

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 8,851.1 3,417.4 192

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														
Hickory	4														
Maple	4	Abundant	4	High	21	17	Increase	13	20	Very Good	6	5	Likely	0	0
Oak	7	Common	17	Medium	21	37	No Change	9	5	Good	8	13	Infill	19	18
Pine	3	Rare	27	Low	22	13	Decrease	22	19	Fair	4	5	Migrate	4	5
Other	27	Absent	20	FIA	4		New	16	16	Poor	13	9			
	48		68		68	67	Unknown	8	8	Very Poor	9	9			
								68	68	FIA Only	3	3			
										Unknown	4	4			
											47	48			

Potential Changes in Climate Variables

Temperature (°F)

Scenario	2009	2039	2069	2099		
Annual	CCSM45	49.3	51.0	53.1	53.3	
Average	CCSM85	49.3	51.5	53.9	56.8	
	GFDL45	49.3	52.3	54.7	56.0	
	GFDL85	49.3	52.2	56.0	60.3	
	HAD45	49.3	51.9	55.2	56.8	
	HAD85	49.3	52.0	56.2	61.1	
Growing Season	CCSM45	65.6	67.6	69.2	69.5	
	CCSM85	65.6	67.7	70.1	73.3	
May—Sep	GFDL45	65.6	68.8	71.5	72.8	
	GFDL85	65.6	68.7	72.9	77.3	
	HAD45	65.6	68.2	71.1	73.3	
	HAD85	65.6	67.7	72.5	77.7	
Coldest Month	CCSM45	24.5	25.8	27.4	28.1	
	CCSM85	24.5	27.0	28.0	30.0	
Average	GFDL45	24.5	27.8	29.3	30.4	
	GFDL85	24.5	28.1	29.9	32.2	
	HAD45	24.5	26.5	29.0	29.4	
	HAD85	24.5	27.6	29.6	32.6	
Warmest Month	CCSM45	72.1	74.3	75.2	75.2	
	CCSM85	72.1	74.5	76.0	77.5	
Average	GFDL45	72.1	74.7	76.3	77.4	
	GFDL85	72.1	75.3	77.7	80.3	
	HAD45	72.1	74.9	76.4	77.6	
	HAD85	72.1	74.1	76.7	80.1	

Precipitation (in)

Scenario	2009	2039	2069	2099		
Annual	CCSM45	48.8	47.7	46.3	52.5	
Total	CCSM85	48.8	48.3	50.3	54.3	
	GFDL45	48.8	52.2	54.6	53.5	
	GFDL85	48.8	50.8	53.6	55.9	
	HAD45	48.8	49.9	54.1	52.9	
	HAD85	48.8	52.5	53.0	54.1	
Growing Season	CCSM45	19.3	20.3	18.4	20.2	
	CCSM85	19.3	19.1	20.2	20.4	
May—Sep	GFDL45	19.3	18.6	18.0	18.3	
	GFDL85	19.3	19.2	17.8	17.8	
	HAD45	19.3	20.1	20.4	19.8	
	HAD85	19.3	19.4	19.2	20.0	

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	87.6	2547.2	29.3	Sm. dec.	Sm. dec.	High	Abundant	Good	Good	Infill ++	Infill ++	2	1
eastern white pine	Pinus strobus	WDH	High	82.6	2514.4	30.1	Lg. dec.	Lg. dec.	Low	Abundant	Poor	Poor	Infill +	Infill +	2	2
northern red oak	Quercus rubra	WDH	Medium	66.7	567.6	8.9	No change	Sm. dec.	High	Abundant	Very Good	Good	Infill ++	Infill ++	2	3
black oak	Quercus velutina	WDH	High	63.9	504.4	8.1	Sm. inc.	Sm. inc.	Medium	Abundant	Very Good	Very Good	Infill ++	Infill ++	2	4
white oak	Quercus alba	WDH	Medium	57.6	350.3	5.8	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good	Infill ++	Infill ++	2	5
scarlet oak	Quercus coccinea	WDL	Medium	40.1	331.0	7.6	Sm. inc.	No change	Medium	Common	Good	Fair	Infill ++	Infill +	2	6
eastern hemlock	Tsuga canadensis	NSH	High	31.6	233.6	8.9	Sm. dec.	Lg. dec.	Low	Common	Poor	Very Poor	Infill +		2	7
white ash	Fraxinus americana	WDL	Medium	41.4	211.2	5.6	Sm. inc.	No change	Low	Common	Fair	Poor	Infill +	Infill +	2	8
American elm	Ulmus americana	WDH	Medium	32	165.3	5.2	Sm. dec.	No change	Medium	Common	Poor	Fair		Infill +	2	9
sweet birch	Betula lenta	NDH	High	37.7	149.0	4.2	No change	Sm. dec.	Low	Common	Poor	Poor	Infill +	Infill +	2	10
pignut hickory	Carya glabra	WDL	Medium	20.3	143.1	6.8	No change	Sm. inc.	Medium	Common	Fair	Good	Infill +		2	11
pitch pine	Pinus rigida	NSH	High	9.9	140.3	11.2	No change	Sm. dec.	Medium	Common	Fair	Poor	Infill +	Infill +	2	12
black walnut	Juglans nigra	WDH	Low	2.3	125.3	53.4	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	13
yellow birch	Betula alleghaniensis	NDL	High	21.9	105.2	6.1	Sm. inc.	Sm. inc.	Medium	Common	Good	Good	Infill ++	Infill ++	2	14
black cherry	Prunus serotina	WDL	Medium	28.6	101.0	4.7	Lg. inc.	Lg. inc.	Low	Common	Good	Good	Infill ++	Infill ++	2	15
American beech	Fagus grandifolia	WDL	High	23.8	79.2	3.9	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			2	16
blackgum	Nyssa sylvatica	WDL	Medium	21.3	78.9	3.7	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good	Infill ++	Infill ++	2	17
swamp white oak	Quercus bicolor	NSL	Low	11.8	69.3	7.7	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor		Infill +	2	18
bigtooth aspen	Populus grandidentata	NSL	Medium	12.7	67.2	5.9	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor	Infill +		2	19
gray birch	Betula populifolia	NSL	Low	16.8	63.1	3.5	No change	Sm. inc.	Medium	Common	Fair	Good	Infill +	Infill ++	2	20
sugar maple	Acer saccharum	WDH	High	15	61.5	4.4	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			2	21
Norway maple	Acer platanoides	NSL	FIA	9.5	46.4	7.3	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	22
shagbark hickory	Carya ovata	WSL	Medium	17.1	40.3	2.6	Sm. dec.	No change	Medium	Rare	Very Poor	Poor		Infill +	2	23
green ash	Fraxinus pennsylvanica	WSH	Low	8.4	39.4	7.3	No change	Sm. inc.	Medium	Rare	Poor	Fair	Infill +	Infill +	2	24
paper birch	Betula papyrifera	WDH	High	21.8	36.7	1.8	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	25
quaking aspen	Populus tremuloides	WDH	High	9.1	28.0	3.0	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	26
American basswood	Tilia americana	WSL	Medium	9.5	27.3	4.0	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	27
black willow	Salix nigra	NSH	Low	2.3	19.3	8.2	Sm. dec.	Sm. dec.	Low	Rare	Very Poor	Very Poor			0	28
Atlantic white-cedar	Chamaecyparis thyoides	NSH	Low	3.3	16.8	4.7	No change	No change	Low	Rare	Very Poor	Very Poor			2	29
eastern redcedar	Juniperus virginiana	WDH	Medium	12.4	15.6	1.3	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	30
American hornbeam; muscle	Carpinus caroliniana	WSL	Low	9.1	10.3	1.1	No change	Sm. inc.	Medium	Rare	Poor	Fair			2	31
silver maple	Acer saccharinum	NSH	Low	1.1	8.7	7.4	Sm. dec.	Lg. inc.	High	Rare	Poor	Good			2	32
red pine	Pinus resinosa	NSH	Medium	3.4	8.5	2.4	Lg. dec.	Lg. dec.	Low	Rare	Very Poor	Very Poor			0	33
sassafras	Sassafras albidum	WSL	Low	5.6	8.3	1.4	Lg. inc.	Sm. inc.	Medium	Rare	Good	Fair	Infill ++	Infill +	2	34
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	4.5	6.9	1.5	Sm. dec.	Sm. inc.	High	Rare	Poor	Good			2	35
black locust	Robinia pseudoacacia	NDH	Low	2.2	6.5	2.7	No change	Lg. inc.	Medium	Rare	Poor	Good	Infill +		2	36
mockernut hickory	Carya alba	WDL	Medium	1.1	4.7	3.9	Lg. inc.	Lg. inc.	High	Rare	Good	Good			2	37
eastern cottonwood	Populus deltoides	NSH	Low	1.1	2.5	2.2	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	38
pin oak	Quercus palustris	NSH	Low	1.1	1.7	1.4	Very Lg. dec.	Sm. inc.	Low	Rare	Lost	Poor			0	39
tamarack (native)	Larix laricina	NSH	High	1.1	1.4	1.2	Sm. dec.	Sm. dec.	Low	Rare	Very Poor	Very Poor			0	40
pin cherry	Prunus pensylvanica	NSL	Low	1	1.3	1.0	Very Lg. dec.	Very Lg. dec.	Medium	Rare	Lost	Lost			0	41
black ash	Fraxinus nigra	WSH	Medium	1.1	0.8	0.7	Very Lg. dec.	Very Lg. dec.	Low	Rare	Lost	Lost			0	42
serviceberry	Amelanchier spp.	NSL	Low	3.7	0.8	0.4	Very Lg. dec.	Very Lg. dec.	Medium	Rare	Lost	Lost			0	43
northern catalpa	Catalpa speciosa	NSHX	FIA	1.1	0.7	0.6	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	44
butternut	Juglans cinerea	NSLX	FIA	3.8	0.7	2.0	Unknown	Unknown	Low	Rare	FIA Only	FIA Only			0	45
American holly	Ilex opaca	NSL	Medium	1.1	0.6	0.5	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	46
bitternut hickory	Carya cordiformis	WSL	Low	1.1	0.6	0.5	Lg. dec.	Sm. inc.	High	Rare	Poor	Good			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	
bear oak; scrub oak	Quercus ilicifolia	NSLX	FIA	1.1	0.6	0.5	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only				0	48
shortleaf pine	Pinus echinata	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat				3	49
loblolly pine	Pinus taeda	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat				3	50
Virginia pine	Pinus virginiana	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat				3	51
striped maple	Acer pensylvanicum	NSL	Medium	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown				0	52
cittamwood/gum bumelia	Sideroxylon lanuginosum ssp.	NSL	Low	0	0	0	New Habitat	Unknown	High	Absent	New Habitat	Unknown				0	53
black hickory	Carya texana	NDL	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat				0	54
flowering dogwood	Cornus florida	WDL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +		3	55
common persimmon	Diospyros virginiana	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat				3	56
sweetgum	Liquidambar styraciflua	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate ++		3	57
yellow-poplar	Liriodendron tulipifera	WDH	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate +		3	58
redbay	Persea borbonia	NSL	Low	0	0	0	Unknown	Unknown	High	Absent	Unknown	Unknown				0	59
southern red oak	Quercus falcata	WDL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat				3	60
blackjack oak	Quercus marilandica	NSL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat				3	61
swamp chestnut oak	Quercus michauxii	NSL	Low	0	0	0	Unknown	New Habitat	Medium	Absent	Unknown	New Habitat				3	62
water oak	Quercus nigra	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat				3	63
willow oak	Quercus phellos	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat				3	64
chestnut oak	Quercus prinus	NDH	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate +		3	65
post oak	Quercus stellata	WDH	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate ++		3	66
American mountain-ash	Sorbus americana	NSL	Low	0	0	0	Unknown	Unknown	Low	Absent	Unknown	Unknown				0	67
winged elm	Ulmus alata	WDL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat				0	68