

	sq. km	sq. mi	FIA Plots
Area of Region	31,254	12,067	561

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	23	25	Increase	18	21	Very Good	4	6	Likely	2	2
Hickory	4			Medium	37	59	No Change	14	15	Good	12	11	Infill	31	33
Maple	5	Abundant	5	Low	36	15	Decrease	34	30	Fair	13	18	Migrate	7	9
Oak	17	Common	16	FIA	11		New	21	23	Poor	20	14			
Pine	7	Rare	56				Unknown	20	18	Very Poor	17	17			
Other	41	Absent	28							FIA Only	4	4			
	77		105		107	99		107	107	Unknown	9	7			
											79	77			

Potential Changes in Climate Variables

Temperature (°F)

Scenario	2009	2039	2069	2099		
Annual	CCSM45	55.7	57.3	59.3	59.5	
Average	CCSM85	55.7	57.7	60.0	62.8	
	GFDL45	55.7	59.5	60.9	62.0	
	GFDL85	55.7	58.7	62.1	65.9	
	HAD45	55.7	57.9	61.0	62.4	
	HAD85	55.7	58.1	61.7	65.9	
Growing Season	CCSM45	71.2	72.9	74.5	74.8	
	CCSM85	71.2	73.0	75.4	78.7	
May—Sep	GFDL45	71.2	75.6	77.1	78.5	
	GFDL85	71.2	74.8	78.6	82.7	
	HAD45	71.2	73.7	76.5	78.1	
	HAD85	71.2	73.4	77.5	81.8	
Coldest Month	CCSM45	32.5	34.6	35.9	36.4	
	CCSM85	32.5	35.1	36.2	37.8	
Average	GFDL45	32.5	35.6	36.3	37.0	
	GFDL85	32.5	35.3	36.5	38.0	
	HAD45	32.5	33.7	35.8	36.1	
	HAD85	32.5	34.5	36.1	38.1	
Warmest Month	CCSM45	77.2	79.0	79.8	79.9	
	CCSM85	77.2	79.1	80.7	82.1	
Average	GFDL45	77.2	80.0	81.6	82.7	
	GFDL85	77.2	81.1	83.2	85.6	
	HAD45	77.2	80.0	81.5	82.3	
	HAD85	77.2	79.9	82.2	84.9	

Precipitation (in)

Scenario	2009	2039	2069	2099		
Annual	CCSM45	44.9	48.2	50.6	52.1	
Total	CCSM85	44.9	49.6	50.6	56.4	
	GFDL45	44.9	50.4	54.1	54.6	
	GFDL85	44.9	48.2	54.0	55.5	
	HAD45	44.9	47.9	49.2	48.0	
	HAD85	44.9	52.2	47.5	49.8	
Growing Season	CCSM45	19.9	24.0	24.8	26.0	
	CCSM85	19.9	23.7	24.0	26.6	
May—Sep	GFDL45	19.9	21.7	23.8	24.8	
	GFDL85	19.9	21.0	23.7	24.4	
	HAD45	19.9	21.9	20.7	18.9	
	HAD85	19.9	22.7	19.2	18.9	

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	73.5	1014.5	16.1	No change	No change	High	Abundant	Very Good	Very Good			1	1
loblolly pine	Pinus taeda	WDH	High	31.3	763.1	25.5	Lg. inc.	Lg. inc.	Medium	Abundant	Very Good	Very Good	Infill ++	Infill ++	1	2
sweetgum	Liquidambar styraciflua	WDH	High	57.4	740.4	14.2	Sm. inc.	Sm. inc.	Medium	Abundant	Very Good	Very Good			1	3
pitch pine	Pinus rigida	NSH	High	21.8	694.1	37.0	Lg. dec.	Lg. dec.	Medium	Abundant	Fair	Fair	Infill +	Infill +	0	4
white oak	Quercus alba	WDH	Medium	52.6	517.8	11.5	Sm. dec.	Sm. dec.	High	Abundant	Good	Good			1	5
yellow-poplar	Liriodendron tulipifera	WDH	High	37.9	402.3	11.2	Sm. dec.	Sm. dec.	High	Common	Fair	Fair			1	6
blackgum	Nyssa sylvatica	WDL	Medium	64.6	320.1	5.8	Sm. dec.	No change	High	Common	Fair	Good			1	7
American holly	Ilex opaca	NSL	Medium	40.2	234.9	6.1	No change	No change	Medium	Common	Fair	Fair			1	8
black cherry	Prunus serotina	WDL	Medium	36.9	193.5	6.5	No change	Sm. inc.	Low	Common	Poor	Fair			1	9
American beech	Fagus grandifolia	WDH	High	28.7	175.0	6.7	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor	Infill +	Infill +	0	10
scarlet oak	Quercus coccinea	WDL	Medium	34.9	174.7	6.2	Sm. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	11
black oak	Quercus velutina	WDH	High	30.8	159.7	6.0	Sm. inc.	No change	Medium	Common	Good	Fair			1	12
Virginia pine	Pinus virginiana	NDH	High	20.3	152.6	6.7	Sm. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	13
Atlantic white-cedar	Chamaecyparis thyoides	NSH	Low	6.8	117.1	18.3	Sm. dec.	Sm. dec.	Low	Common	Poor	Poor	Infill +	Infill +	0	14
southern red oak	Quercus falcata	WDL	Medium	30.4	113.4	4.4	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	15
sassafras	Sassafras albidum	WSL	Low	37.7	87.9	3.2	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	16
chestnut oak	Quercus prinus	NDH	High	14.9	77.6	7.9	Sm. dec.	Lg. dec.	High	Common	Fair	Fair	Infill +	Infill +	1	17
black locust	Robinia pseudoacacia	NDH	Low	11.9	69.6	7.6	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor	Infill +	Infill +	0	18
willow oak	Quercus phellos	NSL	Low	18.4	67.6	3.9	Sm. inc.	Lg. inc.	Medium	Common	Good	Very Good	Infill ++	Infill ++	1	19
eastern redcedar	Juniperus virginiana	WDH	Medium	10.7	57.9	6.9	Sm. dec.	No change	Medium	Common	Poor	Fair	Infill +	Infill +	1	20
mockernut hickory	Carya alba	WDL	Medium	12.1	53.9	4.8	No change	Sm. inc.	High	Common	Good	Very Good	Infill ++	Infill ++	1	21
white ash	Fraxinus americana	WDL	Medium	12.2	49.5	5.4	Lg. dec.	Lg. dec.	Low	Rare	Very Poor	Very Poor			0	22
northern red oak	Quercus rubra	WDH	Medium	21.1	47.8	3.5	No change	Sm. dec.	High	Rare	Fair	Poor	Infill +	Infill +	1	23
shortleaf pine	Pinus echinata	WDH	High	4.7	32.7	8.6	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	24
swamp chestnut oak	Quercus michauxii	NSL	Low	11.3	31.2	3.3	Sm. inc.	Sm. inc.	Medium	Rare	Fair	Fair	Infill +	Infill +	1	25
black walnut	Juglans nigra	WDH	Low	6.8	30.7	6.7	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	26
pignut hickory	Carya glabra	WDL	Medium	9.1	29.8	2.6	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	1	27
pin oak	Quercus palustris	NSH	Low	7.5	29.2	5.3	Sm. dec.	Sm. dec.	Low	Rare	Very Poor	Very Poor			2	28
cherrybark oak; swamp red o	Quercus pagoda	NSL	Medium	4.8	29.1	5.4	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	29
sweetbay	Magnolia virginiana	NSL	Medium	15.6	27.0	1.8	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	1	30
American hornbeam; muscle	Carpinus caroliniana	WSL	Low	10.5	22.8	2.3	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	1	31
green ash	Fraxinus pennsylvanica	WSH	Low	4.7	21.8	4.5	Sm. inc.	Sm. inc.	Medium	Rare	Fair	Fair	Infill +	Infill +	2	32
sycamore	Platanus occidentalis	NSL	Low	6.9	20.2	5.5	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	33
water oak	Quercus nigra	WDH	High	9.8	19.8	2.5	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	2	34
post oak	Quercus stellata	WDH	High	6.4	15.3	2.4	Sm. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	2	35
eastern white pine	Pinus strobus	WDH	High	3.9	13.8	3.8	Lg. dec.	Lg. dec.	Low	Rare	Very Poor	Very Poor			0	36
slippery elm	Ulmus rubra	WSL	Low	3.3	13.7	4.4	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			2	37
boxelder	Acer negundo	WSH	Low	7.1	12.5	2.5	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor	Infill +	Infill +	2	38
eastern cottonwood	Populus deltoides	NSH	Low	1.6	12.1	9.9	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			2	39
common persimmon	Diospyros virginiana	NSL	Low	9.1	12.0	1.8	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor	Infill +	Infill +	1	40
flowering dogwood	Cornus florida	WDL	Medium	6.4	10.0	1.4	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	1	41
bitternut hickory	Carya cordiformis	WDL	Low	1.6	10.0	4.4	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	2	42
sweet birch	Betula lenta	NDH	High	3.1	9.4	3.8	Lg. dec.	Lg. dec.	Low	Rare	Very Poor	Very Poor			2	43
river birch	Betula nigra	NSL	Low	4.1	8.8	2.9	No change	Sm. inc.	Medium	Rare	Poor	Fair	Infill +	Infill +	2	44
silver maple	Acer saccharinum	NSH	Low	2.2	7.7	7.7	Sm. dec.	No change	High	Rare	Poor	Fair	Infill +	Infill +	2	45
blackjack oak	Quercus marilandica	NSL	Medium	3.5	7.6	2.2	Sm. dec.	No change	High	Rare	Poor	Fair		Infill +	2	46
ailanthus	Ailanthus altissima	NSL	FIA	3.9	7.3	2.2	Unknown	Unknown	NA	Rare	NNIS	NNIS			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 elm	Ulmus americana	WDH	Medium	5.5	6.8	3.4	No change	Lg. inc.	Medium	Rare	Poor	Good	Infill +	Infill ++	2	48
bald cypress	Taxodium distichum	NSH	Medium	0.9	5.5	5.3	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	49
white mulberry	Morus alba	NSL	FIA	1.7	5.5	4.1	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	50
Norway maple	Acer platanoides	NSL	FIA	4.2	5.3	1.5	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	51
paulownia	Paulownia tomentosa	NSL	FIA	1.7	4.6	14.4	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	52
black willow	Salix nigra	NSH	Low	1.5	4.6	2.5	Lg. inc.	Lg. inc.	Low	Rare	Fair	Fair	Infill +	Infill +	2	53
bear oak; scrub oak	Quercus ilicifolia	NSLX	FIA	3.8	4.5	1.2	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	54
pawpaw	Asimina triloba	NSL	Low	2.7	3.8	1.4	Sm. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	55
wild plum	Prunus americana	NSLX	FIA	0.6	3.3	4.9	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	56
red mulberry	Morus rubra	NSL	Low	1	2.7	7.4	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	57
bigtooth aspen	Populus grandidentata	NSL	Medium	1.8	2.0	1.8	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	58
pond pine	Pinus serotina	NSH	Medium	0.3	1.7	5.3	Lg. inc.	Lg. inc.	Low	Rare	Fair	Fair	Infill +	Infill +	2	59
black ash	Fraxinus nigra	WSH	Medium	1.7	1.6	2.1	Sm. dec.	Sm. dec.	Low	Rare	Very Poor	Very Poor			0	60
gray birch	Betula populifolia	NSL	Low	3.1	1.6	1.3	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	61
hackberry	Celtis occidentalis	WDH	Medium	2.4	1.6	2.1	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	2	62
swamp white oak	Quercus bicolor	NSL	Low	1.8	1.3	1.5	Sm. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			2	63
sand hickory	Carya pallida	NSL	FIA	1.3	1.3	1.0	Unknown	Unknown	NA	Rare	FIA Only	FIA Only			0	64
overcup oak	Quercus lyrata	NSL	Medium	0.6	1.0	1.5	Lg. inc.	Lg. inc.	Low	Rare	Fair	Fair	Infill +	Infill +	2	65
sugar maple	Acer saccharum	WDH	High	1.5	0.9	2.7	Sm. inc.	No change	High	Rare	Good	Fair		Infill +	2	66
Scots pine	Pinus sylvestris	NSH	FIA	0.3	0.7	2.2	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	67
Norway spruce	Picea abies	NSH	FIA	2.6	0.6	3.8	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	68
Osage-orange	Maclura pomifera	NDH	Medium	0.6	0.4	2.2	Sm. dec.	Lg. inc.	High	Rare	Poor	Good			2	69
quaking aspen	Populus tremuloides	WDH	High	0.3	0.3	0.9	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	70
Siberian elm	Ulmus pumila	NDH	FIA	0.3	0.3	0.7	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	71
serviceberry	Amelanchier spp.	NSL	Low	0.3	0.2	0.6	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	72
yellow birch	Betula alleghaniensis	NDL	High	0.3	0.2	0.6	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	73
American chestnut	Castanea dentata	NSLX	FIA	0.3	0.2	0.5	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	74
laurel oak	Quercus laurifolia	NDH	Medium	1.3	0.1	1.3	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	75
eastern hemlock	Tsuga canadensis	NSH	High	0.5	0.1	0.3	Lg. dec.	Lg. dec.	Low	Rare	Very Poor	Very Poor			0	76
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	0.5	0.0	0.2	Lg. inc.	Lg. inc.	High	Rare	Good	Good			2	77
ashe juniper	Juniperus ashei	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	78
slash pine	Pinus elliotii	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	79
longleaf pine	Pinus palustris	NSH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate ++	Migrate ++	3	80
pond cypress	Taxodium ascendens	NSH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	81
striped maple	Acer pensylvanicum	NSL	Medium	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	82
mountain maple	Acer spicatum	NSL	Low	0	0	0	Unknown	Unknown	High	Absent	Unknown	Unknown			0	83
cittamwood/gum bumelia	Sideroxylon lanuginosum ssp.	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			0	84
water hickory	Carya aquatica	NSL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	85
pecan	Carya illinoensis	NSH	Low	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat		Migrate ++	3	86
shellbark hickory	Carya laciniosa	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	87
shagbark hickory	Carya ovata	WSL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Likely +	Likely +	3	88
black hickory	Carya texana	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	89
sugarberry	Celtis laevigata	NDL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	90
eastern redbud	Cercis canadensis	NSL	Low	0	0	0	Unknown	Unknown	Medium	Modeled	Unknown	Unknown			2	91
honeylocust	Gleditsia triacanthos	NSH	Low	0	0	0	Unknown	New Habitat	High	Absent	Unknown	New Habitat		Migrate +	3	92
loblolly-bay	Gordonia lasianthus	NSH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	93
cucumbertree	Magnolia acuminata	NSL	Low	0	0	0	Unknown	Unknown	Medium	Modeled	Unknown	Unknown			0	94

MidAtlantic 6

NIACS EVAS Region Climate Change Atlas Tree Species

USDA Forest Service
Northern Research Station
Landscape Change Research Group
Iverson, Peters, Prasad, Matthews

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
bigleaf magnolia	Magnolia macrophylla	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	95
water tupelo	Nyssa aquatica	NSH	Medium	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	96
swamp tupelo	Nyssa biflora	NDH	Medium	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat	Likely +	Likely +	3	97
sourwood	Oxydendrum arboreum	NDL	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate ++		3	98
redbay	Persea borbonia	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	99
water elm	Planera aquatica	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	100
pin cherry	Prunus pensylvanica	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	101
turkey oak	Quercus laevis	NSH	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate +	3	102
nuttall oak	Quercus texana	NSH	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			0	103
live oak	Quercus virginiana	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	104
bluejack oak	Quercus incana	NSL	Low	0	0	0	Unknown	New Habitat	Medium	Absent	Unknown	New Habitat			3	105
winged elm	Ulmus alata	WDL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	106
cedar elm	Ulmus crassifolia	NDH	Medium	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat			0	107