

	sq. km	sq. mi	FIA Plots
Area of Region	8,700.0	3,359.1	330

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	1			High	16	20	Increase	27	32	Very Good	9	10	Likely	1	1
Hickory	6			Medium	26	46	No Change	9	5	Good	18	18	Infill	6	8
Maple	3	Abundant	4	Low	31	8	Decrease	24	23	Fair	7	10	Migrate	2	3
Oak	13	Common	15	FIA	2		New	9	10	Poor	8	7		9	12
Pine	5	Rare	43				Unknown	6	5	Very Poor	16	13			
Other	34	Absent	13							FIA Only	1	1			
	62		75		75	74		75	75	Unknown	4	3			
											63	62			

Potential Changes in Climate Variables

Temperature (°F)

	Scenario	2009	2039	2069	2099	
Annual Average	CCSM45	62.6	64.3	66.3	66.4	
	CCSM85	62.6	64.6	67.1	69.8	
	GFDL45	62.6	65.4	67.4	68.1	
	GFDL85	62.6	65.3	68.6	72.2	
	HAD45	62.6	64.9	67.7	69.2	
	HAD85	62.6	65.1	69.2	73.1	
Growing Season (May—Sep)	CCSM45	75.9	77.6	79.3	79.7	
	CCSM85	75.9	77.7	80.2	83.7	
	GFDL45	75.9	78.9	81.0	82.2	
	GFDL85	75.9	79.0	82.5	86.7	
	HAD45	75.9	79.1	81.6	83.4	
	HAD85	75.9	79.0	84.8	88.6	
Coldest Month (Average)	CCSM45	42.9	45.4	46.2	46.1	
	CCSM85	42.9	45.2	46.3	47.5	
	GFDL45	42.9	46.0	46.2	46.6	
	GFDL85	42.9	44.7	45.7	46.1	
	HAD45	42.9	43.2	44.9	45.5	
	HAD85	42.9	44.2	45.2	46.9	
Warmest Month (Average)	CCSM45	80.6	82.4	83.2	83.3	
	CCSM85	80.6	82.6	83.9	85.8	
	GFDL45	80.6	83.5	84.3	85.0	
	GFDL85	80.6	83.7	85.3	87.6	
	HAD45	80.6	84.4	86.0	86.8	
	HAD85	80.6	84.7	88.3	90.2	

Precipitation (in)

	Scenario	2009	2039	2069	2099	
Annual Total	CCSM45	46.0	48.7	51.6	52.5	
	CCSM85	46.0	48.8	52.5	58.7	
	GFDL45	46.0	50.9	54.0	57.7	
	GFDL85	46.0	50.5	55.1	54.7	
	HAD45	46.0	44.7	48.6	50.0	
	HAD85	46.0	50.4	45.6	48.7	
Growing Season (May—Sep)	CCSM45	18.9	21.0	22.9	23.7	
	CCSM85	18.9	20.5	22.2	24.7	
	GFDL45	18.9	23.3	25.6	26.5	
	GFDL85	18.9	22.6	26.2	26.5	
	HAD45	18.9	18.7	19.4	19.5	
	HAD85	18.9	20.9	16.5	17.2	

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	97.7	4498.8	46.1	No change	Sm. dec.	Medium	Abundant	Good	Fair			1	1
sweetgum	Liquidambar styraciflua	WDH	High	97.7	1431.8	14.7	No change	No change	Medium	Abundant	Good	Good			1	2
white oak	Quercus alba	WDH	Medium	80.5	539.0	6.7	Sm. dec.	Sm. dec.	High	Abundant	Good	Good			1	3
water oak	Quercus nigra	WDH	High	93.1	524.3	5.6	Lg. inc.	Lg. inc.	Medium	Abundant	Very Good	Very Good			1	4
yellow-poplar	Liriodendron tulipifera	WDH	High	79.3	365.7	4.6	Lg. dec.	Lg. dec.	High	Common	Fair	Fair			1	5
winged elm	Ulmus alata	WDL	Medium	86.2	270.9	3.1	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	6
southern red oak	Quercus falcata	WDL	Medium	71.3	253.5	3.6	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	7
red maple	Acer rubrum	WDH	High	72.4	181.6	2.5	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	8
shortleaf pine	Pinus echinata	WDH	High	58.6	168.2	2.9	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	9
pignut hickory	Carya glabra	WDL	Medium	64.4	154.0	2.4	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor			0	10
flowering dogwood	Cornus florida	WDL	Medium	72.4	135.3	1.9	No change	No change	Medium	Common	Fair	Fair			1	11
post oak	Quercus stellata	WDH	High	52.9	129.2	2.4	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	12
green ash	Fraxinus pennsylvanica	WSH	Low	40.2	122.7	3.1	Sm. inc.	Lg. inc.	Medium	Common	Good	Very Good			1	13
black cherry	Prunus serotina	WDL	Medium	69	118.1	1.7	Lg. inc.	Lg. inc.	Low	Common	Good	Good			1	14
eastern redcedar	Juniperus virginiana	WDH	Medium	35.6	70.9	2.0	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	15
boxelder	Acer negundo	WSH	Low	14.9	64.1	4.3	Lg. dec.	Sm. dec.	High	Common	Fair	Fair			1	16
blackgum	Nyssa sylvatica	WDL	Medium	39.1	59.9	1.5	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	17
mockernut hickory	Carya alba	WDL	Medium	33.3	52.4	1.6	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	18
American hornbeam; musclev	Carpinus caroliniana	WSL	Low	27.6	50.3	1.8	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	19
northern red oak	Quercus rubra	WDH	Medium	25.3	45.3	1.8	Lg. dec.	Lg. dec.	High	Rare	Poor	Poor			1	20
florida maple	Acer barbatum	NSL	Low	25.3	44.9	1.8	No change	Sm. inc.	High	Rare	Fair	Good			1	21
black oak	Quercus velutina	WDH	High	24.1	43.8	1.8	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	22
cherrybark oak; swamp red o	Quercus pagoda	NSL	Medium	14.9	33.8	2.3	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			1	23
American elm	Ulmus americana	WDH	Medium	20.7	33.1	1.6	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			1	24
slippery elm	Ulmus rubra	WSL	Low	17.2	32.7	1.9	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	25
river birch	Betula nigra	NSL	Low	6.9	30.9	4.5	Sm. inc.	Sm. inc.	Medium	Rare	Fair	Fair			1	26
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	25.3	29.8	1.2	Lg. inc.	Lg. inc.	High	Rare	Good	Good			1	27
sycamore	Platanus occidentalis	NSL	Low	6.9	28.3	4.1	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	28
common persimmon	Diospyros virginiana	NSL	Low	27.6	27.7	1.0	Lg. dec.	No change	High	Rare	Poor	Fair			1	29
laurel oak	Quercus laurifolia	NDH	Medium	14.9	27.2	1.8	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			1	30
sourwood	Oxydendrum arboreum	NDL	High	19.5	26.0	1.3	No change	No change	High	Rare	Fair	Fair			1	31
scarlet oak	Quercus coccinea	WDL	Medium	16.1	21.8	1.4	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	32
red mulberry	Morus rubra	NSL	Low	21.8	21.4	1.0	Sm. inc.	Lg. inc.	Medium	Rare	Fair	Good			1	33
sugarberry	Celtis laevigata	NDH	Medium	9.2	20.1	2.2	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	1	34
black walnut	Juglans nigra	WDH	Low	6.9	17.4	2.5	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	35
shagbark hickory	Carya ovata	WSL	Medium	10.3	16.8	1.6	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	36
eastern redbud	Cercis canadensis	NSL	Low	12.6	15.4	1.2	Sm. dec.	Sm. inc.	Medium	Rare	Very Poor	Fair			1	37
bitternut hickory	Carya cordiformis	WSL	Low	4.6	13.7	3.0	Lg. dec.	Lg. dec.	High	Rare	Poor	Poor			0	38
American beech	Fagus grandifolia	WDH	High	13.8	13.5	1.0	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	2	39
willow oak	Quercus phellos	NSL	Low	5.7	13.0	2.3	No change	Sm. inc.	Medium	Rare	Poor	Fair	Infill +	Infill +	1	40
pecan	Carya illinoensis	NSH	Low	4.6	11.6	2.5	No change	Sm. inc.	Low	Rare	Very Poor	Poor		Infill +	1	41
slash pine	Pinus elliotii	NDH	High	3.4	11.2	3.3	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	42
black willow	Salix nigra	NSH	Low	3.4	9.9	2.9	Sm. inc.	Lg. inc.	Low	Rare	Poor	Fair	Infill +	Infill +	1	43
American holly	Ilex opaca	NSL	Medium	5.7	9.5	1.6	No change	No change	Medium	Rare	Poor	Poor			1	44
hackberry	Celtis occidentalis	WDH	Medium	5.7	8.6	1.5	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor		Infill +	2	45
swamp tupelo	Nyssa biflora	NDH	Medium	3.4	6.3	1.8	No change	Sm. inc.	Low	Rare	Very Poor	Poor		Infill +	1	46
eastern cottonwood	Populus deltoides	NSH	Low	2.3	3.7	1.6	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	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
American basswood	Tilia americana	WSL	Medium	2.3	3.4	1.5	Lg. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	48
swamp chestnut oak	Quercus michauxii	NSL	Low	2.3	3.3	1.5	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	49
longleaf pine	Pinus palustris	NSH	Medium	1.1	3.3	2.9	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	50
sassafras	Sassafras albidum	WSL	Low	3.4	2.5	0.7	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	2	51
black locust	Robinia pseudoacacia	NDH	Low	1.1	1.7	1.5	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	52
Virginia pine	Pinus virginiana	NDH	High	1.1	1.6	1.4	Very Lg. dec.	Very Lg. dec.	Medium	Rare	Lost	Lost			0	53
shellbark hickory	Carya laciniosa	NSL	Low	1.1	1.1	0.9	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	54
chestnut oak	Quercus prinus	NDH	High	2.3	1.1	0.5	Very Lg. dec.	Very Lg. dec.	High	Rare	Lost	Lost			0	55
yellow buckeye	Aesculus flava	NSL	Low	1.1	0.7	0.6	Sm. dec.	Sm. dec.	Low	Rare	Very Poor	Very Poor			0	56
paulownia	Paulownia tomentosa	NSL	FIA	2.3	0.7	0.3	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	57
sweetbay	Magnolia virginiana	NSL	Medium	2.3	0.6	0.3	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++		2	58
serviceberry	Amelanchier spp.	NSL	Low	1.1	0.6	0.5	Sm. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	59
honeylocust	Gleditsia triacanthos	NSH	Low	1.1	0.6	0.5	Lg. inc.	Lg. inc.	High	Rare	Good	Good			2	60
blackjack oak	Quercus marilandica	NSL	Medium	1.1	0.5	0.5	Lg. inc.	Lg. inc.	High	Rare	Good	Good			2	61
wild plum	Prunus americana	NSLX	FIA	1.1	0.3	0.2	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	62
ashe juniper	Juniperus ashei	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	63
pawpaw	Asimina triloba	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	64
cittamwood/gum bumelia	Sideroxylon lanuginosum ssp.	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			3	65
black hickory	Carya texana	NDL	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	66
white ash	Fraxinus americana	WDL	Medium	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat		Migrate +	3	67
black ash	Fraxinus nigra	WSH	Medium	0	0	0	Unknown	New Habitat	Low	Absent	Unknown	New Habitat			0	68
silverbell	Halesia spp.	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	69
southern magnolia	Magnolia grandiflora	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate ++	Migrate ++	3	70
bigleaf magnolia	Magnolia macrophylla	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	71
redbay	Persea borbonia	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			3	72
live oak	Quercus virginiana	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	73
bluejack oak	Quercus incana	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Likely +	Likely +	3	74
cedar elm	Ulmus crassifolia	NDH	Medium	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat			3	75