

**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  
 3,807.3    1,470.0    99

**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	19	Increase	17	17	Very Good	6	5	Likely	0	0
Hickory	2			Medium	23	34	No Change	5	4	Good	11	12	Infill	15	16
Maple	5	Abundant	5	Low	23	11	Decrease	19	20	Fair	6	7	Migrate	6	14
Oak	5	Common	19	FIA	3		New	20	20	Poor	9	7		<b>21</b>	<b>30</b>
Pine	4	Rare	20				Unknown	4	4	Very Poor	6	7			
Other	25	Absent	21							FIA Only	2	2			
	<b>44</b>		<b>65</b>		<b>65</b>	<b>64</b>		<b>65</b>	<b>65</b>	Unknown	1	1			
											<b>41</b>	<b>41</b>			

**Potential Changes in Climate Variables**

**Temperature (°F)**

	Scenario	2009	2039	2069	2099	
Annual Average	CCSM45	44.7	46.6	49.7	49.6	
	CCSM85	44.7	47.3	50.3	53.7	
	GFDL45	44.7	49.0	50.6	51.9	
	GFDL85	44.7	48.1	51.7	56.6	
	HAD45	44.7	48.0	51.2	53.1	
	HAD85	44.7	48.2	52.5	58.2	
Growing Season (May—Sep)	CCSM45	63.0	64.9	67.2	67.4	
	CCSM85	63.0	65.5	68.0	71.9	
	GFDL45	63.0	68.6	70.4	72.4	
	GFDL85	63.0	67.4	71.8	77.4	
	HAD45	63.0	66.3	68.4	70.7	
	HAD85	63.0	66.0	70.0	75.5	
Coldest Month (Average)	CCSM45	16.2	17.7	20.6	20.6	
	CCSM85	16.2	18.7	21.1	23.4	
	GFDL45	16.2	18.8	20.6	21.0	
	GFDL85	16.2	19.9	21.4	23.8	
	HAD45	16.2	17.7	21.6	21.9	
	HAD85	16.2	20.3	23.8	27.8	
Warmest Month (Average)	CCSM45	69.3	71.6	73.0	73.3	
	CCSM85	69.3	72.3	74.1	76.0	
	GFDL45	69.3	73.2	74.9	76.3	
	GFDL85	69.3	74.1	76.4	79.4	
	HAD45	69.3	72.7	73.7	75.4	
	HAD85	69.3	73.0	75.2	79.0	

**Precipitation (in)**

	Scenario	2009	2039	2069	2099	
Annual Total	CCSM45	30.1	30.0	29.5	30.4	
	CCSM85	30.1	30.7	30.6	31.5	
	GFDL45	30.1	32.3	34.7	34.0	
	GFDL85	30.1	33.1	36.0	36.4	
	HAD45	30.1	30.5	32.2	32.6	
	HAD85	30.1	31.8	32.4	34.3	
Growing Season (May—Sep)	CCSM45	16.5	16.3	15.5	16.4	
	CCSM85	16.5	16.6	16.3	15.7	
	GFDL45	16.5	17.1	18.3	17.7	
	GFDL85	16.5	18.0	18.1	17.8	
	HAD45	16.5	15.8	15.1	15.6	
	HAD85	16.5	16.4	14.3	14.8	

**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
green ash	Fraxinus pennsylvanica	WSH	Low	93.1	1898.2	15.3	Sm. dec.	Sm. dec.	Medium	Abundant	Fair	Fair			0	1
northern white-cedar	Thuja occidentalis	WSH	High	65.3	986.1	12.6	Lg. dec.	Lg. dec.	Medium	Abundant	Fair	Fair			0	2
red maple	Acer rubrum	WDH	High	48.6	706.8	7.2	No change	Sm. dec.	High	Abundant	Very Good	Good			1	3
American elm	Ulmus americana	WDH	Medium	80.5	646.2	5.7	No change	No change	Medium	Abundant	Good	Good			1	4
quaking aspen	Populus tremuloides	WDH	High	58.6	531.4	6.3	Sm. dec.	Sm. dec.	Medium	Abundant	Fair	Fair			0	5
black ash	Fraxinus nigra	WSH	Medium	62.6	496.0	4.2	Lg. dec.	Lg. dec.	Low	Common	Very Poor	Very Poor			0	6
white ash	Fraxinus americana	WDL	Medium	52.8	399.1	5.3	No change	No change	Low	Common	Poor	Poor			0	7
sugar maple	Acer saccharum	WDH	High	37.3	286.0	6.6	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	8
eastern white pine	Pinus strobus	WDH	High	29.5	266.8	6.0	No change	Lg. dec.	Low	Common	Poor	Very Poor			0	9
silver maple	Acer saccharinum	NSH	Low	18.8	251.1	9.9	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good	Infill ++	Infill ++	1	10
American basswood	Tilia americana	WSL	Medium	44.9	246.6	4.2	Sm. inc.	No change	Medium	Common	Good	Fair			1	11
paper birch	Betula papyrifera	WDH	High	64.2	246.5	2.4	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor			0	12
northern red oak	Quercus rubra	WDH	Medium	22.2	208.0	6.0	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good	Infill ++	Infill ++	1	13
white spruce	Picea glauca	NSL	Medium	24.8	178.4	7.4	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	14
yellow birch	Betula alleghaniensis	NDL	High	49.7	132.4	2.4	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	15
boxelder	Acer negundo	WSH	Low	29.6	129.6	5.1	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good	Infill ++	Infill ++	1	16
bigtooth aspen	Populus grandidentata	NSL	Medium	16.4	118.3	3.9	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor	Infill +		0	17
black cherry	Prunus serotina	WDL	Medium	41.2	85.8	1.3	Lg. inc.	Lg. inc.	Low	Common	Good	Good			1	18
eastern hemlock	Tsuga canadensis	NSH	High	27.5	82.0	3.0	Lg. dec.	Lg. dec.	Low	Common	Very Poor	Very Poor			0	19
bur oak	Quercus macrocarpa	NDH	Medium	31.7	78.0	3.5	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good	Infill ++	Infill ++	2	20
northern pin oak	Quercus ellipsoidalis	NSH	Medium	6.1	76.9	2.7	Sm. dec.	Sm. dec.	High	Common	Fair	Fair		Infill +	2	21
tamarack (native)	Larix laricina	NSH	High	21.3	66.7	2.9	Lg. dec.	Lg. dec.	Low	Common	Very Poor	Very Poor			0	22
black willow	Salix nigra	NSH	Low	19.9	53.8	7.9	Sm. dec.	Sm. inc.	Low	Common	Poor	Fair		Infill +	1	23
Scots pine	Pinus sylvestris	NSH	FIA	0.7	52.5	5.2	Unknown	Unknown	NA	Common	NNIS	NNIS			0	24
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	33.1	45.7	1.4	Lg. inc.	Sm. inc.	High	Rare	Good	Good	Infill ++	Infill ++	1	25
red pine	Pinus resinosa	NSH	Medium	11	41.7	1.5	Sm. inc.	Sm. inc.	Low	Rare	Poor	Poor	Infill +	Infill +	2	26
American hornbeam; musclev	Carpinus caroliniana	WSL	Low	15.6	32.0	2.0	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	27
balsam poplar	Populus balsamifera	NSH	Medium	13.5	29.8	1.3	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	28
swamp white oak	Quercus bicolor	NSL	Low	13.5	24.8	2.9	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	2	29
eastern redcedar	Juniperus virginiana	WDH	Medium	9.4	19.0	25.8	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	2	30
eastern cottonwood	Populus deltoides	NSH	Low	9.9	18.0	1.1	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	2	31
American beech	Fagus grandifolia	WDH	High	20.9	17.8	1.1	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	2	32
serviceberry	Amelanchier spp.	NSL	Low	12.7	15.3	0.5	Lg. dec.	Very Lg. dec.	Medium	Rare	Very Poor	Lost			0	33
bitternut hickory	Carya cordiformis	WSL	Low	6.7	13.0	1.3	Sm. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	2	34
white oak	Quercus alba	WDH	Medium	9.7	10.7	0.5	Lg. inc.	Lg. inc.	High	Rare	Good	Good			2	35
balsam fir	Abies balsamea	NDH	High	15.2	9.7	0.5	Very Lg. dec.	Lg. dec.	Low	Rare	Lost	Very Poor			0	36
pin cherry	Prunus pensylvanica	NSL	Low	1.1	5.7	0.2	Very Lg. dec.	Very Lg. dec.	Medium	Rare	Lost	Lost			0	37
mountain maple	Acer spicatum	NSL	Low	7.9	5.7	0.8	Lg. dec.	Lg. dec.	High	Rare	Poor	Poor			0	38
slippery elm	Ulmus rubra	WSL	Low	9.8	5.0	0.5	Sm. inc.	Lg. inc.	Medium	Rare	Fair	Good	Infill +	Infill ++	2	39
jack pine	Pinus banksiana	NSH	Medium	0.2	3.0	0.1	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	2	40
chokecherry	Prunus virginiana	NSLX	FIA	1.6	2.6	0.1	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	41
peachleaf willow	Salix amygdaloides	NSLX	FIA	0.1	2.6	0.1	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	42
shagbark hickory	Carya ovata	WSL	Medium	13.3	2.1	1.0	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	2	43
black spruce	Picea mariana	NSH	High	9	1.6	0.2	Very Lg. dec.	Very Lg. dec.	Medium	Rare	Lost	Lost			0	44
Ohio buckeye	Aesculus glabra	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	45
pignut hickory	Carya glabra	WDL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	46
black hickory	Carya texana	NDL	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	47



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mockernut hickory	<i>Carya alba</i>	WDL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat				3 48
hackberry	<i>Celtis occidentalis</i>	WDH	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate ++		3 49
eastern redbud	<i>Cercis canadensis</i>	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +		3 50
honeylocust	<i>Gleditsia triacanthos</i>	NSH	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate ++		3 51
black walnut	<i>Juglans nigra</i>	WDH	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate ++		3 52
yellow-poplar	<i>Liriodendron tulipifera</i>	WDH	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate +		3 53
Osage-orange	<i>Maclura pomifera</i>	NDH	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate +		3 54
red mulberry	<i>Morus rubra</i>	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat				3 55
blackgum	<i>Nyssa sylvatica</i>	WDL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate +		3 56
sycamore	<i>Platanus occidentalis</i>	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +		3 57
shingle oak	<i>Quercus imbricaria</i>	NDH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat				3 58
chinkapin oak	<i>Quercus muehlenbergii</i>	NSL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +		3 59
pin oak	<i>Quercus palustris</i>	NSH	Low	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat		Migrate +		3 60
post oak	<i>Quercus stellata</i>	WDH	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat				3 61
black oak	<i>Quercus velutina</i>	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate ++		3 62
black locust	<i>Robinia pseudoacacia</i>	NDH	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +		3 63
sassafras	<i>Sassafras albidum</i>	WSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +		3 64
American mountain-ash	<i>Sorbus americana</i>	NSL	Low	0	0	0	Unknown	Unknown	Low	Absent	Unknown	Unknown				0 65