

**One x One Degree**  
**Climate Change Atlas Tree Species**  
 Current and Potential Future Habitat, Capability, and Migration

sq. km      sq. mi      FIA Plots  
 Area of Region    10,421    4,023.6      260

**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	15	24	Increase	42	43	Very Good	9	11	Likely	1	2
Hickory	8			Medium	34	54	No Change	13	14	Good	27	26	Infill	14	15
Maple	4	Abundant	3	Low	36	9	Decrease	14	12	Fair	16	16	Migrate	3	3
Oak	16	Common	30	FIA	4		New	8	9	Poor	9	9			
Pine	3	Rare	40				Unknown	12	11	Very Poor	7	6			
Other	40	Absent	14							FIA Only	3	3			
	<b>73</b>		<b>87</b>		<b>89</b>	<b>87</b>		<b>89</b>	<b>89</b>	Unknown	8	7			
											<b>79</b>	<b>78</b>			

**Potential Changes in Climate Variables**

**Temperature (°F)**

	Scenario	2009	2039	2069	2099	
Annual Average	CCSM45	64.5	66.2	68.0	68.3	
	CCSM85	64.5	66.5	69.0	71.4	
	GFDL45	64.5	67.7	68.9	69.9	
	GFDL85	64.5	67.2	70.2	73.6	
	HAD45	64.5	67.0	69.9	71.0	
HAD85	64.5	67.3	71.4	75.2		
Growing Season (May—Sep)	CCSM45	77.9	79.5	80.9	81.4	
	CCSM85	77.9	79.8	82.2	85.2	
	GFDL45	77.9	81.6	82.7	84.4	
	GFDL85	77.9	81.0	84.3	88.5	
	HAD45	77.9	81.3	84.0	84.9	
HAD85	77.9	81.5	87.3	90.6		
Coldest Month (Average)	CCSM45	44.3	46.6	47.6	47.6	
	CCSM85	44.3	47.0	48.3	49.5	
	GFDL45	44.3	48.0	48.0	48.1	
	GFDL85	44.3	45.7	46.8	47.2	
	HAD45	44.3	44.8	46.6	47.4	
HAD85	44.3	46.0	47.4	49.1		
Warmest Month (Average)	CCSM45	82.0	83.3	83.9	84.1	
	CCSM85	82.0	83.6	84.6	86.2	
	GFDL45	82.0	86.1	86.1	87.3	
	GFDL85	82.0	85.4	86.8	89.3	
	HAD45	82.0	86.4	88.2	88.3	
HAD85	82.0	87.0	90.5	91.5		

**Precipitation (in)**

	Scenario	2009	2039	2069	2099	
Annual Total	CCSM45	55.2	58.5	63.7	60.8	
	CCSM85	55.2	58.9	59.7	63.9	
	GFDL45	55.2	60.8	67.3	65.2	
	GFDL85	55.2	60.2	62.5	64.6	
	HAD45	55.2	54.1	57.5	60.7	
HAD85	55.2	57.1	51.2	55.9		
Growing Season (May—Sep)	CCSM45	19.8	20.0	21.0	20.1	
	CCSM85	19.8	18.7	18.8	19.0	
	GFDL45	19.8	22.3	26.0	24.0	
	GFDL85	19.8	23.4	24.9	25.9	
	HAD45	19.8	18.4	19.9	19.0	
HAD85	19.8	19.6	15.7	15.8		

**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
loblolly pine	Pinus taeda	WDH	High	50.8	1527.2	23.6	Sm. inc.	Sm. inc.	Medium	Abundant	Very Good	Very Good			1	1
sweetgum	Liquidambar styraciflua	WDH	High	81.2	1241.5	12.7	No change	No change	Medium	Abundant	Good	Good			1	2
water oak	Quercus nigra	WDH	High	77.3	884.0	10.2	Sm. inc.	Sm. inc.	Medium	Abundant	Very Good	Very Good			1	3
cherrybark oak; swamp red o	Quercus pagoda	NSL	Medium	47.5	438.4	7.6	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	4
boxelder	Acer negundo	WSH	Low	36.6	395.2	10.6	Sm. dec.	Sm. dec.	High	Common	Fair	Fair			1	5
sugarberry	Celtis laevigata	NDH	Medium	49.1	339.9	5.8	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	6
green ash	Fraxinus pennsylvanica	WSH	Low	59.5	316.1	5.3	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	7
nuttall oak	Quercus texana	NSH	Medium	22.9	306.4	12.5	Sm. dec.	Sm. dec.	High	Common	Fair	Fair			0	8
winged elm	Ulmus alata	WDL	Medium	60.5	287.7	3.7	Sm. inc.	Lg. inc.	Medium	Common	Good	Very Good			1	9
American elm	Ulmus americana	WDH	Medium	65.6	259.5	3.4	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	10
willow oak	Quercus phellos	NSL	Low	28.1	233.0	8.3	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	11
overcup oak	Quercus lyrata	NSL	Medium	25.3	191.0	8.1	Sm. inc.	Sm. inc.	Low	Common	Fair	Fair			1	12
pecan	Carya illinoensis	NSH	Low	20.4	183.1	7.0	Sm. inc.	Sm. inc.	Low	Common	Fair	Fair			1	13
yellow-poplar	Liriodendron tulipifera	WDH	High	25.5	176.2	4.8	Sm. dec.	No change	High	Common	Fair	Good			1	14
southern red oak	Quercus falcata	WDL	Medium	29.2	162.4	3.4	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	15
eastern redcedar	Juniperus virginiana	WDH	Medium	31.2	159.6	4.1	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	16
white oak	Quercus alba	WDH	Medium	30.9	144.5	3.8	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	17
American hornbeam; muscle	Carpinus caroliniana	WSL	Low	40.3	141.5	3.1	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	18
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	34.1	133.7	3.3	No change	No change	High	Common	Good	Good			1	19
pignut hickory	Carya glabra	WDL	Medium	35	128.3	3.1	No change	No change	Medium	Common	Fair	Fair			1	20
American beech	Fagus grandifolia	WDH	High	22.7	118.8	4.1	Sm. inc.	Sm. inc.	Medium	Common	Good	Good	Infill ++	Infill ++	1	21
sycamore	Platanus occidentalis	NSL	Low	27.9	110.5	3.0	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	22
common persimmon	Diospyros virginiana	NSL	Low	44.2	106.9	2.5	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	23
black willow	Salix nigra	NSH	Low	23.6	105.9	5.2	Lg. inc.	Lg. inc.	Low	Common	Good	Good			1	24
black cherry	Prunus serotina	WDL	Medium	42.2	102.6	2.2	Sm. inc.	Sm. inc.	Low	Common	Fair	Fair			1	25
slippery elm	Ulmus rubra	WSL	Low	36.3	100.0	2.8	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	26
red maple	Acer rubrum	WDH	High	35.8	96.3	2.0	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	27
mockernut hickory	Carya alba	WDL	Medium	33.7	93.7	2.2	Sm. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	28
water hickory	Carya aquatica	NSL	Medium	22.5	88.2	6.2	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	29
eastern cottonwood	Populus deltoides	NSH	Low	14.6	81.9	5.4	No change	No change	Medium	Common	Fair	Fair			1	30
shortleaf pine	Pinus echinata	WDH	High	12.7	65.6	2.6	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	31
sassafras	Sassafras albidum	WSL	Low	15.8	64.4	3.1	No change	No change	Medium	Common	Fair	Fair			1	32
Shumard oak	Quercus shumardii	NSL	Low	18.3	60.1	2.8	No change	Sm. inc.	High	Common	Good	Very Good			1	33
white ash	Fraxinus americana	WDL	Medium	23.4	50.0	2.0	Sm. inc.	Lg. inc.	Low	Rare	Poor	Fair			1	34
flowering dogwood	Cornus florida	WDL	Medium	20.8	49.2	1.5	Sm. inc.	Sm. inc.	Medium	Rare	Fair	Fair			1	35
blackgum	Nyssa sylvatica	WDL	Medium	27.4	47.0	1.4	Lg. inc.	Lg. inc.	High	Rare	Good	Good			1	36
bitternut hickory	Carya cordiformis	WSL	Low	14.5	46.0	2.4	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	1	37
post oak	Quercus stellata	WDH	High	12	44.8	2.9	Lg. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	1	38
florida maple	Acer barbatum	NSL	Low	19.1	43.8	2.6	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor			1	39
swamp chestnut oak	Quercus michauxii	NSL	Low	13.8	40.5	2.4	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			1	40
black locust	Robinia pseudoacacia	NDH	Low	8.8	34.5	3.5	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	1	41
cedar elm	Ulmus crassifolia	NDH	Medium	8.8	30.0	4.5	Lg. inc.	Lg. inc.	Low	Rare	Fair	Fair	Infill +	Infill +	2	42
water elm	Planera aquatica	NSL	Low	6	28.8	3.3	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	1	43
red mulberry	Morus rubra	NSL	Low	22.2	25.1	1.2	Sm. inc.	Sm. inc.	Medium	Rare	Fair	Fair			1	44
bald cypress	Taxodium distichum	NSH	Medium	3.6	24.2	5.8	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	2	45
honeylocust	Gleditsia triacanthos	NSH	Low	8.9	22.2	1.6	Sm. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	1	46
bigleaf magnolia	Magnolia macrophylla	NSL	Low	2.9	20.0	6.9	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	47

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

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Common Name	Scientific Name	Range	MR	%Cell	FIAsum	FIAiv	ChngCl45	ChngCl85	Adap	Abund	Capabil45	Capabil85	SHIFT45	SHIFT85	SSO	N
cucumbertree	Magnolia acuminata	NSL	Low	5.8	16.1	2.8	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	1	48
sourwood	Oxydendrum arboreum	NDL	High	4.9	15.1	2.5	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor			0	49
black oak	Quercus velutina	WDH	High	10	13.6	1.0	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			2	50
spruce pine	Pinus glabra	NSL	Low	3.6	13.0	3.3	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	51
Osage-orange	Maclura pomifera	NDH	Medium	5.8	12.6	2.2	No change	No change	High	Rare	Fair	Fair			0	52
southern magnolia	Magnolia grandiflora	NSL	Low	8.4	12.1	1.2	Sm. inc.	Sm. inc.	Medium	Rare	Fair	Fair	Infill +	Infill +	1	53
eastern redbud	Cercis canadensis	NSL	Low	11.5	12.1	1.3	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	54
northern red oak	Quercus rubra	WDH	Medium	6.7	11.8	1.8	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor			0	55
chinkapin oak	Quercus muehlenbergii	NSL	Medium	5.8	10.5	1.8	Sm. dec.	No change	Medium	Rare	Very Poor	Poor		Infill +	2	56
black walnut	Juglans nigra	WDH	Low	8.6	10.0	1.2	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	1	57
live oak	Quercus virginiana	NDH	High	1	9.9	10.3	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	58
paulownia	Paulownia tomentosa	NSL	FIA	2.9	8.8	3.1	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	59
river birch	Betula nigra	NSL	Low	0.4	6.7	2.9	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			2	60
water tupelo	Nyssa aquatica	NSH	Medium	0.9	5.2	1.6	Lg. inc.	Lg. inc.	Low	Rare	Fair	Fair	Infill +	Infill +	2	61
laurel oak	Quercus laurifolia	NDH	Medium	1	5.1	0.7	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	2	62
cittamwood/gum bumelia	Sideroxylon lanuginosum ssp.	NSL	Low	1	3.3	3.4	Lg. inc.	Lg. inc.	High	Rare	Good	Good			2	63
shellbark hickory	Carya laciniosa	NSL	Low	1	3.2	3.3	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	64
waterlocust	Gleditsia aquatica	NSLX	FIA	1.1	3.0	1.1	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	65
sand hickory	Carya pallida	NSL	FIA	1	2.3	2.4	Unknown	Unknown	NA	Rare	FIA Only	FIA Only			0	66
black hickory	Carya texana	NDL	High	2.9	1.4	0.5	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	67
blackjack oak	Quercus marilandica	NSL	Medium	2.6	1.3	0.4	Lg. inc.	Lg. inc.	High	Rare	Good	Good			2	68
American holly	Ilex opaca	NSL	Medium	1	1.0	1.0	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	2	69
pawpaw	Asimina triloba	NSL	Low	1	0.9	1.0	No change	No change	Medium	Rare	Poor	Poor			0	70
silver maple	Acer saccharinum	NSH	Low	1	0.7	0.8	Very Lg. dec.	Very Lg. dec.	High	Rare	Lost	Lost			0	71
sweetbay	Magnolia virginiana	NSL	Medium	0.8	0.7	0.6	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	72
chokecherry	Prunus virginiana	NSLX	FIA	1.9	0.6	0.3	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	73
ashe juniper	Juniperus ashei	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	74
slash pine	Pinus elliotii	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate ++	Migrate ++	3	75
longleaf pine	Pinus palustris	NSH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate ++	Migrate +	3	76
Virginia pine	Pinus virginiana	NDH	High	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	77
striped maple	Acer pensylvanicum	NSL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	78
serviceberry	Amelanchier spp.	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Likely +	Likely +	3	79
hackberry	Celtis occidentalis	WDH	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	80
black ash	Fraxinus nigra	WSH	Medium	0	0	0	Unknown	Unknown	Low	Absent	Unknown	Unknown			0	81
silverbell	Halesia spp.	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	82
swamp tupelo	Nyssa biflora	NDH	Medium	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat			3	83
redbay	Persea borbonia	NSL	Low	0	0	0	Unknown	New Habitat	High	Absent	Unknown	New Habitat		Likely +	3	84
pin cherry	Prunus pensylvanica	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	85
swamp white oak	Quercus bicolor	NSL	Low	0	0	0	Unknown	Unknown	Medium	Modeled	Unknown	Unknown			0	86
scarlet oak	Quercus coccinea	WDL	Medium	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	87
turkey oak	Quercus laevis	NSH	Medium	0	0	0	Unknown	Unknown	High	Modeled	Unknown	Unknown			0	88
American basswood	Tilia americana	WSL	Medium	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	89