

**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  
 9,130.7    3,525.4    117

**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	13	21	Increase	14	9	Very Good	4	2	Likely	1	1
Hickory	3			Medium	26	33	No Change	13	16	Good	12	11	Infill	12	11
Maple	6	Abundant	3	Low	22	9	Decrease	21	23	Fair	10	9	Migrate	4	8
Oak	9	Common	28	FIA	8		New	11	11	Poor	11	15		<b>17</b>	<b>20</b>
Pine	4	Rare	25				Unknown	10	10	Very Poor	9	9			
Other	31	Absent	13					<b>69</b>	<b>69</b>	FIA Only	2	2			
	<b>56</b>		<b>69</b>		<b>69</b>	<b>63</b>				Unknown	2	2			
											<b>50</b>	<b>50</b>			

**Potential Changes in Climate Variables**

**Temperature (°F)**

Scenario	2009	2039	2069	2099		
Annual	CCSM45	48.5	50.4	53.2	53.2	
Average	CCSM85	48.5	51.1	53.9	57.1	
	GFDL45	48.5	51.7	54.1	55.1	
	GFDL85	48.5	51.6	55.1	59.5	
	HAD45	48.5	51.7	55.1	56.9	
	HAD85	48.5	51.9	56.5	61.8	
Growing Season	CCSM45	65.9	67.7	70.2	70.5	
	CCSM85	65.9	68.6	71.0	74.9	
May—Sep	GFDL45	65.9	69.8	72.8	74.4	
	GFDL85	65.9	69.9	74.1	79.2	
	HAD45	65.9	69.5	72.1	74.5	
	HAD85	65.9	69.2	74.4	79.9	
Coldest Month	CCSM45	21.9	23.5	26.2	26.0	
	CCSM85	21.9	24.5	26.5	28.5	
Average	GFDL45	21.9	24.7	25.9	26.3	
	GFDL85	21.9	25.2	26.4	28.2	
	HAD45	21.9	23.5	27.2	27.2	
	HAD85	21.9	25.6	28.5	31.9	
Warmest Month	CCSM45	71.9	74.1	75.6	76.1	
	CCSM85	71.9	75.4	77.0	79.0	
Average	GFDL45	71.9	75.1	76.9	77.9	
	GFDL85	71.9	76.1	78.1	81.1	
	HAD45	71.9	76.0	77.8	79.3	
	HAD85	71.9	76.6	80.0	83.9	

**Precipitation (in)**

Scenario	2009	2039	2069	2099		
Annual	CCSM45	37.5	36.6	36.1	37.1	
Total	CCSM85	37.5	37.3	37.2	37.9	
	GFDL45	37.5	40.1	44.4	44.6	
	GFDL85	37.5	41.0	45.6	47.2	
	HAD45	37.5	38.3	40.8	40.0	
	HAD85	37.5	40.3	37.7	41.1	
Growing Season	CCSM45	18.4	18.5	18.1	18.0	
	CCSM85	18.4	18.0	18.1	17.1	
May—Sep	GFDL45	18.4	19.2	21.4	21.7	
	GFDL85	18.4	20.3	21.3	21.9	
	HAD45	18.4	17.9	17.2	17.7	
	HAD85	18.4	18.2	14.8	15.9	

**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.

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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
black cherry	Prunus serotina	WDL	Medium	55.3	1243.5	22.0	Sm. dec.	Lg. dec.	Low	Abundant	Fair	Poor				0 1
red maple	Acer rubrum	WDH	High	52.5	879.4	13.9	Sm. dec.	Sm. dec.	High	Abundant	Good	Good				1 2
black oak	Quercus velutina	WDH	High	33	608.5	14.5	No change	No change	Medium	Abundant	Good	Good				1 3
American elm	Ulmus americana	WDH	Medium	50.8	469.1	8.1	Sm. inc.	Sm. inc.	Medium	Common	Good	Good				1 4
silver maple	Acer saccharinum	NSH	Low	15.3	390.6	14.8	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good				1 5
green ash	Fraxinus pennsylvanica	WSH	Low	34.4	369.6	10.2	Sm. inc.	Sm. inc.	Medium	Common	Good	Good				1 6
sugar maple	Acer saccharum	WDH	High	24.6	310.4	11.3	Sm. inc.	No change	High	Common	Very Good	Good				1 7
northern red oak	Quercus rubra	WDH	Medium	25.2	275.3	9.5	No change	No change	High	Common	Good	Good				1 8
white oak	Quercus alba	WDH	Medium	25.1	270.5	9.8	Sm. inc.	No change	High	Common	Very Good	Good				1 9
white ash	Fraxinus americana	WDL	Medium	16.7	223.8	12.1	Sm. inc.	Sm. inc.	Low	Common	Fair	Fair				1 10
Scots pine	Pinus sylvestris	NSH	FIA	15.1	214.3	14.5	Unknown	Unknown	NA	Common	NNIS	NNIS				0 11
eastern white pine	Pinus strobus	WDH	High	19.4	202.9	8.5	Lg. dec.	Lg. dec.	Low	Common	Very Poor	Very Poor				0 12
red pine	Pinus resinosa	NSH	Medium	9.4	178.7	15.0	Lg. dec.	Lg. dec.	Low	Common	Very Poor	Very Poor				0 13
sassafras	Sassafras albidum	WSL	Low	27.1	169.0	5.9	Sm. inc.	Sm. dec.	Medium	Common	Good	Poor				1 14
black ash	Fraxinus nigra	WSH	Medium	6.8	154.0	13.1	Lg. dec.	Lg. dec.	Low	Common	Very Poor	Very Poor				0 15
black walnut	Juglans nigra	WDH	Low	13.4	146.6	11.1	Sm. inc.	Sm. inc.	Medium	Common	Good	Good				1 16
American basswood	Tilia americana	WSL	Medium	14.7	137.7	7.8	Sm. inc.	No change	Medium	Common	Good	Fair				1 17
bitternut hickory	Carya cordiformis	WSL	Low	12.8	124.0	9.4	No change	No change	High	Common	Good	Good				1 18
bigtooth aspen	Populus grandidentata	NSL	Medium	12.4	120.0	9.4	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor				0 19
yellow birch	Betula alleghaniensis	NDL	High	7	109.0	13.8	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor				0 20
quaking aspen	Populus tremuloides	WDH	High	6.6	98.4	12.5	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor				0 21
American beech	Fagus grandifolia	WDH	High	9.8	95.8	8.1	No change	Sm. dec.	Medium	Common	Fair	Poor	Infill +			1 22
shagbark hickory	Carya ovata	WSL	Medium	16.9	92.6	4.4	No change	Sm. dec.	Medium	Common	Fair	Poor				1 23
eastern cottonwood	Populus deltoides	NSH	Low	9.4	88.4	15.3	No change	No change	Medium	Common	Fair	Fair				1 24
swamp white oak	Quercus bicolor	NSL	Low	6	68.7	6.9	No change	No change	Medium	Common	Fair	Fair	Infill +	Infill +		1 25
black locust	Robinia pseudoacacia	NDH	Low	4.5	66.5	10.9	No change	No change	Medium	Common	Fair	Fair				1 26
boxelder	Acer negundo	WSH	Low	12.7	63.7	8.9	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good				1 27
black willow	Salix nigra	NSH	Low	5	61.6	10.9	Sm. dec.	No change	Low	Common	Poor	Poor	Infill +	Infill +		0 28
Siberian elm	Ulmus pumila	NDH	FIA	2.4	59.9	4.2	Unknown	Unknown	NA	Common	NNIS	NNIS				0 29
white spruce	Picea glauca	NSL	Medium	3.3	59.0	18.0	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor				0 30
pignut hickory	Carya glabra	WDL	Medium	9.5	53.0	5.4	No change	No change	Medium	Common	Fair	Fair	Infill +	Infill +		1 31
hackberry	Celtis occidentalis	WDH	Medium	4.6	33.6	2.5	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +		2 32
jack pine	Pinus banksiana	NSH	Medium	5.6	30.9	3.4	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor	Infill +	Infill +		2 33
yellow-poplar	Liriodendron tulipifera	WDH	High	4.4	27.8	3.5	Sm. inc.	No change	High	Rare	Good	Fair	Infill ++	Infill +		2 34
northern catalpa	Catalpa speciosa	NSHX	FIA	1.1	22.9	21.0	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only				0 35
sycamore	Platanus occidentalis	NSL	Low	2.3	20.5	5.4	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +		2 36
pin oak	Quercus palustris	NSH	Low	2.7	19.9	5.6	Sm. inc.	Sm. inc.	Low	Rare	Poor	Poor	Infill +	Infill +		2 37
Norway maple	Acer platanoides	NSL	FIA	1.2	19.9	4.6	Unknown	Unknown	NA	Rare	NNIS	NNIS				0 38
slippery elm	Ulmus rubra	WSL	Low	5.5	19.2	3.5	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +		1 39
American hornbeam; musclev	Carpinus caroliniana	WSL	Low	6.8	18.6	1.8	Sm. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor				0 40
white mulberry	Morus alba	NSL	FIA	3.3	17.1	5.2	Unknown	Unknown	NA	Rare	NNIS	NNIS				0 41
ailanthus	Ailanthus altissima	NSL	FIA	5.5	16.4	9.1	Unknown	Unknown	NA	Rare	NNIS	NNIS				0 42
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	10.7	15.8	1.7	Sm. dec.	Lg. dec.	High	Rare	Poor	Poor				1 43
flowering dogwood	Cornus florida	WDL	Medium	6.1	11.6	1.7	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor				0 44
Norway spruce	Picea abies	NSH	FIA	2.2	10.4	4.8	Unknown	Unknown	NA	Rare	NNIS	NNIS				0 45
northern pin oak	Quercus ellipsoidalis	NSH	Medium	2.6	10.1	2.2	Lg. dec.	Lg. dec.	High	Rare	Poor	Poor				0 46
tamarack (native)	Larix laricina	NSH	High	2.2	10.0	4.6	Sm. dec.	Sm. dec.	Low	Rare	Very Poor	Very Poor				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
blackgum	<i>Nyssa sylvatica</i>	WDL	Medium	5	8.3	7.4	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	2	48
eastern redcedar	<i>Juniperus virginiana</i>	WDH	Medium	3.8	5.7	1.3	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	2	49
shingle oak	<i>Quercus imbricaria</i>	NDH	Medium	0.6	5.0	2.5	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	50
paper birch	<i>Betula papyrifera</i>	WDH	High	0.4	3.4	1.1	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	51
bur oak	<i>Quercus macrocarpa</i>	NDH	Medium	0.6	2.1	1.0	Lg. inc.	Lg. inc.	High	Rare	Good	Good			2	52
chokecherry	<i>Prunus virginiana</i>	NSLX	FIA	1.1	1.9	1.8	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	53
serviceberry	<i>Amelanchier spp.</i>	NSL	Low	2.2	1.2	0.6	Very Lg. dec.	Very Lg. dec.	Medium	Rare	Lost	Lost			0	54
black maple	<i>Acer nigrum</i>	NSH	Low	1.1	0.9	0.8	Very Lg. dec.	Very Lg. dec.	High	Rare	Lost	Lost			0	55
chinkapin oak	<i>Quercus muehlenbergii</i>	NSL	Medium	4.4	0.3	1.3	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	56
black hickory	<i>Carya texana</i>	NDL	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	57
mockernut hickory	<i>Carya alba</i>	WDL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	58
sugarberry	<i>Celtis laevigata</i>	NDH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	59
common persimmon	<i>Diospyros virginiana</i>	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	60
sweetgum	<i>Liquidambar styraciflua</i>	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	61
Osage-orange	<i>Maclura pomifera</i>	NDH	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate +	3	62
bigleaf magnolia	<i>Magnolia macrophylla</i>	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	63
red mulberry	<i>Morus rubra</i>	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Likely +	Likely +	3	64
blackjack oak	<i>Quercus marilandica</i>	NSL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			3	65
Shumard oak	<i>Quercus shumardii</i>	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate +	3	66
post oak	<i>Quercus stellata</i>	WDH	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate ++	Migrate ++	3	67
American mountain-ash	<i>Sorbus americana</i>	NSL	Low	0	0	0	Unknown	Unknown	Low	Absent	Unknown	Unknown			0	68
winged elm	<i>Ulmus alata</i>	WDL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	69