

**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    10,642    4,108.9    363

**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			
				High	Low	RCP45	RCP85	RCP45	RCP85	RCP45	RCP85			
Ash	3			13	22	Increase	32	37	Very Good	15	16	Likely	0	0
Hickory	7			34	51	No Change	15	14	Good	10	11	Infill	18	20
Maple	3	Abundant	3	33	9	Decrease	15	11	Fair	11	16	Migrate	1	0
Oak	15	Common	24	FIA	4	New	5	5	Poor	16	14		19	20
Pine	4	Rare	39			Unknown	17	17	Very Poor	10	4			
Other	34	Absent	13				<b>84</b>	<b>84</b>	FIA Only	3	3			
	<b>66</b>		<b>79</b>						Unknown	13	13			
										<b>78</b>	<b>77</b>			

**Potential Changes in Climate Variables**

**Temperature (°F)**

	Scenario	2009	2039	2069	2099	
Annual Average	CCSM45	67.3	69.0	70.5	70.7	
	CCSM85	67.3	69.4	71.7	74.0	
	GFDL45	67.3	70.1	71.4	72.6	
	GFDL85	67.3	69.8	72.7	76.0	
	HAD45	67.3	69.5	72.1	73.1	
	HAD85	67.3	69.8	73.1	76.5	
Growing Season (May—Sep)	CCSM45	79.5	80.9	82.0	82.3	
	CCSM85	79.5	81.4	83.6	86.1	
	GFDL45	79.5	82.6	83.8	85.9	
	GFDL85	79.5	82.5	85.6	89.6	
	HAD45	79.5	82.0	84.3	84.8	
	HAD85	79.5	82.3	86.1	88.9	
Coldest Month (Average)	CCSM45	48.7	51.3	52.2	52.2	
	CCSM85	48.7	51.4	52.6	53.9	
	GFDL45	48.7	52.0	52.1	52.1	
	GFDL85	48.7	49.7	50.7	51.3	
	HAD45	48.7	49.5	51.2	51.9	
	HAD85	48.7	51.1	52.6	54.4	
Warmest Month (Average)	CCSM45	83.2	84.3	84.6	84.8	
	CCSM85	83.2	84.9	85.6	86.9	
	GFDL45	83.2	86.9	87.0	88.5	
	GFDL85	83.2	86.8	88.2	90.8	
	HAD45	83.2	86.1	87.0	87.1	
	HAD85	83.2	86.4	88.4	89.3	

**Precipitation (in)**

	Scenario	2009	2039	2069	2099	
Annual Total	CCSM45	56.1	57.2	63.9	61.7	
	CCSM85	56.1	58.5	62.1	62.3	
	GFDL45	56.1	58.5	68.4	57.9	
	GFDL85	56.1	57.7	60.0	59.4	
	HAD45	56.1	55.6	54.1	58.9	
	HAD85	56.1	59.0	51.8	54.5	
Growing Season (May—Sep)	CCSM45	24.2	25.6	27.8	25.9	
	CCSM85	24.2	24.4	25.4	23.8	
	GFDL45	24.2	26.5	33.7	26.5	
	GFDL85	24.2	26.5	28.4	29.0	
	HAD45	24.2	23.3	22.9	24.9	
	HAD85	24.2	23.9	20.8	21.1	

**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
loblolly pine	Pinus taeda	WDH	High	92.6	4901.5	39.9	No change	Sm. dec.	Medium	Abundant	Good	Fair				1 1
sweetgum	Liquidambar styraciflua	WDH	High	94	856.5	7.1	Sm. inc.	Sm. inc.	Medium	Abundant	Very Good	Very Good				1 2
water oak	Quercus nigra	WDH	High	87.8	760.8	6.7	Sm. inc.	Sm. inc.	Medium	Abundant	Very Good	Very Good				1 3
laurel oak	Quercus laurifolia	NDH	Medium	56.1	326.5	4.9	No change	No change	Medium	Common	Fair	Fair				1 4
slash pine	Pinus elliottii	NDH	High	19.6	273.3	9.8	Sm. inc.	Sm. inc.	Medium	Common	Good	Good				1 5
blackgum	Nyssa sylvatica	WDL	Medium	67.8	262.4	3.3	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good				1 6
willow oak	Quercus phellos	NSL	Low	35.4	218.5	5.1	Sm. inc.	Sm. inc.	Medium	Common	Good	Good				1 7
American hornbeam; musclev	Carpinus caroliniana	WSL	Low	41.9	175.1	3.3	Sm. inc.	Sm. inc.	Medium	Common	Good	Good				1 8
American holly	Ilex opaca	NSL	Medium	59.1	161.5	2.0	No change	No change	Medium	Common	Fair	Fair				1 9
southern red oak	Quercus falcata	WDL	Medium	48.4	124.6	2.1	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good				1 10
red maple	Acer rubrum	WDH	High	55.2	124.5	1.9	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good				1 11
white oak	Quercus alba	WDH	Medium	45.4	124.1	2.1	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good				1 12
bald cypress	Taxodium distichum	NSH	Medium	16.3	123.8	6.8	Sm. inc.	Sm. inc.	Medium	Common	Good	Good				1 13
sugarberry	Celtis laevigata	NDH	Medium	21.9	107.1	4.0	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good				1 14
cherrybark oak; swamp red o.	Quercus pagoda	NSL	Medium	27.8	103.5	3.1	Sm. inc.	Lg. inc.	Medium	Common	Good	Very Good				1 15
shortleaf pine	Pinus echinata	WDH	High	25.9	101.0	3.2	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good				1 16
green ash	Fraxinus pennsylvanica	WSH	Low	31.1	100.9	2.6	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good				1 17
sweetbay	Magnolia virginiana	NSL	Medium	31	89.0	2.5	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good				1 18
southern magnolia	Magnolia grandiflora	NSL	Low	26.3	88.5	2.8	No change	No change	Medium	Common	Fair	Fair				1 19
swamp chestnut oak	Quercus michauxii	NSL	Low	23.3	85.7	3.1	No change	No change	Medium	Common	Fair	Fair				1 20
winged elm	Ulmus alata	WDL	Medium	33.9	79.1	1.9	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good				1 21
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	34.9	76.8	1.8	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good				1 22
post oak	Quercus stellata	WDH	High	23.5	76.6	2.6	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good				1 23
American elm	Ulmus americana	WDH	Medium	25.1	74.4	2.0	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good				1 24
water tupelo	Nyssa aquatica	NSH	Medium	7.2	69.9	8.2	Sm. dec.	Sm. dec.	Low	Common	Poor	Poor	Infill +	Infill +		0 25
longleaf pine	Pinus palustris	NSH	Medium	11	65.7	5.1	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good	Infill ++	Infill ++		1 26
American beech	Fagus grandifolia	WDH	High	18.2	60.7	3.0	Sm. inc.	Sm. inc.	Medium	Common	Good	Good	Infill ++	Infill ++		1 27
redbay	Persea borbonia	NSL	Low	27.8	48.6	1.7	No change	No change	High	Rare	Fair	Fair				1 28
water hickory	Carya aquatica	NSL	Medium	16.1	46.6	2.2	No change	Sm. inc.	Medium	Rare	Poor	Fair	Infill +	Infill +		1 29
overcup oak	Quercus lyrata	NSL	Medium	13.6	42.9	2.0	Lg. inc.	Lg. inc.	Low	Rare	Fair	Fair	Infill +	Infill +		1 30
sassafras	Sassafras albidum	WSL	Low	17	39.4	1.8	Lg. dec.	No change	Medium	Rare	Very Poor	Poor				1 31
cedar elm	Ulmus crassifolia	NDH	Medium	7.3	36.5	3.2	Sm. inc.	Lg. inc.	Low	Rare	Poor	Fair	Infill +	Infill +		2 32
honeylocust	Gleditsia triacanthos	NSH	Low	8.2	30.3	3.5	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +		1 33
slippery elm	Ulmus rubra	WSL	Low	8.8	27.5	3.3	Sm. dec.	No change	Medium	Rare	Very Poor	Poor		Infill +		1 34
water elm	Planera aquatica	NSL	Low	6.2	25.4	2.0	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +		1 35
nuttall oak	Quercus texana	NSH	Medium	5.5	25.3	4.3	Sm. dec.	No change	High	Rare	Poor	Fair				0 36
mockernut hickory	Carya alba	WDL	Medium	18.7	24.1	1.2	Lg. inc.	Lg. inc.	High	Rare	Good	Good				1 37
sycamore	Platanus occidentalis	NSL	Low	7.4	21.4	2.0	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +		1 38
black hickory	Carya texana	NDL	High	13.6	21.3	1.3	Sm. inc.	Lg. inc.	Medium	Rare	Fair	Good	Infill +	Infill ++		1 39
black cherry	Prunus serotina	WDL	Medium	22.2	20.0	0.7	Sm. inc.	Lg. inc.	Low	Rare	Poor	Fair				1 40
white ash	Fraxinus americana	WDL	Medium	17.2	19.9	0.9	No change	Sm. inc.	Low	Rare	Very Poor	Poor				1 41
flowering dogwood	Cornus florida	WDL	Medium	16.5	18.3	0.8	Sm. inc.	Sm. inc.	Medium	Rare	Fair	Fair				1 42
florida maple	Acer barbatum	NSL	Low	8.9	16.0	1.3	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor	Infill +			1 43
river birch	Betula nigra	NSL	Low	5.8	14.2	2.1	No change	Sm. inc.	Medium	Rare	Poor	Fair	Infill +	Infill +		1 44
pecan	Carya illinoensis	NSH	Low	1.9	11.4	6.1	No change	Sm. inc.	Low	Rare	Very Poor	Poor		Infill +		2 45
Shumard oak	Quercus shumardii	NSL	Low	3.6	10.7	2.6	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor				0 46
black willow	Salix nigra	NSH	Low	4.6	10.2	2.8	Sm. inc.	Lg. inc.	Low	Rare	Poor	Fair	Infill +	Infill +		2 47

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USDA Forest Service  
Northern Research Station  
Landscape Change Research Group  
Iverson, Peters, Prasad, Matthews

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
eastern redcedar	Juniperus virginiana	WDH	Medium	6.4	9.9	1.5	Sm. inc.	Lg. inc.	Medium	Rare	Fair	Good	Infill +	Infill ++	2	48
blackjack oak	Quercus marilandica	NSL	Medium	8.8	9.6	0.9	No change	Lg. inc.	High	Rare	Fair	Good	Infill +	Infill ++	1	49
common persimmon	Diospyros virginiana	NSL	Low	11.1	8.9	0.7	Lg. dec.	Lg. dec.	High	Rare	Poor	Poor			1	50
bluejack oak	Quercus incana	NSL	Low	2.6	8.8	1.7	Sm. dec.	No change	Medium	Rare	Very Poor	Poor		Infill +	2	51
waterlocust	Gleditsia aquatica	NSLX	FIA	0.4	8.2	3.6	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	52
boxelder	Acer negundo	WSH	Low	3.2	8.1	2.1	Sm. dec.	No change	High	Rare	Poor	Fair	Infill +	Infill +	2	53
live oak	Quercus virginiana	NDH	High	0.9	6.6	7.1	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	54
pignut hickory	Carya glabra	WDL	Medium	1.8	5.1	2.6	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	55
black oak	Quercus velutina	WDH	High	1.9	4.5	2.4	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	56
black walnut	Juglans nigra	WDH	Low	3.7	4.3	1.1	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	57
red mulberry	Morus rubra	NSL	Low	4.2	3.5	0.7	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	58
bitternut hickory	Carya cordiformis	WSL	Low	1.2	3.4	1.7	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor			0	59
Carolina ash	Fraxinus caroliniana	NSL	FIA	1.9	3.0	1.6	Unknown	Unknown	NA	Rare	FIA Only	FIA Only			0	60
swamp tupelo	Nyssa biflora	NDH	Medium	1.9	2.8	1.5	Sm. inc.	Sm. inc.	Low	Rare	Poor	Poor	Infill +	Infill +	2	61
cittamwood/gum bumelia	Sideroxylon lanuginosum ssp.	NSL	Low	1.2	1.8	0.7	Lg. inc.	Lg. inc.	High	Rare	Good	Good			2	62
shagbark hickory	Carya ovata	WSL	Medium	0.9	1.0	1.1	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	63
white mulberry	Morus alba	NSL	FIA	0.7	0.7	0.6	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	64
wild plum	Prunus americana	NSLX	FIA	1.7	0.7	0.3	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	65
American basswood	Tilia americana	WSL	Medium	0.9	0.6	0.6	Sm. dec.	Very Lg. dec.	Medium	Rare	Very Poor	Lost			0	66
striped maple	Acer pensylvanicum	NSL	Medium	0	0	0	Unknown	New Habitat	Medium	Absent	Unknown	New Habitat			3	67
serviceberry	Amelanchier spp.	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	68
pawpaw	Asimina triloba	NSL	Low	0	0	0	New Habitat	Unknown	Medium	Absent	New Habitat	Unknown			3	69
shellbark hickory	Carya laciniosa	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	70
hackberry	Celtis occidentalis	WDH	Medium	0	0	0	Unknown	Unknown	High	Modeled	Unknown	Unknown			0	71
eastern redbud	Cercis canadensis	NSL	Low	0	0	0	Unknown	Unknown	Medium	Modeled	Unknown	Unknown			0	72
black ash	Fraxinus nigra	WSH	Medium	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat			3	73
silverbell	Halesia spp.	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	74
yellow-poplar	Liriodendron tulipifera	WDH	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +		3	75
cucumbertree	Magnolia acuminata	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	76
bigleaf magnolia	Magnolia macrophylla	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	77
sourwood	Oxydendrum arboreum	NDL	High	0	0	0	Unknown	Unknown	High	Modeled	Unknown	Unknown			0	78
pin cherry	Prunus pensylvanica	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	79
scarlet oak	Quercus coccinea	WDL	Medium	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	80
turkey oak	Quercus laevis	NSH	Medium	0	0	0	Unknown	Unknown	High	Modeled	Unknown	Unknown			0	81
chinkapin oak	Quercus muehlenbergii	NSL	Medium	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	82
northern red oak	Quercus rubra	WDH	Medium	0	0	0	Unknown	Unknown	High	Absent	Unknown	Unknown			0	83
black locust	Robinia pseudoacacia	NDH	Low	0	0	0	Unknown	Unknown	Medium	Modeled	Unknown	Unknown			0	84