

	sq. km	sq. mi	FIA Plots
Area of Region	8,104.6	3,129.2	149

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	21	23	Increase	18	21	Very Good	7	9	Likely	4	4
Hickory	3			Medium	30	51	No Change	11	11	Good	13	13	Infill	27	29
Maple	4	Abundant	6	Low	34	12	Decrease	25	22	Fair	11	13	Migrate	6	10
Oak	13	Common	22	FIA	5		New	22	25	Poor	13	9			
Pine	4	Rare	31				Unknown	14	11	Very Poor	6	7			
Other	33	Absent	31							FIA Only	1	1			
	59		90		90	86		90	90	Unknown	9	6			
											60	58			

Potential Changes in Climate Variables

Temperature (°F)

	Scenario	2009	2039	2069	2099	
Annual Average	CCSM45	56.1	57.8	59.9	60.2	
	CCSM85	56.1	58.2	60.7	63.6	
	GFDL45	56.1	59.7	61.5	62.6	
	GFDL85	56.1	59.3	62.7	66.7	
	HAD45	56.1	58.6	61.9	63.3	
Growing Season (May—Sep)	CCSM45	71.7	73.4	75.2	75.7	
	CCSM85	71.7	73.7	76.3	79.9	
	GFDL45	71.7	75.8	77.9	79.5	
	GFDL85	71.7	75.6	79.5	83.8	
	HAD45	71.7	74.5	77.6	79.3	
Coldest Month (Average)	CCSM45	32.8	34.8	36.1	36.6	
	CCSM85	32.8	35.3	36.5	38.0	
	GFDL45	32.8	35.9	36.4	37.1	
	GFDL85	32.8	35.5	36.5	38.0	
	HAD45	32.8	34.4	36.4	36.6	
Warmest Month (Average)	CCSM45	77.5	79.5	80.4	80.6	
	CCSM85	77.5	79.6	81.5	82.9	
	GFDL45	77.5	80.5	82.1	83.5	
	GFDL85	77.5	81.9	84.0	86.6	
	HAD45	77.5	80.7	82.7	83.6	
HAD85	77.5	81.0	83.8	87.1		

Precipitation (in)

	Scenario	2009	2039	2069	2099	
Annual Total	CCSM45	43.0	46.7	49.6	50.1	
	CCSM85	43.0	47.6	48.8	56.0	
	GFDL45	43.0	48.1	51.7	52.4	
	GFDL85	43.0	44.9	51.6	52.7	
	HAD45	43.0	45.7	46.9	45.6	
Growing Season (May—Sep)	CCSM45	19.6	23.2	24.7	25.2	
	CCSM85	19.6	23.2	23.5	27.2	
	GFDL45	19.6	20.9	23.0	23.4	
	GFDL85	19.6	19.3	22.5	22.9	
	HAD45	19.6	21.6	20.3	18.8	
HAD85	19.6	22.1	18.6	19.7		

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>.

Piscataway Park

National Park 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
yellow-poplar	Liriodendron tulipifera	WDH	High	78.2	1128.0	15.8	Lg. dec.	Lg. dec.	High	Abundant	Good	Good	Infill ++	Infill ++	1	1
white oak	Quercus alba	WDH	Medium	61.4	893.1	14.4	Sm. dec.	Lg. dec.	High	Abundant	Good	Good	Infill ++	Infill ++	1	2
red maple	Acer rubrum	WDH	High	77.5	778.5	10.7	No change	No change	High	Abundant	Very Good	Very Good	Infill ++	Infill ++	1	3
sweetgum	Liquidambar styraciflua	WDH	High	54.6	748.8	13.7	Sm. inc.	Sm. inc.	Medium	Abundant	Very Good	Very Good	Infill ++	Infill ++	1	4
American beech	Fagus grandifolia	WDH	High	60.4	576.6	10.0	Lg. dec.	Lg. dec.	Medium	Abundant	Fair	Fair	Infill +	Infill +	0	5
Virginia pine	Pinus virginiana	NDH	High	50.3	507.5	9.8	Lg. dec.	Lg. dec.	Medium	Abundant	Fair	Fair	Infill +	Infill +	0	6
blackgum	Nyssa sylvatica	WDL	Medium	64.1	329.5	5.1	Sm. dec.	No change	High	Common	Fair	Good	Infill +	Infill ++	1	7
pignut hickory	Carya glabra	WDL	Medium	38.3	240.1	5.7	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor	Infill +	Infill +	0	8
southern red oak	Quercus falcata	WDL	Medium	35.4	237.8	6.1	Sm. inc.	Lg. inc.	High	Common	Very Good	Very Good	Infill ++	Infill ++	1	9
mockernut hickory	Carya alba	WDL	Medium	40.7	220.0	5.5	No change	No change	High	Common	Good	Good	Infill ++	Infill ++	1	10
eastern redcedar	Juniperus virginiana	WDH	Medium	27.3	183.3	7.3	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			2	11
American holly	Ilex opaca	NSL	Medium	41	180.8	3.5	No change	No change	Medium	Common	Fair	Fair	Infill +	Infill +	1	12
chestnut oak	Quercus prinus	NDH	High	24.6	174.9	10.6	Lg. dec.	Lg. dec.	High	Common	Fair	Fair	Infill +		1	13
northern red oak	Quercus rubra	WDH	Medium	37	156.8	4.9	Sm. dec.	Sm. dec.	High	Common	Fair	Fair	Infill +	Infill +	1	14
black oak	Quercus velutina	WDH	High	32.7	156.7	4.2	Sm. inc.	Sm. inc.	Medium	Common	Good	Good	Infill ++	Infill ++	1	15
scarlet oak	Quercus coccinea	WDL	Medium	34.8	131.3	4.3	Sm. dec.	Lg. dec.	Medium	Common	Poor	Poor	Infill +	Infill +	0	16
loblolly pine	Pinus taeda	WDH	High	8	117.8	8.0	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good	Infill ++	Infill ++	2	17
black locust	Robinia pseudoacacia	NDH	Low	26.5	96.6	6.7	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	18
white ash	Fraxinus americana	WDL	Medium	22.7	95.7	7.4	No change	No change	Low	Common	Poor	Poor	Infill +	Infill +	2	19
American elm	Ulmus americana	WDH	Medium	25.3	81.6	4.7	Sm. inc.	Lg. inc.	Medium	Common	Good	Very Good		Infill ++	2	20
sycamore	Platanus occidentalis	NSL	Low	22.6	78.1	7.1	Sm. inc.	Lg. inc.	Medium	Common	Good	Very Good	Infill ++	Infill ++	1	21
sassafras	Sassafras albidum	WSL	Low	25.9	71.9	4.0	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor	Infill +	Infill +	0	22
willow oak	Quercus phellos	NSL	Low	14.5	68.9	4.4	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good	Infill ++	Infill ++	2	23
eastern cottonwood	Populus deltoides	NSH	Low	1.2	68.7	55.7	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor			0	24
pin oak	Quercus palustris	NSH	Low	7.1	65.2	10.7	Sm. dec.	Sm. dec.	Low	Common	Poor	Poor			0	25
Norway spruce	Picea abies	NSH	FIA	1.2	61.7	50.0	Unknown	Unknown	NA	Common	NNIS	NNIS			0	26
green ash	Fraxinus pennsylvanica	WSH	Low	10.7	57.8	8.3	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			2	27
American hornbeam; musclev	Carpinus caroliniana	WSL	Low	31	52.5	1.8	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good	Infill ++	Infill ++	1	28
boxelder	Acer negundo	WDH	Low	13	45.5	4.7	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	2	29
post oak	Quercus stellata	WDH	High	5.5	40.8	5.8	Lg. inc.	Lg. inc.	High	Rare	Good	Good			2	30
black cherry	Prunus serotina	WDL	Medium	28.3	37.5	2.0	Lg. inc.	Lg. inc.	Low	Rare	Fair	Fair	Infill +	Infill +	1	31
bigtooth aspen	Populus grandidentata	NSL	Medium	6.2	33.2	5.4	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	32
bitternut hickory	Carya cordiformis	WSL	Low	4.9	33.0	6.7	No change	No change	High	Rare	Fair	Fair			0	33
black walnut	Juglans nigra	WDH	Low	11.1	31.2	2.8	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	34
flowering dogwood	Cornus florida	WDL	Medium	22.5	28.1	1.2	Sm. inc.	Sm. inc.	Medium	Rare	Fair	Fair	Infill +	Infill +	1	35
pawpaw	Asimina triloba	NSL	Low	9.3	27.5	2.7	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	36
slippery elm	Ulmus rubra	WSL	Low	8.7	27.3	3.8	No change	No change	Medium	Rare	Poor	Poor		Infill +	2	37
silver maple	Acer saccharinum	NSH	Low	2.5	22.5	9.1	Sm. dec.	No change	High	Rare	Poor	Fair			0	38
river birch	Betula nigra	NSL	Low	6.2	17.1	2.8	No change	Sm. inc.	Medium	Rare	Poor	Fair	Infill +	Infill +	2	39
hackberry	Celtis occidentalis	WDH	Medium	11.7	16.7	2.0	No change	No change	High	Rare	Fair	Fair			0	40
swamp chestnut oak	Quercus michauxii	NSL	Low	4.7	15.3	4.1	No change	Sm. inc.	Medium	Rare	Poor	Fair	Infill +	Infill +	2	41
cherrybark oak; swamp red o	Quercus pagoda	NSL	Medium	3.1	11.4	2.5	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	42
common persimmon	Diospyros virginiana	NSL	Low	12.7	11.3	1.3	Lg. inc.	Lg. inc.	High	Rare	Good	Good		Infill ++	2	43
shortleaf pine	Pinus echinata	WDH	High	3.7	10.4	2.8	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	44
sweet birch	Betula lenta	NDH	High	2.5	9.3	3.8	Lg. dec.	Lg. dec.	Low	Rare	Very Poor	Very Poor			0	45
ailanthus	Ailanthus altissima	NSL	FIA	7	6.8	2.2	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	46
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	1.2	5.8	4.7	Sm. inc.	Lg. inc.	High	Rare	Good	Good			2	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	
paulownia	Paulownia tomentosa	NSL	FIA	2.1	5.1	1.7	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	48	
red mulberry	Morus rubra	NSL	Low	1.2	2.9	2.4	Lg. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	49	
blackjack oak	Quercus marilandica	NSL	Medium	2.5	2.7	1.1	Sm. dec.	Lg. inc.	High	Rare	Poor	Good			2	50	
eastern redbud	Cercis canadensis	NSL	Low	1.2	2.3	1.9	Lg. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	51	
pitch pine	Pinus rigida	NSH	High	1.2	2.1	1.7	Very Lg. dec.	Very Lg. dec.	Medium	Rare	Lost	Lost			0	52	
serviceberry	Amelanchier spp.	NSL	Low	1.2	2.1	1.7	Very Lg. dec.	Lg. dec.	Medium	Rare	Lost	Very Poor			0	53	
eastern hemlock	Tsuga canadensis	NSH	High	1.2	1.7	1.4	Very Lg. dec.	Very Lg. dec.	Low	Rare	Lost	Lost			0	54	
Norway maple	Acer platanoides	NSL	FIA	4.9	1.6	5.2	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	55	
quaking aspen	Populus tremuloides	WDH	High	1.2	1.2	0.9	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	56	
swamp white oak	Quercus bicolor	NSL	Low	1	1.0	0.7	Very Lg. dec.	Very Lg. dec.	Medium	Rare	Lost	Lost			0	57	
American chestnut	Castanea dentata	NSLX	FIA	1.2	0.6	0.5	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	58	
winged elm	Ulmus alata	WDL	Medium	1.2	0.3	0.3	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	59	
slash pine	Pinus elliotii	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate ++	3	60	
longleaf pine	Pinus palustris	NSH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate ++	3	61	
bald cypress	Taxodium distichum	NSH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	Migrate ++	3	62
florida maple	Acer barbatum	NSL	Low	0	0	0	Unknown	New Habitat	High	Absent	Unknown	New Habitat			3	63	
sugar maple	Acer saccharum	WDH	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate ++	3	64	
mountain maple	Acer spicatum	NSL	Low	0	0	0	Unknown	Unknown	High	Absent	Unknown	Unknown			0	65	
yellow birch	Betula alleghaniensis	NDL	High	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	66	
cittamwood/gum bumelia	Sideroxylon lanuginosum ssp.	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			0	67	
water hickory	Carya aquatica	NSL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	68	
pecan	Carya illinoensis	NSH	Low	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat		Migrate +	3	69	
shellbark hickory	Carya laciniosa	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	70	
shagbark hickory	Carya ovata	WSL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	71	
black hickory	Carya texana	NDL	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	72	
sugarberry	Celtis laevigata	NDH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	73	
black ash	Fraxinus nigra	WSH	Medium	0	0	0	Unknown	Unknown	Low	Absent	Unknown	Unknown			0	74	
honeylocust	Gleditsia triacanthos	NSH	Low	0	0	0	Unknown	New Habitat	High	Absent	Unknown	New Habitat			3	75	
cucumber tree	Magnolia acuminata	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	76	
sweetbay	Magnolia virginiana	NSL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Likely +	Likely +	3	77
water tupelo	Nyssa aquatica	NSH	Medium	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat		Migrate +	Migrate +	3	78
swamp tupelo	Nyssa biflora	NDH	Medium	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat		Likely +	Likely +	3	79
sourwood	Oxydendrum arboreum	NDL	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Likely +	Likely +	3	80
redbay	Persea borbonia	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate +	Migrate +	3	81
water elm	Planera aquatica	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	82	
pin cherry	Prunus pensylvanica	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	83	
laurel oak	Quercus laurifolia	NDH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	Migrate +	3	84
overcup oak	Quercus lyrata	NSL	Medium	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat		Migrate +	3	85	
water oak	Quercus nigra	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate ++	Migrate ++	3	86
live oak	Quercus virginiana	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	87	
bluejack oak	Quercus incana	NSL	Low	0	0	0	Unknown	New Habitat	Medium	Absent	Unknown	New Habitat			3	88	
black willow	Salix nigra	NSH	Low	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat		Likely +	Likely +	3	89
cedar elm	Ulmus crassifolia	NDH	Medium	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat			0	90	