

**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	9,941.4	3,838.4	286

**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	Scenario	Scenario	Scenario	SHIFT	SHIFT				
						RCP45	RCP85	RCP45	RCP85	RCP45	RCP85				
Ash	3			High	23	26	Increase	20	26	Very Good	12	16	Likely	1	1
Hickory	6			Medium	28	53	No Change	11	10	Good	10	13	Infill	4	7
Maple	6	Abundant	5	Low	40	15	Decrease	39	34	Fair	11	5	Migrate	2	9
Oak	10	Common	37	FIA	7		New	14	17	Poor	15	17			
Pine	6	Rare	35				Unknown	14	11	Very Poor	18	16			
Other	46	Absent	21							FIA Only	4	4			
	<b>77</b>		<b>98</b>		<b>98</b>	<b>94</b>		<b>98</b>	<b>98</b>	Unknown	7	4			
											<b>77</b>	<b>75</b>			

**Potential Changes in Climate Variables**

**Temperature (°F)**

	Scenario	2009	2039	2069	2099	
Annual Average	CCSM45	55.9	57.8	60.0	60.2	
	CCSM85	55.9	58.2	60.6	63.5	
	GFDL45	55.9	58.7	61.2	61.9	
	GFDL85	55.9	58.8	62.3	65.9	
	HAD45	55.9	58.2	61.4	62.6	
HAD85	55.9	58.5	62.9	66.9		
Growing Season (May—Sep)	CCSM45	70.4	72.3	74.4	74.9	
	CCSM85	70.4	72.6	75.2	79.1	
	GFDL45	70.4	73.8	76.8	78.1	
	GFDL85	70.4	74.1	78.3	82.2	
	HAD45	70.4	73.6	76.6	78.2	
HAD85	70.4	73.8	79.8	83.7		
Coldest Month Average	CCSM45	33.9	36.0	37.1	37.3	
	CCSM85	33.9	36.6	37.5	38.8	
	GFDL45	33.9	37.3	37.3	37.8	
	GFDL85	33.9	35.7	36.7	37.5	
	HAD45	33.9	33.9	36.0	36.5	
HAD85	33.9	35.2	36.7	38.4		
Warmest Month Average	CCSM45	75.4	77.5	78.7	78.8	
	CCSM85	75.4	77.7	79.3	81.1	
	GFDL45	75.4	79.1	80.9	81.7	
	GFDL85	75.4	79.6	82.3	84.4	
	HAD45	75.4	79.3	81.6	82.5	
HAD85	75.4	80.4	84.7	86.7		

**Precipitation (in)**

	Scenario	2009	2039	2069	2099	
Annual Total	CCSM45	48.1	50.7	54.0	53.3	
	CCSM85	48.1	53.0	54.4	58.2	
	GFDL45	48.1	53.2	54.4	58.3	
	GFDL85	48.1	52.6	56.3	58.3	
	HAD45	48.1	47.1	50.4	51.1	
HAD85	48.1	49.7	46.7	49.1		
Growing Season (May—Sep)	CCSM45	20.5	21.5	22.6	22.2	
	CCSM85	20.5	22.6	21.5	23.1	
	GFDL45	20.5	23.2	22.8	24.0	
	GFDL85	20.5	22.2	23.3	24.0	
	HAD45	20.5	20.3	19.6	20.3	
HAD85	20.5	21.2	17.7	18.7		

**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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Common Name	Scientific Name	Range	MR	%Cell	FIAsum	FIAiv	ChngCl45	ChngCl85	Adap	Abund	Capabil45	Capabil85	SHIFT45	SHIFT85	SSO	N
yellow-poplar	Liriodendron tulipifera	WDH	High	87	1166.0	9.9	Lg. dec.	Lg. dec.	High	Abundant	Good	Good			1	1
red maple	Acer rubrum	WDH	High	80.3	850.0	7.9	Sm. dec.	Sm. dec.	High	Abundant	Good	Good			1	2
Virginia pine	Pinus virginiana	NDH	High	60.8	740.7	9.5	Sm. dec.	Sm. dec.	Medium	Abundant	Fair	Fair			0	3
eastern redcedar	Juniperus virginiana	WDH	Medium	44.2	663.1	10.3	No change	Sm. inc.	Medium	Abundant	Good	Very Good			1	4
chestnut oak	Quercus prinus	NDH	High	61	621.7	7.1	No change	No change	High	Abundant	Very Good	Very Good			1	5
sugar maple	Acer saccharum	WDH	High	73.4	494.6	4.7	Lg. dec.	Lg. dec.	High	Common	Fair	Fair			1	6
white oak	Quercus alba	WDH	Medium	67	366.1	4.1	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	7
pignut hickory	Carya glabra	WDL	Medium	66.6	354.1	3.6	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor			0	8
American beech	Fagus grandifolia	WDH	High	64.7	330.6	4.0	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor			0	9
black locust	Robinia pseudoacacia	NDH	Low	55	313.0	3.9	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor			0	10
sourwood	Oxydendrum arboreum	NDL	High	69.7	312.3	3.1	Sm. dec.	Sm. dec.	High	Common	Fair	Fair			1	11
mockernut hickory	Carya alba	WDL	Medium	53.1	312.2	3.9	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	12
scarlet oak	Quercus coccinea	WDL	Medium	51.5	300.9	4.0	Sm. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	13
northern red oak	Quercus rubra	WDH	Medium	60.4	290.8	3.3	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	14
sassafras	Sassafras albidum	WSL	Low	59.3	287.5	3.9	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor			0	15
blackgum	Nyssa sylvatica	WDL	Medium	69.1	274.3	3.1	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	16
white ash	Fraxinus americana	WDL	Medium	45.6	269.1	3.9	No change	No change	Low	Common	Poor	Poor			0	17
flowering dogwood	Cornus florida	WDL	Medium	59.9	236.7	2.5	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor			0	18
black oak	Quercus velutina	WDH	High	53.4	231.9	2.9	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	19
shagbark hickory	Carya ovata	WSL	Medium	44.8	201.8	3.1	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor			0	20
sycamore	Platanus occidentalis	NSL	Low	21.3	177.0	4.3	No change	Sm. inc.	Medium	Common	Fair	Good			1	21
sweetgum	Liquidambar styraciflua	WDH	High	18	175.5	5.4	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	22
black walnut	Juglans nigra	WDH	Low	39.8	172.1	3.5	No change	No change	Medium	Common	Fair	Fair			1	23
black cherry	Prunus serotina	WDL	Medium	37.4	143.5	2.4	Sm. inc.	Lg. inc.	Low	Common	Fair	Good			1	24
southern red oak	Quercus falcata	WDL	Medium	22.2	138.7	5.1	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	25
sweet birch	Betula lenta	NDH	High	33.1	134.5	3.1	Lg. dec.	Lg. dec.	Low	Common	Very Poor	Very Poor			0	26
eastern redbud	Cercis canadensis	NSL	Low	41.8	133.0	1.9	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor			0	27
shortleaf pine	Pinus echinata	WDH	High	31.6	131.1	2.7	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	28
American basswood	Tilia americana	WSL	Medium	28.3	119.3	3.9	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	29
American elm	Ulmus americana	WDL	Medium	26.1	107.0	2.7	Sm. inc.	Lg. inc.	Medium	Common	Good	Very Good			1	30
green ash	Fraxinus pennsylvanica	WSH	Low	26	97.9	3.2	Sm. inc.	Lg. inc.	Medium	Common	Good	Very Good			1	31
bitternut hickory	Carya cordiformis	WSL	Low	27.3	89.3	2.8	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	32
cucumbertree	Magnolia acuminata	NSL	Low	32.6	86.0	1.8	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	33
boxelder	Acer negundo	WSH	Low	13.6	83.6	4.6	Sm. dec.	Sm. inc.	High	Common	Fair	Very Good			1	34
chinkapin oak	Quercus muehlenbergii	NSL	Medium	21.1	82.4	3.0	No change	No change	Medium	Common	Fair	Fair			1	35
winged elm	Ulmus alata	WDL	Medium	23.5	80.2	1.8	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	36
hackberry	Celtis occidentalis	WDH	Medium	14.7	77.9	2.5	Sm. inc.	Lg. inc.	High	Common	Very Good	Very Good	Infill ++	Infill ++	1	37
eastern hemlock	Tsuga canadensis	NSH	High	13.3	75.3	4.3	No change	No change	Low	Common	Poor	Poor	Infill +	Infill +	0	38
slippery elm	Ulmus rubra	WSL	Low	26.2	68.4	1.6	No change	Sm. inc.	Medium	Common	Fair	Good			1	39
ailanthus	Ailanthus altissima	NSL	FIA	17.2	64.5	3.3	Unknown	Unknown	NA	Common	NNIS	NNIS			0	40
paulownia	Paulownia tomentosa	NSL	FIA	13.1	63.0	3.3	Unknown	Unknown	NA	Common	NNIS	NNIS			0	41
Osage-orange	Maclura pomifera	NDH	Medium	2.1	51.4	2.3	Sm. dec.	No change	High	Common	Fair	Good			2	42
red mulberry	Morus rubra	NSL	Low	15.4	48.3	2.4	Sm. dec.	No change	Medium	Rare	Very Poor	Poor			1	43
yellow buckeye	Aesculus flava	NSL	Low	22.8	45.3	1.8	Lg. dec.	Lg. dec.	Low	Rare	Very Poor	Very Poor			0	44
pitch pine	Pinus rigida	NSH	High	10.1	43.6	2.7	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	45
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	11.6	40.7	1.1	Lg. inc.	Lg. inc.	High	Rare	Good	Good			1	46
common persimmon	Diospyros virginiana	NSL	Low	15.5	37.4	1.8	Lg. inc.	Lg. inc.	High	Rare	Good	Good			1	47



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loblolly pine	Pinus taeda	WDH	High	5.1	36.8	4.0	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	2	48
eastern white pine	Pinus strobus	WDH	High	6.4	35.5	3.7	No change	No change	Low	Rare	Very Poor	Very Poor			0	49
post oak	Quercus stellata	WDH	High	8.1	32.8	1.1	Lg. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	2	50
serviceberry	Amelanchier spp.	NSL	Low	19.9	29.8	1.1	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	51
American hornbeam; musclev	Carpinus caroliniana	WSL	Low	12.5	23.4	1.6	Sm. inc.	Lg. inc.	Medium	Rare	Fair	Good			1	52
mountain or Fraser magnolia	Magnolia fraseri	NSL	Low	6.4	18.3	2.5	Sm. dec.	No change	Low	Rare	Very Poor	Very Poor			0	53
river birch	Betula nigra	NSL	Low	4.8	17.0	3.2	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	54
bigleaf magnolia	Magnolia macrophylla	NSL	Low	8.2	16.9	1.7	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	55
Table Mountain pine	Pinus pungens	NSL	Low	1	15.9	15.8	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor		Infill +	2	56
black willow	Salix nigra	NSH	Low	2.5	12.8	3.6	No change	Sm. inc.	Low	Rare	Very Poor	Poor		Infill +	2	57
white mulberry	Morus alba	NSL	FIA	6.6	10.8	1.1	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	58
Ohio buckeye	Aesculus glabra	NSL	Low	3.2	9.6	2.0	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	59
pawpaw	Asimina triloba	NSL	Low	4.4	6.0	0.7	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	60
blue ash	Fraxinus quadrangulata	NSL	Low	2	5.4	2.7	Sm. dec.	Sm. dec.	Low	Rare	Very Poor	Very Poor			0	61
black maple	Acer nigrum	NSH	Low	0.9	4.6	4.3	Lg. dec.	Lg. dec.	High	Rare	Poor	Poor			0	62
striped maple	Acer pensylvanicum	NSL	Medium	1.6	4.1	0.6	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	63
shellbark hickory	Carya laciniosa	NSL	Low	2.2	4.0	0.8	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	64
sand hickory	Carya pallida	NSL	FIA	5	3.5	2.4	Unknown	Unknown	NA	Rare	FIA Only	FIA Only			0	65
butternut	Juglans cinerea	NSLX	FIA	1	3.3	3.3	Unknown	Unknown	Low	Rare	FIA Only	FIA Only			0	66
yellow birch	Betula alleghaniensis	NDL	High	0.4	2.2	0.9	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	67
blackjack oak	Quercus marilandica	NSL	Medium	1.3	1.2	0.3	Lg. inc.	Lg. inc.	High	Rare	Good	Good			2	68
American holly	Ilex opaca	NSL	Medium	1.8	1.1	0.5	Very Lg. dec.	No change	Medium	Rare	Lost	Poor		Infill +	2	69
bigtooth aspen	Populus grandidentata	NSL	Medium	1	1.1	1.0	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	70
pin cherry	Prunus pensylvanica	NSL	Low	0.1	0.7	0.1	Very Lg. dec.	Very Lg. dec.	Medium	Rare	Lost	Lost			0	71
silver maple	Acer saccharinum	NSH	Low	0.6	0.6	0.4	Very Lg. dec.	Very Lg. dec.	High	Rare	Lost	Lost			0	72
willow oak	Quercus phellos	NSL	Low	4	0.6	2.4	No change	Lg. inc.	Medium	Rare	Poor	Good			2	73
eastern cottonwood	Populus deltoides	NSH	Low	1	0.6	0.6	Very Lg. dec.	Very Lg. dec.	Medium	Rare	Lost	Lost			0	74
American chestnut	Castanea dentata	NSLX	FIA	0.9	0.5	0.4	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	75
chokecherry	Prunus virginiana	NSLX	FIA	1	0.5	0.5	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	76
silverbell	Halesia spp.	NSL	Low	1	0.2	0.2	Sm. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	77
ashe juniper	Juniperus ashei	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	78
red spruce	Picea rubens	NDH	High	0	0	0	Unknown	Unknown	Low	Absent	Unknown	Unknown			0	79
longleaf pine	Pinus palustris	NSH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	80
northern white-cedar	Thuja occidentalis	WSH	High	0	0	0	Unknown	New Habitat	Medium	Absent	Unknown	New Habitat			3	81
florida maple	Acer barbatum	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	82
mountain maple	Acer spicatum	NSL	Low	0	0	0	Unknown	Unknown	High	Absent	Unknown	Unknown			0	83
cittamwood/gum bumelia	Sideroxylon lanuginosum ssp.	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			3	84
pecan	Carya illinoensis	NSH	Low	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat		Migrate +	3	85
black hickory	Carya texana	NDL	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	86
sugarberry	Celtis laevigata	NDH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Likely +	Likely +	3	87
black ash	Fraxinus nigra	WSH	Medium	0	0	0	Unknown	New Habitat	Low	Absent	Unknown	New Habitat			3	88
honeylocust	Gleditsia triacanthos	NSH	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate +	3	89
southern magnolia	Magnolia grandiflora	NSL	Low	0	0	0	Unknown	New Habitat	Medium	Absent	Unknown	New Habitat		Migrate +	3	90
cherrybark oak; swamp red o	Quercus pagoda	NSL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	91
shingle oak	Quercus imbricaria	NDH	Medium	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	92
water oak	Quercus nigra	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	93
Shumard oak	Quercus shumardii	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate +	3	94

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live oak	Quercus virginiana	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	95
bluejack oak	Quercus incana	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +		3	96
American mountain-ash	Sorbus americana	NSL	Low	0	0	0	Unknown	Unknown	Low	Absent	Unknown	Unknown			0	97
cedar elm	Ulmus crassifolia	NDH	Medium	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat			0	98