

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	8,400.0	3,243.3	265

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	17	22	Increase	31	35	Very Good	12	13
Hickory	4			Medium	31	50	No Change	13	10	Good	19	21
Maple	3	Abundant	3	Low	33	10	Decrease	18	17	Fair	10	10
Oak	16	Common	22	FIA	3		New	12	13	Poor	7	6
Pine	5	Rare	40				Unknown	10	9	Very Poor	10	9
Other	35	Absent	17							FIA Only	1	1
	65		82		84	82		84	84	Unknown	7	6
											66	66

Potential Changes in Climate Variables

Temperature (°F)

	Scenario	2009	2039	2069	2099	
Annual	CCSM45	62.3	64.1	66.2	66.3	
	CCSM85	62.3	64.4	66.9	69.6	
	GFDL45	62.3	65.0	67.0	67.7	
	GFDL85	62.3	64.9	68.1	71.5	
	HAD45	62.3	64.6	67.5	68.9	
Average	HAD85	62.3	64.9	69.2	73.0	
	CCSM45	76.0	77.7	79.4	79.9	
	CCSM85	76.0	77.8	80.4	83.8	
	GFDL45	76.0	78.7	80.8	82.2	
	GFDL85	76.0	78.6	82.2	86.1	
May—Sep	HAD45	76.0	79.3	81.9	83.4	
	HAD85	76.0	79.3	85.6	88.9	
	CCSM45	41.8	44.1	44.9	44.9	
	CCSM85	41.8	44.2	45.5	46.7	
	GFDL45	41.8	45.4	45.5	45.8	
Coldest Month	GFDL85	41.8	43.7	44.8	45.2	
	HAD45	41.8	41.6	43.5	44.1	
	HAD85	41.8	43.0	44.2	45.9	
	CCSM45	80.6	82.3	83.0	83.1	
	CCSM85	80.6	82.3	83.7	85.6	
Warmest Month	GFDL45	80.6	83.2	84.1	85.0	
	GFDL85	80.6	82.9	84.7	86.7	
	HAD45	80.6	85.0	86.9	87.5	
	HAD85	80.6	85.3	89.5	90.8	

Precipitation (in)

	Scenario	2009	2039	2069	2099	
Annual	CCSM45	54.6	56.4	61.0	60.0	
	CCSM85	54.6	57.3	59.4	65.6	
	GFDL45	54.6	61.5	65.0	68.0	
	GFDL85	54.6	61.4	64.2	66.4	
	HAD45	54.6	53.1	59.8	59.7	
Total	HAD85	54.6	58.0	51.9	56.5	
	CCSM45	21.5	21.8	23.1	23.3	
	CCSM85	21.5	21.4	21.6	23.7	
	GFDL45	21.5	26.3	28.1	28.1	
	GFDL85	21.5	26.5	28.5	29.6	
May—Sep	HAD45	21.5	20.6	23.1	21.5	
	HAD85	21.5	23.1	16.8	18.5	

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
loblolly pine	Pinus taeda	WDH	High	91.7	3280.9	34.5	No change	No change	Medium	Abundant	Good	Good			1	1
sweetgum	Liquidambar styraciflua	WDH	High	91.7	1006.2	10.6	No change	Sm. inc.	Medium	Abundant	Good	Very Good			1	2
Virginia pine	Pinus virginiana	NDH	High	70.2	566.0	7.8	Sm. dec.	Sm. dec.	Medium	Abundant	Fair	Fair			0	3
chestnut oak	Quercus prinus	NDH	High	52.4	404.3	7.4	No change	No change	High	Common	Good	Good			1	4
white oak	Quercus alba	WDH	Medium	70.2	364.6	5.0	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	5
yellow-poplar	Liriodendron tulipifera	WDH	High	63.1	359.0	5.5	Sm. dec.	Sm. dec.	High	Common	Fair	Fair			1	6
southern red oak	Quercus falcata	WDL	Medium	75	345.5	4.4	Sm. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	7
mockernut hickory	Carya alba	WDL	Medium	69	315.8	4.4	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	8
post oak	Quercus stellata	WDH	High	58.3	315.6	5.2	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	9
pignut hickory	Carya glabra	WDL	Medium	71.4	278.7	3.8	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor			0	10
water oak	Quercus nigra	WDH	High	57.1	255.8	4.3	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	11
red maple	Acer rubrum	WDH	High	65.5	212.9	3.1	Sm. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	12
blackgum	Nyssa sylvatica	WDL	Medium	73.8	204.3	2.7	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	13
black cherry	Prunus serotina	WDL	Medium	77.4	186.8	2.3	Sm. inc.	Sm. inc.	Low	Common	Fair	Fair			1	14
shortleaf pine	Pinus echinata	WDH	High	52.4	169.8	3.1	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	15
sourwood	Oxydendrum arboreum	NDL	High	61.9	155.7	2.4	Sm. dec.	Sm. dec.	High	Common	Fair	Fair			1	16
longleaf pine	Pinus palustris	NSH	Medium	28.6	149.9	5.1	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	17
flowering dogwood	Cornus florida	WDL	Medium	70.2	140.6	1.9	No change	No change	Medium	Common	Fair	Fair			1	18
winged elm	Ulmus alata	WDL	Medium	54.8	119.5	2.1	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	19
green ash	Fraxinus pennsylvanica	WSH	Low	28.6	114.8	3.9	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	20
northern red oak	Quercus rubra	WDH	Medium	38.1	95.7	2.4	No change	No change	High	Common	Good	Good			1	21
boxelder	Acer negundo	WSH	Low	11.9	78.0	6.3	Sm. dec.	Sm. dec.	High	Common	Fair	Fair			1	22
black oak	Quercus velutina	WDH	High	36.9	77.0	2.0	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	23
American elm	Ulmus americana	WDH	Medium	21.4	72.2	3.3	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	24
scarlet oak	Quercus coccinea	WDL	Medium	20.2	72.0	3.4	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor			0	25
blackjack oak	Quercus marilandica	NSL	Medium	25	46.0	1.8	Lg. inc.	Lg. inc.	High	Rare	Good	Good			1	26
laurel oak	Quercus laurifolia	NDH	Medium	9.5	44.7	4.5	Sm. inc.	Sm. inc.	Medium	Rare	Fair	Fair	Infill +	Infill +	1	27
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	19	44.5	2.3	Lg. inc.	Lg. inc.	High	Rare	Good	Good			1	28
American hornbeam; musclev	Carpinus caroliniana	WSL	Low	16.7	40.9	2.4	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			1	29
eastern cottonwood	Populus deltoides	NSH	Low	2.4	40.3	16.3	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	30
American beech	Fagus grandifolia	WDH	High	20.2	37.9	1.8	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	1	31
common persimmon	Diospyros virginiana	NSL	Low	40.5	37.7	0.9	Lg. inc.	Lg. inc.	High	Rare	Good	Good			1	32
cherrybark oak; swamp red o	Quercus pagoda	NSL	Medium	10.7	35.9	3.2	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	1	33
willow oak	Quercus phellos	NSL	Low	10.7	31.3	2.8	Sm. inc.	Lg. inc.	Medium	Rare	Fair	Good	Infill +	Infill ++	1	34
sycamore	Platanus occidentalis	NSL	Low	9.5	28.5	2.9	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	1	35
red mulberry	Morus rubra	NSL	Low	17.9	26.1	1.4	No change	Sm. inc.	Medium	Rare	Poor	Fair			1	36
black willow	Salix nigra	NSH	Low	9.5	25.0	2.5	No change	No change	Low	Rare	Very Poor	Very Poor			0	37
sugarberry	Celtis laevigata	NDH	Medium	8.3	24.3	2.8	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	1	38
hackberry	Celtis occidentalis	WDH	Medium	6	23.8	3.9	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	1	39
eastern redcedar	Juniperus virginiana	WDH	Medium	15.5	21.0	1.3	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			1	40
paulownia	Paulownia tomentosa	NSL	FIA	3.6	20.3	5.5	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	41
shagbark hickory	Carya ovata	WSL	Medium	11.9	20.1	1.6	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	42
slash pine	Pinus elliotii	NDH	High	1.2	16.8	13.6	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	43
sweetbay	Magnolia virginiana	NSL	Medium	2.4	16.3	6.6	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	2	44
florida maple	Acer barbatum	NSL	Low	15.5	14.3	0.9	Lg. inc.	Lg. inc.	High	Rare	Good	Good			1	45
slippery elm	Ulmus rubra	WSL	Low	3.6	12.2	3.3	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	46
sassafras	Sassafras albidum	WSL	Low	16.7	9.9	0.6	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			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
eastern redbud	Cercis canadensis	NSL	Low	10.7	8.7	0.8	Sm. dec.	Lg. inc.	Medium	Rare	Very Poor	Good			1	48
white ash	Fraxinus americana	WDL	Medium	10.7	8.4	0.8	Sm. inc.	Lg. inc.	Low	Rare	Poor	Fair		Infill +	1	49
wild plum	Prunus americana	NSLX	FIA	6	7.0	1.1	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	50
overcup oak	Quercus lyrata	NSL	Medium	1.2	5.3	4.3	No change	No change	Low	Rare	Very Poor	Very Poor			2	51
American basswood	Tilia americana	WSL	Medium	6	4.9	0.8	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	52
serviceberry	Amelanchier spp.	NSL	Low	7.1	4.6	0.6	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	53
water tupelo	Nyssa aquatica	NSH	Medium	1.2	4.0	3.3	Sm. dec.	Sm. dec.	Low	Rare	Very Poor	Very Poor			0	54
white mulberry	Morus alba	NSL	FIA	1.2	3.0	2.4	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	55
Shumard oak	Quercus shumardii	NSL	Low	2.4	2.4	1.0	Very Lg. dec.	Sm. dec.	High	Rare	Lost	Poor			0	56
bigleaf magnolia	Magnolia macrophylla	NSL	Low	2.4	2.0	0.8	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	57
chinkapin oak	Quercus muehlenbergii	NSL	Medium	3.6	1.9	0.5	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	58
river birch	Betula nigra	NSL	Low	2.4	1.9	0.8	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	2	59
American holly	Ilex opaca	NSL	Medium	4.8	1.9	0.4	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	2	60
bitternut hickory	Carya cordiformis	WSL	Low	2.4	1.9	0.8	Very Lg. dec.	Very Lg. dec.	High	Rare	Lost	Lost			0	61
cucumbertree	Magnolia acuminata	NSL	Low	1.2	1.8	1.5	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	62
swamp chestnut oak	Quercus michauxii	NSL	Low	2.4	1.6	0.7	Very Lg. dec.	Very Lg. dec.	Medium	Rare	Lost	Lost			0	63
redbay	Persea borbonia	NSL	Low	1.2	1.0	0.8	No change	Sm. inc.	High	Rare	Fair	Good			0	64
black locust	Robinia pseudoacacia	NDH	Low	1.2	0.7	0.5	Very Lg. dec.	Very Lg. dec.	Medium	Rare	Lost	Lost			0	65
ashe juniper	Juniperus ashei	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	66
spruce pine	Pinus glabra	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	67
pitch pine	Pinus rigida	NSH	High	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	68
striped maple	Acer pensylvanicum	NSL	Medium	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	69
yellow buckeye	Aesculus flava	NSL	Low	0	0	0	Unknown	Unknown	Low	Absent	Unknown	Unknown			0	70
pawpaw	Asimina triloba	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	71
cittamwood/gum bumelia	Sideroxylon lanuginosum ssp.	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate +	3	72
pecan	Carya illinoensis	NSH	Low	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat	Likely +	Likely +	3	73
black hickory	Carya texana	NDL	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Likely +	Likely +	3	74
black ash	Fraxinus nigra	WSH	Medium	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat			0	75
honeylocust	Gleditsia triacanthos	NSH	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Likely +	Likely +	3	76
silverbell	Halesia spp.	NSL	Low	0	0	0	Unknown	New Habitat	Medium	Absent	Unknown	New Habitat			3	77
black walnut	Juglans nigra	WDH	Low	0	0	0	Unknown	Unknown	Medium	Modeled	Unknown	Unknown			0	78
southern magnolia	Magnolia grandiflora	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	79
swamp tupelo	Nyssa biflora	NDH	Medium	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat	Migrate ++	Migrate ++	3	80
Nuttall oak	Quercus texana	NSH	Medium	0	0	0	Unknown	Unknown	High	Modeled	Unknown	Unknown			0	81
live oak	Quercus virginiana	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate ++	Migrate ++	3	82
bluejack oak	Quercus incana	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	83
cedar elm	Ulmus crassifolia	NDH	Medium	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat		Migrate ++	3	84