

	sq. km	sq. mi	FIA Plots
Area of Region	8,800.0	3,397.7	340

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	22	Increase	18	19	Very Good	3	4	Likely	8	8
Hickory	3			Medium	25	No Change	5	4	Good	14	14	Infill	6	6
Maple	4	Abundant	7	Low	30	Decrease	16	16	Fair	8	8	Migrate	8	14
Oak	5	Common	12	FIA	3	New	33	34	Poor	8	7			
Pine	1	Rare	23			Unknown	8	7	Very Poor	4	4			
Other	26	Absent	38						FIA Only	2	2			
	<b>42</b>		<b>80</b>		<b>80</b>		<b>80</b>	<b>80</b>	Unknown	5	4			
										<b>44</b>	<b>43</b>			

Potential Changes in Climate Variables

Temperature (°F)

	Scenario	2009	2039	2069	2099	
Annual Average	CCSM45	43.0	45.0	47.4	47.5	
	CCSM85	43.0	45.5	48.1	51.4	
	GFDL45	43.0	46.2	49.5	50.9	
	GFDL85	43.0	46.7	50.9	55.8	
	HAD45	43.0	46.2	49.3	51.1	
HAD85	43.0	46.2	50.4	56.0		
Growing Season (May—Sep)	CCSM45	60.3	62.5	64.3	64.8	
	CCSM85	60.3	62.7	65.2	69.1	
	GFDL45	60.3	63.6	67.4	69.0	
	GFDL85	60.3	64.3	68.9	74.1	
	HAD45	60.3	63.4	66.1	68.4	
HAD85	60.3	63.0	67.5	73.7		
Coldest Month (Average)	CCSM45	16.0	17.8	20.1	20.3	
	CCSM85	16.0	19.1	20.3	22.8	
	GFDL45	16.0	19.2	21.5	22.6	
	GFDL85	16.0	20.1	22.2	25.0	
	HAD45	16.0	18.7	21.7	22.0	
HAD85	16.0	19.8	22.4	26.0		
Warmest Month (Average)	CCSM45	66.2	68.7	69.8	70.0	
	CCSM85	66.2	69.2	70.8	72.9	
	GFDL45	66.2	69.2	71.2	72.6	
	GFDL85	66.2	70.3	73.2	76.0	
	HAD45	66.2	69.5	70.9	72.4	
HAD85	66.2	69.2	71.8	76.2		

Precipitation (in)

	Scenario	2009	2039	2069	2099	
Annual Total	CCSM45	50.5	49.7	47.6	53.2	
	CCSM85	50.5	50.0	51.8	54.3	
	GFDL45	50.5	55.2	57.5	55.6	
	GFDL85	50.5	52.9	56.0	58.6	
	HAD45	50.5	53.5	55.3	54.5	
HAD85	50.5	54.7	54.6	58.0		
Growing Season (May—Sep)	CCSM45	22.9	22.9	21.3	23.1	
	CCSM85	22.9	22.3	23.5	22.4	
	GFDL45	22.9	23.4	22.2	22.4	
	GFDL85	22.9	23.1	22.5	21.6	
	HAD45	22.9	24.7	23.5	24.3	
HAD85	22.9	23.3	23.2	24.7		

**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
sugar maple	Acer saccharum	WDH	High	92	1888.5	21.5	Sm. dec.	Sm. dec.	High	Abundant	Good	Good			1	1
American beech	Fagus grandifolia	WDH	High	92	1248.8	14.3	Sm. dec.	Sm. dec.	Medium	Abundant	Fair	Fair			0	2
red maple	Acer rubrum	WDH	High	88.6	1111.8	13.5	Sm. inc.	Sm. inc.	High	Abundant	Very Good	Very Good			1	3
yellow birch	Betula alleghaniensis	NDL	High	77.3	733.1	9.5	Sm. dec.	Sm. dec.	Medium	Abundant	Fair	Fair			0	4
eastern hemlock	Tsuga canadensis	NSH	High	56.8	557.0	9.8	Sm. inc.	No change	Low	Abundant	Good	Fair			1	5
white ash	Fraxinus americana	WDL	Medium	84.1	518.2	6.4	No change	No change	Low	Abundant	Fair	Fair			0	6
red spruce	Picea rubens	NDH	High	76.1	514.7	6.8	Sm. dec.	Sm. dec.	Low	Abundant	Fair	Fair			0	7
eastern white pine	Pinus strobus	WDH	High	47.7	466.2	9.8	Sm. inc.	Sm. inc.	Low	Common	Fair	Fair			1	8
paper birch	Betula papyrifera	WDH	High	76.1	374.7	4.9	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor			0	9
balsam fir	Abies balsamea	NDH	High	39.8	278.8	7.0	Lg. dec.	Lg. dec.	Low	Common	Very Poor	Very Poor			0	10
northern red oak	Quercus rubra	WDH	Medium	37.5	255.7	6.8	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	11
sweet birch	Betula lenta	NDH	High	38.6	241.8	6.3	Sm. inc.	Sm. inc.	Low	Common	Fair	Fair			1	12
black cherry	Prunus serotina	WDL	Medium	60.2	193.5	3.2	Lg. inc.	Lg. inc.	Low	Common	Good	Good			1	13
striped maple	Acer pensylvanicum	NSL	Medium	73.9	168.9	2.3	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor			0	14
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	50	144.9	3.2	No change	No change	High	Common	Good	Good			1	15
quaking aspen	Populus tremuloides	WDH	High	27.3	91.6	3.4	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	16
pin cherry	Prunus pensylvanica	NSL	Low	25	67.1	2.7	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	17
northern white-cedar	Thuja occidentalis	WSH	High	2.3	66.1	29.1	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	18
bitternut hickory	Carya cordiformis	WSL	Low	17	55.7	4.4	No change	Sm. inc.	High	Common	Good	Very Good			1	19
American elm	Ulmus americana	WDH	Medium	17	40.9	2.4	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			1	20
bigtooth aspen	Populus grandidentata	NSL	Medium	10.2	33.7	3.3	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			1	21
butternut	Juglans cinerea	NSLX	FIA	4.5	33.3	7.3	Unknown	Unknown	Low	Rare	FIA Only	FIA Only			0	22
green ash	Fraxinus pennsylvanica	WSH	Low	3.4	28.6	8.4	No change	Sm. inc.	Medium	Rare	Poor	Fair	Infill +	Infill +	1	23
black locust	Robinia pseudoacacia	NDH	Low	1.1	28.0	24.7	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	1	24
black ash	Fraxinus nigra	WSH	Medium	5.7	23.6	4.2	Sm. dec.	Sm. dec.	Low	Rare	Very Poor	Very Poor			0	25
Norway spruce	Picea abies	NSH	FIA	4.5	21.4	4.7	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	26
gray birch	Betula populifolia	NSL	Low	5.7	18.6	3.3	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	27
bur oak	Quercus macrocarpa	NDH	Medium	2.3	17.1	7.5	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor	Infill +	Infill +	2	28
serviceberry	Amelanchier spp.	NSL	Low	19.3	16.8	0.9	Sm. inc.	Lg. inc.	Medium	Rare	Fair	Good			1	29
balsam poplar	Populus balsamifera	NSH	Medium	1.1	16.2	14.3	Very Lg. dec.	Very Lg. dec.	Medium	Rare	Lost	Lost			0	30
shagbark hickory	Carya ovata	WSL	Medium	1.1	14.5	12.8	Sm. inc.	Lg. inc.	Medium	Rare	Fair	Good	Infill +	Infill ++	1	31
American hornbeam; musclev	Carpinus caroliniana	WSL	Low	8	9.7	1.2	No change	No change	Medium	Rare	Poor	Poor			1	32
American basswood	Tilia americana	WSL	Medium	6.8	9.2	1.4	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			1	33
chestnut oak	Quercus prinus	NDH	High	5.7	9.0	1.6	Lg. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	2	34
American mountain-ash	Sorbus americana	NSL	Low	8	4.5	0.6	Lg. dec.	Lg. dec.	Low	Rare	Very Poor	Very Poor			0	35
white oak	Quercus alba	WDH	Medium	2.3	4.0	1.8	Lg. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	2	36
mountain maple	Acer spicatum	NSL	Low	8	3.8	0.5	Lg. dec.	Lg. dec.	High	Rare	Poor	Poor			1	37
eastern redcedar	Juniperus virginiana	WDH	Medium	2.3	2.2	1.0	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	38
chokecherry	Prunus virginiana	NSLX	FIA	1.1	1.6	1.4	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	39
black oak	Quercus velutina	WDH	High	1.1	1.2	1.0	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	40
tamarack (native)	Larix laricina	NSH	High	2.3	1.1	0.5	Very Lg. dec.	Very Lg. dec.	Low	Rare	Lost	Lost			0	41
mockernut hickory	Carya alba	WDL	Medium	1.1	0.6	0.6	Lg. inc.	Lg. inc.	High	Rare	Good	Good			2	42
red pine	Pinus resinosa	NSH	Medium	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat	Likely +	Likely +	3	43
pitch pine	Pinus rigida	NSH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Likely +	Likely +	3	44
Virginia pine	Pinus virginiana	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	45
boxelder	Acer negundo	WSH	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Likely +	Likely +	3	46
silver maple	Acer saccharinum	NSH	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	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
cittamwood/gum bumelia	Sideroxylon lanuginosum ssp.	NSL	Low	0	0	0	Unknown	New Habitat	High	Absent	Unknown	New Habitat			0	48
pignut hickory	Carya glabra	WDL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Likely +	Likely +	3	49
pecan	Carya illinoensis	NSH	Low	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat			0	50
shellbark hickory	Carya laciniosa	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	51
black hickory	Carya texana	NDL	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	52
sugarberry	Celtis laevigata	NDH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	53
hackberry	Celtis occidentalis	WDH	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	54
eastern redbud	Cercis canadensis	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	55
flowering dogwood	Cornus florida	WDL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	56
common persimmon	Diospyros virginiana	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate +	3	57
honeylocust	Gleditsia triacanthos	NSH	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			3	58
black walnut	Juglans nigra	WDH	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	59
sweetgum	Liquidambar styraciflua	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate ++	3	60
yellow-poplar	Liriodendron tulipifera	WDH	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Likely +	Likely +	3	61
southern magnolia	Magnolia grandiflora	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	62
bigleaf magnolia	Magnolia macrophylla	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	63
blackgum	Nyssa sylvatica	WDL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	64
sourwood	Oxydendrum arboreum	NDL	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			0	65
redbay	Persea borbonia	NSL	Low	0	0	0	Unknown	Unknown	High	Absent	Unknown	Unknown			0	66
sycamore	Platanus occidentalis	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	67
eastern cottonwood	Populus deltoides	NSH	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Likely +	Likely +	3	68
swamp white oak	Quercus bicolor	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	69
scarlet oak	Quercus coccinea	WDL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Likely +	Likely +	3	70
shingle oak	Quercus imbricaria	NDH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	71
overcup oak	Quercus lyrata	NSL	Medium	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat			0	72
chinkapin oak	Quercus muehlenbergii	NSL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	73
pin oak	Quercus palustris	NSH	Low	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	74
willow oak	Quercus phellos	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	75
Shumard oak	Quercus shumardii	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			0	76
post oak	Quercus stellata	WDH	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			3	77
sassafras	Sassafras albidum	WSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	78
winged elm	Ulmus alata	WDL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	79
slippery elm	Ulmus rubra	WSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Likely +	Likely +	3	80