

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

	sq. km	sq. mi	FIA Plots
Area of Region	8,837.4	3,412.1	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					
				Reliability	Adaptability	Scenario RCP45	Scenario RCP85	Scenario RCP45	Scenario RCP85	SHIFT RCP45	SHIFT RCP85				
Ash	3			High	16	20	Increase	14	13	Very Good	10	10	Likely	0	0
Hickory	2			Medium	22	33	No Change	6	8	Good	8	9	Infill	5	5
Maple	4	Abundant	9	Low	22	11	Decrease	23	22	Fair	9	7	Migrate	5	8
Oak	6	Common	22	FIA	8		New	12	15	Poor	5	6		<b>10</b>	<b>13</b>
Pine	4	Rare	20				Unknown	13	10	Very Poor	11	10			
Other	32	Absent	17					<b>68</b>	<b>68</b>	FIA Only	4	4			
	<b>51</b>		<b>68</b>		<b>68</b>	<b>64</b>				Unknown	5	2			
											<b>52</b>	<b>48</b>			

**Potential Changes in Climate Variables**

**Temperature (°F)**

	Scenario	2009	2039	2069	2099	
Annual Average	CCSM45	44.7	46.7	49.8	49.9	
	CCSM85	44.7	47.5	50.6	54.1	
	GFDL45	44.7	47.7	50.4	51.7	
	GFDL85	44.7	48.1	51.5	56.5	
	HAD45	44.7	47.8	51.6	53.4	
	HAD85	44.7	48.4	52.8	58.2	
Growing Season (May—Sep)	CCSM45	64.8	66.8	69.5	69.7	
	CCSM85	64.8	67.7	70.5	74.7	
	GFDL45	64.8	68.1	71.4	73.5	
	GFDL85	64.8	68.8	72.8	78.5	
	HAD45	64.8	68.0	71.0	73.2	
	HAD85	64.8	68.1	72.9	78.3	
Coldest Month Average	CCSM45	12.6	14.3	16.9	17.3	
	CCSM85	12.6	15.1	17.2	19.6	
	GFDL45	12.6	16.3	17.9	18.3	
	GFDL85	12.6	16.6	18.4	21.3	
	HAD45	12.6	13.8	18.2	18.0	
	HAD85	12.6	17.6	20.9	24.4	
Warmest Month Average	CCSM45	71.2	73.6	75.2	75.7	
	CCSM85	71.2	74.9	76.7	79.3	
	GFDL45	71.2	74.6	76.1	77.8	
	GFDL85	71.2	75.5	77.5	81.3	
	HAD45	71.2	74.6	76.3	77.7	
	HAD85	71.2	75.7	78.2	82.1	

**Precipitation (in)**

	Scenario	2009	2039	2069	2099	
Annual Total	CCSM45	33.0	33.6	33.1	32.8	
	CCSM85	33.0	32.3	32.7	33.2	
	GFDL45	33.0	36.1	38.3	35.7	
	GFDL85	33.0	36.2	38.8	37.3	
	HAD45	33.0	34.6	35.1	35.2	
	HAD85	33.0	34.3	35.2	37.3	
Growing Season (May—Sep)	CCSM45	20.6	20.3	19.5	19.8	
	CCSM85	20.6	19.8	19.4	18.6	
	GFDL45	20.6	22.2	23.0	20.6	
	GFDL85	20.6	22.3	22.4	20.3	
	HAD45	20.6	20.6	19.6	19.8	
	HAD85	20.6	20.1	18.5	19.0	

**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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Common Name	Scientific Name	Range	MR	%Cell	FIAsum	FIAiv	ChngCl45	ChngCl85	Adap	Abund	Capabil45	Capabil85	SHIFT45	SHIFT85	SSO	N
red maple	Acer rubrum	WDH	High	63.5	993.7	12.8	Sm. dec.	Lg. dec.	High	Abundant	Good	Good			1	1
northern red oak	Quercus rubra	WDH	Medium	67.3	991.8	10.5	Sm. dec.	Sm. dec.	High	Abundant	Good	Good			1	2
American elm	Ulmus americana	WDH	Medium	81.4	853.9	7.7	No change	No change	Medium	Abundant	Good	Good			1	3
boxelder	Acer negundo	WSH	Low	67.2	817.2	9.5	Sm. dec.	Sm. dec.	High	Abundant	Good	Good			1	4
black oak	Quercus velutina	WDH	High	44.9	663.2	10.3	No change	No change	Medium	Abundant	Good	Good			1	5
black cherry	Prunus serotina	WDL	Medium	88.1	656.4	5.9	No change	No change	Low	Abundant	Fair	Fair			0	6
quaking aspen	Populus tremuloides	WDH	High	59.5	553.8	7.2	Sm. dec.	Sm. dec.	Medium	Abundant	Fair	Fair			0	7
white oak	Quercus alba	WDH	Medium	71.5	553.6	5.6	Sm. inc.	No change	High	Abundant	Very Good	Very Good			1	8
paper birch	Betula papyrifera	WDH	High	67.9	524.3	5.7	Sm. dec.	Sm. dec.	Medium	Abundant	Fair	Fair			0	9
northern pin oak	Quercus ellipsoidalis	NSH	Medium	47	478.0	8.3	Sm. dec.	Lg. dec.	High	Common	Fair	Fair			1	10
eastern white pine	Pinus strobus	WDH	High	33.3	417.8	8.6	Sm. dec.	Lg. dec.	Low	Common	Poor	Very Poor			0	11
American basswood	Tilia americana	WSL	Medium	53.8	416.7	5.4	No change	No change	Medium	Common	Fair	Fair			1	12
silver maple	Acer saccharinum	NSH	Low	17.5	386.0	12.4	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	13
bur oak	Quercus macrocarpa	NDH	Medium	49.1	327.2	4.7	Lg. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	14
red pine	Pinus resinosa	NSH	Medium	21.7	327.0	13.2	Sm. dec.	Sm. dec.	Low	Common	Poor	Poor			0	15
shagbark hickory	Carya ovata	WSL	Medium	37.9	320.0	6.7	No change	Sm. dec.	Medium	Common	Fair	Poor			1	16
bigtooth aspen	Populus grandidentata	NSL	Medium	43.4	205.6	3.8	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor			0	17
jack pine	Pinus banksiana	NSH	Medium	13.2	137.1	6.2	Lg. dec.	Lg. dec.	High	Common	Fair	Fair	Infill +	Infill +	1	18
sugar maple	Acer saccharum	WDH	High	19.5	133.8	3.8	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good	Infill ++	Infill ++	1	19
green ash	Fraxinus pennsylvanica	WSH	Low	33.8	128.8	2.4	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	20
black walnut	Juglans nigra	WDH	Low	18.6	128.7	4.8	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	21
bitternut hickory	Carya cordiformis	WSL	Low	33.4	122.2	2.1	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	22
black ash	Fraxinus nigra	WSH	Medium	12.1	101.1	4.1	Lg. dec.	Lg. dec.	Low	Common	Very Poor	Very Poor			0	23
white ash	Fraxinus americana	WDL	Medium	20.7	100.4	3.8	Lg. inc.	Lg. inc.	Low	Common	Good	Good			1	24
white spruce	Picea glauca	NSL	Medium	8	100.0	10.4	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	25
black locust	Robinia pseudoacacia	NDH	Low	7.7	92.7	9.8	No change	No change	Medium	Common	Fair	Fair			1	26
slippery elm	Ulmus rubra	WSL	Low	24.5	83.2	2.0	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	27
eastern cottonwood	Populus deltoides	NSH	Low	12	66.7	3.7	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	28
hackberry	Celtis occidentalis	WDH	Medium	21.1	58.6	1.4	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good	Infill ++	Infill ++	1	29
river birch	Betula nigra	NSL	Low	7.2	58.3	3.2	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor			0	30
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	16.7	56.6	2.1	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	31
eastern redcedar	Juniperus virginiana	WDH	Medium	10.9	47.3	2.1	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	1	32
red mulberry	Morus rubra	NSL	Low	1.1	42.4	37.5	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	33
butternut	Juglans cinerea	NSLX	FIA	11.9	36.9	1.9	Unknown	Unknown	Low	Rare	FIA Only	FIA Only			0	34
wild plum	Prunus americana	NSLX	FIA	8.5	31.4	2.7	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	35
black willow	Salix nigra	NSH	Low	4.1	26.9	5.8	Sm. dec.	No change	Low	Rare	Very Poor	Very Poor			0	36
Siberian elm	Ulmus pumila	NDH	FIA	2.3	25.0	11.1	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	37
American hornbeam; musclev	Carpinus caroliniana	WSL	Low	7.9	13.1	1.2	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	38
chokecherry	Prunus virginiana	NSLX	FIA	11.7	13.0	0.9	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	39
serviceberry	Amelanchier spp.	NSL	Low	11	11.5	1.0	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	40
tamarack (native)	Larix laricina	NSH	High	0.8	10.7	6.6	Lg. dec.	Lg. dec.	Low	Rare	Very Poor	Very Poor			0	41
pin cherry	Prunus pensylvanica	NSL	Low	7.3	9.0	0.6	Lg. dec.	Very Lg. dec.	Medium	Rare	Very Poor	Lost			0	42
rock elm	Ulmus thomasii	NSLX	FIA	1.8	6.5	1.0	Unknown	Unknown	Low	Rare	FIA Only	FIA Only			0	43
Norway spruce	Picea abies	NSH	FIA	1.3	5.6	1.3	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	44
northern white-cedar	Thuja occidentalis	WSH	High	1.1	5.0	1.0	Lg. dec.	No change	Medium	Rare	Very Poor	Poor		Infill +	2	45
swamp white oak	Quercus bicolor	NSL	Low	2.3	3.5	1.5	Sm. inc.	Lg. inc.	Medium	Rare	Fair	Good	Infill +		2	46
Scots pine	Pinus sylvestris	NSH	FIA	1	2.6	2.0	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	47



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white mulberry	Morus alba	NSL	FIA	1	1.7	0.3	Unknown	Unknown	NA	Rare	NNIS	NNIS				0 48
yellow birch	Betula alleghaniensis	NDL	High	1.9	1.3	0.2	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor				0 49
balsam fir	Abies balsamea	NDH	High	0.7	1.1	0.6	Sm. dec.	Lg. dec.	Low	Rare	Very Poor	Very Poor				0 50
eastern hemlock	Tsuga canadensis	NSH	High	0.7	0.1	0.0	Lg. dec.	Lg. dec.	Low	Rare	Very Poor	Very Poor				0 51
slash pine	Pinus elliottii	NDH	High	0	0	0	Unknown	New Habitat	Medium	Absent	Unknown	New Habitat				0 52
striped maple	Acer pensylvanicum	NSL	Medium	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown				0 53
mountain maple	Acer spicatum	NSL	Low	0	0	0	Unknown	Unknown	High	Absent	Unknown	Unknown				0 54
cittamwood/gum bumelia	Sideroxylon lanuginosum ssp.	NSL	Low	0	0	0	Unknown	New Habitat	High	Absent	Unknown	New Habitat				0 55
black hickory	Carya texana	NDL	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat				3 56
mockernut hickory	Carya alba	WDL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate +		3 57
sugarberry	Celtis laevigata	NDH	Medium	0	0	0	Unknown	New Habitat	Medium	Absent	Unknown	New Habitat				0 58
eastern redbud	Cercis canadensis	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +		3 59
American beech	Fagus grandifolia	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +		3 60
honeylocust	Gleditsia triacanthos	NSH	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate +		3 61
yellow-poplar	Liriodendron tulipifera	WDH	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat				3 62
Osage-orange	Maclura pomifera	NDH	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate ++		3 63
sycamore	Platanus occidentalis	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +		3 64
blackjack oak	Quercus marilandica	NSL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat				3 65
chinkapin oak	Quercus muehlenbergii	NSL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +		3 66
post oak	Quercus stellata	WDH	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat				3 67
sassafras	Sassafras albidum	WSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +		3 68