

	sq. km	sq. mi	FIA Plots
Area of Region	8,000.0	3,088.8	125

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	23	Increase	28	30	Very Good	3	3
Hickory	7			Medium	32	49	No Change	20	19	Good	19	22
Maple	4	Abundant	0	Low	33	8	Decrease	12	11	Fair	18	16
Oak	13	Common	22	FIA	2		New	13	13	Poor	14	14
Pine	2	Rare	40				Unknown	8	8	Very Poor	5	4
Other	34	Absent	15							FIA Only	1	1
	62		77		81	80		81	81	Unknown	6	6
											66	66

Potential Changes in Climate Variables

Temperature (°F)

	Scenario	2009	2039	2069	2099	
Annual Average	CCSM45	64.5	66.1	68.0	68.3	
	CCSM85	64.5	66.5	69.0	71.4	
	GFDL45	64.5	68.7	68.9	69.8	
	GFDL85	64.5	67.2	70.2	73.6	
	HAD45	64.5	66.9	69.8	71.0	
HAD85	64.5	67.2	71.5	75.2		
Growing Season (May—Sep)	CCSM45	78.2	79.8	81.2	81.7	
	CCSM85	78.2	80.2	82.5	85.6	
	GFDL45	78.2	83.4	83.1	84.9	
	GFDL85	78.2	81.5	84.8	89.0	
	HAD45	78.2	81.6	84.4	85.2	
HAD85	78.2	81.8	87.8	91.0		
Coldest Month Average	CCSM45	43.6	45.9	46.9	47.1	
	CCSM85	43.6	46.3	47.6	48.8	
	GFDL45	43.6	47.4	47.4	47.4	
	GFDL85	43.6	45.0	46.1	46.6	
	HAD45	43.6	44.3	46.1	46.8	
HAD85	43.6	45.4	46.9	48.5		
Warmest Month Average	CCSM45	82.6	83.9	84.4	84.6	
	CCSM85	82.6	84.2	85.3	86.9	
	GFDL45	82.6	86.8	86.7	88.1	
	GFDL85	82.6	86.1	87.6	90.2	
	HAD45	82.6	87.0	88.8	88.8	
HAD85	82.6	87.6	91.2	92.2		

Precipitation (in)

	Scenario	2009	2039	2069	2099	
Annual Total	CCSM45	55.5	58.5	64.0	61.2	
	CCSM85	55.5	59.0	60.5	64.1	
	GFDL45	55.5	60.9	67.8	65.3	
	GFDL85	55.5	60.2	62.7	65.0	
	HAD45	55.5	54.2	57.6	61.1	
HAD85	55.5	57.2	51.2	56.3		
Growing Season (May—Sep)	CCSM45	19.4	19.5	20.3	19.6	
	CCSM85	19.4	18.2	18.2	18.3	
	GFDL45	19.4	21.5	25.2	23.3	
	GFDL85	19.4	22.7	24.1	24.9	
	HAD45	19.4	18.0	19.3	18.3	
HAD85	19.4	19.1	15.2	15.3		

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	
Nuttall oak	Quercus texana	NSH	Medium	47.5	414.4	19.6	Sm. dec.	Sm. dec.	High	Common	Fair	Fair			0	1	
boxelder	Acer negundo	WSH	Low	52.5	388.5	13.7	Lg. dec.	Lg. dec.	High	Common	Fair	Fair				1	2
sweetgum	Liquidambar styraciflua	WDH	High	61.3	383.6	13.3	Sm. inc.	Sm. inc.	Medium	Common	Good	Good				1	3
sugarberry	Celtis laevigata	NDH	Medium	63.7	311.1	13.7	Sm. inc.	Sm. inc.	Medium	Common	Good	Good				1	4
green ash	Fraxinus pennsylvanica	WSH	Low	81.2	252.2	8.3	No change	No change	Medium	Common	Fair	Fair				1	5
overcup oak	Quercus lyrata	NSL	Medium	53.7	223.6	10.7	No change	No change	Low	Common	Poor	Poor				0	6
water oak	Quercus nigra	WDH	High	50	208.1	9.4	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good				1	7
cherrybark oak; swamp red o.	Quercus pagoda	NSL	Medium	23.8	190.8	10.0	Sm. inc.	Sm. inc.	Medium	Common	Good	Good				1	8
American elm	Ulmus americana	WDH	Medium	62.5	151.7	4.9	Sm. inc.	Sm. inc.	Medium	Common	Good	Good				1	9
pecan	Carya illinoensis	NSH	Low	16.3	147.4	11.9	Sm. inc.	Sm. inc.	Low	Common	Fair	Fair				1	10
willow oak	Quercus phellos	NSL	Low	45	135.6	9.3	Sm. inc.	Sm. inc.	Medium	Common	Good	Good				1	11
water hickory	Carya aquatica	NSL	Medium	57.5	123.6	10.2	Sm. inc.	Sm. inc.	Medium	Common	Good	Good				1	12
black willow	Salix nigra	NSH	Low	33.7	118.4	14.3	Lg. inc.	Lg. inc.	Low	Common	Good	Good				1	13
American beech	Fagus grandifolia	WDH	High	13.8	95.8	7.0	No change	No change	Medium	Common	Fair	Fair	Infill +	Infill +		1	14
sycamore	Platanus occidentalis	NSL	Low	20	92.3	6.7	No change	No change	Medium	Common	Fair	Fair				1	15
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	17.5	79.0	4.5	Sm. dec.	Sm. dec.	High	Common	Fair	Fair				1	16
loblolly pine	Pinus taeda	WDH	High	7.5	74.0	9.9	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good				1	17
eastern cottonwood	Populus deltoides	NSH	Low	35	71.7	9.4	No change	No change	Medium	Common	Fair	Fair	Infill +	Infill +		1	18
yellow-poplar	Liriodendron tulipifera	WDH	High	12.5	71.4	5.7	No change	No change	High	Common	Good	Good	Infill ++	Infill ++		1	19
American hornbeam; musclev	Carpinus caroliniana	WSL	Low	22.5	62.9	3.4	Sm. inc.	Sm. inc.	Medium	Common	Good	Good				1	20
pignut hickory	Carya glabra	WDL	Medium	16.3	52.8	3.3	No change	No change	Medium	Common	Fair	Fair	Infill +	Infill +		1	21
common persimmon	Diospyros virginiana	NSL	Low	53.7	51.8	2.7	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good				1	22
sassafras	Sassafras albidum	WSL	Low	10	49.1	4.9	Sm. dec.	No change	Medium	Rare	Very Poor	Poor		Infill +		1	23
slippery elm	Ulmus rubra	WSL	Low	50	46.5	2.8	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good				1	24
winged elm	Ulmus alata	WDL	Medium	36.3	42.3	2.6	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good				1	25
Shumard oak	Quercus shumardii	NSL	Low	11.2	36.2	3.2	Sm. inc.	Sm. inc.	High	Rare	Good	Good	Infill ++	Infill ++		1	26
black locust	Robinia pseudoacacia	NDH	Low	13.7	35.9	3.6	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor				0	27
cedar elm	Ulmus crassifolia	NDH	Medium	16.2	35.0	5.2	Lg. inc.	Lg. inc.	Low	Rare	Fair	Fair	Infill +	Infill +		2	28
honeylocust	Gleditsia triacanthos	NSH	Low	32.5	32.1	4.6	Lg. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++		1	29
florida maple	Acer barbatum	NSL	Low	18.8	30.0	2.1	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor	Infill +	Infill +		1	30
flowering dogwood	Cornus florida	WDL	Medium	22.5	28.0	2.2	No change	No change	Medium	Rare	Poor	Poor				1	31
bitternut hickory	Carya cordiformis	WSL	Low	7.5	26.5	3.5	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +		1	32
mockernut hickory	Carya alba	WDL	Medium	8.8	26.5	3.0	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +		1	33
southern red oak	Quercus falcata	WDL	Medium	5	24.7	5.0	No change	Sm. inc.	High	Rare	Fair	Good	Infill +	Infill ++		1	34
swamp chestnut oak	Quercus michauxii	NSL	Low	6.2	23.8	3.8	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +		2	35
white ash	Fraxinus americana	WDL	Medium	11.3	23.7	2.1	Sm. inc.	Sm. inc.	Low	Rare	Poor	Poor	Infill +	Infill +		1	36
red maple	Acer rubrum	WDH	High	31.2	22.7	1.9	Lg. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++		1	37
bald cypress	Taxodium distichum	NSH	Medium	12.5	21.4	7.7	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++		2	38
cucumbertree	Magnolia acuminata	NSL	Low	6.2	20.6	3.3	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +		2	39
water elm	Planera aquatica	NSL	Low	18.7	20.5	4.5	Sm. inc.	Lg. inc.	Medium	Rare	Fair	Good	Infill +	Infill ++		1	40
eastern redcedar	Juniperus virginiana	WDH	Medium	7.5	20.4	2.7	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +		1	41
bigleaf magnolia	Magnolia macrophylla	NSL	Low	1.3	19.9	15.9	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor				0	42
white oak	Quercus alba	WDH	Medium	8.8	17.9	2.1	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +		2	43
red mulberry	Morus rubra	NSL	Low	13.7	14.0	1.5	Sm. inc.	Sm. inc.	Medium	Rare	Fair	Fair	Infill +	Infill +		1	44
eastern redbud	Cercis canadensis	NSL	Low	12.5	12.8	1.6	Lg. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor				0	45
black cherry	Prunus serotina	WDL	Medium	11.3	11.9	1.1	Lg. inc.	Lg. inc.	Low	Rare	Fair	Fair	Infill +	Infill +		1	46
black walnut	Juglans nigra	WDH	Low	7.5	8.9	1.2	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +		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
northern red oak	Quercus rubra	WDH	Medium	5	8.5	1.7	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor			0	48
chinkapin oak	Quercus muehlenbergii	NSL	Medium	5	8.3	1.7	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	49
blackgum	Nyssa sylvatica	WDL	Medium	10	5.2	0.9	Sm. inc.	Sm. inc.	High	Rare	Good	Good	Infill ++	Infill ++	1	50
cittamwood/gum bumelia	Sideroxylon lanuginosum ssp.	NSL	Low	1.3	4.3	3.4	Lg. inc.	Lg. inc.	High	Rare	Good	Good			2	51
paulownia	Paulownia tomentosa	NSL	FIA	2.5	3.6	1.4	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	52
southern magnolia	Magnolia grandiflora	NSL	Low	5	3.2	0.7	Sm. inc.	Sm. inc.	Medium	Rare	Fair	Fair	Infill +	Infill +	2	53
waterlocust	Gleditsia aquatica	NSLX	FIA	1.3	2.6	2.1	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	54
black oak	Quercus velutina	WDH	High	2.5	2.3	0.9	No change	No change	Medium	Rare	Poor	Poor			0	55
pawpaw	Asimina triloba	NSL	Low	6.2	1.5	0.9	No change	No change	Medium	Rare	Poor	Poor			0	56
post oak	Quercus stellata	WDH	High	1.3	1.3	1.0	Lg. inc.	Lg. inc.	High	Rare	Good	Good			2	57
black hickory	Carya texana	NDL	High	2.5	1.2	0.5	No change	Lg. inc.	Medium	Rare	Poor	Good	Infill +		2	58
Osage-orange	Maclura pomifera	NDH	Medium	1.2	0.8	0.6	Very Lg. dec.	Very Lg. dec.	High	Rare	Lost	Lost			0	59
shortleaf pine	Pinus echinata	WDH	High	1.3	0.7	0.5	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	60
silver maple	Acer saccharinum	NSH	Low	5	0.6	1.8	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor			0	61
shagbark hickory	Carya ovata	WSL	Medium	5	0.3	0.9	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	62
ashe juniper	Juniperus ashei	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	63
slash pine	Pinus elliotii	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate ++	Migrate ++	3	64
longleaf pine	Pinus palustris	NSH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	65
striped maple	Acer pensylvanicum	NSL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	66
serviceberry	Amelanchier spp.	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	67
river birch	Betula nigra	NSL	Low	0	0	0	Unknown	Unknown	Medium	Modeled	Unknown	Unknown			0	68
hackberry	Celtis occidentalis	WDH	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Likely +	Likely +	3	69
black ash	Fraxinus nigra	WSH	Medium	0	0	0	Unknown	Unknown	Low	Absent	Unknown	Unknown			0	70
American holly	Ilex opaca	NSL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	71
water tupelo	Nyssa aquatica	NSH	Medium	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat	Likely +	Likely +	3	72
sourwood	Oxydendrum arboreum	NDL	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			3	73
redbay	Persea borbonia	NSL	Low	0	0	0	Unknown	Unknown	High	Modeled	Unknown	Unknown			0	74
pin cherry	Prunus pensylvanica	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	75
swamp white oak	Quercus bicolor	NSL	Low	0	0	0	Unknown	Unknown	Medium	Modeled	Unknown	Unknown			0	76
scarlet oak	Quercus coccinea	WDL	Medium	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	Likely +	Likely +	3	80
American basswood	Tilia americana	WSL	Medium	0	0	0	Unknown	Unknown	Medium	Modeled	Unknown	Unknown			0	81