6	Lg. inc.	Sm. inc.	Low	Rare	Fair	Poor			0	21
sassafras	Sassafras albidum	WSL	Low	10	40.5	5.7	No change	No change	Medium	Rare	Poor	Poor			0	22
swamp white oak	Quercus bicolor	NSL	Low	13.7	40.3	5.2	Sm. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	23
bitternut hickory	Carya cordiformis	WSL	Low	13.5	36.1	4.2	Sm. inc.	Lg. inc.	High	Rare	Good	Good			0	24
eastern redcedar	Juniperus virginiana	WDH	Medium	19.1	34.9	3.4	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			0	25
sycamore	Platanus occidentalis	NSL	Low	1.2	29.5	23.1	No change	No change	Medium	Rare	Poor	Poor			0	26
paper birch	Betula papyrifera	WDH	High	2.5	28.7	11.2	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	27
bigtooth aspen	Populus grandidentata	NSL	Medium	6.6	27.5	10.6	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	28
American hornbeam; musclev	Carpinus caroliniana	WSL	Low	11.2	21.8	1.9	No change	Lg. inc.	Medium	Rare	Poor	Good			0	29
green ash	Fraxinus pennsylvanica	WSH	Low	4.6	20.4	5.4	No change	Sm. inc.	Medium	Rare	Poor	Fair			0	30
ailanthus	Ailanthus altissima	NSL	FIA	19.7	16.6	5.6	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	31
serviceberry	Amelanchier spp.	NSL	Low	8.7	15.5	1.7	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	32
mockernut hickory	Carya alba	WDL	Medium	8	15.3	2.2	Sm. inc.	Lg. inc.	High	Rare	Good	Good			0	33
blackgum	Nyssa sylvatica	WDL	Medium	11.5	13.4	3.9	Lg. inc.	Lg. inc.	High	Rare	Good	Good			0	34
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	8.7	10.1	1.1	No change	Sm. inc.	High	Rare	Fair	Good			0	35
quaking aspen	Populus tremuloides	WDH	High	2.5	8.4	3.3	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	36
gray birch	Betula populifolia	NSL	Low	11.6	6.8	2.3	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	37
pin oak	Quercus palustris	NSH	Low	8.5	5.9	8.0	No change	No change	Low	Rare	Very Poor	Very Poor			0	38
pitch pine	Pinus rigida	NSH	High	5	5.2	16.2	No change	No change	Medium	Rare	Poor	Poor			0	39
flowering dogwood	Cornus florida	WDL	Medium	15	4.4	0.8	Lg. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	40
black walnut	Juglans nigra	WDH	Low	4.1	4.3	11.2	Sm. dec.	No change	Medium	Rare	Very Poor	Poor			0	41
Scots pine	Pinus sylvestris	NSH	FIA	1.2	3.4	2.7	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	42
pin cherry	Prunus pensylvanica	NSL	Low	1.2	3.1	2.4	Very Lg. dec.	Very Lg. dec.	Medium	Rare	Lost	Lost			0	43
red spruce	Picea rubens	NDH	High	4.5	2.8	1.3	Sm. dec.	Sm. dec.	Low	Rare	Very Poor	Very Poor			0	44
Norway spruce	Picea abies	NSH	FIA	7.5	2.6	0.9	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	45
black willow	Salix nigra	NSH	Low	1.2	2.4	1.9	Lg. dec.	Sm. dec.	Low	Rare	Very Poor	Very Poor			0	46
American chestnut	Castanea dentata	NSLX	FIA	4.5	2.3	1.0	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	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
slippery elm	Ulmus rubra	WSL	Low	2.5	2.3	0.9	Very Lg. dec.	Very Lg. dec.	Medium	Rare	Lost	Lost				0 48
white mulberry	Morus alba	NSL	FIA	5	2.3	7.3	Unknown	Unknown	NA	Rare	NNIS	NNIS				0 49
sweetgum	Liquidambar styraciflua	WDH	High	3.1	2.1	4.2	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good				0 50
butternut	Juglans cinerea	NSLX	FIA	1.2	1.6	1.2	Unknown	Unknown	Low	Rare	FIA Only	FIA Only				0 51
eastern cottonwood	Populus deltoides	NSH	Low	1.2	1.2	1.0	No change	No change	Medium	Rare	Poor	Poor				0 52
northern pin oak	Quercus ellipsoidalis	NSH	Medium	4.1	1.2	3.1	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor				0 53
striped maple	Acer pensylvanicum	NSL	Medium	1.2	0.7	0.5	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor				0 54
post oak	Quercus stellata	WDH	High	5	0.4	1.1	Lg. inc.	Lg. inc.	High	Rare	Good	Good				0 55
tamarack (native)	Larix laricina	NSH	High	3.3	0.4	0.7	Sm. dec.	Sm. dec.	Low	Rare	Very Poor	Very Poor				0 56
bear oak; scrub oak	Quercus ilicifolia	NSLX	FIA	5	0.3	1.0	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only				0 57
shortleaf pine	Pinus echinata	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat				0 58
slash pine	Pinus elliotii	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat				0 59
longleaf pine	Pinus palustris	NSH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat				0 60
loblolly pine	Pinus taeda	WDH	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				0 62
bald cypress	Taxodium distichum	NSH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat				0 63
florida maple	Acer barbatum	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat				0 64
boxelder	Acer negundo	WSH	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat				0 65
silver maple	Acer saccharinum	NSH	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat				0 66
cittamwood/gum bumelia	Sideroxylon lanuginosum ssp.	NSL	Low	0	0	0	Unknown	New Habitat	High	Absent	Unknown	New Habitat				0 67
pecan	Carya illinoensis	NSH	Low	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat				0 68
black hickory	Carya texana	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat				0 69
sugarberry	Celtis laevigata	NDH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat				0 70
eastern redbud	Cercis canadensis	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat				0 71
American holly	Ilex opaca	NSL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat				0 72
sweetbay	Magnolia virginiana	NSL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat				0 73
mountain or Fraser magnolia	Magnolia fraseri	NSL	Low	0	0	0	Unknown	Unknown	Low	Absent	Unknown	Unknown				0 74
water tupelo	Nyssa aquatica	NSH	Medium	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat				0 75
swamp tupelo	Nyssa biflora	NDH	Medium	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat				0 76
sourwood	Oxydendrum arboreum	NDL	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat				0 77
redbay	Persea borbonia	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat				0 78
southern red oak	Quercus falcata	WDL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat				0 79
cherrybark oak; swamp red o.	Quercus pagoda	NSL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat				0 80
laurel oak	Quercus laurifolia	NDH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat				0 81
overcup oak	Quercus lyrata	NSL	Medium	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat				0 82
blackjack oak	Quercus marilandica	NSL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat				0 83
swamp chestnut oak	Quercus michauxii	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat				0 84
water oak	Quercus nigra	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat				0 85
willow oak	Quercus phellos	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat				0 86
live oak	Quercus virginiana	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat				0 87
American mountain-ash	Sorbus americana	NSL	Low	0	0	0	Unknown	Unknown	Low	Absent	Unknown	Unknown				0 88
winged elm	Ulmus alata	WDL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat				0 89