

	sq. km	sq. mi	FIA Plots
Area of Region	8,400.0	3,243.3	319

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	34	38	Very Good	13	13	Likely	3	4
Hickory	5			Medium	33	51	No Change	23	18	Good	20	22	Infill	11	11
Maple	4	Abundant	3	Low	36	10	Decrease	13	14	Fair	15	15	Migrate	1	2
Oak	17	Common	24	FIA	2		New	8	10	Poor	10	7			
Pine	5	Rare	45				Unknown	7	5	Very Poor	9	9			
Other	39	Absent	12							FIA Only	1	1			
	72		84		85	84		85	85	Unknown	5	3			
											73	70			

Potential Changes in Climate Variables

Temperature (°F)

	Scenario	2009	2039	2069	2099	
Annual Average	CCSM45	65.4	67.0	68.7	68.9	
	CCSM85	65.4	67.3	69.7	72.0	
	GFDL45	65.4	68.1	69.5	70.5	
	GFDL85	65.4	67.9	70.9	74.2	
	HAD45	65.4	67.7	70.6	71.7	
HAD85	65.4	68.0	71.9	75.6		
Growing Season May—Sep	CCSM45	77.8	79.2	80.6	81.0	
	CCSM85	77.8	79.4	81.8	84.6	
	GFDL45	77.8	80.8	82.1	83.9	
	GFDL85	77.8	80.7	83.9	87.9	
	HAD45	77.8	80.9	83.6	84.4	
HAD85	77.8	81.2	86.4	89.6		
Coldest Month Average	CCSM45	46.3	48.7	49.6	49.6	
	CCSM85	46.3	49.1	50.4	51.5	
	GFDL45	46.3	49.9	49.9	49.9	
	GFDL85	46.3	47.6	48.5	49.1	
	HAD45	46.3	46.9	48.7	49.6	
HAD85	46.3	48.3	49.7	51.5		
Warmest Month Average	CCSM45	81.4	82.6	83.0	83.2	
	CCSM85	81.4	82.9	83.8	85.5	
	GFDL45	81.4	85.0	84.8	86.2	
	GFDL85	81.4	84.5	85.9	88.4	
	HAD45	81.4	85.3	86.9	87.1	
HAD85	81.4	85.8	88.9	90.0		

Precipitation (in)

	Scenario	2009	2039	2069	2099	
Annual Total	CCSM45	60.3	63.7	68.3	66.0	
	CCSM85	60.3	63.8	65.0	68.7	
	GFDL45	60.3	66.5	73.5	70.2	
	GFDL85	60.3	65.5	67.5	69.3	
	HAD45	60.3	59.1	61.2	64.2	
HAD85	60.3	62.4	55.8	60.4		
Growing Season May—Sep	CCSM45	23.5	24.2	24.9	24.4	
	CCSM85	23.5	22.5	23.1	23.1	
	GFDL45	23.5	26.9	31.7	28.1	
	GFDL85	23.5	27.5	29.5	31.3	
	HAD45	23.5	22.6	23.7	23.3	
HAD85	23.5	23.0	19.3	19.7		

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
loblolly pine	Pinus taeda	WDH	High	94	4156.9	44.2	No change	No change	Medium	Abundant	Good	Good			1	1
sweetgum	Liquidambar styraciflua	WDH	High	98.8	1156.2	11.7	No change	No change	Medium	Abundant	Good	Good			1	2
water oak	Quercus nigra	WDH	High	98.8	729.8	7.4	Sm. inc.	Sm. inc.	Medium	Abundant	Very Good	Very Good			1	3
cherrybark oak; swamp red o	Quercus pagoda	NSL	Medium	66.7	411.9	6.2	No change	No change	Medium	Common	Fair	Fair			1	4
white oak	Quercus alba	WDH	Medium	61.9	304.8	4.9	No change	No change	High	Common	Good	Good			1	5
shortleaf pine	Pinus echinata	WDH	High	56	246.3	4.4	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	6
yellow-poplar	Liriodendron tulipifera	WDH	High	58.3	205.6	3.5	No change	No change	High	Common	Good	Good			1	7
American hornbeam; musclev	Carpinus caroliniana	WSL	Low	69	178.5	2.6	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	8
winged elm	Ulmus alata	WDL	Medium	75	163.7	2.2	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	9
southern red oak	Quercus falcata	WDL	Medium	59.5	145.2	2.4	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	10
blackgum	Nyssa sylvatica	WDL	Medium	67.9	144.1	2.1	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	11
black willow	Salix nigra	NSH	Low	17.9	129.9	7.3	Sm. inc.	Lg. inc.	Low	Common	Fair	Good			1	12
black cherry	Prunus serotina	WDL	Medium	70.2	126.3	1.8	Sm. inc.	Sm. inc.	Low	Common	Fair	Fair			1	13
American beech	Fagus grandifolia	WDH	High	51.2	125.9	2.5	Lg. inc.	Sm. inc.	Medium	Common	Very Good	Good			1	14
pignut hickory	Carya glabra	WDL	Medium	54.8	113.7	2.1	No change	No change	Medium	Common	Fair	Fair			1	15
sycamore	Platanus occidentalis	NSL	Low	28.6	112.7	3.9	No change	No change	Medium	Common	Fair	Fair			1	16
flowering dogwood	Cornus florida	WDL	Medium	61.9	93.5	1.5	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	17
sugarberry	Celtis laevigata	NDH	Medium	25	86.0	3.4	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	18
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	63.1	84.7	1.3	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	19
red maple	Acer rubrum	WDH	High	64.3	79.0	1.2	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	20
post oak	Quercus stellata	WDH	High	32.1	77.1	2.4	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	21
boxelder	Acer negundo	WSH	Low	23.8	72.8	3.1	No change	Sm. inc.	High	Common	Good	Very Good			1	22
southern magnolia	Magnolia grandiflora	NSL	Low	38.1	63.2	1.7	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	23
sourwood	Oxydendrum arboreum	NDL	High	42.9	55.7	1.3	Sm. dec.	Sm. dec.	High	Common	Fair	Fair			1	24
swamp chestnut oak	Quercus michauxii	NSL	Low	16.7	54.0	3.2	Lg. inc.	Sm. inc.	Medium	Common	Very Good	Good			1	25
slippery elm	Ulmus rubra	WSL	Low	23.8	51.1	2.2	Sm. inc.	Lg. inc.	Medium	Common	Good	Very Good			1	26
mockernut hickory	Carya alba	WDL	Medium	34.5	51.1	1.5	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	27
green ash	Fraxinus pennsylvanica	WSH	Low	26.2	49.4	1.9	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			1	28
American elm	Ulmus americana	WDH	Medium	28.6	48.6	1.7	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			1	29
willow oak	Quercus phellos	NSL	Low	21.4	47.5	2.2	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			1	30
pecan	Carya illinoensis	NSH	Low	17.9	46.1	2.6	Lg. inc.	Lg. inc.	Low	Rare	Fair	Fair			1	31
bald cypress	Taxodium distichum	NSH	Medium	4.8	38.7	8.1	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	1	32
eastern cottonwood	Populus deltoides	NSH	Low	4.8	36.0	7.6	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	1	33
white ash	Fraxinus americana	WDL	Medium	29.8	35.9	1.2	Lg. inc.	Lg. inc.	Low	Rare	Fair	Fair			1	34
black locust	Robinia pseudoacacia	NDH	Low	9.5	31.3	3.3	No change	No change	Medium	Rare	Poor	Poor			1	35
honeylocust	Gleditsia triacanthos	NSH	Low	15.5	30.7	2.0	Sm. inc.	Lg. inc.	High	Rare	Good	Good			1	36
eastern redcedar	Juniperus virginiana	WDH	Medium	16.7	28.9	1.7	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			1	37
common persimmon	Diospyros virginiana	NSL	Low	29.8	25.1	0.8	Sm. inc.	Lg. inc.	High	Rare	Good	Good			1	38
waterlocust	Gleditsia aquatica	NSLX	FIA	1.2	23.8	20.0	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	39
sweetbay	Magnolia virginiana	NSL	Medium	9.5	23.5	2.5	Sm. inc.	Sm. inc.	Medium	Rare	Fair	Fair			1	40
American holly	Ilex opaca	NSL	Medium	21.4	20.0	0.9	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			1	41
water elm	Planera aquatica	NSL	Low	3.6	19.6	5.5	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	1	42
water tupelo	Nyssa aquatica	NSH	Medium	4.8	18.3	3.9	No change	No change	Low	Rare	Very Poor	Very Poor			2	43
bitternut hickory	Carya cordiformis	WSL	Low	14.3	17.3	1.2	No change	Sm. inc.	High	Rare	Fair	Good	Infill +	Infill ++	1	44
bigleaf magnolia	Magnolia macrophylla	NSL	Low	22.6	16.2	0.7	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	45
sassafras	Sassafras albidum	WSL	Low	15.5	14.8	1.0	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			1	46
red mulberry	Morus rubra	NSL	Low	15.5	12.9	0.8	No change	Sm. inc.	Medium	Rare	Poor	Fair			1	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
chinkapin oak	Quercus muehlenbergii	NSL	Medium	4.8	12.1	2.5	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor				2 48
laurel oak	Quercus laurifolia	NDH	Medium	14.3	11.3	0.8	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good				1 49
Shumard oak	Quercus shumardii	NSL	Low	9.5	10.8	1.1	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +		1 50
black oak	Quercus velutina	WDH	High	14.3	10.5	0.7	No change	No change	Medium	Rare	Poor	Poor	Infill +			1 51
florida maple	Acer barbatum	NSL	Low	8.3	9.5	1.1	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +		1 52
longleaf pine	Pinus palustris	NSH	Medium	4.8	9.1	1.9	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++		2 53
cucumbertree	Magnolia acuminata	NSL	Low	7.1	8.8	1.2	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor				0 54
spruce pine	Pinus glabra	NSL	Low	2.4	7.6	3.2	No change	Sm. dec.	Medium	Rare	Poor	Very Poor	Infill +			1 55
blackjack oak	Quercus marilandica	NSL	Medium	4.8	6.8	1.4	Lg. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++		2 56
swamp tupelo	Nyssa biflora	NDH	Medium	2.4	6.8	2.8	No change	No change	Low	Rare	Very Poor	Very Poor				2 57
northern red oak	Quercus rubra	WDH	Medium	2.4	5.2	2.2	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor		Infill +		2 58
river birch	Betula nigra	NSL	Low	2.4	3.7	1.6	No change	Sm. inc.	Medium	Rare	Poor	Fair		Infill +		2 59
overcup oak	Quercus lyrata	NSL	Medium	3.6	3.7	1.0	Lg. inc.	Lg. inc.	Low	Rare	Fair	Fair	Infill +	Infill +		1 60
Nuttall oak	Quercus texana	NSH	Medium	3.6	3.4	1.0	No change	No change	High	Rare	Fair	Fair				0 61
black walnut	Juglans nigra	WDH	Low	3.6	3.4	0.9	Lg. dec.	Very Lg. dec.	Medium	Rare	Very Poor	Lost				0 62
pawpaw	Asimina triloba	NSL	Low	2.4	2.6	1.1	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor				0 63
silver maple	Acer saccharinum	NSH	Low	1.2	2.3	2.0	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor				0 64
eastern redbud	Cercis canadensis	NSL	Low	4.8	2.1	0.5	Very Lg. dec.	Very Lg. dec.	Medium	Rare	Lost	Lost				0 65
black hickory	Carya texana	NDL	High	1.2	1.6	1.4	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good				2 66
redbay	Persea borbonia	NSL	Low	3.6	1.3	0.4	No change	No change	High	Rare	Fair	Fair				1 67
scarlet oak	Quercus coccinea	WDL	Medium	1.2	1.2	1.0	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor				0 68
Osage-orange	Maclura pomifera	NDH	Medium	1.2	1.0	0.8	Very Lg. dec.	Very Lg. dec.	High	Rare	Lost	Lost				0 69
turkey oak	Quercus laevis	NSH	Medium	2.4	0.9	0.4	Very Lg. dec.	Very Lg. dec.	High	Rare	Lost	Lost				0 70
Virginia pine	Pinus virginiana	NDH	High	1.2	0.8	0.7	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor				0 71
paulownia	Paulownia tomentosa	NSL	FIA	1.2	0.8	0.6	Unknown	Unknown	NA	Rare	NNIS	NNIS				0 72
slash pine	Pinus elliottii	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Likely +	Likely +		3 73
striped maple	Acer pensylvanicum	NSL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat				3 74
yellow buckeye	Aesculus flava	NSL	Low	0	0	0	Unknown	Unknown	Low	Absent	Unknown	Unknown				0 75
serviceberry	Amelanchier spp.	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat				3 76
cittamwood/gum bumelia	Sideroxylon lanuginosum ssp.	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate +		3 77
water hickory	Carya aquatica	NSL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Likely +	Likely +		3 78
black ash	Fraxinus nigra	WSH	Medium	0	0	0	Unknown	New Habitat	Low	Absent	Unknown	New Habitat				3 79
silverbell	Halesia spp.	NSL	Low	0	0	0	Unknown	New Habitat	Medium	Absent	Unknown	New Habitat		Likely +		3 80
pin cherry	Prunus pensylvanica	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat				3 81
swamp white oak	Quercus bicolor	NSL	Low	0	0	0	Unknown	Unknown	Medium	Modeled	Unknown	Unknown				0 82
live oak	Quercus virginiana	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate ++	Migrate ++		3 83
American basswood	Tilia americana	WSL	Medium	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown				0 84
cedar elm	Ulmus crassifolia	NDH	Medium	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat	Likely +	Likely +		3 85