

**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    9,549.4    3,687.0      165

**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	23	Increase	17	21	Very Good	7	7	Likely	0	0
Hickory	6			Medium	29	44	No Change	9	6	Good	6	12	Infill	17	17
Maple	5	Abundant	1	Low	33	11	Decrease	31	30	Fair	16	12	Migrate	5	13
Oak	9	Common	29	FIA	7		New	14	14	Poor	13	11		<b>22</b>	<b>30</b>
Pine	5	Rare	34				Unknown	11	11	Very Poor	14	14			
Other	36	Absent	17							FIA Only	3	3			
	<b>64</b>		<b>81</b>		<b>82</b>	<b>78</b>		<b>82</b>	<b>82</b>	Unknown	4	4			
											<b>63</b>	<b>63</b>			

**Potential Changes in Climate Variables**

**Temperature (°F)**

Scenario	2009	2039	2069	2099		
Annual	CCSM45	53.3	55.1	57.2	57.6	
Average	CCSM85	53.3	55.7	58.2	61.1	
	GFDL45	53.3	57.7	58.7	59.6	
	GFDL85	53.3	56.3	59.7	63.7	
	HAD45	53.3	56.1	59.6	61.1	
	HAD85	53.3	56.5	61.2	65.6	
Growing Season	CCSM45	70.6	72.6	74.2	75.2	
	CCSM85	70.6	73.3	75.6	79.1	
May—Sep	GFDL45	70.6	75.8	76.8	78.3	
	GFDL85	70.6	74.2	78.2	83.0	
	HAD45	70.6	73.8	76.9	79.0	
	HAD85	70.6	74.2	80.1	84.6	
Coldest Month	CCSM45	25.7	26.9	28.5	28.9	
Average	CCSM85	25.7	28.4	29.5	31.1	
	GFDL45	25.7	30.1	30.5	31.0	
	GFDL85	25.7	29.0	30.1	31.0	
	HAD45	25.7	27.3	30.1	30.1	
	HAD85	25.7	28.7	31.1	33.3	
Warmest Month	CCSM45	76.3	78.1	79.3	80.1	
Average	CCSM85	76.3	79.3	81.0	82.8	
	GFDL45	76.3	79.4	81.0	82.0	
	GFDL85	76.3	80.1	82.2	85.2	
	HAD45	76.3	79.9	82.4	83.3	
	HAD85	76.3	81.5	85.4	88.1	

**Precipitation (in)**

Scenario	2009	2039	2069	2099		
Annual	CCSM45	43.0	41.6	44.7	43.4	
Total	CCSM85	43.0	43.7	44.2	45.9	
	GFDL45	43.0	48.4	51.3	52.9	
	GFDL85	43.0	47.0	53.2	54.8	
	HAD45	43.0	44.5	47.0	46.4	
	HAD85	43.0	45.5	43.7	47.1	
Growing Season	CCSM45	20.2	19.4	20.2	18.7	
May—Sep	CCSM85	20.2	18.8	18.9	18.7	
	GFDL45	20.2	22.5	22.6	23.2	
	GFDL85	20.2	21.8	22.9	22.7	
	HAD45	20.2	20.1	18.8	19.2	
	HAD85	20.2	19.9	16.7	16.7	

**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
sugar maple	Acer saccharum	WDH	High	58.8	600.7	10.2	Sm. dec.	Sm. dec.	High	Abundant	Good	Good			1	1
sassafras	Sassafras albidum	WSL	Low	60.3	457.8	7.4	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	2
yellow-poplar	Liriodendron tulipifera	WDH	High	35.7	356.1	8.8	Lg. dec.	Lg. dec.	High	Common	Fair	Fair			1	3
black cherry	Prunus serotina	WDL	Medium	65.9	337.3	6.2	Sm. dec.	Sm. dec.	Low	Common	Poor	Poor			0	4
American elm	Ulmus americana	WDH	Medium	64.4	314.9	4.7	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	5
white oak	Quercus alba	WDH	Medium	41.6	283.9	7.2	Sm. dec.	Sm. dec.	High	Common	Fair	Fair			1	6
black walnut	Juglans nigra	WDH	Low	60.9	249.3	5.1	No change	No change	Medium	Common	Fair	Fair			1	7
sycamore	Platanus occidentalis	NSL	Low	40.8	239.4	5.8	No change	No change	Medium	Common	Fair	Fair			1	8
red maple	Acer rubrum	WDH	High	35.9	225.5	6.5	Sm. dec.	Sm. dec.	High	Common	Fair	Fair			1	9
shagbark hickory	Carya ovata	WSL	Medium	54.5	194.9	4.1	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor			0	10
white ash	Fraxinus americana	WDL	Medium	47.2	184.7	4.6	Sm. inc.	Sm. inc.	Low	Common	Fair	Fair			1	11
northern red oak	Quercus rubra	WDH	Medium	35.3	165.6	5.1	Sm. dec.	Lg. dec.	High	Common	Fair	Fair			1	12
slippery elm	Ulmus rubra	WSL	Low	55.6	159.8	3.7	No change	No change	Medium	Common	Fair	Fair			1	13
pignut hickory	Carya glabra	WDL	Medium	37.7	149.4	4.5	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor			0	14
honeylocust	Gleditsia triacanthos	NSH	Low	35.8	142.3	7.4	Sm. dec.	No change	High	Common	Fair	Good			1	15
Osage-orange	Maclura pomifera	NDH	Medium	14.6	130.8	11.6	Sm. dec.	Sm. inc.	High	Common	Fair	Very Good	Infill +	Infill ++	1	16
boxelder	Acer negundo	WSH	Low	37.6	128.8	5.1	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	17
hackberry	Celtis occidentalis	WDH	Medium	49.2	120.0	3.3	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	18
shingle oak	Quercus imbricaria	NDH	Medium	39.8	116.2	4.9	No change	Sm. dec.	Medium	Common	Fair	Poor	Infill +	Infill +	1	19
green ash	Fraxinus pennsylvanica	WSH	Low	43.2	109.9	3.7	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	20
bitternut hickory	Carya cordiformis	WSL	Low	35.3	109.3	2.4	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good	Infill ++	Infill ++	1	21
American beech	Fagus grandifolia	WDH	High	30.7	103.0	2.5	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor	Infill +		0	22
black oak	Quercus velutina	WDH	High	39.7	99.0	3.7	Lg. inc.	Sm. inc.	Medium	Common	Very Good	Good			1	23
eastern cottonwood	Populus deltoides	NSH	Low	29	93.3	6.0	No change	Sm. inc.	Medium	Common	Fair	Good	Infill +	Infill ++	1	24
silver maple	Acer saccharinum	NSH	Low	18.7	91.8	4.7	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good	Infill ++	Infill ++	1	25
sweetgum	Liquidambar styraciflua	WDH	High	12.6	87.7	7.8	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good	Infill ++	Infill ++	2	26
American basswood	Tilia americana	WSL	Medium	11.7	72.1	2.9	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	27
eastern white pine	Pinus strobus	WDH	High	5.2	52.5	10.0	Very Lg. dec.	Very Lg. dec.	Low	Common	Lost	Lost			0	28
eastern redbud	Cercis canadensis	NSL	Low	22.8	51.1	2.5	Lg. dec.	Sm. dec.	Medium	Common	Poor	Poor			0	29
pin oak	Quercus palustris	NSH	Low	11.5	50.3	4.5	Sm. inc.	Sm. inc.	Low	Common	Fair	Fair	Infill +	Infill +	1	30
black locust	Robinia pseudoacacia	NDH	Low	15.3	47.9	4.4	Sm. inc.	Lg. inc.	Medium	Rare	Fair	Good	Infill +	Infill ++	1	31
mockernut hickory	Carya alba	WDL	Medium	13.8	43.7	4.3	Sm. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	1	32
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	24.5	41.2	2.1	Sm. dec.	No change	High	Rare	Poor	Fair		Infill +	1	33
red pine	Pinus resinosa	NSH	Medium	2.8	34.5	9.5	Lg. dec.	Lg. dec.	Low	Rare	Very Poor	Very Poor			2	34
river birch	Betula nigra	NSL	Low	12.8	34.1	3.0	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	35
bigtooth aspen	Populus grandidentata	NSL	Medium	5.5	33.5	3.2	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	36
chinkapin oak	Quercus muehlenbergii	NSL	Medium	26.2	31.9	2.1	No change	Sm. dec.	Medium	Rare	Poor	Very Poor	Infill +		1	37
red mulberry	Morus rubra	NSL	Low	16.3	31.0	2.0	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	38
Ohio buckeye	Aesculus glabra	NSL	Low	14.8	26.4	2.0	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	39
shellbark hickory	Carya laciniosa	NSL	Low	3.9	26.2	6.2	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			2	40
flowering dogwood	Cornus florida	WDL	Medium	23.8	18.5	1.2	No change	No change	Medium	Rare	Poor	Poor			1	41
Virginia pine	Pinus virginiana	NDH	High	5.4	18.4	3.6	Sm. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			2	42
Kentucky coffeetree	Gymnocladus dioicus	NSLX	FIA	4.6	17.5	2.3	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	43
common persimmon	Diospyros virginiana	NSL	Low	8.2	16.3	5.6	Sm. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	1	44
bur oak	Quercus macrocarpa	NDH	Medium	12.1	14.7	1.8	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor	Infill +	Infill +	2	45
American hornbeam; muscle	Carpinus caroliniana	WSL	Low	17	14.4	1.2	Sm. inc.	Lg. inc.	Medium	Rare	Fair	Good		Infill ++	1	46
black willow	Salix nigra	NSH	Low	4.2	13.4	3.2	No change	Lg. inc.	Low	Rare	Very Poor	Fair		Infill +	2	47



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eastern redcedar	Juniperus virginiana	WDH	Medium	7.1	12.5	1.6	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	2	48
Scots pine	Pinus sylvestris	NSH	FIA	1	11.1	10.6	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	49
pawpaw	Asimina triloba	NSL	Low	15.8	10.0	0.9	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	50
black maple	Acer nigrum	NSH	Low	0.6	9.5	5.6	Lg. dec.	Lg. dec.	High	Rare	Poor	Poor			0	51
swamp chestnut oak	Quercus michauxii	NSL	Low	1	8.9	1.8	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	52
blue ash	Fraxinus quadrangulata	NSL	Low	2.1	7.5	3.6	Sm. dec.	Sm. dec.	Low	Rare	Very Poor	Very Poor			2	53
blackgum	Nyssa sylvatica	WDL	Medium	8.7	7.4	0.8	Sm. inc.	Sm. inc.	High	Rare	Good	Good	Infill ++	Infill ++	2	54
white mulberry	Morus alba	NSL	FIA	3.1	4.6	1.5	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	55
swamp white oak	Quercus bicolor	NSL	Low	1.8	4.0	0.5	No change	Sm. dec.	Medium	Rare	Poor	Very Poor	Infill +		2	56
shortleaf pine	Pinus echinata	WDH	High	2.1	3.4	1.6	Sm. dec.	Lg. inc.	Medium	Rare	Very Poor	Good			2	57
waterlocust	Gleditsia aquatica	NSLX	FIA	1	3.0	2.9	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	58
serviceberry	Amelanchier spp.	NSL	Low	2.1	2.3	1.1	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	59
Siberian elm	Ulmus pumila	NDH	FIA	5.2	2.3	1.9	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	60
northern catalpa	Catalpa speciosa	NSHX	FIA	1	0.8	0.8	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	61
ailanthus	Ailanthus altissima	NSL	FIA	0.3	0.5	0.1	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	62
pecan	Carya illinoensis	NSH	Low	4.2	0.4	1.5	Lg. inc.	Lg. inc.	Low	Rare	Fair	Fair	Infill +	Infill +	2	63
bald cypress	Taxodium distichum	NSH	Medium	1.6	0.3	0.4	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	64
loblolly pine	Pinus taeda	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate ++	3	65
striped maple	Acer pensylvanicum	NSL	Medium	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	66
mountain maple	Acer spicatum	NSL	Low	0	0	0	Unknown	Unknown	High	Absent	Unknown	Unknown			0	67
cittamwood/gum bumelia	Sideroxylon lanuginosum ssp.	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate +	3	68
black hickory	Carya texana	NDL	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	69
sugarberry	Celtis laevigata	NDH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	70
black ash	Fraxinus nigra	WSH	Medium	0	0	0	Unknown	Unknown	Low	Modeled	Unknown	Unknown			0	71
pin cherry	Prunus pensylvanica	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	72
southern red oak	Quercus falcata	WDL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	73
cherrybark oak; swamp red o.	Quercus pagoda	NSL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	74
overcup oak	Quercus lyrata	NSL	Medium	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat		Migrate +	3	75
blackjack oak	Quercus marilandica	NSL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate ++	3	76
water oak	Quercus nigra	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate ++	3	77
willow oak	Quercus phellos	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	78
Shumard oak	Quercus shumardii	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate +	3	79
post oak	Quercus stellata	WDH	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate ++	Migrate ++	3	80
winged elm	Ulmus alata	WDL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	81
cedar elm	Ulmus crassifolia	NDH	Medium	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat			3	82