

	sq. km	sq. mi	FIA Plots
Area of Region	62,957	24,308	707

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	20	Increase	14	15	Very Good	5	4	Likely	0	0
Hickory	4			Medium	32	No Change	20	15	Good	11	14	Infill	18	19
Maple	6	Abundant	3	Low	30	Decrease	28	32	Fair	14	10	Migrate	5	6
Oak	11	Common	23	FIA	11	New	16	16	Poor	12	14			
Pine	5	Rare	47			Unknown	15	15	Very Poor	19	18			
Other	44	Absent	20						FIA Only	5	5			
	73		93		93		93	93	Unknown	4	4			
										70	69			

Potential Changes in Climate Variables

Temperature (°F)

Scenario	2009	2039	2069	2099		
Annual	CCSM45	47.9	49.8	52.7	52.7	
Average	CCSM85	47.9	50.5	53.3	56.6	
	GFDL45	47.9	51.9	53.6	54.7	
	GFDL85	47.9	51.1	54.7	59.2	
	HAD45	47.9	51.2	54.6	56.4	
	HAD85	47.9	51.4	55.9	61.2	
Growing Season	CCSM45	65.5	67.2	69.7	70.0	
	CCSM85	65.5	68.0	70.5	74.4	
May—Sep	GFDL45	65.5	70.2	72.5	74.0	
	GFDL85	65.5	69.5	73.8	78.9	
	HAD45	65.5	69.0	71.5	73.9	
	HAD85	65.5	68.6	73.6	79.1	
Coldest Month	CCSM45	21.2	22.8	25.6	25.4	
	CCSM85	21.2	23.9	25.9	28.0	
Average	GFDL45	21.2	24.0	25.3	25.8	
	GFDL85	21.2	24.5	25.9	27.8	
	HAD45	21.2	22.9	26.7	26.6	
	HAD85	21.2	25.0	27.8	31.4	
Warmest Month	CCSM45	71.5	73.7	75.2	75.6	
	CCSM85	71.5	74.9	76.5	78.6	
Average	GFDL45	71.5	74.7	76.5	77.6	
	GFDL85	71.5	75.7	77.8	80.8	
	HAD45	71.5	75.6	77.2	78.8	
	HAD85	71.5	76.0	79.2	83.2	

Precipitation (in)

Scenario	2009	2039	2069	2099		
Annual	CCSM45	34.4	33.9	33.3	34.6	
Total	CCSM85	34.4	34.6	34.4	35.0	
	GFDL45	34.4	36.8	40.7	40.6	
	GFDL85	34.4	37.2	41.3	42.8	
	HAD45	34.4	35.1	37.2	36.6	
	HAD85	34.4	37.0	34.7	38.0	
Growing Season	CCSM45	17.2	17.3	16.6	16.8	
	CCSM85	17.2	16.9	16.8	16.0	
May—Sep	GFDL45	17.2	17.9	19.6	19.8	
	GFDL85	17.2	18.6	19.2	19.5	
	HAD45	17.2	16.8	15.9	16.4	
	HAD85	17.2	17.1	13.8	15.0	

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
red maple	Acer rubrum	WDH	High	46	714.5	18.2	Sm. dec.	Sm. dec.	High	Abundant	Good	Good			1	1
black cherry	Prunus serotina	WDL	Medium	47.7	610.6	15.8	No change	Sm. dec.	Low	Abundant	Fair	Fair			0	2
green ash	Fraxinus pennsylvanica	WSH	Low	46.3	564.9	17.8	No change	No change	Medium	Abundant	Good	Good			1	3
American elm	Ulmus americana	WDH	Medium	55.4	399.6	10.3	No change	Sm. inc.	Medium	Common	Fair	Good			1	4
black oak	Quercus velutina	WDH	High	19.9	256.3	13.5	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	5
northern red oak	Quercus rubra	WDH	Medium	29.2	225.5	9.3	No change	No change	High	Common	Good	Good			1	6
silver maple	Acer saccharinum	NSH	Low	17.8	221.7	17.4	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	7
sugar maple	Acer saccharum	WDH	High	23.5	217.4	12.4	Sm. inc.	No change	High	Common	Very Good	Good			1	8
quaking aspen	Populus tremuloides	WDH	High	18.2	214.5	15.8	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor	Infill +	Infill +	0	9
white oak	Quercus alba	WDH	Medium	21.2	201.6	10.8	Sm. inc.	No change	High	Common	Very Good	Good			1	10
eastern cottonwood	Populus deltoides	NSH	Low	15.4	159.0	15.7	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	11
bigtooth aspen	Populus grandidentata	NSL	Medium	14	156.0	12.6	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	12
Scots pine	Pinus sylvestris	NSH	FIA	10.3	144.3	21.6	Unknown	Unknown	NA	Common	NNIS	NNIS			0	13
eastern white pine	Pinus strobus	WDH	High	12.7	139.5	11.6	Lg. dec.	Lg. dec.	Low	Common	Very Poor	Very Poor			0	14
American basswood	Tilia americana	WSL	Medium	21.3	131.2	9.4	No change	Sm. dec.	Medium	Common	Fair	Poor			1	15
white ash	Fraxinus americana	WDL	Medium	23	125.4	8.3	Sm. inc.	Sm. inc.	Low	Common	Fair	Fair			1	16
sassafras	Sassafras albidum	WSL	Low	16.4	118.9	8.1	Sm. inc.	Sm. dec.	Medium	Common	Good	Poor			1	17
red pine	Pinus resinosa	NSH	Medium	7	118.1	18.0	Sm. dec.	Sm. dec.	Low	Common	Poor	Poor	Infill +	Infill +	0	18
boxelder	Acer negundo	WSH	Low	12.2	84.9	11.0	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good	Infill ++	Infill ++	1	19
black walnut	Juglans nigra	WDH	Low	11.9	83.3	11.4	Sm. inc.	Lg. inc.	Medium	Common	Good	Very Good			1	20
shagbark hickory	Carya ovata	WSL	Medium	14.4	71.7	7.4	No change	Sm. dec.	Medium	Common	Fair	Poor	Infill +	Infill +	1	21
northern pin oak	Quercus ellipsoidalis	NSH	Medium	4.3	64.2	13.0	Sm. dec.	Sm. dec.	High	Common	Fair	Fair	Infill +	Infill +	2	22
bitternut hickory	Carya cordiformis	WSL	Low	10.1	56.3	7.7	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good	Infill ++	Infill ++	1	23
swamp white oak	Quercus bicolor	NSL	Low	9.7	55.9	7.3	No change	No change	Medium	Common	Fair	Fair	Infill +	Infill +	1	24
American beech	Fagus grandifolia	WDH	High	11.9	52.3	5.1	No change	Sm. dec.	Medium	Common	Fair	Poor	Infill +	Infill +	2	25
paper birch	Betula papyrifera	WDH	High	8.2	50.1	5.8	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor	Infill +	Infill +	2	26
slippery elm	Ulmus rubra	WSL	Low	6.6	48.3	8.7	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	27
black willow	Salix nigra	NSH	Low	6.9	48.2	9.4	Sm. dec.	No change	Low	Rare	Very Poor	Very Poor			0	28
black ash	Fraxinus nigra	WSH	Medium	7.5	43.7	6.6	Lg. dec.	Lg. dec.	Low	Rare	Very Poor	Very Poor			0	29
bur oak	Quercus macrocarpa	NDH	Medium	9.2	39.0	9.2	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	2	30
black locust	Robinia pseudoacacia	NDH	Low	3.5	31.6	10.2	No change	Sm. inc.	Medium	Rare	Poor	Fair	Infill +	Infill +	1	31
pignut hickory	Carya glabra	WDL	Medium	7	31.3	5.4	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	32
jack pine	Pinus banksiana	NSH	Medium	2.5	29.6	9.1	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor	Infill +	Infill +	2	33
tamarack (native)	Larix laricina	NSH	High	1.3	27.2	10.1	Sm. dec.	Sm. dec.	Low	Rare	Very Poor	Very Poor			2	34
northern white-cedar	Thuja occidentalis	WSH	High	1.8	26.9	15.5	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			2	35
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	9.4	26.5	3.5	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor	Infill +	Infill +	1	36
yellow birch	Betula alleghaniensis	NDL	High	3.6	25.7	8.1	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			2	37
Norway spruce	Picea abies	NSH	FIA	1.3	20.7	16.3	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	38
yellow-poplar	Liriodendron tulipifera	WDH	High	3.3	20.5	7.6	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	2	39
pin oak	Quercus palustris	NSH	Low	1.5	20.2	7.8	No change	No change	Low	Rare	Very Poor	Very Poor			2	40
white mulberry	Morus alba	NSL	FIA	4.1	18.2	5.3	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	41
Siberian elm	Ulmus pumila	NDH	FIA	2.2	18.2	9.2	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	42
northern catalpa	Catalpa speciosa	NSHX	FIA	0.5	17.8	20.0	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	43
eastern hemlock	Tsuga canadensis	NSH	High	1.2	17.8	11.0	Sm. dec.	Lg. dec.	Low	Rare	Very Poor	Very Poor			2	44
scarlet oak	Quercus coccinea	WDL	Medium	0.3	17.2	54.1	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			2	45
white spruce	Picea glauca	NSL	Medium	1.3	17.1	13.5	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	46
American hornbeam; muscle	Carpinus caroliniana	WSL	Low	9.2	13.6	2.3	Sm. dec.	Sm. 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
hackberry	Celtis occidentalis	WDH	Medium	3.2	13.1	6.5	Sm. inc.	Sm. inc.	High	Rare	Good	Good			2	48
blackgum	Nyssa sylvatica	WDL	Medium	3.7	11.6	3.7	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	2	49
serviceberry	Amelanchier spp.	NSL	Low	5.3	10.6	1.9	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	50
peachleaf willow	Salix amygdaloides	NSLX	FIA	1.3	9.9	13.2	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	51
eastern redcedar	Juniperus virginiana	WDH	Medium	2.4	9.6	4.0	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	52
chokecherry	Prunus virginiana	NSLX	FIA	3.4	4.6	1.9	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	53
sycamore	Platanus occidentalis	NSL	Low	0.8	4.0	3.9	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	54
red mulberry	Morus rubra	NSL	Low	2	3.9	4.0	No change	No change	Medium	Rare	Poor	Poor		Infill +	2	55
moccasin hickory	Carya alba	WDL	Medium	0.6	3.9	5.9	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	2	56
flowering dogwood	Cornus florida	WDL	Medium	1.6	3.4	1.7	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	57
Shumard oak	Quercus shumardii	NSL	Low	0.2	3.2	19.9	No change	No change	High	Rare	Fair	Fair		Infill +	2	58
Norway maple	Acer platanoides	NSL	FIA	1.1	3.1	5.5	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	59
loblolly pine	Pinus taeda	WDH	High	0.2	2.7	17.2	No change	Lg. inc.	Medium	Rare	Poor	Good			2	60
ailanthus	Ailanthus altissima	NSL	FIA	0.8	2.4	9.1	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	61
rock elm	Ulmus thomasii	NSLX	FIA	0.2	2.2	14.1	Unknown	Unknown	Low	Rare	FIA Only	FIA Only			0	62
pin cherry	Prunus pensylvanica	NSL	Low	1.1	2.0	3.5	Lg. dec.	Very Lg. dec.	Medium	Rare	Very Poor	Lost			0	63
black maple	Acer nigrum	NSH	Low	0.8	2.0	2.5	Lg. dec.	Lg. dec.	High	Rare	Poor	Poor			0	64
honeylocust	Gleditsia triacanthos	NSH	Low	0.8	1.5	7.3	No change	Sm. inc.	High	Rare	Fair	Good	Infill +		2	65
balsam poplar	Populus balsamifera	NSH	Medium	0.8	1.1	1.3	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	66
Osage-orange	Maclura pomifera	NDH	Medium	0.1	1.1	4.3	Lg. inc.	Lg. inc.	High	Rare	Good	Good			2	67
butternut	Juglans cinerea	NSLX	FIA	0.9	0.8	2.5	Unknown	Unknown	Low	Rare	FIA Only	FIA Only			0	68
shingle oak	Quercus imbricaria	NDH	Medium	0.2	0.7	4.6	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	69
chinkapin oak	Quercus muehlenbergii	NSL	Medium	0.8	0.3	1.5	No change	No change	Medium	Rare	Poor	Poor			0	70
Ohio buckeye	Aesculus glabra	NSL	Low	0.7	0.3	1.2	Sm. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	71
American mountain-ash	Sorbus americana	NSL	Low	0.3	0.2	1.9	Lg. dec.	Sm. dec.	Low	Rare	Very Poor	Very Poor			0	72
pawpaw	Asimina triloba	NSL	Low	0.2	0.2	1.0	Very Lg. dec.	Very Lg. dec.	Medium	Rare	Lost	Lost			0	73
ashe juniper	Juniperus ashei	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	74
shortleaf pine	Pinus echinata	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	75
Virginia pine	Pinus virginiana	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +		3	76
striped maple	Acer pensylvanicum	NSL	Medium	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	77
pecan	Carya illinoensis	NSH	Low	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat			3	78
black hickory	Carya texana	NDL	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	79
sugarberry	Celtis laevigata	NDH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	80
eastern redbud	Cercis canadensis	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	81
common persimmon	Diospyros virginiana	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	82
sweetgum	Liquidambar styraciflua	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	83
cucumber tree	Magnolia acuminata	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	84
bigleaf magnolia	Magnolia macrophylla	NSL	Low	0	0	0	New Habitat	Unknown	Medium	Absent	New Habitat	Unknown			0	85
southern red oak	Quercus falcata	WDL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			3	86
laurel oak	Quercus laurifolia	NDH	Medium	0	0	0	Unknown	New Habitat	Medium	Absent	Unknown	New Habitat			0	87
blackjack oak	Quercus marilandica	NSL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			3	88
post oak	Quercus stellata	WDH	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate ++	Migrate ++	3	89
live oak	Quercus virginiana	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	90
bluejack oak	Quercus incana	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	91
winged elm	Ulmus alata	WDL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate ++	3	92
cedar elm	Ulmus crassifolia	NDH	Medium	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat			0	93