

**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	146

**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	23	25	Increase	24	27	Very Good	7	9	Likely	2	2
Hickory	4			Medium	34	58	No Change	9	11	Good	20	22	Infill	14	18
Maple	5	Abundant	3	Low	35	13	Decrease	27	22	Fair	8	6	Migrate	11	14
Oak	13	Common	28	FIA	10		New	24	24	Poor	8	8		27	34
Pine	6	Rare	39				Unknown	18	18	Very Poor	16	14			
Other	40	Absent	31							FIA Only	4	4			
	<b>70</b>		<b>101</b>		<b>102</b>	<b>96</b>		<b>102</b>	<b>102</b>	Unknown	8	8			
											<b>71</b>	<b>71</b>			

**Potential Changes in Climate Variables**

**Temperature (°F)**

	Scenario	2009	2039	2069	2099	
Annual Average	CCSM45	53.5	55.3	57.5	57.8	
	CCSM85	53.5	55.7	58.2	61.3	
	GFDL45	53.5	57.3	59.2	60.3	
	GFDL85	53.5	56.9	60.4	64.5	
	HAD45	53.5	56.2	59.6	61.1	
HAD85	53.5	56.4	60.6	65.2		
Growing Season (May—Sep)	CCSM45	69.5	71.3	73.2	73.7	
	CCSM85	69.5	71.6	74.2	78.1	
	GFDL45	69.5	73.9	76.2	77.8	
	GFDL85	69.5	73.7	77.7	82.2	
	HAD45	69.5	72.5	75.8	77.7	
HAD85	69.5	72.4	77.4	82.7		
Coldest Month Average	CCSM45	29.5	31.3	32.9	33.3	
	CCSM85	29.5	31.8	33.2	34.8	
	GFDL45	29.5	32.7	33.3	34.0	
	GFDL85	29.5	32.4	33.6	35.1	
	HAD45	29.5	31.3	33.6	33.7	
HAD85	29.5	31.8	33.6	35.6		
Warmest Month Average	CCSM45	75.3	77.4	78.3	78.7	
	CCSM85	75.3	77.6	79.5	81.2	
	GFDL45	75.3	78.3	80.3	81.7	
	GFDL85	75.3	79.9	82.3	85.1	
	HAD45	75.3	78.8	80.8	82.0	
HAD85	75.3	79.1	82.3	85.9		

**Precipitation (in)**

	Scenario	2009	2039	2069	2099	
Annual Total	CCSM45	41.7	45.0	46.1	48.1	
	CCSM85	41.7	45.3	46.8	52.5	
	GFDL45	41.7	46.7	49.4	49.6	
	GFDL85	41.7	43.0	49.3	50.7	
	HAD45	41.7	44.5	45.5	44.7	
HAD85	41.7	47.5	43.2	47.0		
Growing Season (May—Sep)	CCSM45	18.8	21.7	22.3	23.0	
	CCSM85	18.8	21.6	21.9	24.3	
	GFDL45	18.8	19.8	20.6	20.9	
	GFDL85	18.8	18.0	20.2	20.6	
	HAD45	18.8	20.3	18.8	18.2	
HAD85	18.8	20.7	17.8	18.8		

**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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Common Name	Scientific Name	Range	MR	%Cell	FIAsum	FIAiv	ChngCl45	ChngCl85	Adap	Abund	Capabil45	Capabil85	SHIFT45	SHIFT85	SSO	N
chestnut oak	Quercus prinus	NDH	High	53.9	865.6	15.6	Lg. dec.	Lg. dec.	High	Abundant	Good	Good			1	1
red maple	Acer rubrum	WDH	High	54.7	754.4	10.8	Sm. dec.	Sm. dec.	High	Abundant	Good	Good			1	2
yellow-poplar	Liriodendron tulipifera	WDH	High	38.7	566.5	10.2	Sm. dec.	Lg. dec.	High	Abundant	Good	Good			1	3
black cherry	Prunus serotina	WDL	Medium	60.7	470.2	7.9	Sm. dec.	Sm. dec.	Low	Common	Poor	Poor			0	4
white oak	Quercus alba	WDH	Medium	50.1	377.7	5.2	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	5
black locust	Robinia pseudoacacia	NDH	Low	39.7	336.5	9.6	Lg. dec.	Sm. dec.	Medium	Common	Poor	Poor			0	6
white ash	Fraxinus americana	WDL	Medium	41.7	300.0	6.5	No change	No change	Low	Common	Poor	Poor			0	7
northern red oak	Quercus rubra	WDH	Medium	47.6	294.7	5.6	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	8
black oak	Quercus velutina	WDH	High	44.5	274.8	5.6	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	9
eastern redcedar	Juniperus virginiana	WDH	Medium	16.7	268.9	12.7	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	10
black walnut	Juglans nigra	WDH	Low	31.5	232.4	6.6	No change	No change	Medium	Common	Fair	Fair			1	11
blackgum	Nyssa sylvatica	WDL	Medium	39.6	213.6	4.8	No change	Sm. inc.	High	Common	Good	Very Good			1	12
pignut hickory	Carya glabra	WDL	Medium	44.6	201.2	4.5	Sm. inc.	No change	Medium	Common	Good	Fair			1	13
sweet birch	Betula lenta	NDH	High	15.4	183.4	6.8	Lg. dec.	Lg. dec.	Low	Common	Very Poor	Very Poor			0	14
mockernut hickory	Carya alba	WDL	Medium	28.4	161.6	4.3	Sm. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	15
ailanthus	Ailanthus altissima	NSL	FIA	35.8	155.7	3.9	Unknown	Unknown	NA	Common	NNIS	NNIS			0	16
boxelder	Acer negundo	WSH	Low	21.2	154.6	9.0	Sm. dec.	No change	High	Common	Fair	Good			1	17
bitternut hickory	Carya cordiformis	WSL	Low	22.1	141.7	7.4	No change	Sm. inc.	High	Common	Good	Very Good			1	18
eastern white pine	Pinus strobus	WDH	High	5.4	125.2	9.7	Lg. dec.	Lg. dec.	Low	Common	Very Poor	Very Poor			0	19
hackberry	Celtis occidentalis	WDH	Medium	18	125.2	4.5	Sm. dec.	No change	High	Common	Fair	Good	Infill +	Infill ++	1	20
scarlet oak	Quercus coccinea	WDL	Medium	23.7	121.4	4.0	No change	Sm. dec.	Medium	Common	Fair	Poor			1	21
American beech	Fagus grandifolia	WDH	High	12.9	118.9	6.2	Sm. inc.	No change	Medium	Common	Good	Fair	Infill ++	Infill +	1	22
sassafras	Sassafras albidum	WSL	Low	24.1	109.9	3.0	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	23
sycamore	Platanus occidentalis	NSL	Low	18.1	82.0	4.9	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good	Infill ++	Infill ++	1	24
silver maple	Acer saccharinum	NSH	Low	8.7	81.3	11.1	Sm. dec.	No change	High	Common	Fair	Good	Infill +	Infill ++	1	25
shagbark hickory	Carya ovata	WSL	Medium	25.1	66.5	4.0	Sm. inc.	Sm. inc.	Medium	Common	Good	Good	Infill ++	Infill ++	1	26
eastern cottonwood	Populus deltoides	NSH	Low	0.9	58.3	47.9	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor			0	27
pin oak	Quercus palustris	NSH	Low	11	54.2	8.7	Sm. dec.	No change	Low	Common	Poor	Poor		Infill +	0	28
Norway spruce	Picea abies	NSH	FIA	1	52.4	50.0	Unknown	Unknown	NA	Common	NNIS	NNIS			0	29
American elm	Ulmus americana	WDH	Medium	28.7	51.8	2.6	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good	Infill ++	Infill ++	1	30
Virginia pine	Pinus virginiana	NDH	High	19.4	51.2	2.5	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	31
sugar maple	Acer saccharum	WDH	High	7.1	46.3	5.0	Lg. inc.	Sm. inc.	High	Rare	Good	Good	Infill ++	Infill ++	2	32
American basswood	Tilia americana	WSL	Medium	5.9	33.3	3.3	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	33
green ash	Fraxinus pennsylvanica	WSH	Low	9.2	32.5	5.3	Sm. inc.	Sm. inc.	Medium	Rare	Fair	Fair	Infill +	Infill +	1	34
eastern hemlock	Tsuga canadensis	NSH	High	4.6	31.5	5.5	Sm. dec.	Lg. dec.	Low	Rare	Very Poor	Very Poor			2	35
slippery elm	Ulmus rubra	WSL	Low	10.7	29.9	2.2	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	1	36
Norway maple	Acer platanoides	NSL	FIA	6.1	28.9	6.1	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	37
American hornbeam; musclev	Carpinus caroliniana	WSL	Low	6.3	26.2	1.0	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	1	38
red mulberry	Morus rubra	NSL	Low	9.9	26.2	6.8	Sm. dec.	No change	Medium	Rare	Very Poor	Poor		Infill +	1	39
southern red oak	Quercus falcata	WDL	Medium	5.2	19.3	3.3	Lg. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	2	40
eastern redbud	Cercis canadensis	NSL	Low	12.9	17.3	1.7	Sm. inc.	Lg. inc.	Medium	Rare	Fair	Good	Infill +	Infill ++	1	41
pawpaw	Asimina triloba	NSL	Low	8.5	16.7	2.6	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	42
swamp chestnut oak	Quercus michauxii	NSL	Low	5.9	16.0	1.6	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			2	43
white mulberry	Morus alba	NSL	FIA	7.3	15.1	6.7	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	44
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	12.3	12.7	2.2	Lg. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	2	45
common persimmon	Diospyros virginiana	NSL	Low	1.3	12.7	3.9	Sm. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	2	46
serviceberry	Amelanchier spp.	NSL	Low	10.6	12.7	0.9	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	47



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pitch pine	Pinus rigida	NSH	High	6.8	12.2	1.8	Sm. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	48
flowering dogwood	Cornus florida	WDL	Medium	15.2	12.1	0.8	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			1	49
yellow birch	Betula alleghaniensis	NDL	High	2	11.2	4.9	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	50
Osage-orange	Maclura pomifera	NDH	Medium	1.3	10.1	4.2	Sm. dec.	No change	High	Rare	Poor	Fair	Infill +		2	51
honeylocust	Gleditsia triacanthos	NSH	Low	2.1	7.1	3.4	No change	Lg. inc.	High	Rare	Fair	Good			2	52
paulownia	Paulownia tomentosa	NSL	FIA	1.5	7.0	1.9	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	53
black willow	Salix nigra	NSH	Low	2.1	6.7	3.2	No change	Lg. inc.	Low	Rare	Very Poor	Fair	Infill +		2	54
butternut	Juglans cinerea	NSLX	FIA	1.3	5.8	2.3	Unknown	Unknown	Low	Rare	FIA Only	FIA Only			0	55
shingle oak	Quercus imbricaria	NDH	Medium	1.5	5.4	1.4	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	56
loblolly pine	Pinus taeda	WDH	High	1.1	5.2	1.8	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	57
swamp white oak	Quercus bicolor	NSL	Low	4.2	4.3	16.2	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	58
willow oak	Quercus phellos	NSL	Low	1.3	3.6	0.8	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	59
river birch	Betula nigra	NSL	Low	1	2.8	2.7	No change	Lg. inc.	Medium	Rare	Poor	Good			2	60
Scots pine	Pinus sylvestris	NSH	FIA	0.3	2.6	0.7	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	61
chinkapin oak	Quercus muehlenbergii	NSL	Medium	1	2.6	2.5	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	62
cucumbertree	Magnolia acuminata	NSL	Low	1.4	2.5	0.6	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	63
shortleaf pine	Pinus echinata	WDH	High	0.3	1.7	0.5	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	64
chokecherry	Prunus virginiana	NSLX	FIA	1	1.7	1.6	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	65
pin cherry	Prunus pensylvanica	NSL	Low	1	1.5	1.4	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	66
American chestnut	Castanea dentata	NSLX	FIA	0.4	1.3	0.5	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	67
bigtooth aspen	Populus grandidentata	NSL	Medium	0.1	1.2	0.1	Very Lg. dec.	Very Lg. dec.	Medium	Rare	Lost	Lost			0	68
white spruce	Picea glauca	NSL	Medium	0.1	0.4	0.0	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	69
bear oak; scrub oak	Quercus ilicifolia	NSLX	FIA	4.2	0.2	0.7	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	70
ashe juniper	Juniperus ashei	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	71
red spruce	Picea rubens	NDH	High	0	0	0	Unknown	Unknown	Low	Absent	Unknown	Unknown			0	72
longleaf pine	Pinus palustris	NSH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +		3	73
bald cypress	Taxodium distichum	NSH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	74
florida maple	Acer barbatum	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	75
striped maple	Acer pensylvanicum	NSL	Medium	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	76
mountain maple	Acer spicatum	NSL	Low	0	0	0	Unknown	Unknown	High	Absent	Unknown	Unknown			0	77
cittamwood/gum bumelia	Sideroxylon lanuginosum ssp.	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			0	78
water hickory	Carya aquatica	NSL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	79
pecan	Carya illinoensis	NSH	Low	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat			3	80
shellbark hickory	Carya laciniosa	NSL	Low	0	0	0	Unknown	Unknown	Medium	Modeled	Unknown	Unknown			0	81
black hickory	Carya texana	NDL	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	82
sugarberry	Celtis laevigata	NDH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	83
American holly	Ilex opaca	NSL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Likely +	Likely +	3	84
sweetgum	Liquidambar styraciflua	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Likely +	Likely +	3	85
sweetbay	Magnolia virginiana	NSL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	86
bigleaf magnolia	Magnolia macrophylla	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	87
swamp tupelo	Nyssa biflora	NDH	Medium	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	88
sourwood	Oxydendrum arboreum	NDL	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	89
redbay	Persea borbonia	NSL	Low	0	0	0	Unknown	Unknown	High	Absent	Unknown	Unknown			0	90
quaking aspen	Populus tremuloides	WDH	High	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	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
laurel oak	Quercus laurifolia	NDH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	93
overcup oak	Quercus lyrata	NSL	Medium	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat		Migrate +	3	94



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blackjack oak	Quercus marilandica	NSL	Medium	0	0	0	New Habitat	New Habitat	High	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
Shumard oak	Quercus shumardii	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			3	97
post oak	Quercus stellata	WDH	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate ++	Migrate ++	3	98
live oak	Quercus virginiana	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	99
bluejack oak	Quercus incana	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	100
winged elm	Ulmus alata	WDL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	101
cedar elm	Ulmus crassifolia	NDH	Medium	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat			0	102