

**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	9,412.7	3,634.3	86

**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	8	19	Increase	14	17	Very Good	2	2	Likely	1	1
Hickory	7			Medium	20	34	No Change	12	11	Good	14	17	Infill	18	19
Maple	4	Abundant	1	Low	30	8	Decrease	19	17	Fair	8	8	Migrate	4	6
Oak	10	Common	20	FIA	5		New	8	9	Poor	13	11			
Pine	1	Rare	29				Unknown	10	9	Very Poor	6	5			
Other	26	Absent	12							FIA Only	3	3			
	<b>50</b>		<b>62</b>		<b>63</b>	<b>61</b>		<b>63</b>	<b>63</b>	Unknown	5	4			
											<b>51</b>	<b>50</b>			

**Potential Changes in Climate Variables**

**Temperature (°F)**

	Scenario	2009	2039	2069	2099	
Annual Average	CCSM45	51.6	53.6	55.7	56.1	
	CCSM85	51.6	54.4	56.8	59.6	
	GFDL45	51.6	56.9	57.0	58.0	
	GFDL85	51.6	54.6	57.9	62.0	
	HAD45	51.6	54.4	57.7	59.5	
	HAD85	51.6	54.8	59.5	63.8	
Growing Season (May—Sep)	CCSM45	69.8	72.1	73.9	74.7	
	CCSM85	69.8	73.1	75.4	78.6	
	GFDL45	69.8	76.2	76.1	77.8	
	GFDL85	69.8	73.5	77.3	82.4	
	HAD45	69.8	72.7	75.5	77.7	
	HAD85	69.8	73.1	78.6	82.7	
Coldest Month (Average)	CCSM45	22.1	23.8	26.0	26.2	
	CCSM85	22.1	25.1	26.5	28.1	
	GFDL45	22.1	26.2	27.0	27.6	
	GFDL85	22.1	25.5	27.0	28.2	
	HAD45	22.1	23.5	26.8	26.8	
	HAD85	22.1	25.9	29.0	31.2	
Warmest Month (Average)	CCSM45	75.8	78.1	79.4	80.2	
	CCSM85	75.8	79.6	81.3	82.8	
	GFDL45	75.8	79.3	80.9	82.1	
	GFDL85	75.8	79.9	81.6	84.9	
	HAD45	75.8	78.9	81.0	82.0	
	HAD85	75.8	80.4	83.7	86.2	

**Precipitation (in)**

	Scenario	2009	2039	2069	2099	
Annual Total	CCSM45	38.0	36.5	38.0	37.0	
	CCSM85	38.0	36.6	37.9	37.9	
	GFDL45	38.0	41.3	43.6	44.7	
	GFDL85	38.0	41.3	46.5	46.5	
	HAD45	38.0	40.0	41.6	41.0	
	HAD85	38.0	40.3	39.3	42.0	
Growing Season (May—Sep)	CCSM45	20.0	19.3	19.8	18.2	
	CCSM85	20.0	18.4	18.7	18.0	
	GFDL45	20.0	20.9	21.5	22.0	
	GFDL85	20.0	21.3	22.9	22.0	
	HAD45	20.0	20.4	19.8	19.9	
	HAD85	20.0	20.2	18.0	17.9	

**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
American elm	Ulmus americana	WDH	Medium	69.7	519.7	12.4	Sm. dec.	Sm. dec.	Medium	Abundant	Fair	Fair			0	1
silver maple	Acer saccharinum	NSH	Low	20.7	270.3	29.5	No change	No change	High	Common	Good	Good	Infill ++	Infill ++	1	2
shagbark hickory	Carya ovata	WSL	Medium	39.9	254.5	7.9	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	3
black oak	Quercus velutina	WDH	High	38.6	215.9	8.9	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor			0	4
shingle oak	Quercus imbricaria	NDH	Medium	34.4	202.3	8.4	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor	Infill +	Infill +	0	5
white oak	Quercus alba	WDH	Medium	33.5	176.7	7.9	No change	Sm. dec.	High	Common	Good	Fair			1	6
northern red oak	Quercus rubra	WDH	Medium	31.7	170.5	9.1	Sm. dec.	Lg. dec.	High	Common	Fair	Fair			1	7
honeylocust	Gleditsia triacanthos	NSH	Low	35	162.1	7.7	No change	No change	High	Common	Good	Good			1	8
white ash	Fraxinus americana	WDL	Medium	32.2	154.1	8.5	Sm. dec.	No change	Low	Common	Poor	Poor			0	9
black walnut	Juglans nigra	WDH	Low	49.8	153.8	7.2	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	10
black cherry	Prunus serotina	WDL	Medium	55.9	153.4	5.3	Sm. dec.	Sm. dec.	Low	Common	Poor	Poor			0	11
American basswood	Tilia americana	WSL	Medium	19.5	123.4	12.4	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor	Infill +	Infill +	0	12
eastern redcedar	Juniperus virginiana	WDH	Medium	18.9	121.2	12.0	No change	Sm. inc.	Medium	Common	Fair	Good	Infill +	Infill ++	1	13
sugar maple	Acer saccharum	WDH	High	21.3	120.7	8.6	No change	No change	High	Common	Good	Good	Infill ++	Infill ++	1	14
Osage-orange	Maclura pomifera	NDH	Medium	34.7	111.4	7.7	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	15
bitternut hickory	Carya cordiformis	WSL	Low	41.8	108.6	5.1	No change	No change	High	Common	Good	Good			1	16
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	28.5	106.6	5.4	Lg. dec.	Lg. dec.	High	Common	Fair	Fair			1	17
black locust	Robinia pseudoacacia	NDH	Low	17.7	102.1	17.6	Lg. dec.	No change	Medium	Common	Poor	Fair	Infill +	Infill +	1	18
hackberry	Celtis occidentalis	WDH	Medium	50.8	98.5	6.2	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	19
slippery elm	Ulmus rubra	WSL	Low	44.4	86.7	3.9	No change	Sm. inc.	Medium	Common	Fair	Good			1	20
black willow	Salix nigra	NSH	Low	12.6	57.5	10.1	Lg. dec.	No change	Low	Common	Very Poor	Poor		Infill +	0	21
sycamore	Platanus occidentalis	NSL	Low	5.3	49.9	9.4	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	22
red mulberry	Morus rubra	NSL	Low	17.6	40.1	4.5	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			1	23
green ash	Fraxinus pennsylvanica	WSH	Low	26.5	34.5	5.7	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	1	24
post oak	Quercus stellata	WDH	High	3.7	30.7	9.7	Sm. inc.	Lg. inc.	High	Rare	Good	Good			2	25
eastern cottonwood	Populus deltoides	NSH	Low	10.6	26.2	8.1	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	1	26
bur oak	Quercus macrocarpa	NDH	Medium	6.1	21.6	2.6	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	2	27
mockernut hickory	Carya alba	WDL	Medium	13.3	17.2	2.6	Sm. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	1	28
Ohio buckeye	Aesculus glabra	NSL	Low	12.3	16.1	6.9	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	29
white mulberry	Morus alba	NSL	FIA	18.2	15.7	5.8	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	30
black maple	Acer nigrum	NSH	Low	6.4	12.2	6.8	Lg. dec.	Lg. dec.	High	Rare	Poor	Poor			0	31
boxelder	Acer negundo	WSH	Low	17.9	10.4	2.6	Lg. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	1	32
sassafras	Sassafras albidum	WSL	Low	11	7.6	2.3	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	1	33
swamp white oak	Quercus bicolor	NSL	Low	3.7	6.8	2.2	No change	Sm. dec.	Medium	Rare	Poor	Very Poor	Infill +		2	34
Kentucky coffeetree	Gymnocladus dioicus	NSLX	FIA	3.6	4.5	14.5	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	35
pignut hickory	Carya glabra	WDL	Medium	5.4	3.8	1.0	Sm. inc.	No change	Medium	Rare	Fair	Poor	Infill +	Infill +	2	36
pin oak	Quercus palustris	NSH	Low	3.7	3.2	2.6	Sm. inc.	Lg. inc.	Low	Rare	Poor	Fair	Infill +	Infill +	2	37
shellbark hickory	Carya laciniosa	NSL	Low	4.2	3.0	11.2	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	38
northern catalpa	Catalpa speciosa	NSHX	FIA	4.2	2.3	8.5	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	39
pawpaw	Asimina triloba	NSL	Low	1.1	2.2	2.1	Very Lg. dec.	Very Lg. dec.	Medium	Rare	Lost	Lost			0	40
black hickory	Carya texana	NDL	High	5.8	2.1	2.8	Sm. dec.	Lg. inc.	Medium	Rare	Very Poor	Good			2	41
eastern redbud	Cercis canadensis	NSL	Low	2.6	1.9	1.1	No change	Lg. inc.	Medium	Rare	Poor	Good	Infill +	Infill ++	2	42
blackjack oak	Quercus marilandica	NSL	Medium	4	1.1	3.8	Lg. inc.	Lg. inc.	High	Rare	Good	Good			2	43
American hornbeam; muscle	Carpinus caroliniana	WSL	Low	1.1	0.7	0.7	Very Lg. dec.	Very Lg. dec.	Medium	Rare	Lost	Lost			0	44
chinkapin oak	Quercus muehlenbergii	NSL	Medium	1.1	0.7	0.7	No change	No change	Medium	Rare	Poor	Poor		Infill +	2	45
pecan	Carya illinoensis	NSH	Low	3.3	0.5	1.5	Lg. inc.	Lg. inc.	Low	Rare	Fair	Fair	Infill +	Infill +	2	46
river birch	Betula nigra	NSL	Low	4.2	0.4	1.7	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	47

One x One Degree  
Climate Change Atlas Tree Species

USDA Forest Service  
Northern Research Station  
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Common Name	Scientific Name	Range	MR	%Cell	FIAsum	FIAiv	ChngCl45	ChngCl85	Adap	Abund	Capabil45	Capabil85	SHIFT45	SHIFT85	SSO	N	
Siberian elm	Ulmus pumila	NDH	FIA	4	0.3	1.1	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	48	
chokecherry	Prunus virginiana	NSLX	FIA	3.7	0.2	0.6	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	49	
eastern white pine	Pinus strobus	WDH	High	4	0.2	0.6	Lg. dec.	Lg. dec.	Low	Rare	Very Poor	Very Poor			0	50	
red pine	Pinus resinosa	NSH	Medium	0	0	0	Unknown	Unknown	Low	Modeled	Unknown	Unknown			0	51	
red maple	Acer rubrum	WDH	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			3	52	
serviceberry	Amelanchier spp.	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	53	
cittamwood/gum bumelia	Sideroxylon lanuginosum ssp.	NSL	Low	0	0	0	Unknown	New Habitat	High	Absent	Unknown	New Habitat		Migrate +	3	54	
sugarberry	Celtis laevigata	NDH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	Migrate ++	3	55
flowering dogwood	Cornus florida	WDL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Likely +	Likely +	3	56
common persimmon	Diospyros virginiana	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate ++	Migrate ++	3	57
blue ash	Fraxinus quadrangulata	NSL	Low	0	0	0	Unknown	Unknown	Low	Absent	Unknown	Unknown			0	58	
sweetgum	Liquidambar styraciflua	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	Migrate +	3	59
pin cherry	Prunus pensylvanica	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	60	
water oak	Quercus nigra	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	61	
Shumard oak	Quercus shumardii	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate +		3	62
winged elm	Ulmus alata	WDL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	Migrate ++	3	63