

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

Area of Region    sq. km    sq. mi    FIA Plots  
 6,464.4    2,495.9    209

**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	14	19	Increase	27	33	Very Good	12	10	Likely	0	1
Hickory	6			Medium	34	52	No Change	18	16	Good	12	21	Infill	18	22
Maple	3	Abundant	6	Low	33	10	Decrease	18	14	Fair	12	8	Migrate	0	2
Oak	15	Common	18	FIA	1		New	5	7	Poor	12	13		<b>18</b>	<b>25</b>
Pine	5	Rare	40				Unknown	14	12	Very Poor	12	8			
Other	33	Absent	15							FIA Only	1	1			
	<b>64</b>		<b>79</b>		<b>82</b>	<b>81</b>		<b>82</b>	<b>82</b>	Unknown	13	11			
											<b>74</b>	<b>72</b>			

**Potential Changes in Climate Variables**

**Temperature (°F)**

Scenario	2009	2039	2069	2099		
Annual	CCSM45	66.6	68.1	69.8	69.9	
Average	CCSM85	66.6	68.3	70.6	72.8	
	GFDL45	66.6	69.3	70.9	71.6	
	GFDL85	66.6	68.9	71.9	75.2	
	HAD45	66.6	68.6	71.1	72.3	
	HAD85	66.6	68.9	72.1	75.6	
Growing Season	CCSM45	78.5	79.7	81.0	81.3	
	CCSM85	78.5	79.7	82.0	84.6	
May—Sep	GFDL45	78.5	81.2	82.5	84.0	
	GFDL85	78.5	80.9	83.8	87.6	
	HAD45	78.5	81.1	83.2	84.2	
	HAD85	78.5	81.1	85.3	88.3	
Coldest Month	CCSM45	48.6	50.8	51.6	51.4	
	CCSM85	48.6	50.9	52.1	53.1	
Average	GFDL45	48.6	52.0	52.2	52.4	
	GFDL85	48.6	50.2	51.3	51.9	
	HAD45	48.6	48.6	50.2	51.0	
	HAD85	48.6	50.1	51.3	52.9	
Warmest Month	CCSM45	81.7	82.8	83.1	83.3	
	CCSM85	81.7	82.7	83.8	85.2	
Average	GFDL45	81.7	84.4	84.9	85.7	
	GFDL85	81.7	83.7	85.0	87.1	
	HAD45	81.7	84.8	86.0	86.5	
	HAD85	81.7	85.1	87.5	88.7	

**Precipitation (in)**

Scenario	2009	2039	2069	2099		
Annual	CCSM45	65.0	67.3	71.6	71.7	
Total	CCSM85	65.0	68.8	70.2	73.8	
	GFDL45	65.0	72.7	76.9	75.3	
	GFDL85	65.0	71.3	73.5	73.7	
	HAD45	65.0	62.5	67.2	70.1	
	HAD85	65.0	70.4	61.6	64.5	
Growing Season	CCSM45	29.8	31.4	32.2	32.5	
	CCSM85	29.8	29.8	31.1	31.5	
May—Sep	GFDL45	29.8	35.7	38.8	35.8	
	GFDL85	29.8	35.5	38.2	39.3	
	HAD45	29.8	28.5	29.9	31.3	
	HAD85	29.8	31.1	23.9	24.9	

**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
slash pine	Pinus elliottii	NDH	High	79.7	1972.9	19.3	No change	No change	Medium	Abundant	Good	Good			1	1
loblolly pine	Pinus taeda	WDH	High	72.6	1712.2	16.7	Sm. inc.	Sm. inc.	Medium	Abundant	Very Good	Very Good			1	2
longleaf pine	Pinus palustris	NSH	Medium	68.4	1536.0	17.3	No change	No change	Medium	Abundant	Good	Good			1	3
sweetbay	Magnolia virginiana	NSL	Medium	75.5	806.8	8.8	Sm. inc.	No change	Medium	Abundant	Very Good	Good			1	4
water oak	Quercus nigra	WDH	High	75.8	753.3	7.4	Sm. inc.	Sm. inc.	Medium	Abundant	Very Good	Very Good			1	5
swamp tupelo	Nyssa biflora	NDH	Medium	63.7	530.4	7.3	Sm. inc.	Sm. inc.	Low	Abundant	Good	Good			1	6
laurel oak	Quercus laurifolia	NDH	Medium	58.4	438.3	6.0	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	7
blackgum	Nyssa sylvatica	WDL	Medium	57.4	322.0	4.1	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	8
red maple	Acer rubrum	WDH	High	72.2	308.5	3.2	Sm. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	9
bald cypress	Taxodium distichum	NSH	Medium	20.3	226.8	9.4	Lg. inc.	Sm. inc.	Medium	Common	Very Good	Good			1	10
sweetgum	Liquidambar styraciflua	WDH	High	50.7	212.1	3.0	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	11
yellow-poplar	Liriodendron tulipifera	WDH	High	31.6	185.4	4.4	Sm. inc.	No change	High	Common	Very Good	Good			1	12
southern red oak	Quercus falcata	WDL	Medium	38.5	134.0	2.1	Sm. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	13
water tupelo	Nyssa aquatica	NSH	Medium	7.1	123.2	8.6	No change	No change	Low	Common	Poor	Poor	Infill +	Infill +	0	14
green ash	Fraxinus pennsylvanica	WSH	Low	13.5	111.1	5.4	Sm. inc.	Lg. inc.	Medium	Common	Good	Very Good			1	15
live oak	Quercus virginiana	NDH	High	26.4	98.1	3.5	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good	Infill ++	Infill ++	1	16
black cherry	Prunus serotina	WDL	Medium	38.9	86.9	1.8	Lg. inc.	Lg. inc.	Low	Common	Good	Good			1	17
flowering dogwood	Cornus florida	WDL	Medium	32.3	74.4	1.4	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor			0	18
shortleaf pine	Pinus echinata	WDH	High	8.6	69.0	3.8	No change	No change	Medium	Common	Fair	Fair	Infill +	Infill +	1	19
redbay	Persea borbonia	NSL	Low	41.6	64.7	1.3	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	20
turkey oak	Quercus laevis	NSH	Medium	11.6	61.1	3.3	Sm. dec.	Sm. dec.	High	Common	Fair	Fair	Infill +	Infill +	1	21
willow oak	Quercus phellos	NSL	Low	12.1	61.1	4.9	No change	Sm. inc.	Medium	Common	Fair	Good	Infill +	Infill ++	1	22
black willow	Salix nigra	NSH	Low	10.4	61.1	3.4	No change	Sm. inc.	Low	Common	Poor	Fair			1	23
American holly	Ilex opaca	NSL	Medium	30.3	52.6	1.3	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	24
post oak	Quercus stellata	WDH	High	20.8	43.9	1.0	Lg. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	1	25
American hornbeam; musclev	Carpinus caroliniana	WSL	Low	11	38.4	2.8	Sm. inc.	Lg. inc.	Medium	Rare	Fair	Good			1	26
pecan	Carya illinoensis	NSH	Low	2.4	37.7	6.4	Sm. dec.	No change	Low	Rare	Very Poor	Very Poor			2	27
pond cypress	Taxodium ascendens	NSH	Medium	8	29.8	3.8	No change	Lg. inc.	Medium	Rare	Poor	Good	Infill +	Infill ++	2	28
white oak	Quercus alba	WDH	Medium	14.9	26.3	0.8	No change	Sm. inc.	High	Rare	Fair	Good	Infill +	Infill ++	1	29
sycamore	Platanus occidentalis	NSL	Low	3.5	23.7	3.1	No change	No change	Medium	Rare	Poor	Poor			2	30
bluejack oak	Quercus incana	NSL	Low	3.5	20.7	3.9	No change	No change	Medium	Rare	Poor	Poor			1	31
Atlantic white-cedar	Chamaecyparis thyoides	NSH	Low	4.7	18.6	4.0	Sm. inc.	Sm. inc.	Low	Rare	Poor	Poor	Infill +		1	32
water hickory	Carya aquatica	NSL	Medium	3.6	16.5	3.3	Sm. dec.	No change	Medium	Rare	Very Poor	Poor		Infill +	2	33
overcup oak	Quercus lyrata	NSL	Medium	9.3	14.3	1.5	No change	Sm. inc.	Low	Rare	Very Poor	Poor		Infill +	1	34
swamp chestnut oak	Quercus michauxii	NSL	Low	2.8	13.7	1.4	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	35
eastern cottonwood	Populus deltoides	NSH	Low	1.5	13.4	8.6	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	36
river birch	Betula nigra	NSL	Low	3.1	12.1	3.9	Sm. inc.	Sm. inc.	Medium	Rare	Fair	Fair	Infill +	Infill +	1	37
common persimmon	Diospyros virginiana	NSL	Low	17.9	11.9	0.6	Lg. dec.	Lg. dec.	High	Rare	Poor	Poor			1	38
mockernut hickory	Carya alba	WDL	Medium	8.1	10.3	1.1	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	1	39
cherrybark oak; swamp red o.	Quercus pagoda	NSL	Medium	2.2	10.1	0.3	No change	Sm. inc.	Medium	Rare	Poor	Fair		Infill +	2	40
spruce pine	Pinus glabra	NSL	Low	4.8	9.4	1.3	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	41
American elm	Ulmus americana	WDH	Medium	6.5	8.6	0.8	Sm. inc.	Lg. inc.	Medium	Rare	Fair	Good	Infill +	Infill ++	2	42
southern magnolia	Magnolia grandiflora	NSL	Low	9.7	8.5	0.6	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			1	43
sourwood	Oxydendrum arboreum	NDL	High	6.6	7.8	0.6	No change	Sm. dec.	High	Rare	Fair	Poor	Infill +		1	44
sassafras	Sassafras albidum	WSL	Low	5.5	7.1	0.6	Sm. dec.	No change	Medium	Rare	Very Poor	Poor		Infill +	1	45
florida maple	Acer barbatum	NSL	Low	0.5	6.2	1.2	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor			0	46
slippery elm	Ulmus rubra	WSL	Low	2	5.4	0.8	Sm. dec.	Sm. 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
American beech	Fagus grandifolia	WDH	High	4.2	4.6	0.9	Sm. inc.	Sm. inc.	Medium	Rare	Fair	Fair	Infill +	Infill +	2	48
blackjack oak	Quercus marilandica	NSL	Medium	5	4.3	0.7	No change	Sm. inc.	High	Rare	Fair	Good	Infill +	Infill ++	2	49
white ash	Fraxinus americana	WDL	Medium	3.1	2.9	1.0	No change	No change	Low	Rare	Very Poor	Very Poor			2	50
sugarberry	Celtis laevigata	NDH	Medium	4.7	2.8	0.6	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good		Infill ++	2	51
nuttall oak	Quercus texana	NSH	Medium	3.6	2.4	0.4	Lg. dec.	Very Lg. dec.	High	Rare	Poor	Lost			0	52
cucumbertree	Magnolia acuminata	NSL	Low	1.5	2.1	1.3	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	53
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	2	2.0	0.3	Sm. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	2	54
black oak	Quercus velutina	WDH	High	1.9	1.8	0.4	Very Lg. dec.	Very Lg. dec.	Medium	Rare	Lost	Lost			0	55
eastern redbud	Cercis canadensis	NSL	Low	1.6	1.4	0.9	Very Lg. dec.	Very Lg. dec.	Medium	Rare	Lost	Lost			0	56
sand hickory	Carya pallida	NSL	FIA	1.6	1.1	0.7	Unknown	Unknown	NA	Rare	FIA Only	FIA Only			0	57
eastern redcedar	Juniperus virginiana	WDH	Medium	1.1	1.0	0.5	Very Lg. dec.	No change	Medium	Rare	Lost	Poor		Infill +	2	58
black hickory	Carya texana	NDL	High	0.1	0.6	0.0	Lg. dec.	Lg. inc.	Medium	Rare	Very Poor	Good			2	59
loblolly-bay	Gordonia lasianthus	NSH	Medium	1.6	0.6	0.4	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	60
pawpaw	Asimina triloba	NSL	Low	1.6	0.5	0.3	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	61
silver maple	Acer saccharinum	NSH	Low	1.6	0.4	0.3	No change	No change	High	Rare	Fair	Fair			0	62
winged elm	Ulmus alata	WDL	Medium	0.1	0.4	0.0	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	63
pignut hickory	Carya glabra	WDL	Medium	0.9	0.3	0.1	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	64
Table Mountain pine	Pinus pungens	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			3	65
Virginia pine	Pinus virginiana	NDH	High	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	66
striped maple	Acer pensylvanicum	NSL	Medium	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	67
serviceberry	Amelanchier spp.	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	68
cittamwood/gum bumelia	Sideroxylon lanuginosum ssp.	NSL	Low	0	0	0	Unknown	New Habitat	High	Absent	Unknown	New Habitat		Migrate +	3	69
bitternut hickory	Carya cordiformis	WSL	Low	0	0	0	Unknown	Unknown	High	Modeled	Unknown	Unknown			0	70
black ash	Fraxinus nigra	WSH	Medium	0	0	0	Unknown	Unknown	Low	Absent	Unknown	Unknown			0	71
silverbell	Halesia spp.	NSL	Low	0	0	0	New Habitat	Unknown	Medium	Absent	New Habitat	Unknown			3	72
black walnut	Juglans nigra	WDH	Low	0	0	0	Unknown	Unknown	Medium	Modeled	Unknown	Unknown			0	73
bigleaf magnolia	Magnolia macrophylla	NSL	Low	0	0	0	Unknown	New Habitat	Medium	Absent	Unknown	New Habitat			3	74
red mulberry	Morus rubra	NSL	Low	0	0	0	Unknown	Unknown	Medium	Modeled	Unknown	Unknown			0	75
water elm	Planera aquatica	NSL	Low	0	0	0	Unknown	New Habitat	Medium	Absent	Unknown	New Habitat		Likely +	3	76
pin cherry	Prunus pensylvanica	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	77
scarlet oak	Quercus coccinea	WDL	Medium	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	78
chinkapin oak	Quercus muehlenbergii	NSL	Medium	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	79
cabbage palmetto	Sabal palmetto	NDH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	80
American basswood	Tilia americana	WSL	Medium	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	81
cedar elm	Ulmus crassifolia	NDH	Medium	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat		Migrate ++	3	82