

**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    335

**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		
		High	Low	Reliability	Adaptability	Scenario RCP45	Scenario RCP85	Scenario RCP45	Scenario RCP85	SHIFT RCP45	SHIFT RCP85	
Ash	3					Increase	12	15	Very Good	3	3	
Hickory	2					No Change	5	5	Good	9	12	
Maple	5	Abundant	10	High	22	16	Decrease	21	18	Fair	9	10
Oak	4	Common	8	Medium	20	39	New	19	21	Poor	7	4
Pine	2	Rare	23	Low	23	12	Unknown	11	9	Very Poor	7	6
Other	25	Absent	26	FIA	3					FIA Only	2	2
	<b>41</b>		<b>67</b>		<b>68</b>	<b>67</b>		<b>68</b>	<b>68</b>	Unknown	8	6
											<b>45</b>	<b>43</b>
											<b>11</b>	<b>20</b>

**Potential Changes in Climate Variables**

**Temperature (°F)**

	Scenario	2009	2039	2069	2099	
Annual Average	CCSM45	43.5	45.4	47.8	47.9	
	CCSM85	43.5	45.9	48.6	51.8	
	GFDL45	43.5	46.4	49.9	51.3	
	GFDL85	43.5	47.0	51.3	56.2	
	HAD45	43.5	46.5	49.7	51.4	
	HAD85	43.5	46.6	50.8	56.4	
Growing Season May—Sep	CCSM45	60.9	63.1	64.9	65.3	
	CCSM85	60.9	63.3	65.8	69.6	
	GFDL45	60.9	63.9	67.8	69.4	
	GFDL85	60.9	64.7	69.4	74.6	
	HAD45	60.9	64.0	66.6	68.9	
	HAD85	60.9	63.6	68.1	74.2	
Coldest Month Average	CCSM45	16.3	18.2	20.3	20.6	
	CCSM85	16.3	19.4	20.6	23.1	
	GFDL45	16.3	19.5	21.8	23.0	
	GFDL85	16.3	20.4	22.6	25.4	
	HAD45	16.3	19.1	22.0	22.3	
	HAD85	16.3	20.2	22.7	26.3	
Warmest Month Average	CCSM45	66.9	69.3	70.4	70.6	
	CCSM85	66.9	69.8	71.4	73.5	
	GFDL45	66.9	69.8	71.8	73.2	
	GFDL85	66.9	70.8	73.7	76.5	
	HAD45	66.9	70.1	71.5	72.9	
	HAD85	66.9	69.7	72.3	76.7	

**Precipitation (in)**

	Scenario	2009	2039	2069	2099	
Annual Total	CCSM45	47.1	46.3	44.1	49.7	
	CCSM85	47.1	46.3	48.3	50.8	
	GFDL45	47.1	51.4	53.9	52.0	
	GFDL85	47.1	49.5	52.2	54.7	
	HAD45	47.1	50.2	52.1	51.1	
	HAD85	47.1	51.3	51.1	54.3	
Growing Season May—Sep	CCSM45	21.2	21.1	19.6	21.3	
	CCSM85	21.2	20.4	21.6	20.8	
	GFDL45	21.2	21.6	20.5	20.6	
	GFDL85	21.2	21.4	20.6	19.9	
	HAD45	21.2	22.9	22.1	22.6	
	HAD85	21.2	21.6	21.6	23.1	

**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	91.1	2074.3	16.3	Sm. dec.	Sm. dec.	High	Abundant	Good	Good			1	1
red maple	Acer rubrum	WDH	High	93.2	1463.0	10.7	Sm. inc.	Sm. inc.	High	Abundant	Very Good	Very Good			1	2
eastern hemlock	Tsuga canadensis	NSH	High	75	1185.6	11.3	Sm. dec.	Sm. dec.	Low	Abundant	Fair	Fair			0	3
eastern white pine	Pinus strobus	WDH	High	69.3	1042.3	11.4	No change	Sm. dec.	Low	Abundant	Fair	Fair			0	4
American beech	Fagus grandifolia	WDH	High	91	1026.9	7.5	Sm. dec.	Sm. dec.	Medium	Abundant	Fair	Fair			0	5
yellow birch	Betula alleghaniensis	NDL	High	83.1	725.3	5.7	Sm. dec.	Sm. dec.	Medium	Abundant	Fair	Fair			0	6
paper birch	Betula papyrifera	WDH	High	88	653.8	5.1	Sm. dec.	Lg. dec.	Medium	Abundant	Fair	Fair			0	7
red spruce	Picea rubens	NDH	High	72.4	591.2	5.6	Sm. dec.	Sm. dec.	Low	Abundant	Fair	Fair			0	8
white ash	Fraxinus americana	WDL	Medium	86.7	587.4	4.8	No change	No change	Low	Abundant	Fair	Fair			0	9
northern red oak	Quercus rubra	WDH	Medium	61.9	510.0	4.9	Lg. inc.	Lg. inc.	High	Abundant	Very Good	Very Good			1	10
balsam fir	Abies balsamea	NDH	High	45.8	400.5	5.6	Lg. dec.	Lg. dec.	Low	Common	Very Poor	Very Poor			0	11
black cherry	Prunus serotina	WDL	Medium	64.3	272.5	3.2	Sm. inc.	Lg. inc.	Low	Common	Fair	Good			1	12
sweet birch	Betula lenta	NDH	High	30.2	268.3	5.7	Sm. inc.	Sm. inc.	Low	Common	Fair	Fair			1	13
quaking aspen	Populus tremuloides	WDH	High	43.6	197.1	3.2	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	14
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	56.6	133.7	1.8	No change	No change	High	Common	Good	Good			1	15
striped maple	Acer pensylvanicum	NSL	Medium	59.5	131.1	1.5	Sm. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	16
American elm	Ulmus americana	WDH	Medium	16	75.9	3.9	Sm. dec.	No change	Medium	Common	Poor	Fair			1	17
American basswood	Tilia americana	WSL	Medium	19.3	55.3	2.2	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	18
bigtooth aspen	Populus grandidentata	NSL	Medium	13.8	45.2	1.2	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			1	19
pin cherry	Prunus pensylvanica	NSL	Low	18.4	39.6	1.3	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	20
bitternut hickory	Carya cordiformis	WSL	Low	12.3	38.6	2.8	Sm. dec.	Sm. inc.	High	Rare	Poor	Good			1	21
boxelder	Acer negundo	WSH	Low	1.1	37.1	33.3	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor	Infill +		1	22
balsam poplar	Populus balsamifera	NSH	Medium	5	34.9	6.2	Very Lg. dec.	Very Lg. dec.	Medium	Rare	Lost	Lost			0	23
Norway spruce	Picea abies	NSH	FIA	3.8	30.6	6.4	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	24
black ash	Fraxinus nigra	WSH	Medium	4.8	25.7	4.5	Lg. dec.	Lg. dec.	Low	Rare	Very Poor	Very Poor			0	25
white oak	Quercus alba	WDH	Medium	4.8	20.5	3.3	Lg. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	2	26
butternut	Juglans cinerea	NSLX	FIA	2.7	17.9	5.2	Unknown	Unknown	Low	Rare	FIA Only	FIA Only			0	27
red pine	Pinus resinosa	NSH	Medium	2.2	17.8	3.4	Sm. dec.	No change	Low	Rare	Very Poor	Very Poor			2	28
serviceberry	Amelanchier spp.	NSL	Low	16.2	16.8	0.7	No change	Sm. inc.	Medium	Rare	Poor	Fair			1	29
gray birch	Betula populifolia	NSL	Low	11.8	15.7	1.1	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	30
American hornbeam; muscle	Carpinus caroliniana	WSL	Low	5.2	10.8	1.5	Sm. dec.	No change	Medium	Rare	Very Poor	Poor	Infill +		1	31
black oak	Quercus velutina	WDH	High	2.2	4.8	2.2	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	32
American mountain-ash	Sorbus americana	NSL	Low	3.7	3.6	0.4	Lg. dec.	Lg. dec.	Low	Rare	Very Poor	Very Poor			0	33
green ash	Fraxinus pennsylvanica	WSH	Low	1.1	1.8	1.6	No change	Lg. inc.	Medium	Rare	Poor	Good			2	34
shagbark hickory	Carya ovata	WSL	Medium	1.1	1.7	1.6	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	35
northern white-cedar	Thuja occidentalis	WSH	High	1	1.6	1.3	Very Lg. dec.	Very Lg. dec.	Medium	Rare	Lost	Lost			0	36
mountain maple	Acer spicatum	NSL	Low	0.8	1.5	0.3	Lg. dec.	Lg. dec.	High	Rare	Poor	Poor			1	37
tamarack (native)	Larix laricina	NSH	High	1.7	1.0	0.3	Very Lg. dec.	Very Lg. dec.	Low	Rare	Lost	Lost			0	38
chestnut oak	Quercus prinus	NDH	High	1.1	1.0	0.9	Lg. inc.	Lg. inc.	High	Rare	Good	Good			2	39
chokecherry	Prunus virginiana	NSLX	FIA	1.1	0.7	0.6	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	40
eastern redcedar	Juniperus virginiana	WDH	Medium	1.1	0.6	0.6	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	41
white spruce	Picea glauca	NSL	Medium	0	0	0	Unknown	Unknown	Medium	Modeled	Unknown	Unknown			0	42
shortleaf pine	Pinus echinata	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	43
pitch pine	Pinus rigida	NSH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Likely +	Likely +	3	44
Virginia pine	Pinus virginiana	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	45
Ohio buckeye	Aesculus glabra	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	46
cittamwood/gum bumelia	Sideroxylon lanuginosum ssp.	NSL	Low	0	0	0	Unknown	Unknown	High	Absent	Unknown	Unknown			0	47

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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
pignut hickory	<i>Carya glabra</i>	WDL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	48
mockernut hickory	<i>Carya alba</i>	WDL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	49
sugarberry	<i>Celtis laevigata</i>	NDH	Medium	0	0	0	Unknown	New Habitat	Medium	Absent	Unknown	New Habitat				50
eastern redbud	<i>Cercis canadensis</i>	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +		51
flowering dogwood	<i>Cornus florida</i>	WDL	Medium	0	0	0	Unknown	New Habitat	Medium	Absent	Unknown	New Habitat		Migrate +		52
black walnut	<i>Juglans nigra</i>	WDH	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate ++		53
sweetgum	<i>Liquidambar styraciflua</i>	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate ++		54
yellow-poplar	<i>Liriodendron tulipifera</i>	WDH	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate ++		55
cucumbertree	<i>Magnolia acuminata</i>	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +		56
southern magnolia	<i>Magnolia grandiflora</i>	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown				57
bigleaf magnolia	<i>Magnolia macrophylla</i>	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown				58
blackgum	<i>Nyssa sylvatica</i>	WDL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate ++	Migrate +		59
sourwood	<i>Oxydendrum arboreum</i>	NDL	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat				60
redbay	<i>Persea borbonia</i>	NSL	Low	0	0	0	Unknown	Unknown	High	Absent	Unknown	Unknown				61
sycamore	<i>Platanus occidentalis</i>	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +		62
eastern cottonwood	<i>Populus deltoides</i>	NSH	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Likely +	Likely +		63
swamp white oak	<i>Quercus bicolor</i>	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +		64
scarlet oak	<i>Quercus coccinea</i>	WDL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate ++	Migrate ++		65
post oak	<i>Quercus stellata</i>	WDH	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat				66
black locust	<i>Robinia pseudoacacia</i>	NDH	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Likely +	Likely +		67
sassafras	<i>Sassafras albidum</i>	WSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +		68