

	sq. km	sq. mi	FIA Plots
Area of Region	9,160.3	3,536.8	282

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			High	15	19	Increase	22	27	Very Good	9	9	Likely	6	7
Hickory	4			Medium	33	50	No Change	17	16	Good	12	17	Infill	13	15
Maple	2	Abundant	5	Low	32	11	Decrease	12	8	Fair	9	8	Migrate	0	2
Oak	12	Common	14	FIA	2		New	11	13	Poor	13	11			
Pine	6	Rare	34				Unknown	20	18	Very Poor	6	4			
Other	26	Absent	27							FIA Only	2	2			
	53		80		82	80		82	82	Unknown	18	16			
											69	67			

Potential Changes in Climate Variables

Temperature (°F)

	Scenario	2009	2039	2069	2099	
Annual Average	CCSM45	67.2	68.6	70.3	70.4	
	CCSM85	67.2	68.8	71.1	73.2	
	GFDL45	67.2	70.1	71.4	72.2	
	GFDL85	67.2	69.5	72.5	75.8	
	HAD45	67.2	69.1	71.5	72.7	
	HAD85	67.2	69.4	72.4	75.9	
Growing Season (May-Sep)	CCSM45	78.9	80.1	81.3	81.7	
	CCSM85	78.9	80.1	82.3	84.8	
	GFDL45	78.9	81.8	83.0	84.3	
	GFDL85	78.9	81.3	84.2	88.0	
	HAD45	78.9	81.4	83.4	84.5	
	HAD85	78.9	81.4	85.3	88.2	
Coldest Month Average	CCSM45	49.3	51.5	52.3	52.1	
	CCSM85	49.3	51.5	52.7	53.8	
	GFDL45	49.3	52.6	52.8	53.1	
	GFDL85	49.3	51.0	52.1	52.8	
	HAD45	49.3	49.3	50.9	51.6	
	HAD85	49.3	50.7	51.9	53.5	
Warmest Month Average	CCSM45	82.1	83.1	83.5	83.7	
	CCSM85	82.1	83.0	84.1	85.5	
	GFDL45	82.1	84.6	85.2	85.9	
	GFDL85	82.1	84.0	85.4	87.4	
	HAD45	82.1	84.9	86.0	86.4	
	HAD85	82.1	85.1	87.3	88.6	

Precipitation (in)

	Scenario	2009	2039	2069	2099	
Annual Total	CCSM45	66.2	68.8	71.7	72.9	
	CCSM85	66.2	70.0	71.9	74.8	
	GFDL45	66.2	74.1	78.0	77.0	
	GFDL85	66.2	72.8	76.1	75.0	
	HAD45	66.2	62.9	68.0	71.7	
	HAD85	66.2	71.0	62.8	66.3	
Growing Season (May-Sep)	CCSM45	31.3	33.5	33.6	34.4	
	CCSM85	31.3	31.9	33.4	33.5	
	GFDL45	31.3	37.6	40.0	37.5	
	GFDL85	31.3	37.4	40.5	40.8	
	HAD45	31.3	30.0	31.2	32.8	
	HAD85	31.3	32.3	25.4	26.7	

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	71.6	2481.4	28.4	No change	No change	Medium	Abundant	Good	Good			1	1
longleaf pine	Pinus palustris	NSH	Medium	69.2	1358.8	18.7	Sm. inc.	No change	Medium	Abundant	Very Good	Good			1	2
loblolly pine	Pinus taeda	WDH	High	41.3	857.6	19.9	Sm. inc.	Lg. inc.	Medium	Abundant	Very Good	Very Good			1	3
sand pine	Pinus clausa	NDH	High	19.1	634.4	22.8	No change	No change	Low	Abundant	Fair	Fair	Infill +	Infill +	0	4
sweetbay	Magnolia virginiana	NSL	Medium	58.3	502.4	8.2	Sm. inc.	Sm. inc.	Medium	Abundant	Very Good	Very Good			1	5
swamp tupelo	Nyssa biflora	NDH	Medium	49.3	473.1	8.8	Sm. inc.	Sm. inc.	Low	Common	Fair	Fair			1	6
laurel oak	Quercus laurifolia	NDH	Medium	48.3	454.3	9.0	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	7
water oak	Quercus nigra	WDH	High	52.2	300.5	5.4	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	8
turkey oak	Quercus laevis	NSH	Medium	26.2	283.2	9.8	No change	No change	High	Common	Good	Good	Infill ++	Infill ++	1	9
live oak	Quercus virginiana	NDH	High	42.8	236.1	5.0	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	10
blackgum	Nyssa sylvatica	WDL	Medium	39.8	211.7	5.6	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	11
pond cypress	Taxodium ascendens	NSH	Medium	13.7	169.8	8.2	Sm. inc.	Lg. inc.	Medium	Common	Good	Very Good	Infill ++	Infill ++	1	12
bald cypress	Taxodium distichum	NSH	Medium	22.8	168.6	8.1	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	13
red maple	Acer rubrum	WDH	High	43.5	139.7	3.4	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	14
yellow-poplar	Liriodendron tulipifera	WDH	High	17.5	111.0	6.4	No change	No change	High	Common	Good	Good			1	15
Atlantic white-cedar	Chamaecyparis thyoides	NSH	Low	10.9	93.2	8.5	Lg. inc.	Sm. inc.	Low	Common	Good	Fair	Infill ++	Infill +	1	16
water tupelo	Nyssa aquatica	NSH	Medium	8.7	74.2	8.5	No change	No change	Low	Common	Poor	Poor	Infill +	Infill +	0	17
sweetgum	Liquidambar styraciflua	WDH	High	24.3	71.1	3.1	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	18
green ash	Fraxinus pennsylvanica	WSH	Low	8.7	54.5	6.2	No change	No change	Medium	Common	Fair	Fair	Infill +	Infill +	1	19
redbay	Persea borbonia	NSL	Low	26.3	48.5	1.7	Sm. inc.	Sm. inc.	High	Rare	Good	Good			1	20
southern magnolia	Magnolia grandiflora	NSL	Low	15.7	37.0	2.2	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			1	21
American holly	Ilex opaca	NSL	Medium	16.4	27.6	1.7	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			1	22
American hornbeam; muscle	Carpinus caroliniana	WSL	Low	6.5	18.5	2.8	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	1	23
bluejack oak	Quercus incana	NSL	Low	9.8	16.5	1.7	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	1	24
common persimmon	Diospyros virginiana	NSL	Low	16.5	15.6	0.9	Lg. dec.	Lg. dec.	High	Rare	Poor	Poor			1	25
southern red oak	Quercus falcata	WDL	Medium	7.7	13.8	1.4	No change	Lg. inc.	High	Rare	Fair	Good			1	26
willow oak	Quercus phellos	NSL	Low	3.3	13.6	4.1	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	27
black cherry	Prunus serotina	WDL	Medium	16.3	12.7	0.8	Lg. inc.	Lg. inc.	Low	Rare	Fair	Fair			1	28
spruce pine	Pinus glabra	NSL	Low	3.3	9.6	2.9	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	29
river birch	Betula nigra	NSL	Low	2.2	8.5	3.9	Sm. inc.	Sm. inc.	Medium	Rare	Fair	Fair	Infill +	Infill +	2	30
flowering dogwood	Cornus florida	WDL	Medium	7.5	7.0	0.9	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	31
overcup oak	Quercus lyrata	NSL	Medium	4.4	6.4	1.5	No change	No change	Low	Rare	Very Poor	Very Poor			2	32
blackjack oak	Quercus marilandica	NSL	Medium	4.4	6.3	1.5	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor		Infill +	2	33
pignut hickory	Carya glabra	WDL	Medium	3.3	5.7	1.8	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	34
American elm	Ulmus americana	WDH	Medium	5.5	5.3	1.0	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	35
sourwood	Oxydendrum arboreum	NDL	High	2.2	4.4	2.0	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor			0	36
black willow	Salix nigra	NSH	Low	3.3	3.4	1.0	No change	Sm. inc.	Low	Rare	Very Poor	Poor		Infill +	2	37
pecan	Carya illinoensis	NSH	Low	1	3.1	2.5	No change	No change	Low	Rare	Very Poor	Very Poor			2	38
shortleaf pine	Pinus echinata	WDH	High	1.1	2.6	2.4	Sm. inc.	Lg. inc.	Medium	Rare	Fair	Good	Infill +		2	39
post oak	Quercus stellata	WDH	High	1.5	2.2	0.5	No change	Lg. inc.	High	Rare	Fair	Good			2	40
mockernut hickory	Carya alba	WDL	Medium	1.1	2.0	1.8	Lg. dec.	Sm. dec.	High	Rare	Poor	Poor		Infill +	2	41
American beech	Fagus grandifolia	WDH	High	1.1	1.8	1.7	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	42
Carolina ash	Fraxinus caroliniana	NSL	FIA	1.1	1.7	1.5	Unknown	Unknown	NA	Rare	FIA Only	FIA Only			0	43
sassafras	Sassafras albidum	WSL	Low	1.1	1.5	1.3	Lg. dec.	Very Lg. dec.	Medium	Rare	Very Poor	Lost			0	44
cittamwood/gum bumelia	Sideroxylon lanuginosum ssp.	NSL	Low	1.1	1.4	1.3	Lg. dec.	Lg. inc.	High	Rare	Poor	Good			2	45
white ash	Fraxinus americana	WDL	Medium	2.2	1.0	0.5	Very Lg. dec.	Very Lg. dec.	Low	Rare	Lost	Lost			0	46
loblolly-bay	Gordonia lasianthus	NSH	Medium	2.2	1.0	0.4	Lg. inc.	Lg. inc.	Medium	Rare	Good	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
Nuttall oak	Quercus texana	NSH	Medium	1.1	0.9	0.8	Lg. dec.	No change	High	Rare	Poor	Fair			0	48
white oak	Quercus alba	WDH	Medium	1.1	0.8	0.7	Very Lg. dec.	Sm. inc.	High	Rare	Lost	Good			2	49
sugarberry	Celtis laevigata	NDH	Medium	1.1	0.5	0.5	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	50
silver maple	Acer saccharinum	NSH	Low	1.1	0.3	0.3	No change	No change	High	Rare	Fair	Fair			0	51
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	1.1	0.3	0.3	Lg. dec.	Sm. inc.	High	Rare	Poor	Good			2	52
sand hickory	Carya pallida	NSL	FIA	1.2	0.1	0.1	Unknown	Unknown	NA	Rare	FIA Only	FIA Only			0	53
Table Mountain pine	Pinus pungens	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			3	54
pond pine	Pinus serotina	NSH	Medium	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat	Likely +	Likely +	3	55
Virginia pine	Pinus virginiana	NDH	High	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	56
boxelder	Acer negundo	WSH	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			3	57
striped maple	Acer pensylvanicum	NSL	Medium	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	58
serviceberry	Amelanchier spp.	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Likely +	Likely +	3	59
pawpaw	Asimina triloba	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	60
water hickory	Carya aquatica	NSL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Likely +	Likely +	3	61
bitternut hickory	Carya cordiformis	WSL	Low	0	0	0	Unknown	Unknown	High	Modeled	Unknown	Unknown			0	62
shellbark hickory	Carya laciniosa	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	63
shagbark hickory	Carya ovata	WSL	Medium	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	64
eastern redbud	Cercis canadensis	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	65
silverbell	Halesia spp.	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	66
cucumbertree	Magnolia acuminata	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	67
bigleaf magnolia	Magnolia macrophylla	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	68
red mulberry	Morus rubra	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	69
water elm	Planera aquatica	NSL	Low	0	0	0	Unknown	New Habitat	Medium	Absent	Unknown	New Habitat		Likely +	3	70
sycamore	Platanus occidentalis	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Likely +	Likely +	3	71
quaking aspen	Populus tremuloides	WDH	High	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	72
pin cherry	Prunus pensylvanica	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	73
cherrybark oak; swamp red o.	Quercus pagoda	NSL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Likely +	Likely +	3	74
swamp chestnut oak	Quercus michauxii	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Likely +	Likely +	3	75
chinkapin oak	Quercus muehlenbergii	NSL	Medium	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	76
black oak	Quercus velutina	WDH	High	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	77
black locust	Robinia pseudoacacia	NDH	Low	0	0	0	Unknown	Unknown	Medium	Modeled	Unknown	Unknown			0	78
cabbage palmetto	Sabal palmetto	NDH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	79
American basswood	Tilia americana	WSL	Medium	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	80
winged elm	Ulmus alata	WDL	Medium	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		Migrate ++	3	82