

**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  
 2,376.3    917.5    61

**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	15	18	Increase	10	8	Very Good	6	7	Likely	1	1
Hickory	0			Medium	22	31	No Change	7	8	Good	2	2	Infill	4	3
Maple	4	Abundant	10	Low	21	11	Decrease	14	15	Fair	14	11	Migrate	10	17
Oak	3	Common	16	FIA	5		New	24	24	Poor	6	7		15	21
Pine	4	Rare	10				Unknown	8	8	Very Poor	2	2			
Other	22	Absent	26							FIA Only	2	2			
	<b>36</b>		<b>62</b>		<b>63</b>	<b>60</b>		<b>63</b>	<b>63</b>	Unknown	3	3			
											<b>35</b>	<b>34</b>			

**Potential Changes in Climate Variables**

**Temperature (°F)**

Scenario	2009	2039	2069	2099		
Annual	CCSM45	43.8	45.5	48.7	48.5	
Average	CCSM85	43.8	46.3	49.4	52.9	
	GFDL45	43.8	47.0	50.0	51.5	
	GFDL85	43.8	47.4	51.3	56.5	
	HAD45	43.8	47.2	50.4	52.4	
	HAD85	43.8	47.5	51.6	57.6	
Growing Season	CCSM45	61.5	62.9	65.2	65.4	
	CCSM85	61.5	63.5	66.3	70.0	
May—Sep	GFDL45	61.5	65.6	69.5	71.5	
	GFDL85	61.5	66.3	71.1	76.9	
	HAD45	61.5	64.8	66.9	69.3	
	HAD85	61.5	64.5	68.4	74.1	
Coldest Month	CCSM45	17.1	18.6	21.7	21.2	
	CCSM85	17.1	19.9	22.2	24.8	
Average	GFDL45	17.1	18.9	21.1	21.8	
	GFDL85	17.1	19.9	21.8	24.7	
	HAD45	17.1	18.9	22.9	23.2	
	HAD85	17.1	21.3	24.0	29.0	
Warmest Month	CCSM45	68.1	69.9	71.3	71.7	
	CCSM85	68.1	70.7	72.5	74.4	
Average	GFDL45	68.1	72.5	74.3	75.6	
	GFDL85	68.1	73.1	75.6	78.6	
	HAD45	68.1	71.4	72.3	74.1	
	HAD85	68.1	71.7	73.8	77.8	

**Precipitation (in)**

Scenario	2009	2039	2069	2099		
Annual	CCSM45	29.5	29.4	29.2	30.1	
Total	CCSM85	29.5	30.1	29.2	30.4	
	GFDL45	29.5	31.4	33.6	32.9	
	GFDL85	29.5	31.5	33.8	34.2	
	HAD45	29.5	31.1	32.6	32.0	
	HAD85	29.5	31.8	32.0	34.7	
Growing Season	CCSM45	15.1	15.5	14.8	15.2	
	CCSM85	15.1	15.4	14.3	14.2	
May—Sep	GFDL45	15.1	15.4	16.5	16.0	
	GFDL85	15.1	16.0	15.6	14.9	
	HAD45	15.1	15.3	14.3	14.5	
	HAD85	15.1	15.4	13.2	14.0	

**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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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
northern white-cedar	Thuja occidentalis	WSH	High	64.8	2580.9	14.7	Sm. dec.	Sm. dec.	Medium	Abundant	Fair	Fair			0	1
quaking aspen	Populus tremuloides	WDH	High	76.2	1884.7	7.9	Sm. dec.	Sm. dec.	Medium	Abundant	Fair	Fair			0	2
balsam fir	Abies balsamea	NDH	High	83.3	1492.4	7.6	Lg. dec.	Lg. dec.	Low	Abundant	Poor	Poor			0	3
red maple	Acer rubrum	WDH	High	57.3	1277.7	10.2	No change	No change	High	Abundant	Very Good	Very Good			1	4
white spruce	Picea glauca	NSL	Medium	48.1	678.2	5.7	Lg. dec.	Lg. dec.	Medium	Abundant	Fair	Fair			0	5
paper birch	Betula papyrifera	WDH	High	71.1	670.4	4.9	Sm. dec.	Sm. dec.	Medium	Abundant	Fair	Fair			0	6
northern red oak	Quercus rubra	WDH	Medium	18.5	576.2	4.2	No change	No change	High	Abundant	Very Good	Very Good			1	7
sugar maple	Acer saccharum	WDH	High	34.9	540.5	6.3	Sm. inc.	Sm. inc.	High	Abundant	Very Good	Very Good			1	8
red pine	Pinus resinosa	NSH	Medium	24.2	535.8	6.6	No change	Sm. dec.	Low	Abundant	Fair	Fair			0	9
black ash	Fraxinus nigra	WSH	Medium	54.2	503.9	5.3	No change	No change	Low	Abundant	Fair	Fair			0	10
bigtooth aspen	Populus grandidentata	NSL	Medium	38	470.5	4.2	Sm. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	11
eastern white pine	Pinus strobus	WDH	High	37.7	389.9	4.6	Sm. inc.	No change	Low	Common	Fair	Poor			1	12
balsam poplar	Populus balsamifera	NSH	Medium	31.5	360.0	2.9	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	13
silver maple	Acer saccharinum	NSH	Low	12.6	274.9	21.8	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	14
jack pine	Pinus banksiana	NSH	Medium	14.3	250.6	3.4	Sm. dec.	Sm. dec.	High	Common	Fair	Fair			1	15
green ash	Fraxinus pennsylvanica	WSH	Low	29.1	244.7	4.6	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	16
American elm	Ulmus americana	WDH	Medium	34.8	237.3	6.0	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	17
tamarack (native)	Larix laricina	NSH	High	18.1	226.2	3.9	No change	No change	Low	Common	Poor	Poor			0	18
white ash	Fraxinus americana	WDL	Medium	33.3	221.0	3.1	Sm. inc.	Lg. inc.	Low	Common	Fair	Good			1	19
black spruce	Picea mariana	NSH	High	39.3	180.5	3.5	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	20
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	15.6	144.2	2.0	Sm. dec.	Lg. dec.	High	Common	Fair	Fair			1	21
American beech	Fagus grandifolia	WDH	High	11.3	138.1	5.6	Sm. inc.	Lg. inc.	Medium	Common	Good	Very Good	Infill ++	Infill ++	1	22
American basswood	Tilia americana	WSL	Medium	10	89.4	2.4	No change	No change	Medium	Common	Fair	Fair			1	23
pin cherry	Prunus pensylvanica	NSL	Low	1.8	88.2	9.0	Very Lg. dec.	Very Lg. dec.	Medium	Common	Lost	Lost			0	24
eastern hemlock	Tsuga canadensis	NSH	High	10	70.9	2.1	Sm. dec.	Lg. dec.	Low	Common	Poor	Very Poor	Infill +		0	25
peachleaf willow	Salix amygdaloides	NSLX	FIA	11.9	61.5	4.6	Unknown	Unknown	Medium	Common	FIA Only	FIA Only			0	26
northern pin oak	Quercus ellipsoidalis	NSH	Medium	2.1	40.7	4.8	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	2	27
serviceberry	Amelanchier spp.	NSL	Low	13.3	37.2	1.1	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	28
Scots pine	Pinus sylvestris	NSH	FIA	3.5	30.2	6.0	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	29
black cherry	Prunus serotina	WDL	Medium	15.9	28.7	0.8	Lg. inc.	Lg. inc.	Low	Rare	Fair	Fair			1	30
Norway spruce	Picea abies	NSH	FIA	4.2	28.5	6.8	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	31
Siberian elm	Ulmus pumila	NDH	FIA	4.2	19.1	4.5	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	32
yellow birch	Betula alleghaniensis	NDL	High	4.6	15.4	1.7	Sm. inc.	No change	Medium	Rare	Fair	Poor	Infill +	Infill +	1	33
chokecherry	Prunus virginiana	NSLX	FIA	5.9	15.3	1.0	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	34
black oak	Quercus velutina	WDH	High	1	3.9	0.2	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	35
striped maple	Acer pensylvanicum	NSL	Medium	1.9	2.5	0.3	Lg. dec.	Very Lg. dec.	Medium	Rare	Very Poor	Lost			0	36
eastern redcedar	Juniperus virginiana	WDH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	37
boxelder	Acer negundo	WSH	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	38
mountain maple	Acer spicatum	NSL	Low	0	0	0	Unknown	Unknown	High	Absent	Unknown	Unknown			0	39
American hornbeam; musclev	Carpinus caroliniana	WSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	40
bitternut hickory	Carya cordiformis	WSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	41
pignut hickory	Carya glabra	WDL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	42
shagbark hickory	Carya ovata	WSL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	43
hackberry	Celtis occidentalis	WDH	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate +	3	44
flowering dogwood	Cornus florida	WDL	Medium	0	0	0	Unknown	Unknown	Medium	Modeled	Unknown	Unknown			0	45
honeylocust	Gleditsia triacanthos	NSH	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			3	46
black walnut	Juglans nigra	WDH	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	47

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USDA Forest Service  
Northern Research Station  
Landscape Change Research Group  
Iverson, Peters, Prasad, Matthews

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Common Name	Scientific Name	Range	MR	%Cell	FIAsum	FIAiv	ChngCl45	ChngCl85	Adap	Abund	Capabil45	Capabil85	SHIFT45	SHIFT85	SSO	N
yellow-poplar	Liriodendron tulipifera	WDH	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate +	3	48
Osage-orange	Maclura pomifera	NDH	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			3	49
red mulberry	Morus rubra	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	50
blackgum	Nyssa sylvatica	WDL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate +	3	51
sycamore	Platanus occidentalis	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	52
eastern cottonwood	Populus deltoides	NSH	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate ++	Migrate ++	3	53
white oak	Quercus alba	WDH	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Likely +	Likely +	3	54
swamp white oak	Quercus bicolor	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	55
bur oak	Quercus macrocarpa	NDH	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate +	3	56
pin oak	Quercus palustris	NSH	Low	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat		Migrate +	3	57
post oak	Quercus stellata	WDH	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			0	58
black locust	Robinia pseudoacacia	NDH	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	59
black willow	Salix nigra	NSH	Low	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat		Migrate +	3	60
sassafras	Sassafras albidum	WSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	61
American mountain-ash	Sorbus americana	NSL	Low	0	0	0	Unknown	Unknown	Low	Absent	Unknown	Unknown			0	62
slippery elm	Ulmus rubra	WSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	63