

**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    209

**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	21	19	Increase	17	17	Very Good	6	7	Likely	2	2
Hickory	5			Medium	24	44	No Change	12	11	Good	15	14	Infill	6	7
Maple	6	Abundant	4	Low	29	13	Decrease	21	22	Fair	8	7	Migrate	3	12
Oak	8	Common	23	FIA	5		New	17	18	Poor	7	9		<b>11</b>	<b>21</b>
Pine	4	Rare	28				Unknown	12	11	Very Poor	9	7			
Other	30	Absent	21					<b>79</b>	<b>79</b>	FIA Only	2	2			
	<b>55</b>		<b>76</b>		<b>79</b>	<b>76</b>				Unknown	7	6			
											<b>54</b>	<b>52</b>			

**Potential Changes in Climate Variables**

**Temperature (°F)**

	Scenario	2009	2039	2069	2099	
Annual Average	CCSM45	46.2	48.2	50.8	50.8	
	CCSM85	46.2	48.6	51.3	54.5	
	GFDL45	46.2	50.1	52.4	53.7	
	GFDL85	46.2	49.7	53.6	58.3	
	HAD45	46.2	49.4	52.8	54.6	
	HAD85	46.2	49.5	53.8	59.3	
Growing Season (May—Sep)	CCSM45	62.9	64.9	67.1	67.4	
	CCSM85	62.9	65.1	67.8	71.7	
	GFDL45	62.9	67.4	70.3	71.9	
	GFDL85	62.9	67.4	71.8	76.8	
	HAD45	62.9	66.4	69.2	71.7	
	HAD85	62.9	66.0	71.0	77.0	
Coldest Month (Average)	CCSM45	20.5	22.7	24.9	25.0	
	CCSM85	20.5	23.8	25.0	27.1	
	GFDL45	20.5	23.5	25.2	25.8	
	GFDL85	20.5	24.2	25.7	28.1	
	HAD45	20.5	22.3	25.6	25.6	
	HAD85	20.5	23.7	26.2	29.6	
Warmest Month (Average)	CCSM45	68.8	71.0	72.3	72.6	
	CCSM85	68.8	71.5	73.3	75.5	
	GFDL45	68.8	71.7	74.1	75.2	
	GFDL85	68.8	73.2	75.7	78.7	
	HAD45	68.8	72.8	74.3	76.2	
	HAD85	68.8	72.9	76.1	80.5	

**Precipitation (in)**

	Scenario	2009	2039	2069	2099	
Annual Total	CCSM45	35.3	35.6	34.4	36.9	
	CCSM85	35.3	36.2	36.6	36.8	
	GFDL45	35.3	39.0	40.2	39.6	
	GFDL85	35.3	36.7	39.5	40.7	
	HAD45	35.3	35.9	37.0	36.5	
	HAD85	35.3	37.0	35.2	38.8	
Growing Season (May—Sep)	CCSM45	17.8	17.9	16.9	18.1	
	CCSM85	17.8	17.4	17.6	16.6	
	GFDL45	17.8	18.9	18.3	18.0	
	GFDL85	17.8	17.8	17.7	17.4	
	HAD45	17.8	17.8	16.5	17.0	
	HAD85	17.8	17.6	15.6	16.6	

**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-DGP30 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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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	84.4	1295.6	15.6	Sm. dec.	Sm. dec.	High	Abundant	Good	Good			1	1
white ash	Fraxinus americana	WDL	Medium	90	1281.8	14.4	Sm. dec.	Sm. dec.	Low	Abundant	Fair	Fair			0	2
red maple	Acer rubrum	WDH	High	73.6	998.4	12.5	No change	Sm. dec.	High	Abundant	Very Good	Good			1	3
northern red oak	Quercus rubra	WDH	Medium	63.3	572.4	8.8	No change	No change	High	Abundant	Very Good	Very Good			1	4
eastern white pine	Pinus strobus	WDH	High	47.5	492.5	9.5	Sm. dec.	Sm. dec.	Low	Common	Poor	Poor			0	5
black cherry	Prunus serotina	WDL	Medium	59.4	400.4	6.2	Sm. inc.	Sm. inc.	Low	Common	Fair	Fair			1	6
eastern hemlock	Tsuga canadensis	NSH	High	35.3	381.0	9.4	Sm. dec.	Sm. dec.	Low	Common	Poor	Poor			0	7
quaking aspen	Populus tremuloides	WDH	High	48	342.2	7.2	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	8
American beech	Fagus grandifolia	WDH	High	48	257.8	4.8	No change	No change	Medium	Common	Fair	Fair			1	9
American basswood	Tilia americana	WSL	Medium	46	238.6	6.7	No change	No change	Medium	Common	Fair	Fair			1	10
shagbark hickory	Carya ovata	WSL	Medium	42.8	165.5	4.1	No change	No change	Medium	Common	Fair	Fair			1	11
bitternut hickory	Carya cordiformis	WSL	Low	42.3	143.6	5.3	Sm. dec.	No change	High	Common	Fair	Good			1	12
Scots pine	Pinus sylvestris	NSH	FIA	15.2	140.5	11.5	Unknown	Unknown	NA	Common	NNIS	NNIS			0	13
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	59	137.6	2.4	No change	Sm. dec.	High	Common	Good	Fair			1	14
white oak	Quercus alba	WDH	Medium	27.1	132.6	4.2	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	15
red pine	Pinus resinosa	NSH	Medium	10.5	129.6	8.2	Lg. dec.	Lg. dec.	Low	Common	Very Poor	Very Poor			0	16
black walnut	Juglans nigra	WDH	Low	28.3	125.6	6.5	Sm. inc.	Lg. inc.	Medium	Common	Good	Very Good			1	17
Norway spruce	Picea abies	NSH	FIA	16.5	108.4	7.6	Unknown	Unknown	NA	Common	NNIS	NNIS			0	18
bigtooth aspen	Populus grandidentata	NSL	Medium	14.1	102.4	5.8	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	19
green ash	Fraxinus pennsylvanica	WSH	Low	15.6	93.0	8.0	Sm. inc.	Lg. inc.	Medium	Common	Good	Very Good			1	20
pignut hickory	Carya glabra	WDL	Medium	32.9	92.0	4.1	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	21
black willow	Salix nigra	NSH	Low	9.4	90.2	9.7	Sm. dec.	Sm. dec.	Low	Common	Poor	Poor			0	22
American elm	Ulmus americana	WDH	Medium	31.1	75.0	2.7	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	23
black oak	Quercus velutina	WDH	High	20.2	71.3	3.9	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	24
eastern cottonwood	Populus deltoides	NSH	Low	9.8	60.6	5.8	No change	No change	Medium	Common	Fair	Fair			1	25
silver maple	Acer saccharinum	NSH	Low	4	54.8	7.3	No change	No change	High	Common	Good	Good	Infill ++	Infill ++	1	26
sweet birch	Betula lenta	NDH	High	18	52.3	2.3	Lg. inc.	Lg. inc.	Low	Common	Good	Good			1	27
American hornbeam; muscle	Carpinus caroliniana	WSL	Low	22.1	48.0	1.7	Sm. dec.	No change	Medium	Rare	Very Poor	Poor			1	28
chestnut oak	Quercus prinus	NDH	High	8.4	47.6	5.1	Sm. inc.	Sm. inc.	High	Rare	Good	Good	Infill ++	Infill ++	1	29
yellow birch	Betula alleghaniensis	NDL	High	10.4	42.2	3.2	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	30
black locust	Robinia pseudoacacia	NDH	Low	4.9	34.1	5.9	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			1	31
paper birch	Betula papyrifera	WDH	High	9.8	31.8	1.9	Very Lg. dec.	Very Lg. dec.	Medium	Rare	Lost	Lost			0	32
serviceberry	Amelanchier spp.	NSL	Low	19.7	31.8	1.3	No change	No change	Medium	Rare	Poor	Poor			1	33
eastern redcedar	Juniperus virginiana	WDH	Medium	7.6	21.3	4.9	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	1	34
chokecherry	Prunus virginiana	NSLX	FIA	13.2	12.9	1.5	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	35
boxelder	Acer negundo	WSH	Low	11.3	12.4	12.8	Lg. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	1	36
sycamore	Platanus occidentalis	NSL	Low	1.1	11.3	10.3	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	37
pin cherry	Prunus pensylvanica	NSL	Low	7.7	10.9	1.9	Lg. dec.	Very Lg. dec.	Medium	Rare	Very Poor	Lost			0	38
white spruce	Picea glauca	NSL	Medium	2.6	8.2	2.0	Very Lg. dec.	Very Lg. dec.	Medium	Rare	Lost	Lost			0	39
scarlet oak	Quercus coccinea	WDL	Medium	1.8	5.3	2.0	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	40
tamarack (native)	Larix laricina	NSH	High	1.1	5.2	4.7	Very Lg. dec.	Very Lg. dec.	Low	Rare	Lost	Lost			0	41
northern white-cedar	Thuja occidentalis	WSH	High	0.4	4.6	1.6	Sm. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	42
butternut	Juglans cinerea	NSLX	FIA	1.2	4.5	1.3	Unknown	Unknown	Low	Rare	FIA Only	FIA Only			0	43
sassafras	Sassafras albidum	WSL	Low	2.2	4.5	2.0	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	2	44
pitch pine	Pinus rigida	NSH	High	1.9	4.2	1.8	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	45
striped maple	Acer pensylvanicum	NSL	Medium	3.9	4.1	0.9	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	46
pin oak	Quercus palustris	NSH	Low	5.5	3.9	2.1	No change	No change	Low	Rare	Very Poor	Very Poor			2	47



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shellbark hickory	<i>Carya laciniosa</i>	NSL	Low	1.1	3.7	3.4	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor				0	48
mockernut hickory	<i>Carya alba</i>	WDL	Medium	1.9	3.3	1.4	Lg. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++		2	49
Norway maple	<i>Acer platanoides</i>	NSL	FIA	0.7	3.0	0.4	Unknown	Unknown	NA	Rare	NNIS	NNIS				0	50
bur oak	<i>Quercus macrocarpa</i>	NDH	Medium	8.4	1.7	1.8	No change	Sm. dec.	High	Rare	Fair	Poor				0	51
flowering dogwood	<i>Cornus florida</i>	WDL	Medium	1.1	1.4	1.3	No change	No change	Medium	Rare	Poor	Poor		Infill +		2	52
gray birch	<i>Betula populifolia</i>	NSL	Low	0.7	1.1	0.6	Very Lg. dec.	Very Lg. dec.	Medium	Rare	Lost	Lost				0	53
cucumbertree	<i>Magnolia acuminata</i>	NSL	Low	0.9	1.0	0.7	Very Lg. dec.	Very Lg. dec.	Medium	Rare	Lost	Lost				0	54
swamp white oak	<i>Quercus bicolor</i>	NSL	Low	0.8	0.5	0.3	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good				2	55
balsam fir	<i>Abies balsamea</i>	NDH	High	0	0	0	Unknown	Unknown	Low	Modeled	Unknown	Unknown				0	56
shortleaf pine	<i>Pinus echinata</i>	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +		3	57
Table Mountain pine	<i>Pinus pungens</i>	NSL	Low	0	0	0	Unknown	Unknown	High	Modeled	Unknown	Unknown				0	58
Virginia pine	<i>Pinus virginiana</i>	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +		3	59
black hickory	<i>Carya texana</i>	NDL	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat				0	60
sugarberry	<i>Celtis laevigata</i>	NDH	Medium	0	0	0	Unknown	New Habitat	Medium	Absent	Unknown	New Habitat				3	61
hackberry	<i>Celtis occidentalis</i>	WDH	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate +		3	62
eastern redbud	<i>Cercis canadensis</i>	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +		3	63
common persimmon	<i>Diospyros virginiana</i>	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate +		3	64
honeylocust	<i>Gleditsia triacanthos</i>	NSH	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate +		3	65
sweetgum	<i>Liquidambar styraciflua</i>	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +		3	66
yellow-poplar	<i>Liriodendron tulipifera</i>	WDH	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Likely +	Likely +		3	67
bigleaf magnolia	<i>Magnolia macrophylla</i>	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown				0	68
mountain or Fraser magnolia	<i>Magnolia fraseri</i>	NSL	Low	0	0	0	Unknown	Unknown	Low	Absent	Unknown	Unknown				0	69
red mulberry	<i>Morus rubra</i>	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +		3	70
blackgum	<i>Nyssa sylvatica</i>	WDL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Likely +	Likely +		3	71
shingle oak	<i>Quercus imbricaria</i>	NDH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +		3	72
blackjack oak	<i>Quercus marilandica</i>	NSL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate ++		3	73
swamp chestnut oak	<i>Quercus michauxii</i>	NSL	Low	0	0	0	Unknown	Unknown	Medium	Modeled	Unknown	Unknown				0	74
chinkapin oak	<i>Quercus muehlenbergii</i>	NSL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat				3	75
post oak	<i>Quercus stellata</i>	WDH	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate ++		3	76
American mountain-ash	<i>Sorbus americana</i>	NSL	Low	0	0	0	Unknown	Unknown	Low	Absent	Unknown	Unknown				0	77
winged elm	<i>Ulmus alata</i>	WDL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat				3	78
slippery elm	<i>Ulmus rubra</i>	WSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate ++		3	79