

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
 1,869.0 721.6 67

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	19	17	Increase	12	12	Very Good	4	4	Likely	0	0
Hickory	0			Medium	23	31	No Change	6	4	Good	10	9	Infill	7	5
Maple	3	Abundant	9	Low	16	11	Decrease	10	12	Fair	8	9	Migrate	7	13
Oak	1	Common	11	FIA	1		New	28	30	Poor	4	3		14	18
Pine	3	Rare	9				Unknown	3	1	Very Poor	1	2			
Other	19	Absent	30					59	59	FIA Only	1	1			
	29		59		59	59				Unknown	2	0			
											30	28			

Potential Changes in Climate Variables

Temperature (°F)

Scenario	2009	2039	2069	2099		
Annual	CCSM45	41.6	43.1	46.2	46.2	
Average	CCSM85	41.6	44.0	47.2	50.8	
	GFDL45	41.6	45.3	48.1	49.7	
	GFDL85	41.6	45.3	49.3	54.9	
	HAD45	41.6	45.2	48.4	50.5	
	HAD85	41.6	45.4	49.5	55.8	
Growing Season	CCSM45	59.6	60.9	63.2	63.3	
	CCSM85	59.6	61.5	64.1	67.8	
May—Sep	GFDL45	59.6	64.7	68.4	70.7	
	GFDL85	59.6	64.8	69.6	76.3	
	HAD45	59.6	62.6	64.8	67.3	
	HAD85	59.6	62.5	66.2	71.8	
Coldest Month	CCSM45	14.7	16.2	18.8	18.2	
	CCSM85	14.7	16.6	19.0	21.6	
Average	GFDL45	14.7	16.6	18.8	19.3	
	GFDL85	14.7	17.9	19.8	22.8	
	HAD45	14.7	17.4	21.6	21.6	
	HAD85	14.7	20.0	22.7	27.7	
Warmest Month	CCSM45	66.3	67.9	69.3	69.5	
	CCSM85	66.3	68.7	70.4	72.3	
Average	GFDL45	66.3	71.2	73.1	74.7	
	GFDL85	66.3	71.8	74.3	77.2	
	HAD45	66.3	69.5	70.3	72.3	
	HAD85	66.3	69.5	71.4	75.1	

Precipitation (in)

Scenario	2009	2039	2069	2099		
Annual	CCSM45	29.6	31.1	32.1	30.7	
Total	CCSM85	29.6	29.1	30.5	30.8	
	GFDL45	29.6	32.1	33.8	33.5	
	GFDL85	29.6	31.9	35.1	36.0	
	HAD45	29.6	31.6	32.9	32.0	
	HAD85	29.6	31.8	33.7	35.1	
Growing Season	CCSM45	13.4	14.1	13.3	12.9	
	CCSM85	13.4	12.6	12.8	11.8	
May—Sep	GFDL45	13.4	14.4	14.7	14.7	
	GFDL85	13.4	14.7	15.9	15.0	
	HAD45	13.4	13.4	13.0	12.1	
	HAD85	13.4	13.5	12.4	12.5	

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
sugar maple	Acer saccharum	WDH	High	90.6	3137.4	15.9	Sm. dec.	Sm. dec.	High	Abundant	Good	Good			1	1
red maple	Acer rubrum	WDH	High	83.4	2026.8	12.5	No change	No change	High	Abundant	Very Good	Very Good			1	2
northern white-cedar	Thuja occidentalis	WSH	High	69.6	1344.7	7.7	No change	Sm. dec.	Medium	Abundant	Good	Fair			1	3
balsam fir	Abies balsamea	NDH	High	81.2	1146.5	6.3	Sm. dec.	Sm. dec.	Low	Abundant	Fair	Fair			0	4
quaking aspen	Populus tremuloides	WDH	High	59.2	1130.5	5.6	No change	No change	Medium	Abundant	Good	Good			1	5
paper birch	Betula papyrifera	WDH	High	70.6	956.2	4.8	Sm. dec.	Sm. dec.	Medium	Abundant	Fair	Fair			0	6
yellow birch	Betula alleghaniensis	NDL	High	74.7	899.3	5.0	Sm. dec.	Sm. dec.	Medium	Abundant	Fair	Fair			0	7
eastern hemlock	Tsuga canadensis	NSH	High	39.2	778.2	8.6	No change	No change	Low	Abundant	Fair	Fair			0	8
white spruce	Picea glauca	NSL	Medium	70.1	658.7	3.5	Sm. dec.	Lg. dec.	Medium	Abundant	Fair	Fair			0	9
black spruce	Picea mariana	NSH	High	22.1	400.4	3.0	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor			0	10
northern red oak	Quercus rubra	WDH	Medium	57	357.0	4.5	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	11
eastern white pine	Pinus strobus	WDH	High	25.1	268.9	6.0	Lg. inc.	Lg. inc.	Low	Common	Good	Good			1	12
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	45.2	200.9	1.9	No change	No change	High	Common	Good	Good			1	13
white ash	Fraxinus americana	WDL	Medium	19.9	179.9	4.6	Lg. inc.	Lg. inc.	Low	Common	Good	Good			1	14
American basswood	Tilia americana	WSL	Medium	32.4	163.6	1.7	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	15
red pine	Pinus resinosa	NSH	Medium	6.6	134.5	10.3	Sm. inc.	Sm. inc.	Low	Common	Fair	Fair	Infill +	Infill +	1	16
chokecherry	Prunus virginiana	NSLX	FIA	17.9	100.6	4.5	Unknown	Unknown	Medium	Common	FIA Only	FIA Only			0	17
black ash	Fraxinus nigra	WSH	Medium	24.2	93.3	1.4	Lg. inc.	Lg. inc.	Low	Common	Good	Good			1	18
serviceberry	Amelanchier spp.	NSL	Low	17.7	52.9	2.1	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	19
bigtooth aspen	Populus grandidentata	NSL	Medium	10.6	50.9	2.4	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	20
jack pine	Pinus banksiana	NSH	Medium	0.6	34.6	0.7	Sm. inc.	Sm. inc.	High	Rare	Good	Good			2	21
balsam poplar	Populus balsamifera	NSH	Medium	5.1	33.6	1.6	No change	Sm. dec.	Medium	Rare	Poor	Very Poor	Infill +		2	22
American mountain-ash	Sorbus americana	NSL	Low	17.9	22.2	0.6	Lg. dec.	Lg. dec.	Low	Rare	Very Poor	Very Poor			0	23
tamarack (native)	Larix laricina	NSH	High	8.5	21.6	1.6	Lg. inc.	Lg. inc.	Low	Rare	Fair	Fair	Infill +	Infill +	1	24
green ash	Fraxinus pennsylvanica	WSH	Low	14.6	21.6	1.1	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	1	25
black cherry	Prunus serotina	WDL	Medium	4.9	21.2	0.9	Lg. inc.	Lg. inc.	Low	Rare	Fair	Fair	Infill +	Infill +	1	26
mountain maple	Acer spicatum	NSL	Low	14	9.3	0.3	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor	Infill +		1	27
pin cherry	Prunus pensylvanica	NSL	Low	2.9	6.2	0.6	Very Lg. dec.	Very Lg. dec.	Medium	Rare	Lost	Lost			0	28
American elm	Ulmus americana	WDH	Medium	5.7	5.2	0.3	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	2	29
ashe juniper	Juniperus ashei	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	30
eastern redcedar	Juniperus virginiana	WDH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate ++	3	31
boxelder	Acer negundo	WSH	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	32
silver maple	Acer saccharinum	NSH	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate +	3	33
sweet birch	Betula lenta	NDH	High	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat			0	34
American hornbeam; muscle	Carpinus caroliniana	WSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	35
bitternut hickory	Carya cordiformis	WSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate +	3	36
pignut hickory	Carya glabra	WDL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	37
shagbark hickory	Carya ovata	WSL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	38
mockernut hickory	Carya alba	WDL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			0	39
flowering dogwood	Cornus florida	WDL	Medium	0	0	0	Unknown	New Habitat	Medium	Absent	Unknown	New Habitat			0	40
American beech	Fagus grandifolia	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	41
black walnut	Juglans nigra	WDH	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	42
yellow-poplar	Liriodendron tulipifera	WDH	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			0	43
blackgum	Nyssa sylvatica	WDL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			0	44
sycamore	Platanus occidentalis	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	45
eastern cottonwood	Populus deltoides	NSH	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	46
white oak	Quercus alba	WDH	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate ++	Migrate ++	3	47

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
swamp white oak	Quercus bicolor	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	48
scarlet oak	Quercus coccinea	WDL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	49
northern pin oak	Quercus ellipsoidalis	NSH	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	50
bur oak	Quercus macrocarpa	NDH	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			3	51
chinkapin oak	Quercus muehlenbergii	NSL	Medium	0	0	0	Unknown	New Habitat	Medium	Absent	Unknown	New Habitat			0	52
chestnut oak	Quercus prinus	NDH	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			0	53
post oak	Quercus stellata	WDH	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			0	54
black oak	Quercus velutina	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate ++	Migrate ++	3	55
live oak	Quercus virginiana	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	56
black locust	Robinia pseudoacacia	NDH	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	57
sassafras	Sassafras albidum	WSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	58
cedar elm	Ulmus crassifolia	NDH	Medium	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat			0	59