

	sq. km	sq. mi	FIA Plots
Area of Region	43,104	16,643	829

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	4	11	Increase	2	3	Very Good	0	0
Hickory	3			Medium	18	24	No Change	11	10	Good	5	6
Maple	1	Abundant	2	Low	17	7	Decrease	17	17	Fair	4	3
Oak	11	Common	3	FIA	4		New	0	0	Poor	8	8
Pine	0	Rare	29				Unknown	13	13	Very Poor	13	13
Other	16	Absent	9							FIA Only	4	4
	34		43		43	42		43	43	Unknown	9	9
											6	5

Potential Changes in Climate Variables

Temperature (°F)

	Scenario	2009	2039	2069	2099	
Annual Average	CCSM45	65.7	67.1	68.4	69.2	
	CCSM85	65.7	67.7	69.7	72.1	
	GFDL45	65.7	69.7	70.0	71.7	
	GFDL85	65.7	68.5	71.7	75.4	
	HAD45	65.7	67.8	70.2	71.0	
HAD85	65.7	68.4	71.7	74.6		
Growing Season (May—Sep)	CCSM45	78.6	79.8	81.0	81.7	
	CCSM85	78.6	80.6	82.5	85.3	
	GFDL45	78.6	83.4	83.8	86.3	
	GFDL85	78.6	82.4	85.9	90.6	
	HAD45	78.6	80.7	82.6	83.1	
HAD85	78.6	81.3	84.7	87.4		
Coldest Month (Average)	CCSM45	46.1	48.4	49.0	49.4	
	CCSM85	46.1	48.2	49.1	50.5	
	GFDL45	46.1	49.6	49.6	49.7	
	GFDL85	46.1	47.3	48.3	48.7	
	HAD45	46.1	46.8	48.3	48.7	
HAD85	46.1	49.4	50.8	52.3		
Warmest Month (Average)	CCSM45	82.9	84.0	84.9	85.0	
	CCSM85	82.9	84.9	85.6	87.0	
	GFDL45	82.9	87.7	88.1	89.5	
	GFDL85	82.9	88.0	89.5	92.7	
	HAD45	82.9	85.2	86.1	86.5	
HAD85	82.9	85.9	87.7	88.8		

Precipitation (in)

	Scenario	2009	2039	2069	2099	
Annual Total	CCSM45	29.8	32.5	32.6	29.4	
	CCSM85	29.8	30.3	32.9	31.9	
	GFDL45	29.8	28.3	33.1	26.2	
	GFDL85	29.8	27.8	29.3	27.3	
	HAD45	29.8	31.0	29.5	32.2	
HAD85	29.8	29.7	27.4	30.3		
Growing Season (May—Sep)	CCSM45	14.6	17.2	16.1	15.1	
	CCSM85	14.6	15.8	16.1	15.1	
	GFDL45	14.6	14.0	16.9	13.0	
	GFDL85	14.6	14.1	14.6	13.4	
	HAD45	14.6	14.4	14.3	16.3	
HAD85	14.6	14.2	13.0	14.6		

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>.

Section 315D

EcoMap 2007

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
ashe juniper	Juniperus ashei	NDH	High	82.4	2822.6	47.6	No change	No change	Medium	Abundant	Good	Good			0	1
live oak	Quercus virginiana	NDH	High	82.4	2309.5	38.0	No change	No change	Medium	Abundant	Good	Good			1	2
cedar elm	Ulmus crassifolia	NDH	Medium	27.3	170.4	9.6	Lg. inc.	Lg. inc.	Low	Common	Good	Good			1	3
post oak	Quercus stellata	WDH	High	15.7	137.9	14.4	No change	No change	High	Common	Good	Good			1	4
sugarberry	Celtis laevigata	NDH	Medium	15.6	53.0	5.7	No change	No change	Medium	Common	Fair	Fair			1	5
black walnut	Juglans nigra	WDH	Low	4.7	30.7	9.5	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	6
pecan	Carya illinoensis	NSH	Low	6.3	23.7	6.5	No change	No change	Low	Rare	Very Poor	Very Poor			0	7
black cherry	Prunus serotina	WDL	Medium	8	23.2	4.9	Sm. dec.	Sm. dec.	Low	Rare	Very Poor	Very Poor			0	8
cittamwood/gum bumelia	Sideroxylon lanuginosum ssp.	NSL	Low	9.7	18.2	3.2	Sm. inc.	Sm. inc.	High	Rare	Good	Good			1	9
hackberry	Celtis occidentalis	WDH	Medium	7.1	14.9	2.5	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	2	10
blackjack oak	Quercus marilandica	NSL	Medium	5.7	12.8	4.8	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	1	11
bald cypress	Taxodium distichum	NSH	Medium	0.2	7.7	33.3	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	12
sycamore	Platanus occidentalis	NSL	Low	0.7	7.0	10.1	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			2	13
southern red oak	Quercus falcata	WDL	Medium	2.2	4.9	7.6	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor			0	14
white ash	Fraxinus americana	WDL	Medium	0.5	4.5	9.6	Sm. dec.	Sm. dec.	Low	Rare	Very Poor	Very Poor			0	15
Texas ash	Fraxinus texensis	NDH	FIA	1.2	4.0	3.5	Unknown	Unknown	NA	Rare	FIA Only	FIA Only			0	16
American elm	Ulmus americana	WDH	Medium	2.9	3.2	2.8	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			2	17
eastern redcedar	Juniperus virginiana	WDH	Medium	0.8	2.9	4.1	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	18
black hickory	Carya texana	NDL	High	1.7	2.2	2.4	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	19
Shumard oak	Quercus shumardii	NSL	Low	0.5	2.2	1.5	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor			0	20
durand oak	Quercus sinuata var. sinuata	NSL	FIA	2	2.2	1.9	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	21
swamp chestnut oak	Quercus michauxii	NSL	Low	0.2	1.8	7.9	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	22
pin oak	Quercus palustris	NSH	Low	0.5	1.1	2.3	Sm. dec.	Sm. dec.	Low	Rare	Very Poor	Very Poor			0	23
green ash	Fraxinus pennsylvanica	WSH	Low	0.3	1.0	1.1	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	24
bear oak; scrub oak	Quercus ilicifolia	NSLX	FIA	0.5	1.0	2.3	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	25
Nuttall oak	Quercus texana	NSH	Medium	0.2	0.9	4.0	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor			0	26
winged elm	Ulmus alata	WDL	Medium	0.2	0.8	3.6	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	27
Osage-orange	Maclura pomifera	NDH	Medium	0.2	0.7	3.1	No change	Sm. inc.	High	Rare	Fair	Good	Infill +		2	28
pignut hickory	Carya glabra	WDL	Medium	1.2	0.7	3.2	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	29
boxelder	Acer negundo	WSH	Low	0.2	0.5	1.8	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor			0	30
slippery elm	Ulmus rubra	WSL	Low	0.2	0.5	2.1	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	31
eastern redbud	Cercis canadensis	NSL	Low	0.2	0.4	1.9	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	32
wild plum	Prunus americana	NSLX	FIA	0.2	0.4	1.6	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	33
bur oak	Quercus macrocarpa	NDH	Medium	0.1	0.1	0.2	Sm. dec.	Lg. dec.	High	Rare	Poor	Poor			0	34
Ohio buckeye	Aesculus glabra	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	35
American hornbeam; muscle	Carpinus caroliniana	WSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	36
shellbark hickory	Carya laciniosa	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	37
shagbark hickory	Carya ovata	WSL	Medium	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	38
flowering dogwood	Cornus florida	WDL	Medium	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	39
blue ash	Fraxinus quadrangulata	NSL	Low	0	0	0	Unknown	Unknown	Low	Absent	Unknown	Unknown			0	40
cucumbertree	Magnolia acuminata	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	41
northern red oak	Quercus rubra	WDH	Medium	0	0	0	Unknown	Unknown	High	Absent	Unknown	Unknown			0	42
American mountain-ash	Sorbus americana	NSL	Low	0	0	0	Unknown	Unknown	Low	Absent	Unknown	Unknown			0	43

