

	sq. km	sq. mi	FIA Plots
Area of Region	10,100	3,899.6	356

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	24	25	Increase	24	29	Very Good	11	9	Likely	3	3
Hickory	4			Medium	30	54	No Change	24	22	Good	11	23	Infill	6	9
Maple	6	Abundant	4	Low	37	14	Decrease	18	15	Fair	16	12	Migrate	4	12
Oak	9	Common	25	FIA	4		New	17	21	Poor	16	14			
Pine	6	Rare	41				Unknown	12	8	Very Poor	12	7			
Other	43	Absent	22							FIA Only	2	2			
	70		92		95	93		95	95	Unknown	8	4			
											76	71			

Potential Changes in Climate Variables

Temperature (°F)

Scenario	2009	2039	2069	2099		
Annual	CCSM45	53.1	55.0	57.1	57.2	
Average	CCSM85	53.1	55.4	57.8	60.6	
	GFDL45	53.1	55.8	58.3	59.1	
	GFDL85	53.1	56.1	59.4	63.1	
	HAD45	53.1	55.4	58.4	59.7	
	HAD85	53.1	55.7	59.8	63.9	
Growing Season	CCSM45	66.4	68.2	70.2	70.6	
	CCSM85	66.4	68.4	71.1	74.8	
May—Sep	GFDL45	66.4	69.5	72.3	73.6	
	GFDL85	66.4	70.0	73.9	78.0	
	HAD45	66.4	69.5	72.3	73.8	
	HAD85	66.4	69.4	75.1	79.2	
Coldest Month	CCSM45	33.3	35.5	36.4	36.5	
	CCSM85	33.3	35.9	36.9	38.0	
Average	GFDL45	33.3	36.5	36.7	37.3	
	GFDL85	33.3	35.2	36.3	37.1	
	HAD45	33.3	33.4	35.3	35.7	
	HAD85	33.3	34.3	35.6	37.2	
Warmest Month	CCSM45	70.9	73.0	74.1	74.2	
	CCSM85	70.9	73.2	74.8	76.5	
Average	GFDL45	70.9	74.3	75.6	76.5	
	GFDL85	70.9	75.0	77.2	79.5	
	HAD45	70.9	74.6	76.6	77.3	
	HAD85	70.9	75.4	79.1	81.3	

Precipitation (in)

Scenario	2009	2039	2069	2099		
Annual	CCSM45	52.0	55.5	58.9	59.2	
Total	CCSM85	52.0	56.7	58.9	64.3	
	GFDL45	52.0	57.9	60.3	63.7	
	GFDL85	52.0	56.3	62.0	62.3	
	HAD45	52.0	51.9	55.3	56.4	
	HAD85	52.0	56.7	52.4	54.8	
Growing Season	CCSM45	23.2	25.9	27.7	28.3	
	CCSM85	23.2	26.0	26.2	28.8	
May—Sep	GFDL45	23.2	27.1	28.4	29.5	
	GFDL85	23.2	25.5	29.3	29.5	
	HAD45	23.2	23.3	23.6	24.5	
	HAD85	23.2	26.1	22.3	23.1	

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
yellow-poplar	Liriodendron tulipifera	WDH	High	95	1257.1	13.2	No change	Sm. dec.	High	Abundant	Very Good	Good			1	1
red maple	Acer rubrum	WDH	High	97	1252.6	12.9	No change	Sm. dec.	High	Abundant	Very Good	Good			1	2
chestnut oak	Quercus prinus	NDH	High	86.1	971.2	11.3	Sm. inc.	No change	High	Abundant	Very Good	Very Good			1	3
eastern white pine	Pinus strobus	WDH	High	66.3	647.3	9.8	No change	No change	Low	Abundant	Fair	Fair			0	4
sourwood	Oxydendrum arboreum	NDL	High	84.2	481.6	5.7	No change	No change	High	Common	Good	Good			1	5
northern red oak	Quercus rubra	WDH	Medium	88.1	439.0	5.0	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	6
scarlet oak	Quercus coccinea	WDL	Medium	71.3	417.2	5.9	No change	No change	Medium	Common	Fair	Fair			1	7
eastern hemlock	Tsuga canadensis	NSH	High	73.3	402.0	5.5	No change	No change	Low	Common	Poor	Poor			0	8
black locust	Robinia pseudoacacia	NDH	Low	87.1	400.5	4.6	No change	No change	Medium	Common	Fair	Fair			1	9
sweet birch	Betula lenta	NDH	High	80.2	387.7	4.8	No change	Sm. dec.	Low	Common	Poor	Poor			0	10
white oak	Quercus alba	WDH	Medium	67.3	308.2	4.6	Sm. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	11
pignut hickory	Carya glabra	WDL	Medium	64.4	225.7	3.5	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	12
American beech	Fagus grandifolia	WDH	High	47.5	210.0	4.4	No change	No change	Medium	Common	Fair	Fair			1	13
sugar maple	Acer saccharum	WDH	High	35.6	204.2	5.7	Sm. dec.	Sm. dec.	High	Common	Fair	Fair			1	14
blackgum	Nyssa sylvatica	WDL	Medium	71.3	199.8	2.8	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	15
Virginia pine	Pinus virginiana	NDH	High	37.6	195.2	5.2	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	16
black oak	Quercus velutina	WDH	High	50.5	161.5	3.2	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	17
mountain or Fraser magnolia	Magnolia fraseri	NSL	Low	50.5	146.9	2.9	No change	No change	Low	Common	Poor	Poor			0	18
white ash	Fraxinus americana	WDL	Medium	32.7	138.6	4.2	No change	No change	Low	Common	Poor	Poor			0	19
pitch pine	Pinus rigida	NSH	High	29.7	132.6	4.5	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	20
black cherry	Prunus serotina	WDL	Medium	42.6	113.9	2.7	Sm. inc.	Lg. inc.	Low	Common	Fair	Good			1	21
yellow birch	Betula alleghaniensis	NDL	High	23.8	98.2	4.1	No change	No change	Medium	Common	Fair	Fair			1	22
mockernut hickory	Carya alba	WDL	Medium	32.7	84.9	2.6	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	23
yellow buckeye	Aesculus flava	NSL	Low	23.8	79.9	3.4	No change	Sm. dec.	Low	Common	Poor	Poor			0	24
cucumbertree	Magnolia acuminata	NSL	Low	23.8	71.9	3.0	Sm. dec.	No change	Medium	Common	Poor	Fair			1	25
shortleaf pine	Pinus echinata	WDH	High	31.7	61.3	1.9	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	26
flowering dogwood	Cornus florida	WDL	Medium	47.5	59.4	1.3	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	27
American basswood	Tilia americana	WSL	Medium	19.8	53.6	2.7	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	28
serviceberry	Amelanchier spp.	NSL	Low	42.6	51.6	1.2	No change	No change	Medium	Common	Fair	Fair			1	29
striped maple	Acer pensylvanicum	NSL	Medium	31.7	48.5	1.5	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	30
southern red oak	Quercus falcata	WDL	Medium	13.9	48.4	3.5	Lg. inc.	Lg. inc.	High	Rare	Good	Good			1	31
sassafras	Sassafras albidum	WSL	Low	34.7	48.2	1.4	Sm. inc.	Lg. inc.	Medium	Rare	Fair	Good			1	32
silverbell	Halesia spp.	NSL	Low	19.8	41.4	2.1	No change	No change	Medium	Rare	Poor	Poor			1	33
black walnut	Juglans nigra	WDH	Low	13.9	38.2	2.8	Sm. inc.	Lg. inc.	Medium	Rare	Fair	Good			1	34
bitternut hickory	Carya cordiformis	WSL	Low	20.8	37.9	1.8	Sm. dec.	Sm. inc.	High	Rare	Poor	Good			1	35
pin cherry	Prunus pensylvanica	NSL	Low	5.9	28.8	4.9	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	36
Table Mountain pine	Pinus pungens	NSL	Low	7.9	24.9	3.1	Sm. dec.	No change	High	Rare	Poor	Fair			1	37
American holly	Ilex opaca	NSL	Medium	17.8	24.8	1.4	Sm. dec.	No change	Medium	Rare	Very Poor	Poor			1	38
red spruce	Picea rubens	NDH	High	5	21.9	4.4	No change	No change	Low	Rare	Very Poor	Very Poor			0	39
shagbark hickory	Carya ovata	WSL	Medium	11.9	21.6	1.8	Sm. dec.	No change	Medium	Rare	Very Poor	Poor		Infill +	1	40
eastern redcedar	Juniperus virginiana	WDH	Medium	3	18.3	6.2	Sm. inc.	Lg. inc.	Medium	Rare	Fair	Good	Infill +	Infill ++	1	41
green ash	Fraxinus pennsylvanica	WDL	Low	12.9	18.2	1.4	Sm. inc.	Lg. inc.	Medium	Rare	Fair	Good			1	42
loblolly pine	Pinus taeda	WDH	High	4	18.0	4.6	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	2	43
American chestnut	Castanea dentata	NSLX	FIA	15.8	16.4	1.0	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	44
American hornbeam; musclev	Carpinus caroliniana	WSL	Low	11.9	16.3	1.4	No change	Lg. inc.	Medium	Rare	Poor	Good			1	45
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	10.9	16.0	1.5	No change	Lg. inc.	High	Rare	Fair	Good			1	46
American elm	Ulmus americana	WDH	Medium	6.9	8.2	1.2	No change	Sm. inc.	Medium	Rare	Poor	Fair	Infill +	Infill +	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
eastern redbud	Cercis canadensis	NSL	Low	5.9	7.2	1.2	Sm. dec.	No change	Medium	Rare	Very Poor	Poor				1 48
sweetgum	Liquidambar styraciflua	WDH	High	5	7.1	1.4	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++		2 49
winged elm	Ulmus alata	WDL	Medium	3	6.7	2.3	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++		2 50
river birch	Betula nigra	NSL	Low	3	6.6	2.2	Sm. dec.	No change	Medium	Rare	Very Poor	Poor		Infill +		2 51
boxelder	Acer negundo	WSH	Low	2	6.4	3.2	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor				0 52
butternut	Juglans cinerea	NSLX	FIA	1	5.1	5.2	Unknown	Unknown	Low	Rare	FIA Only	FIA Only				0 53
post oak	Quercus stellata	WDH	High	5	4.4	0.9	Lg. inc.	Lg. inc.	High	Rare	Good	Good				2 54
slippery elm	Ulmus rubra	WSL	Low	3	4.4	1.5	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor				0 55
honeylocust	Gleditsia triacanthos	NSH	Low	1	3.3	3.3	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor				0 56
paulownia	Paulownia tomentosa	NSL	FIA	2	3.2	1.6	Unknown	Unknown	NA	Rare	NNIS	NNIS				0 57
red mulberry	Morus rubra	NSL	Low	2	2.3	1.2	No change	No change	Medium	Rare	Poor	Poor		Infill +		1 58
bigtooth aspen	Populus grandidentata	NSL	Medium	1	1.9	1.9	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor				0 59
common persimmon	Diospyros virginiana	NSL	Low	3	1.4	0.5	No change	Lg. inc.	High	Rare	Fair	Good				1 60
pawpaw	Asimina triloba	NSL	Low	2	1.2	0.6	Lg. dec.	Very Lg. dec.	Medium	Rare	Very Poor	Lost				0 61
mountain maple	Acer spicatum	NSL	Low	2	1.1	0.6	No change	No change	High	Rare	Fair	Fair				1 62
hackberry	Celtis occidentalis	WDH	Medium	1	1.0	1.0	No change	No change	High	Rare	Fair	Fair		Infill +		2 63
chinkapin oak	Quercus muehlenbergii	NSL	Medium	1	0.9	0.9	No change	Lg. inc.	Medium	Rare	Poor	Good	Infill +			2 64
silver maple	Acer saccharinum	NSH	Low	1	0.9	0.9	Sm. dec.	Lg. dec.	High	Rare	Poor	Poor				0 65
ailanthus	Ailanthus altissima	NSL	FIA	2	0.8	0.4	Unknown	Unknown	NA	Rare	NNIS	NNIS				0 66
blackjack oak	Quercus marilandica	NSL	Medium	1	0.5	0.5	Lg. inc.	Lg. inc.	High	Rare	Good	Good				2 67
bigleaf magnolia	Magnolia macrophylla	NSL	Low	1	0.3	0.3	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor				0 68
sycamore	Platanus occidentalis	NSL	Low	1	0.2	0.2	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good				2 69
American mountain-ash	Sorbus americana	NSL	Low	1	0.2	0.2	Lg. dec.	Lg. dec.	Low	Rare	Very Poor	Very Poor				0 70
ashe juniper	Juniperus ashei	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat				0 71
slash pine	Pinus elliottii	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate ++		3 72
longleaf pine	Pinus palustris	NSH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +		3 73
pond cypress	Taxodium ascendens	NSH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate ++			3 74
northern white-cedar	Thuja occidentalis	WSH	High	0	0	0	Unknown	New Habitat	Medium	Absent	Unknown	New Habitat				3 75
florida maple	Acer barbatum	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate +		3 76
black maple	Acer nigrum	NSH	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat				0 77
Ohio buckeye	Aesculus glabra	NSL	Low	0	0	0	Unknown	Unknown	Medium	Modeled	Unknown	Unknown				0 78
cittamwood/gum bumelia	Sideroxylon lanuginosum ssp.	NSL	Low	0	0	0	Unknown	New Habitat	High	Absent	Unknown	New Habitat				3 79
pecan	Carya illinoensis	NSH	Low	0	0	0	Unknown	New Habitat	Low	Absent	Unknown	New Habitat		Migrate +		3 80
black hickory	Carya texana	NDL	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat				3 81
sugarberry	Celtis laevigata	NDH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate ++		3 82
southern magnolia	Magnolia grandiflora	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Likely +	Likely +		3 83
sweetbay	Magnolia virginiana	NSL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +		3 84
swamp tupelo	Nyssa biflora	NDH	Medium	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat		Migrate +		3 85
cherrybark oak; swamp red o	Quercus pagoda	NSL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +		3 86
shingle oak	Quercus imbricaria	NDH	Medium	0	0	0	Unknown	Unknown	Medium	Modeled	Unknown	Unknown				0 87
laurel oak	Quercus laurifolia	NDH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +		3 88
overcup oak	Quercus lyrata	NSL	Medium	0	0	0	Unknown	Unknown	Low	Absent	Unknown	Unknown				0 89
water oak	Quercus nigra	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Likely +	Likely +		3 90
willow oak	Quercus phellos	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +		3 91
Shumard oak	Quercus shumardii	NSL	Low	0	0	0	Unknown	Unknown	High	Modeled	Unknown	Unknown				0 92
live oak	Quercus virginiana	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate ++		3 93
bluejack oak	Quercus incana	NSL	Low	0	0	0	Unknown	New Habitat	Medium	Absent	Unknown	New Habitat		Migrate +		3 94

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
black willow	Salix nigra	NSH	Low	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat	Likely +	Likely +	3	95