

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
 8,800.0 3,397.7 237

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	2			High	21	Increase	19	28	Very Good	8	11	Likely	1	1
Hickory	6			Medium	26	No Change	13	9	Good	12	15	Infill	4	8
Maple	5	Abundant	5	Low	31	Decrease	29	24	Fair	12	13	Migrate	2	5
Oak	10	Common	24	FIA	4	New	10	12	Poor	13	9			
Pine	5	Rare	36			Unknown	11	9	Very Poor	15	11			
Other	37	Absent	16						FIA Only	2	2			
	65		81		82		82	82	Unknown	7	5		7	14
										69	66			

Potential Changes in Climate Variables

Temperature (°F)

Scenario	2009	2039	2069	2099
Annual	58.4	60.2	62.3	62.4
Average	58.4	60.6	63.0	65.9
GFDL45	58.4	61.2	63.5	64.4
GFDL85	58.4	61.4	64.6	68.4
HAD45	58.4	60.7	63.8	65.1
HAD85	58.4	60.9	65.0	69.3
Growing Season	72.7	74.5	76.4	76.9
May—Sep	72.7	74.8	77.4	81.1
GFDL45	72.7	75.9	78.5	79.8
GFDL85	72.7	76.3	80.0	84.2
HAD45	72.7	75.7	78.6	80.2
HAD85	72.7	75.7	81.1	85.6
Coldest Month	37.1	39.3	40.2	40.3
Average	37.1	39.5	40.5	41.6
GFDL45	37.1	40.5	40.7	41.5
GFDL85	37.1	39.3	40.3	41.3
HAD45	37.1	37.8	39.6	39.9
HAD85	37.1	38.3	39.5	41.1
Warmest Month	78.0	80.1	81.1	81.1
Average	78.0	80.2	81.8	83.5
GFDL45	78.0	81.1	82.3	83.3
GFDL85	78.0	81.8	83.9	86.4
HAD45	78.0	81.4	83.3	84.0
HAD85	78.0	82.1	85.4	88.2

Precipitation (in)

Scenario	2009	2039	2069	2099
Annual	44.4	48.1	51.0	52.2
Total	44.4	49.5	51.8	57.0
GFDL45	44.4	49.7	53.0	55.8
GFDL85	44.4	48.2	54.2	54.7
HAD45	44.4	47.0	48.6	48.4
HAD85	44.4	49.1	46.0	48.1
Growing Season	19.9	22.9	24.6	25.7
May—Sep	19.9	23.0	23.5	26.2
GFDL45	19.9	23.3	25.3	26.6
GFDL85	19.9	21.9	26.2	26.4
HAD45	19.9	20.9	20.9	21.6
HAD85	19.9	22.8	20.6	20.8

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
yellow-poplar	Liriodendron tulipifera	WDH	High	87.5	1396.3	15.9	Lg. dec.	Lg. dec.	High	Abundant	Good	Good			1	1
Virginia pine	Pinus virginiana	NDH	High	73.9	1184.1	16.1	Lg. dec.	Lg. dec.	Medium	Abundant	Fair	Fair			0	2
red maple	Acer rubrum	WDH	High	90.9	993.1	11.0	Sm. dec.	Sm. dec.	High	Abundant	Good	Good			1	3
sweetgum	Liquidambar styraciflua	WDH	High	68.2	809.6	12.0	Sm. inc.	Sm. inc.	Medium	Abundant	Very Good	Very Good			1	4
white oak	Quercus alba	WDH	Medium	81.8	591.7	7.4	No change	No change	High	Abundant	Very Good	Very Good			1	5
shortleaf pine	Pinus echinata	WDH	High	63.6	495.7	7.9	Sm. inc.	Lg. inc.	Medium	Common	Good	Very Good			1	6
loblolly pine	Pinus taeda	WDH	High	30.7	427.5	13.3	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	7
eastern redcedar	Juniperus virginiana	WDH	Medium	65.9	313.5	4.9	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	8
sourwood	Oxydendrum arboreum	NDL	High	69.3	296.4	4.3	Lg. dec.	Lg. dec.	High	Common	Fair	Fair			1	9
black cherry	Prunus serotina	WDL	Medium	76.1	247.7	3.3	No change	No change	Low	Common	Poor	Poor			0	10
chestnut oak	Quercus prinus	NDH	High	22.7	205.4	10.3	Lg. dec.	Lg. dec.	High	Common	Fair	Fair			1	11
northern red oak	Quercus rubra	WDH	Medium	53.4	188.4	3.6	No change	No change	High	Common	Good	Good			1	12
southern red oak	Quercus falcata	WDL	Medium	54.5	188.2	3.6	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	13
American beech	Fagus grandifolia	WDH	High	55.7	184.9	3.4	Sm. dec.	No change	Medium	Common	Poor	Fair			1	14
pignut hickory	Carya glabra	WDL	Medium	59.1	180.0	3.2	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor			0	15
flowering dogwood	Cornus florida	WDL	Medium	76.1	170.9	2.3	No change	Sm. dec.	Medium	Common	Fair	Poor			1	16
scarlet oak	Quercus coccinea	WDL	Medium	35.2	133.6	4.0	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	17
American hornbeam; muscley	Carpinus caroliniana	WSL	Low	39.8	127.7	3.1	No change	Sm. inc.	Medium	Common	Fair	Good			1	18
white ash	Fraxinus americana	WDL	Medium	46.6	113.8	2.5	No change	Sm. inc.	Low	Common	Poor	Fair			1	19
green ash	Fraxinus pennsylvanica	WSH	Low	12.5	103.2	7.9	Sm. inc.	Lg. inc.	Medium	Common	Good	Very Good			1	20
mockernut hickory	Carya alba	WDL	Medium	45.5	103.1	2.4	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	21
sycamore	Platanus occidentalis	NSL	Low	22.7	102.8	4.3	Sm. dec.	Sm. inc.	Medium	Common	Poor	Good			1	22
winged elm	Ulmus alata	WDL	Medium	34.1	92.9	2.9	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	23
blackgum	Nyssa sylvatica	WDL	Medium	53.4	90.8	1.8	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	24
American elm	Ulmus americana	WDH	Medium	35.2	79.1	2.4	Sm. inc.	Lg. inc.	Medium	Common	Good	Very Good			1	25
willow oak	Quercus phellos	NSL	Low	22.7	71.3	3.6	Sm. dec.	No change	Medium	Common	Poor	Fair			1	26
florida maple	Acer barbatum	NSL	Low	11.4	59.5	5.0	Lg. dec.	Sm. dec.	High	Common	Fair	Fair			1	27
common persimmon	Diospyros virginiana	NSL	Low	27.3	59.3	2.1	Lg. dec.	Lg. dec.	High	Common	Fair	Fair			1	28
black oak	Quercus velutina	WDH	High	27.3	51.7	2.2	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	29
river birch	Betula nigra	NSL	Low	11.4	48.1	4.0	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			1	30
black walnut	Juglans nigra	WDH	Low	15.9	40.9	3.3	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	31
post oak	Quercus stellata	WDH	High	20.5	40.9	1.9	Lg. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	1	32
eastern redbud	Cercis canadensis	NSL	Low	17	40.2	2.3	Lg. dec.	No change	Medium	Rare	Very Poor	Poor			1	33
butternut	Juglans cinerea	NSLX	FIA	2.3	33.3	14.0	Unknown	Unknown	Low	Rare	FIA Only	FIA Only			0	34
black locust	Robinia pseudoacacia	NDH	Low	18.2	33.0	2.3	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	35
shagbark hickory	Carya ovata	WSL	Medium	12.5	31.5	2.4	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	36
boxelder	Acer negundo	WSH	Low	6.8	22.8	3.2	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	1	37
black willow	Salix nigra	NSH	Low	5.7	22.7	3.8	No change	Sm. inc.	Low	Rare	Very Poor	Poor		Infill +	1	38
slippery elm	Ulmus rubra	WSL	Low	10.2	20.6	1.9	No change	Sm. inc.	Medium	Rare	Poor	Fair			1	39
ailanthus	Ailanthus altissima	NSL	FIA	12.5	20.4	2.2	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	40
sassafras	Sassafras albidum	WSL	Low	13.6	19.5	1.4	Sm. inc.	Lg. inc.	Medium	Rare	Fair	Good			1	41
hackberry	Celtis occidentalis	WDH	Medium	12.5	19.3	2.5	Lg. dec.	Sm. inc.	High	Rare	Poor	Good			1	42
American holly	Ilex opaca	NSL	Medium	14.8	18.9	1.6	Sm. inc.	Lg. inc.	Medium	Rare	Fair	Good			1	43
eastern white pine	Pinus strobus	WDH	High	6.8	15.9	2.2	Lg. dec.	Lg. dec.	Low	Rare	Very Poor	Very Poor			0	44
red mulberry	Morus rubra	NSL	Low	8	7.0	0.8	Sm. dec.	No change	Medium	Rare	Very Poor	Poor		Infill +	1	45
sweet birch	Betula lenta	NDH	High	1.1	6.3	5.3	Lg. dec.	Lg. dec.	Low	Rare	Very Poor	Very Poor			0	46
mountain or Fraser magnolia	Magnolia fraseri	NSL	Low	3.4	5.3	1.5	Sm. dec.	Sm. dec.	Low	Rare	Very Poor	Very Poor			0	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
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	9.1	5.1	1.0	Lg. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	1	48
cherrybark oak; swamp red o.	Quercus pagoda	NSL	Medium	2.3	5.1	2.1	No change	Sm. inc.	Medium	Rare	Poor	Fair	Infill +		2	49
cucumbertree	Magnolia acuminata	NSL	Low	2.3	4.6	1.9	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	50
honeylocust	Gleditsia triacanthos	NSH	Low	3.4	4.2	1.2	No change	Sm. inc.	High	Rare	Fair	Good		Infill ++	2	51
southern magnolia	Magnolia grandiflora	NSL	Low	1.1	3.5	2.9	No change	Sm. inc.	Medium	Rare	Poor	Fair		Infill +	2	52
striped maple	Acer pensylvanicum	NSL	Medium	3.4	2.3	0.6	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	53
pecan	Carya illinoensis	NSH	Low	1.1	2.1	1.8	Lg. inc.	Lg. inc.	Low	Rare	Fair	Fair		Infill +	2	54
yellow birch	Betula alleghaniensis	NDL	High	1.1	2.0	1.7	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	55
shellbark hickory	Carya laciniosa	NSL	Low	1.1	1.1	0.9	Lg. dec.	Very Lg. dec.	Medium	Rare	Very Poor	Lost			0	56
pitch pine	Pinus rigida	NSH	High	1.1	0.8	0.7	Very Lg. dec.	Very Lg. dec.	Medium	Rare	Lost	Lost			0	57
water oak	Quercus nigra	WDH	High	1.1	0.8	0.6	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	58
swamp tupelo	Nyssa biflora	NDH	Medium	1.1	0.7	0.6	No change	No change	Low	Rare	Very Poor	Very Poor			0	59
sugar maple	Acer saccharum	WDH	High	2.3	0.5	0.2	Lg. dec.	Lg. dec.	High	Rare	Poor	Poor			0	60
serviceberry	Amelanchier spp.	NSL	Low	2.3	0.4	0.2	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	61
sugarberry	Celtis laevigata	NDH	Medium	1.1	0.4	0.3	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	62
white mulberry	Morus alba	NSL	FIA	1.1	0.4	0.3	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	63
wild plum	Prunus americana	NSLX	FIA	1.1	0.4	0.3	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	64
bitternut hickory	Carya cordiformis	WSL	Low	1.1	0.3	0.3	Lg. dec.	Lg. dec.	High	Rare	Poor	Poor			0	65
ashe juniper	Juniperus ashei	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	66
slash pine	Pinus elliotii	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	67
longleaf pine	Pinus palustris	NSH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate ++	Migrate ++	3	68
Table Mountain pine	Pinus pungens	NSL	Low	0	0	0	Unknown	Unknown	High	Absent	Unknown	Unknown			0	69
cittamwood/gum bumelia	Sideroxylon lanuginosum ssp.	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			0	70
black hickory	Carya texana	NDL	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	71
black ash	Fraxinus nigra	WSH	Medium	0	0	0	Unknown	New Habitat	Low	Absent	Unknown	New Habitat			3	72
blue ash	Fraxinus quadrangulata	NSL	Low	0	0	0	Unknown	Unknown	Low	Absent	Unknown	Unknown			0	73
silverbell	Halesia spp.	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	74
sweetbay	Magnolia virginiana	NSL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	75
bigleaf magnolia	Magnolia macrophylla	NSL	Low	0	0	0	Unknown	Unknown	Medium	Modeled	Unknown	Unknown			0	76
pin cherry	Prunus pensylvanica	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	77
laurel oak	Quercus laurifolia	NDH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Likely +	Likely +	3	78
blackjack oak	Quercus marilandica	NSL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate ++	Migrate ++	3	79
live oak	Quercus virginiana	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate ++	3	80
bluejack oak	Quercus incana	NSL	Low	0	0	0	Unknown	New Habitat	Medium	Absent	Unknown	New Habitat		Migrate +	3	81
cedar elm	Ulmus crassifolia	NDH	Medium	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat			0	82