

**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	9,273.2	3,580.4	46

**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	5	17	Increase	6	11	Very Good	1	1	Likely	2	2
Hickory	3			Medium	20	25	No Change	16	8	Good	7	8	Infill	22	23
Maple	2	Abundant	0	Low	22	6	Decrease	10	13	Fair	10	9	Migrate	3	9
Oak	8	Common	12	FIA	2		New	11	12	Poor	6	8			
Pine	0	Rare	22				Unknown	6	5	Very Poor	8	6			
Other	19	Absent	12							FIA Only	1	1			
	<b>34</b>		<b>46</b>		<b>49</b>	<b>48</b>		<b>49</b>	<b>49</b>	Unknown	4	3			
											<b>37</b>	<b>36</b>			

**Potential Changes in Climate Variables**

**Temperature (°F)**

	Scenario	2009	2039	2069	2099	
Annual Average	CCSM45	49.5	51.6	53.9	54.3	
	CCSM85	49.5	52.3	54.9	58.0	
	GFDL45	49.5	55.9	54.8	56.0	
	GFDL85	49.5	52.6	55.9	60.2	
	HAD45	49.5	52.2	55.7	57.4	
Growing Season (May-Sep)	CCSM45	68.6	71.0	72.9	73.7	
	CCSM85	68.6	71.9	74.4	77.9	
	GFDL45	68.6	76.7	74.9	76.8	
	GFDL85	68.6	72.5	76.1	81.6	
	HAD45	68.6	71.2	74.0	76.8	
Coldest Month Average	CCSM45	18.8	20.9	23.0	23.5	
	CCSM85	18.8	21.4	23.1	25.1	
	GFDL45	18.8	22.4	23.2	23.7	
	GFDL85	18.8	22.1	23.7	25.3	
	HAD45	18.8	20.1	23.7	23.8	
Warmest Month Average	CCSM45	74.9	77.2	78.6	79.3	
	CCSM85	74.9	78.8	80.5	82.3	
	GFDL45	74.9	78.4	79.9	81.5	
	GFDL85	74.9	79.2	80.8	84.7	
	HAD45	74.9	77.5	79.5	80.4	

**Precipitation (in)**

	Scenario	2009	2039	2069	2099	
Annual Total	CCSM45	36.2	35.0	35.9	35.0	
	CCSM85	36.2	34.5	35.7	36.2	
	GFDL45	36.2	38.8	41.4	41.1	
	GFDL85	36.2	39.5	43.5	42.9	
	HAD45	36.2	39.5	39.7	39.9	
Growing Season (May-Sep)	CCSM45	21.8	20.9	21.4	20.4	
	CCSM85	21.8	20.1	20.5	20.2	
	GFDL45	21.8	22.8	23.8	23.3	
	GFDL85	21.8	23.7	24.9	23.5	
	HAD45	21.8	22.5	21.7	22.3	
Coldest Month	CCSM45	21.8	21.5	19.9	19.5	
	CCSM85	21.8	21.5	19.9	19.5	
	GFDL45	21.8	21.5	19.9	19.5	
	GFDL85	21.8	21.5	19.9	19.5	
	HAD45	21.8	21.5	19.9	19.5	

**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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Iverson, Peters, Prasad, Matthews

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
American elm	Ulmus americana	WDH	Medium	80.3	213.4	11.4	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor	Infill +	Infill +	0	1
hackberry	Celtis occidentalis	WDH	Medium	43.1	116.8	7.0	Sm. inc.	No change	High	Common	Very Good	Good	Infill ++	Infill ++	1	2
silver maple	Acer saccharinum	NSH	Low	38.9	94.8	18.1	No change	No change	High	Common	Good	Good	Infill ++	Infill ++	2	3
black walnut	Juglans nigra	WDH	Low	47.9	82.0	8.8	No change	No change	Medium	Common	Fair	Fair	Infill +	Infill +	1	4
red mulberry	Morus rubra	NSL	Low	66.2	78.8	10.2	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor	Infill +	Infill +	0	5
white oak	Quercus alba	WDH	Medium	13.1	77.0	6.7	No change	Sm. dec.	High	Common	Good	Fair	Infill ++	Infill +	2	6
bur oak	Quercus macrocarpa	NDH	Medium	29.3	66.3	7.3	No change	No change	High	Common	Good	Good	Infill ++	Infill ++	2	7
shagbark hickory	Carya ovata	WSL	Medium	33.4	66.1	6.3	No change	Sm. dec.	Medium	Common	Fair	Poor	Infill +	Infill +	2	8
honeylocust	Gleditsia triacanthos	NSH	Low	34.5	64.0	11.9	No change	Sm. inc.	High	Common	Good	Very Good	Infill ++	Infill ++	1	9
bitternut hickory	Carya cordiformis	WSL	Low	26.9	56.0	3.3	Sm. dec.	Sm. dec.	High	Common	Fair	Fair	Infill +	Infill +	2	10
green ash	Fraxinus pennsylvanica	WSH	Low	26	54.3	6.8	No change	Sm. inc.	Medium	Common	Fair	Good	Infill +	Infill ++	2	11
shingle oak	Quercus imbricaria	NDH	Medium	18.7	51.0	7.7	No change	Sm. dec.	Medium	Common	Fair	Poor	Infill +	Infill +	2	12
black cherry	Prunus serotina	WDL	Medium	48.4	42.5	2.8	No change	Sm. dec.	Low	Rare	Very Poor	Very Poor			0	13
black oak	Quercus velutina	WDH	High	14.9	41.9	3.4	Sm. inc.	Sm. inc.	Medium	Rare	Fair	Fair	Infill +	Infill +	2	14
American basswood	Tilia americana	WSL	Medium	16.1	37.5	7.5	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			2	15
boxelder	Acer negundo	WSH	Low	39.1	36.7	6.9	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	2	16
northern red oak	Quercus rubra	WDH	Medium	12.2	33.8	3.2	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	2	17
white ash	Fraxinus americana	WDL	Medium	21.7	33.0	2.8	No change	Sm. inc.	Low	Rare	Very Poor	Poor		Infill +	2	18
slippery elm	Ulmus rubra	WSL	Low	33.9	32.7	3.0	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	1	19
eastern cottonwood	Populus deltoides	NSH	Low	29.5	29.2	9.0	Sm. inc.	Sm. inc.	Medium	Rare	Fair	Fair	Infill +	Infill +	2	20
black locust	Robinia pseudoacacia	NDH	Low	10.6	23.1	8.7	No change	Sm. inc.	Medium	Rare	Poor	Fair	Infill +	Infill +	2	21
Osage-orange	Maclura pomifera	NDH	Medium	17.1	21.0	7.1	Lg. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	2	22
swamp white oak	Quercus bicolor	NSL	Low	6.6	15.0	4.6	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	23
wild plum	Prunus americana	NSLX	FIA	6.7	11.1	11.1	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	24
black willow	Salix nigra	NSH	Low	17.9	9.3	3.4	Sm. dec.	Lg. inc.	Low	Rare	Very Poor	Fair		Infill +	2	25
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	15	8.7	3.9	Lg. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	2	26
eastern redcedar	Juniperus virginiana	WDH	Medium	6.2	8.3	2.5	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	2	27
Siberian elm	Ulmus pumila	NDH	FIA	8.6	5.7	10.6	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	28
Ohio buckeye	Aesculus glabra	NSL	Low	3.7	5.4	1.9	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	29
river birch	Betula nigra	NSL	Low	4.3	2.6	9.7	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	30
northern pin oak	Quercus ellipsoidalis	NSH	Medium	2.8	2.4	1.6	Lg. dec.	Lg. dec.	High	Rare	Poor	Poor			0	31
chinkapin oak	Quercus muehlenbergii	NSL	Medium	0.7	2.2	1.3	No change	No change	Medium	Rare	Poor	Poor			0	32
mockernut hickory	Carya alba	WDL	Medium	1.7	0.6	1.0	No change	Lg. inc.	High	Rare	Fair	Good	Infill +		2	33
quaking aspen	Populus tremuloides	WDH	High	4.3	0.2	0.8	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	34
red pine	Pinus resinosa	NSH	Medium	0	0	0	Unknown	Unknown	Low	Modeled	Unknown	Unknown			0	35
sugar maple	Acer saccharum	WDH	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	36
pawpaw	Asimina triloba	NSL	Low	0	0	0	Unknown	Unknown	Medium	Modeled	Unknown	Unknown			0	37
cittamwood/gum bumelia	Sideroxylon lanuginosum ssp.	NSL	Low	0	0	0	Unknown	New Habitat	High	Absent	Unknown	New Habitat			3	38
pecan	Carya illinoensis	NSH	Low	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat		Migrate ++	3	39
black hickory	Carya texana	NDL	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	40
sugarberry	Celtis laevigata	NDH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate ++	3	41
eastern redbud	Cercis canadensis	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Likely +	Likely +	3	42
flowering dogwood	Cornus florida	WDL	Medium	0	0	0	Unknown	Unknown	Medium	Modeled	Unknown	Unknown			0	43
common persimmon	Diospyros virginiana	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate +	3	44
sycamore	Platanus occidentalis	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	45
blackjack oak	Quercus marilandica	NSL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate +	3	46
pin oak	Quercus palustris	NSH	Low	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat	Likely +	Likely +	3	47



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post oak	Quercus stellata	WDH	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	48
winged elm	Ulmus alata	WDL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate ++	3	49