

**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  
 8,952.1    3,456.4    138

**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	22	24	Increase	24	28	Very Good	5	2	Likely	1	1
Hickory	4			Medium	37	54	No Change	17	11	Good	19	27	Infill	15	15
Maple	6	Abundant	2	Low	34	17	Decrease	20	22	Fair	11	9	Migrate	12	14
Oak	14	Common	23	FIA	6		New	25	27	Poor	11	7			
Pine	6	Rare	42				Unknown	13	11	Very Poor	14	14			
Other	34	Absent	31							FIA Only	2	2			
	<b>67</b>		<b>98</b>		<b>99</b>	<b>95</b>		<b>99</b>	<b>99</b>	Unknown	7	5			
											<b>69</b>	<b>66</b>			

**Potential Changes in Climate Variables**

**Temperature (°F)**

Scenario	2009	2039	2069	2099		
Annual	CCSM45	52.4	54.1	56.2	56.5	
Average	CCSM85	52.4	54.5	57.0	60.0	
	GFDL45	52.4	56.7	57.8	58.9	
	GFDL85	52.4	55.5	59.0	63.0	
	HAD45	52.4	54.8	58.1	59.6	
	HAD85	52.4	54.9	58.9	63.4	
Growing Season	CCSM45	68.4	70.3	72.1	72.5	
	CCSM85	68.4	70.5	73.0	76.6	
May—Sep	GFDL45	68.4	73.2	74.7	75.9	
	GFDL85	68.4	72.1	76.0	80.1	
	HAD45	68.4	71.2	74.0	75.9	
	HAD85	68.4	70.6	75.1	79.9	
Coldest Month	CCSM45	28.4	30.2	31.8	32.3	
	CCSM85	28.4	30.8	32.1	33.9	
Average	GFDL45	28.4	31.6	32.6	33.4	
	GFDL85	28.4	31.6	32.9	34.8	
	HAD45	28.4	29.7	32.1	32.4	
	HAD85	28.4	30.6	32.5	34.9	
Warmest Month	CCSM45	74.5	76.6	77.7	77.7	
	CCSM85	74.5	76.9	78.5	80.2	
Average	GFDL45	74.5	77.3	79.1	80.3	
	GFDL85	74.5	78.4	80.7	83.2	
	HAD45	74.5	77.6	79.0	80.0	
	HAD85	74.5	77.3	79.6	82.8	

**Precipitation (in)**

Scenario	2009	2039	2069	2099		
Annual	CCSM45	48.3	51.1	52.4	56.5	
Total	CCSM85	48.3	51.7	54.5	58.2	
	GFDL45	48.3	54.2	58.0	57.6	
	GFDL85	48.3	52.4	57.5	60.3	
	HAD45	48.3	51.3	52.5	52.5	
	HAD85	48.3	54.2	51.9	54.1	
Growing Season	CCSM45	21.7	25.9	25.9	28.0	
	CCSM85	21.7	24.5	26.5	26.9	
May—Sep	GFDL45	21.7	23.6	24.7	26.2	
	GFDL85	21.7	23.0	24.9	26.2	
	HAD45	21.7	23.6	21.9	21.2	
	HAD85	21.7	23.4	21.1	20.8	

**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
red maple	Acer rubrum	WDH	High	71.3	911.2	14.9	No change	Sm. dec.	High	Abundant	Very Good	Good			1	1
pitch pine	Pinus rigida	NSH	High	14	539.0	26.8	Lg. dec.	Lg. dec.	Medium	Abundant	Fair	Fair			0	2
white ash	Fraxinus americana	WDL	Medium	50.5	492.0	12.4	Sm. dec.	Lg. dec.	Low	Common	Poor	Very Poor			0	3
yellow-poplar	Liriodendron tulipifera	WDH	High	35.6	378.2	12.4	Sm. inc.	No change	High	Common	Very Good	Good			1	4
black cherry	Prunus serotina	WDL	Medium	50.8	329.7	10.0	No change	No change	Low	Common	Poor	Poor			0	5
sweetgum	Liquidambar styraciflua	WDH	High	18.3	303.1	24.5	Sm. inc.	Lg. inc.	Medium	Common	Good	Very Good			1	6
white oak	Quercus alba	WDH	Medium	43.4	253.5	8.5	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	7
chestnut oak	Quercus prinus	NDH	High	35.3	245.6	9.1	No change	Sm. dec.	High	Common	Good	Fair			1	8
black oak	Quercus velutina	WDH	High	35.8	242.7	7.1	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	9
eastern redcedar	Juniperus virginiana	WDH	Medium	40.1	237.8	9.3	No change	No change	Medium	Common	Fair	Fair			1	10
northern red oak	Quercus rubra	WDH	Medium	36.8	229.8	7.6	No change	No change	High	Common	Good	Good			1	11
blackgum	Nyssa sylvatica	WDL	Medium	37.9	216.2	6.4	No change	No change	High	Common	Good	Good			1	12
sweet birch	Betula lenta	NDH	High	36.4	207.0	7.7	Lg. dec.	Lg. dec.	Low	Common	Very Poor	Very Poor			0	13
sugar maple	Acer saccharum	WDH	High	33.4	178.5	7.5	Sm. inc.	No change	High	Common	Very Good	Good			1	14
sassafras	Sassafras albidum	WSL	Low	34.3	124.7	4.6	No change	Sm. dec.	Medium	Common	Fair	Poor			1	15
pin oak	Quercus palustris	NSH	Low	16.7	122.1	8.9	Sm. dec.	Sm. dec.	Low	Common	Poor	Poor			0	16
American beech	Fagus grandifolia	WDH	High	24.6	114.3	5.6	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	17
flowering dogwood	Cornus florida	WDL	Medium	14.3	85.6	8.3	Lg. dec.	Sm. dec.	Medium	Common	Poor	Poor			0	18
scarlet oak	Quercus coccinea	WDL	Medium	28.4	83.7	5.5	Lg. inc.	Sm. inc.	Medium	Common	Very Good	Good			1	19
black locust	Robinia pseudoacacia	NDH	Low	11	76.4	7.4	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	20
green ash	Fraxinus pennsylvanica	WSH	Low	7.5	76.1	9.7	No change	No change	Medium	Common	Fair	Fair	Infill +	Infill +	1	21
black walnut	Juglans nigra	WDH	Low	20.6	74.8	5.0	No change	No change	Medium	Common	Fair	Fair			1	22
Atlantic white-cedar	Chamaecyparis thyoides	NSH	Low	0.5	70.4	7.9	Lg. dec.	Lg. dec.	Low	Common	Very Poor	Very Poor			2	23
pignut hickory	Carya glabra	WDL	Medium	26.3	65.2	3.1	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	24
American elm	Ulmus americana	WDH	Medium	25.6	58.8	4.7	No change	Sm. inc.	Medium	Common	Fair	Good			1	25
bigtooth aspen	Populus grandidentata	NSL	Medium	6	42.2	5.9	Lg. dec.	Very Lg. dec.	Medium	Rare	Very Poor	Lost			0	26
eastern cottonwood	Populus deltoides	NSH	Low	4.8	41.9	13.9	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			2	27
eastern white pine	Pinus strobus	WDH	High	16.3	40.9	9.6	Sm. inc.	Lg. dec.	Low	Rare	Poor	Very Poor			1	28
ailanthus	Ailanthus altissima	NSL	FIA	8.4	37.5	5.8	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	29
shagbark hickory	Carya ovata	WSL	Medium	14.6	32.2	4.9	Sm. inc.	Sm. inc.	Medium	Rare	Fair	Fair	Infill +	Infill +	1	30
yellow birch	Betula alleghaniensis	NDL	High	8.2	29.9	5.2	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	31
Scots pine	Pinus sylvestris	NSH	FIA	1.1	29.1	26.1	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	32
American basswood	Tilia americana	WSL	Medium	4.8	23.2	2.6	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	1	33
swamp white oak	Quercus bicolor	NSL	Low	3.3	18.7	5.6	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			2	34
slippery elm	Ulmus rubra	WSL	Low	9.3	18.7	2.1	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	1	35
mockernut hickory	Carya alba	WDL	Medium	17.2	17.1	1.7	Lg. inc.	Lg. inc.	High	Rare	Good	Good			1	36
sycamore	Platanus occidentalis	NSL	Low	6.6	16.2	3.9	No change	Sm. inc.	Medium	Rare	Poor	Fair	Infill +	Infill +	2	37
bitternut hickory	Carya cordiformis	WSL	Low	9	11.9	3.4	No change	Sm. inc.	High	Rare	Fair	Good	Infill +	Infill ++	1	38
Norway maple	Acer platanoides	NSL	FIA	12.6	11.9	2.6	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	39
shortleaf pine	Pinus echinata	WDH	High	2.2	11.0	4.9	Sm. inc.	Lg. inc.	Medium	Rare	Fair	Good	Infill +	Infill ++	2	40
serviceberry	Amelanchier spp.	NSL	Low	9.1	9.9	1.4	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	41
river birch	Betula nigra	NSL	Low	11.2	9.2	3.4	Sm. dec.	Sm. inc.	Medium	Rare	Very Poor	Fair		Infill +	1	42
Norway spruce	Picea abies	NSH	FIA	5.5	8.6	2.9	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	43
silver maple	Acer saccharinum	NSH	Low	8.5	8.1	3.1	No change	Sm. inc.	High	Rare	Fair	Good	Infill +	Infill ++	2	44
American hornbeam; muscley	Carpinus caroliniana	WSL	Low	15.4	7.8	0.9	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	1	45
Osage-orange	Maclura pomifera	NDH	Medium	4	7.5	7.1	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor			0	46
American holly	Ilex opaca	NSL	Medium	2.1	7.1	11.8	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	2	47

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boxelder	Acer negundo	WSH	Low	12.6	6.2	4.2	Lg. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	1	48
sweetbay	Magnolia virginiana	NSL	Medium	6.3	6.1	0.8	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	2	49
eastern hemlock	Tsuga canadensis	NSH	High	7.1	5.8	1.2	Sm. inc.	No change	Low	Rare	Poor	Very Poor	Infill +		2	50
blackjack oak	Quercus marilandica	NSL	Medium	0.1	5.7	0.5	No change	Lg. inc.	High	Rare	Fair	Good	Infill +		2	51
red pine	Pinus resinosa	NSH	Medium	1.1	4.9	4.4	Very Lg. dec.	Very Lg. dec.	Low	Rare	Lost	Lost			0	52
gray birch	Betula populifolia	NSL	Low	4.9	4.4	1.1	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	53
red mulberry	Morus rubra	NSL	Low	1.1	4.2	3.8	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	54
black ash	Fraxinus nigra	WSH	Medium	1.9	4.1	1.5	Lg. dec.	Lg. dec.	Low	Rare	Very Poor	Very Poor			0	55
black willow	Salix nigra	NSH	Low	1.1	3.9	3.5	Sm. dec.	Lg. inc.	Low	Rare	Very Poor	Fair		Infill +	2	56
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	10.5	3.8	0.8	Lg. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	1	57
Virginia pine	Pinus virginiana	NDH	High	1.5	3.6	1.2	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	58
post oak	Quercus stellata	WDH	High	1.1	2.9	2.6	Lg. inc.	Lg. inc.	High	Rare	Good	Good			2	59
bear oak; scrub oak	Quercus ilicifolia	NSLX	FIA	2.2	1.3	0.6	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	60
southern red oak	Quercus falcata	WDL	Medium	0.4	1.3	0.4	Lg. inc.	Lg. inc.	High	Rare	Good	Good			2	61
American chestnut	Castanea dentata	NSLX	FIA	0.9	1.2	0.9	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	62
willow oak	Quercus phellos	NSLX	Low	0.4	1.1	0.4	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	63
striped maple	Acer pensylvanicum	NSL	Medium	1.1	0.9	0.8	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	64
quaking aspen	Populus tremuloides	WDH	High	4.5	0.7	2.5	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	65
chinkapin oak	Quercus muehlenbergii	NSL	Medium	1.1	0.6	0.6	No change	Lg. inc.	Medium	Rare	Poor	Good			2	66
laurel oak	Quercus laurifolia	NDH	Medium	0.6	0.4	0.2	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	67
slash pine	Pinus elliotii	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	68
longleaf pine	Pinus palustris	NSH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	69
pond pine	Pinus serotina	NSH	Medium	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat	Migrate ++	Migrate +	3	70
loblolly pine	Pinus taeda	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate ++	Migrate ++	3	71
bald cypress	Taxodium distichum	NSH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	72
florida maple	Acer barbatum	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			3	73
mountain maple	Acer spicatum	NSL	Low	0	0	0	Unknown	Unknown	High	Absent	Unknown	Unknown			0	74
Ohio buckeye	Aesculus glabra	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	75
yellow buckeye	Aesculus flava	NSL	Low	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat			3	76
pawpaw	Asimina triloba	NSL	Low	0	0	0	Unknown	Unknown	Medium	Modeled	Unknown	Unknown			0	77
cittamwood/gum bumelia	Sideroxylon lanuginosum ssp.	NSL	Low	0	0	0	Unknown	New Habitat	High	Absent	Unknown	New Habitat			0	78
water hickory	Carya aquatica	NSL	Medium	0	0	0	Unknown	New Habitat	Medium	Absent	Unknown	New Habitat			3	79
pecan	Carya illinoensis	NSH	Low	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat			3	80
black hickory	Carya texana	NDL	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	81
sugarberry	Celtis laevigata	NDH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	82
hackberry	Celtis occidentalis	WDH	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Likely +	Likely +	3	83
eastern redbud	Cercis canadensis	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	84
common persimmon	Diospyros virginiana	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	85
loblolly-bay	Gordonia lasianthus	NSH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	86
mountain or Fraser magnolia	Magnolia fraseri	NSL	Low	0	0	0	Unknown	Unknown	Low	Absent	Unknown	Unknown			0	87
water tupelo	Nyssa aquatica	NSH	Medium	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat		Migrate +	3	88
swamp tupelo	Nyssa biflora	NDH	Medium	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	89
sourwood	Oxydendrum arboreum	NDL	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	90
redbay	Persea borbonia	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	91
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	92
turkey oak	Quercus laevis	NSH	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			3	93
overcup oak	Quercus lyrata	NSL	Medium	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat			3	94

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swamp chestnut oak	Quercus michauxii	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	95
water oak	Quercus nigra	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	96
live oak	Quercus virginiana	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	97
bluejack oak	Quercus incana	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	98
winged elm	Ulmus alata	WDL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	99