

One x One Degree
Climate Change Atlas Tree Species
 Current and Potential Future Habitat, Capability, and Migration

	sq. km	sq. mi	FIA Plots
Area of Region	8,837.4	3,412.1	17

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	1	10	Increase	3	4	Very Good	0	0
Hickory	0			Medium	9	8	No Change	5	4	Good	1	2
Maple	2	Abundant	0	Low	10	2	Decrease	7	7	Fair	6	6
Oak	3	Common	2	FIA	1		New	5	5	Poor	5	4
Pine	0	Rare	14				Unknown	1	1	Very Poor	3	3
Other	9	Absent	5							FIA Only	0	0
	16		21		21	20		21	21	Unknown	0	0
											9	11
											15	15

Potential Changes in Climate Variables

Temperature (°F)

	Scenario	2009	2039	2069	2099	
Annual Average	CCSM45	44.7	46.7	49.5	50.0	
	CCSM85	44.7	47.5	50.6	54.0	
	GFDL45	44.7	51.2	49.8	51.2	
	GFDL85	44.7	47.8	51.0	55.8	
	HAD45	44.7	47.6	51.4	53.2	
Growing Season (May—Sep)	CCSM45	65.7	67.9	70.5	71.1	
	CCSM85	65.7	68.7	71.6	75.9	
	GFDL45	65.7	73.7	71.9	73.7	
	GFDL85	65.7	69.4	73.1	78.6	
	HAD45	65.7	68.4	71.4	73.3	
Coldest Month Average	CCSM45	11.5	13.7	16.0	16.7	
	CCSM85	11.5	13.6	15.7	18.0	
	GFDL45	11.5	15.1	16.3	16.7	
	GFDL85	11.5	14.9	16.6	19.2	
	HAD45	11.5	13.5	17.4	17.2	
Warmest Month Average	CCSM45	72.1	74.8	76.4	77.1	
	CCSM85	72.1	76.3	78.1	80.9	
	GFDL45	72.1	75.4	76.9	78.3	
	GFDL85	72.1	76.1	77.8	81.4	
	HAD45	72.1	74.7	76.4	77.7	

Precipitation (in)

	Scenario	2009	2039	2069	2099	
Annual Total	CCSM45	27.7	28.7	28.3	27.9	
	CCSM85	27.7	28.0	27.7	28.3	
	GFDL45	27.7	31.1	33.6	31.0	
	GFDL85	27.7	31.5	34.1	33.0	
	HAD45	27.7	31.0	29.5	29.9	
Growing Season (May—Sep)	CCSM45	17.5	17.4	16.8	16.3	
	CCSM85	17.5	16.7	15.7	15.4	
	GFDL45	17.5	19.8	21.0	18.6	
	GFDL85	17.5	20.2	20.5	19.0	
	HAD45	17.5	18.3	17.0	16.7	

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>.

One x One Degree
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
green ash	Fraxinus pennsylvanica	WSH	Low	42.1	144.4	21.8	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor	Infill +	Infill +	2	1
boxelder	Acer negundo	WSH	Low	40	116.7	29.2	Lg. dec.	Lg. dec.	High	Common	Fair	Fair	Infill +	Infill +	2	2
eastern redcedar	Juniperus virginiana	WDH	Medium	13.6	38.9	45.8	No change	Sm. inc.	Medium	Rare	Poor	Fair	Infill +	Infill +	2	3
hackberry	Celtis occidentalis	WDH	Medium	10.4	24.5	28.3	Sm. dec.	No change	High	Rare	Poor	Fair	Infill +	Infill +	2	4
American elm	Ulmus americana	WDH	Medium	17.4	23.1	7.7	Sm. inc.	Lg. inc.	Medium	Rare	Fair	Good	Infill +		2	5
silver maple	Acer saccharinum	NSH	Low	6.9	22.3	8.6	No change	Sm. dec.	High	Rare	Fair	Poor	Infill +	Infill +	2	6
bur oak	Quercus macrocarpa	NDH	Medium	15.1	17.7	9.8	Lg. inc.	Lg. inc.	High	Rare	Good	Good			2	7
eastern cottonwood	Populus deltoides	NSH	Low	6.2	16.6	7.2	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	8
black willow	Salix nigra	NSH	Low	1.6	10.0	0.8	Sm. dec.	Sm. dec.	Low	Rare	Very Poor	Very Poor			0	9
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	4.5	6.9	24.4	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	2	10
slippery elm	Ulmus rubra	WSL	Low	9.2	6.5	7.4	Lg. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	11
Siberian elm	Ulmus pumila	NDH	FIA	1.5	5.4	6.3	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	12
black ash	Fraxinus nigra	WSH	Medium	4.5	2.9	10.2	Lg. dec.	Lg. dec.	Low	Rare	Very Poor	Very Poor			0	13
American basswood	Tilia americana	WSL	Medium	9.1	2.8	5.0	Sm. inc.	Sm. inc.	Medium	Rare	Fair	Fair	Infill +	Infill +	2	14
white oak	Quercus alba	WDH	Medium	4.5	2.4	8.3	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor			0	15
northern red oak	Quercus rubra	WDH	Medium	4.5	2.3	8.2	No change	No change	High	Rare	Fair	Fair		Infill +	2	16
honeylocust	Gleditsia triacanthos	NSH	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate +	3	17
black walnut	Juglans nigra	WDH	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	18
Osage-orange	Maclura pomifera	NDH	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			3	19
red mulberry	Morus rubra	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	20
post oak	Quercus stellata	WDH	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			0	21