

**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      207

**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	18	Increase	13	13	Very Good	7	8	Likely	0	0
Hickory	2			Medium	23	33	No Change	9	7	Good	12	9	Infill	15	15
Maple	6	Abundant	4	Low	20	10	Decrease	21	23	Fair	5	7	Migrate	4	7
Oak	5	Common	26	FIA	10		New	12	13	Poor	7	7			
Pine	4	Rare	23				Unknown	11	10	Very Poor	10	10			
Other	33	Absent	13							FIA Only	5	5			
	<b>53</b>		<b>66</b>		<b>66</b>	<b>61</b>		<b>66</b>	<b>66</b>	Unknown	1	0			
											<b>47</b>	<b>46</b>			

**Potential Changes in Climate Variables**

**Temperature (°F)**

Scenario	2009	2039	2069	2099		
Annual	CCSM45	44.8	46.7	49.8	50.1	
Average	CCSM85	44.8	47.6	50.7	54.2	
	GFDL45	44.8	48.8	50.3	51.6	
	GFDL85	44.8	48.0	51.4	56.3	
	HAD45	44.8	47.8	51.5	53.4	
	HAD85	44.8	48.4	52.8	58.2	
Growing Season	CCSM45	65.0	67.0	69.7	70.1	
	CCSM85	65.0	67.9	70.8	75.1	
May—Sep	GFDL45	65.0	69.7	71.4	73.5	
	GFDL85	65.0	68.9	72.7	78.4	
	HAD45	65.0	68.0	71.1	73.3	
	HAD85	65.0	68.3	72.9	78.2	
Coldest Month	CCSM45	12.3	14.1	16.6	17.2	
	CCSM85	12.3	14.8	17.0	19.4	
Average	GFDL45	12.3	16.0	17.6	17.8	
	GFDL85	12.3	16.2	18.0	20.8	
	HAD45	12.3	13.7	18.1	17.9	
	HAD85	12.3	17.6	21.1	24.4	
Warmest Month	CCSM45	71.3	73.8	75.4	76.0	
	CCSM85	71.3	75.1	77.0	79.6	
Average	GFDL45	71.3	74.6	76.1	77.6	
	GFDL85	71.3	75.5	77.4	81.1	
	HAD45	71.3	74.5	76.3	77.7	
	HAD85	71.3	75.8	78.2	81.9	

**Precipitation (in)**

Scenario	2009	2039	2069	2099		
Annual	CCSM45	32.7	33.6	33.0	32.5	
Total	CCSM85	32.7	32.0	32.4	32.7	
	GFDL45	32.7	35.9	38.1	35.3	
	GFDL85	32.7	35.9	38.6	37.0	
	HAD45	32.7	34.8	34.8	34.7	
	HAD85	32.7	34.0	35.1	37.2	
Growing Season	CCSM45	20.7	20.8	19.7	19.9	
	CCSM85	20.7	19.7	19.1	18.4	
May—Sep	GFDL45	20.7	22.5	23.5	20.8	
	GFDL85	20.7	22.6	22.7	20.7	
	HAD45	20.7	21.1	19.8	19.9	
	HAD85	20.7	20.1	18.9	19.1	

**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
boxelder	Acer negundo	WSH	Low	79.9	1052.0	14.0	Sm. dec.	Lg. dec.	High	Abundant	Good	Good			1	1
American elm	Ulmus americana	WDH	Medium	76.2	864.4	11.5	No change	No change	Medium	Abundant	Good	Good			1	2
American basswood	Tilia americana	WSL	Medium	68	609.3	9.0	Sm. dec.	Lg. dec.	Medium	Abundant	Fair	Fair			0	3
bur oak	Quercus macrocarpa	NDH	Medium	51.4	513.9	12.3	Sm. inc.	No change	High	Abundant	Very Good	Very Good			1	4
northern red oak	Quercus rubra	WDH	Medium	54.7	452.7	7.2	No change	Sm. dec.	High	Common	Good	Fair			1	5
sugar maple	Acer saccharum	WDH	High	33.8	359.9	8.4	No change	No change	High	Common	Good	Good	Infill ++	Infill ++	1	6
silver maple	Acer saccharinum	NSH	Low	30.3	327.5	12.8	No change	No change	High	Common	Good	Good	Infill ++	Infill ++	1	7
quaking aspen	Populus tremuloides	WDH	High	41.8	255.0	6.3	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	8
black cherry	Prunus serotina	WDL	Medium	69.2	252.7	3.8	Sm. inc.	Sm. inc.	Low	Common	Fair	Fair			1	9
slippery elm	Ulmus rubra	WSL	Low	65.7	244.9	4.0	No change	No change	Medium	Common	Fair	Fair			1	10
eastern redcedar	Juniperus virginiana	WDH	Medium	33.6	236.6	8.9	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good	Infill ++	Infill ++	1	11
paper birch	Betula papyrifera	WDH	High	36.6	211.7	4.5	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor	Infill +	Infill +	0	12
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	46.2	210.0	4.7	No change	No change	High	Common	Good	Good			1	13
bitternut hickory	Carya cordiformis	WSL	Low	42.7	175.9	4.4	No change	Sm. inc.	High	Common	Good	Very Good			1	14
black walnut	Juglans nigra	WDH	Low	24.6	167.9	7.8	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	15
green ash	Fraxinus pennsylvanica	WDH	Low	41	162.8	4.3	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	16
hackberry	Celtis occidentalis	WDH	Medium	34.8	147.6	4.3	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good	Infill ++	Infill ++	1	17
black ash	Fraxinus nigra	WSH	Medium	25	134.9	4.2	Lg. dec.	Lg. dec.	Low	Common	Very Poor	Very Poor			0	18
white oak	Quercus alba	WDH	Medium	32.5	134.3	3.4	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good	Infill ++	Infill ++	1	19
red pine	Pinus resinosa	NSH	Medium	18.1	114.8	8.7	Lg. dec.	Lg. dec.	Low	Common	Very Poor	Very Poor			0	20
white spruce	Picea glauca	NSL	Medium	13.7	113.8	10.6	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	21
white ash	Fraxinus americana	WDL	Medium	26.6	112.1	3.8	Lg. inc.	Lg. inc.	Low	Common	Good	Good	Infill ++	Infill ++	1	22
red maple	Acer rubrum	WDH	High	14.7	98.0	2.4	No change	Sm. dec.	High	Common	Good	Fair	Infill ++	Infill +	1	23
eastern cottonwood	Populus deltoides	NSH	Low	17.3	89.7	5.0	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good	Infill ++	Infill ++	1	24
bigtooth aspen	Populus grandidentata	NSL	Medium	18.7	87.1	3.7	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor	Infill +	Infill +	0	25
eastern white pine	Pinus strobus	WDH	High	15.5	85.4	6.7	Lg. dec.	Lg. dec.	Low	Common	Very Poor	Very Poor			0	26
northern pin oak	Quercus ellipsoidalis	NSH	Medium	26.6	71.4	3.7	Lg. dec.	Lg. dec.	High	Common	Fair	Fair	Infill +	Infill +	1	27
black oak	Quercus velutina	WDH	High	4.9	54.9	8.2	Sm. inc.	Sm. inc.	Medium	Common	Good	Good	Infill ++	Infill ++	2	28
butternut	Juglans cinerea	NSLX	FIA	23.1	50.3	1.7	Unknown	Unknown	Low	Common	FIA Only	FIA Only			0	29
black willow	Salix nigra	NSH	Low	7.4	50.0	5.2	No change	No change	Low	Common	Poor	Poor	Infill +	Infill +	2	30
river birch	Betula nigra	NSL	Low	3.7	38.0	5.9	Sm. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	31
Scots pine	Pinus sylvestris	NSH	FIA	4.3	33.1	17.7	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	32
black locust	Robinia pseudoacacia	NDH	Low	5.2	29.0	7.4	Sm. inc.	Sm. inc.	Medium	Rare	Fair	Fair	Infill +	Infill +	2	33
Siberian elm	Ulmus pumila	NDH	FIA	5.6	20.9	5.7	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	34
yellow birch	Betula alleghaniensis	NDL	High	5.8	20.0	2.9	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	35
rock elm	Ulmus thomasii	NSLX	FIA	5	14.1	1.6	Unknown	Unknown	Low	Rare	FIA Only	FIA Only			0	36
shagbark hickory	Carya ovata	WSL	Medium	6.8	14.0	1.2	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	2	37
Norway spruce	Picea abies	NSH	FIA	2.1	11.9	5.0	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	38
tamarack (native)	Larix laricina	NSH	High	0.3	10.7	2.8	Lg. dec.	Lg. dec.	Low	Rare	Very Poor	Very Poor			0	39
balsam fir	Abies balsamea	NDH	High	1.1	10.3	9.1	Sm. dec.	Sm. dec.	Low	Rare	Very Poor	Very Poor			0	40
chokecherry	Prunus virginiana	NSLX	FIA	22.2	8.7	0.6	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	41
American hornbeam; musclev	Carpinus caroliniana	WSL	Low	4.7	6.9	1.2	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	42
wild plum	Prunus americana	NSLX	FIA	1.5	5.8	0.3	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	43
Norway maple	Acer platanoides	NSL	FIA	1.1	5.2	4.6	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	44
black spruce	Picea mariana	NSH	High	1.1	2.5	2.2	Sm. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	45
jack pine	Pinus banksiana	NSH	Medium	0.3	2.0	0.4	Sm. dec.	Lg. dec.	High	Rare	Poor	Poor			0	46
white mulberry	Morus alba	NSL	FIA	0.6	1.2	0.5	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	47

One x One Degree  
Climate Change Atlas Tree Species

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Northern Research Station  
Landscape Change Research Group  
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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
peachleaf willow	Salix amygdaloides	NSLX	FIA	3.4	1.2	3.2	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	48
pin cherry	Prunus pensylvanica	NSL	Low	0.1	0.9	0.1	Very Lg. dec.	Very Lg. dec.	Medium	Rare	Lost	Lost			0	49
balsam poplar	Populus balsamifera	NSH	Medium	1.1	0.7	0.6	Very Lg. dec.	Very Lg. dec.	Medium	Rare	Lost	Lost			0	50
mountain maple	Acer spicatum	NSL	Low	1.4	0.6	0.7	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor			0	51
red mulberry	Morus rubra	NSL	Low	3.4	0.4	1.1	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	52
serviceberry	Amelanchier spp.	NSL	Low	1.1	0.2	0.2	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	53
black hickory	Carya texana	NDL	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	54
mockernut hickory	Carya alba	WDL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate +	3	55
sugarberry	Celtis laevigata	NDH	Medium	0	0	0	Unknown	New Habitat	Medium	Absent	Unknown	New Habitat			0	56
eastern redbud	Cercis canadensis	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	57
American beech	Fagus grandifolia	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	58
honeylocust	Gleditsia triacanthos	NSH	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	59
Osage-orange	Maclura pomifera	NDH	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	60
sycamore	Platanus occidentalis	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	61
swamp white oak	Quercus bicolor	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	62
shingle oak	Quercus imbricaria	NDH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	63
blackjack oak	Quercus marilandica	NSL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			3	64
chinkapin oak	Quercus muehlenbergii	NSL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	65
post oak	Quercus stellata	WDH	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			3	66