

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

Area of Region sq. km sq. mi FIA Plots
 8,985.5 3,469.3 14

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	4	13	Increase	4	5	Very Good	0	0	Likely	2	2
Hickory	1			Medium	12	17	No Change	8	5	Good	3	4	Infill	11	9
Maple	2	Abundant	0	Low	15	4	Decrease	8	10	Fair	6	3	Migrate	4	6
Oak	4	Common	1	FIA	3		New	11	11	Poor	5	7			
Pine	0	Rare	22				Unknown	3	3	Very Poor	4	4			
Other	14	Absent	11							FIA Only	3	3			
	23		34		34	34		34	34	Unknown	0	0			
											21	21			

Potential Changes in Climate Variables

Temperature (°F)

Scenario	2009	2039	2069	2099		
Annual	CCSM45	45.4	47.3	50.2	50.6	
Average	CCSM85	45.4	48.1	51.1	54.5	
	GFDL45	45.4	52.0	50.7	52.0	
	GFDL85	45.4	48.5	51.8	56.5	
	HAD45	45.4	48.2	51.8	53.7	
	HAD85	45.4	48.8	53.3	58.2	
Growing Season	CCSM45	65.9	68.0	70.6	71.1	
	CCSM85	65.9	68.9	71.6	75.8	
May—Sep	GFDL45	65.9	74.1	72.1	74.1	
	GFDL85	65.9	69.7	73.4	79.1	
	HAD45	65.9	68.5	71.4	73.5	
	HAD85	65.9	69.1	73.6	78.2	
Coldest Month	CCSM45	12.6	14.7	17.2	17.8	
	CCSM85	12.6	15.3	17.3	19.6	
Average	GFDL45	12.6	16.3	17.7	18.0	
	GFDL85	12.6	16.3	18.0	20.2	
	HAD45	12.6	14.3	18.4	18.4	
	HAD85	12.6	17.6	21.4	24.4	
Warmest Month	CCSM45	72.1	74.6	76.3	77.0	
	CCSM85	72.1	76.3	78.1	80.6	
Average	GFDL45	72.1	75.2	76.7	78.2	
	GFDL85	72.1	76.1	77.9	81.8	
	HAD45	72.1	74.8	76.7	77.8	
	HAD85	72.1	76.3	78.8	82.0	

Precipitation (in)

Scenario	2009	2039	2069	2099		
Annual	CCSM45	33.3	33.6	33.1	32.8	
Total	CCSM85	33.3	32.7	33.8	33.9	
	GFDL45	33.3	36.7	39.7	37.3	
	GFDL85	33.3	37.1	39.6	38.6	
	HAD45	33.3	35.8	35.5	35.0	
	HAD85	33.3	34.4	34.9	37.6	
Growing Season	CCSM45	21.2	20.9	20.0	20.3	
	CCSM85	21.2	19.9	19.9	19.1	
May—Sep	GFDL45	21.2	23.3	25.0	22.4	
	GFDL85	21.2	23.7	24.0	22.5	
	HAD45	21.2	22.0	20.8	20.6	
	HAD85	21.2	20.5	19.6	19.8	

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
bur oak	Quercus macrocarpa	NDH	Medium	30.6	126.7	39.0	Sm. dec.	Lg. dec.	High	Common	Fair	Fair	Infill +	Infill +	2	1
boxelder	Acer negundo	WDH	Low	16.8	43.4	22.1	No change	Sm. dec.	High	Rare	Fair	Poor	Infill +	Infill +	2	2
black walnut	Juglans nigra	WDH	Low	10.4	41.6	29.6	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			2	3
green ash	Fraxinus pennsylvanica	WSH	Low	12.7	33.2	17.7	Sm. inc.	Sm. inc.	Medium	Rare	Fair	Fair	Infill +	Infill +	2	4
silver maple	Acer saccharinum	NSH	Low	4.4	26.6	11.1	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor	Infill +	Infill +	2	5
American elm	Ulmus americana	WDH	Medium	20.5	19.6	5.8	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	6
eastern cottonwood	Populus deltoides	NSH	Low	7.2	19.4	27.5	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	7
American basswood	Tilia americana	WSL	Medium	4.4	19.1	6.2	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	8
hackberry	Celtis occidentalis	WDH	Medium	10.6	18.9	12.7	Sm. inc.	Sm. inc.	High	Rare	Good	Good			2	9
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	0.3	18.2	4.8	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor	Infill +	Infill +	2	10
black cherry	Prunus serotina	WDL	Medium	21.5	18.0	9.3	No change	Sm. dec.	Low	Rare	Very Poor	Very Poor			2	11
slippery elm	Ulmus rubra	WSL	Low	6.8	8.5	7.4	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	12
quaking aspen	Populus tremuloides	WDH	High	2.7	5.5	12.1	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	13
white oak	Quercus alba	WDH	Medium	3.3	4.8	12.8	No change	Sm. dec.	High	Rare	Fair	Poor	Infill +		2	14
white ash	Fraxinus americana	WDL	Medium	0.3	4.3	1.0	Sm. dec.	No change	Low	Rare	Very Poor	Very Poor			2	15
wild plum	Prunus americana	NSLX	FIA	6.6	2.4	3.2	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	16
northern red oak	Quercus rubra	WDH	Medium	3.3	1.4	3.7	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	2	17
northern pin oak	Quercus ellipsoidalis	NSH	Medium	4.5	1.3	4.7	Very Lg. dec.	Very Lg. dec.	High	Rare	Lost	Lost			0	18
serviceberry	Amelanchier spp.	NSL	Low	3.3	1.2	3.2	Very Lg. dec.	Very Lg. dec.	Medium	Rare	Lost	Lost			0	19
peachleaf willow	Salix amygdaloides	NSLX	FIA	3.9	1.2	3.7	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	20
chokecherry	Prunus virginiana	NSLX	FIA	4.5	0.6	2.3	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	21
bitternut hickory	Carya cordiformis	WSL	Low	2.1	0.6	0.9	No change	Sm. inc.	High	Rare	Fair	Good	Infill +		2	22
red mulberry	Morus rubra	NSL	Low	2.1	0.4	0.7	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	23
eastern redcedar	Juniperus virginiana	WDH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate ++	Migrate ++	3	24
sugar maple	Acer saccharum	WDH	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Likely +	Likely +	3	25
pecan	Carya illinoensis	NSH	Low	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat			3	26
shagbark hickory	Carya ovata	WSL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	27
honeylocust	Gleditsia triacanthos	NSH	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	28
Osage-orange	Maclura pomifera	NDH	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate +	3	29
sycamore	Platanus occidentalis	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	30
post oak	Quercus stellata	WDH	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			3	31
black oak	Quercus velutina	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	32
black locust	Robinia pseudoacacia	NDH	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	33
black willow	Salix nigra	NSH	Low	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat	Likely +	Likely +	3	34