

**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	9,813.8	3,789.1	291

**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	20	25	Increase	29	33	Very Good	12	8	Likely	1	1
Hickory	4			Medium	26	47	No Change	17	11	Good	17	24	Infill	10	11
Maple	4	Abundant	7	Low	33	12	Decrease	14	16	Fair	12	12	Migrate	5	10
Oak	12	Common	25	FIA	9		New	11	14	Poor	8	5		<b>16</b>	<b>22</b>
Pine	8	Rare	37				Unknown	17	14	Very Poor	8	8			
Other	38	Absent	19					<b>88</b>	<b>88</b>	FIA Only	5	5			
	<b>69</b>		<b>88</b>		<b>88</b>	<b>84</b>				Unknown	8	5			
											<b>70</b>	<b>67</b>			

**Potential Changes in Climate Variables**

**Temperature (°F)**

	Scenario	2009	2039	2069	2099	
Annual Average	CCSM45	52.1	54.0	56.2	56.4	
	CCSM85	52.1	54.4	56.9	59.9	
	GFDL45	52.1	54.9	57.6	58.5	
	GFDL85	52.1	55.4	58.7	62.6	
	HAD45	52.1	54.6	57.8	59.1	
HAD85	52.1	54.9	59.0	63.3		
Growing Season (May—Sep)	CCSM45	66.7	68.7	70.8	71.3	
	CCSM85	66.7	69.0	71.6	75.6	
	GFDL45	66.7	70.0	73.2	74.5	
	GFDL85	66.7	70.8	74.8	79.0	
	HAD45	66.7	69.8	73.0	74.5	
HAD85	66.7	69.9	75.3	79.9		
Coldest Month Average	CCSM45	29.9	31.8	33.0	33.4	
	CCSM85	29.9	32.4	33.5	34.7	
	GFDL45	29.9	33.4	33.8	34.4	
	GFDL85	29.9	32.3	33.2	34.4	
	HAD45	29.9	30.7	32.6	32.9	
HAD85	29.9	31.3	32.7	34.3		
Warmest Month Average	CCSM45	72.0	74.2	75.3	75.5	
	CCSM85	72.0	74.3	76.1	77.9	
	GFDL45	72.0	75.5	77.3	78.3	
	GFDL85	72.0	76.8	79.3	81.7	
	HAD45	72.0	75.5	77.7	78.6	
HAD85	72.0	76.4	79.9	82.8		

**Precipitation (in)**

	Scenario	2009	2039	2069	2099	
Annual Total	CCSM45	40.9	44.2	45.9	46.1	
	CCSM85	40.9	45.4	46.3	50.7	
	GFDL45	40.9	45.1	46.8	49.1	
	GFDL85	40.9	42.8	47.6	48.5	
	HAD45	40.9	42.8	43.3	42.9	
HAD85	40.9	44.0	42.3	43.8		
Growing Season (May—Sep)	CCSM45	19.1	21.8	22.6	22.5	
	CCSM85	19.1	21.9	21.3	23.6	
	GFDL45	19.1	21.1	21.4	22.6	
	GFDL85	19.1	19.4	21.5	21.7	
	HAD45	19.1	20.6	19.4	19.6	
HAD85	19.1	20.7	19.5	20.2		

**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	74.4	1696.5	18.4	Sm. dec.	Sm. dec.	High	Abundant	Good	Good			1	1
red maple	Acer rubrum	WDH	High	82.4	840.6	7.8	No change	Sm. dec.	High	Abundant	Very Good	Good			1	2
eastern white pine	Pinus strobus	WDH	High	57	688.3	8.1	Sm. dec.	Sm. dec.	Low	Abundant	Fair	Fair			0	3
white oak	Quercus alba	WDH	Medium	70.1	675.1	8.0	Sm. inc.	Sm. inc.	High	Abundant	Very Good	Very Good			1	4
yellow-poplar	Liriodendron tulipifera	WDH	High	63.2	644.0	7.6	Sm. inc.	Sm. dec.	High	Abundant	Very Good	Good			1	5
northern red oak	Quercus rubra	WDH	Medium	77.4	634.3	6.4	Sm. inc.	Sm. inc.	High	Abundant	Very Good	Very Good			1	6
scarlet oak	Quercus coccinea	WDL	Medium	63.5	510.7	6.8	No change	Sm. dec.	Medium	Abundant	Good	Fair			1	7
black oak	Quercus velutina	WDH	High	72.1	482.6	5.6	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	8
black locust	Robinia pseudoacacia	NDH	Low	63.2	440.0	5.3	No change	No change	Medium	Common	Fair	Fair			1	9
Virginia pine	Pinus virginiana	NDH	High	42	402.7	7.3	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	10
sugar maple	Acer saccharum	WDH	High	55.6	379.9	5.7	Sm. inc.	No change	High	Common	Very Good	Good			1	11
black cherry	Prunus serotina	WDL	Medium	44.8	234.7	3.8	No change	Sm. inc.	Low	Common	Poor	Fair			1	12
blackgum	Nyssa sylvatica	WDL	Medium	66.5	216.3	2.6	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	13
white ash	Fraxinus americana	WDL	Medium	40	204.2	4.4	Sm. inc.	Sm. inc.	Low	Common	Fair	Fair			1	14
mockernut hickory	Carya alba	WDL	Medium	53.6	190.8	2.5	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	15
pitch pine	Pinus rigida	NSH	High	35.6	189.2	4.5	Sm. dec.	No change	Medium	Common	Poor	Fair			1	16
pignut hickory	Carya glabra	WDL	Medium	57.9	179.8	2.6	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	17
sourwood	Oxydendrum arboreum	NDL	High	44.7	165.6	3.2	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	18
black walnut	Juglans nigra	WDH	Low	23.5	148.2	4.7	No change	Sm. inc.	Medium	Common	Fair	Good			1	19
Table Mountain pine	Pinus pungens	NSL	Low	20.8	131.3	5.6	Lg. dec.	Lg. dec.	High	Common	Fair	Fair			1	20
sweet birch	Betula lenta	NDH	High	33.6	117.8	2.4	Sm. inc.	No change	Low	Common	Fair	Poor			1	21
eastern redcedar	Juniperus virginiana	WDH	Medium	14.4	114.3	7.4	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	22
American beech	Fagus grandifolia	WDH	High	24.9	106.6	3.7	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	23
shagbark hickory	Carya ovata	WSL	Medium	32.6	94.0	2.5	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	24
yellow buckeye	Aesculus flava	NSL	Low	15.6	86.4	4.2	Sm. dec.	Sm. dec.	Low	Common	Poor	Poor			0	25
eastern hemlock	Tsuga canadensis	NSH	High	25.2	81.1	2.3	Lg. inc.	Lg. inc.	Low	Common	Good	Good			1	26
cucumbertree	Magnolia acuminata	NSL	Low	29.4	75.7	1.9	No change	No change	Medium	Common	Fair	Fair			1	27
American basswood	Tilia americana	WSL	Medium	23	75.3	3.1	Lg. inc.	Sm. inc.	Medium	Common	Very Good	Good			1	28
sassafras	Sassafras albidum	WSL	Low	34.1	68.3	1.6	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	29
ailanthus	Ailanthus altissima	NSL	FIA	7.3	60.3	4.3	Unknown	Unknown	NA	Common	NNIS	NNIS			0	30
American elm	Ulmus americana	WDH	Medium	9.9	57.8	4.9	No change	No change	Medium	Common	Fair	Fair			1	31
slippery elm	Ulmus rubra	WSL	Low	15.2	53.7	3.8	No change	Sm. inc.	Medium	Common	Fair	Good			1	32
bitternut hickory	Carya cordiformis	WSL	Low	15.1	47.0	3.3	Lg. inc.	Lg. inc.	High	Rare	Good	Good			1	33
flowering dogwood	Cornus florida	WDL	Medium	32.4	45.1	1.2	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			1	34
serviceberry	Amelanchier spp.	NSL	Low	34.5	44.4	1.0	No change	No change	Medium	Rare	Poor	Poor			1	35
sycamore	Platanus occidentalis	NSL	Low	5.9	42.9	4.9	No change	Sm. inc.	Medium	Rare	Poor	Fair	Infill +	Infill +	1	36
striped maple	Acer pensylvanicum	NSL	Medium	20.6	34.5	1.6	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	37
American hornbeam; musclev	Carpinus caroliniana	WSL	Low	9.2	32.8	3.2	Sm. dec.	No change	Medium	Rare	Very Poor	Poor			1	38
green ash	Fraxinus pennsylvanica	WSH	Low	16.3	27.3	1.5	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	1	39
chinkapin oak	Quercus muehlenbergii	NSL	Medium	3.1	25.5	8.3	No change	Sm. inc.	Medium	Rare	Poor	Fair	Infill +	Infill +	2	40
butternut	Juglans cinerea	NSLX	FIA	4	25.4	4.3	Unknown	Unknown	Low	Rare	FIA Only	FIA Only			0	41
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	15.1	21.4	1.3	Sm. inc.	Lg. inc.	High	Rare	Good	Good			1	42
eastern redbud	Cercis canadensis	NSL	Low	8.4	20.1	1.7	Sm. inc.	Sm. inc.	Medium	Rare	Fair	Fair			1	43
loblolly pine	Pinus taeda	WDH	High	3	19.4	6.0	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	2	44
post oak	Quercus stellata	WDH	High	7.1	17.4	2.4	Lg. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	2	45
chokecherry	Prunus virginiana	NSLX	FIA	0.1	14.5	0.9	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	46
shortleaf pine	Pinus echinata	WDH	High	8	14.5	1.7	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	1	47



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Norway spruce	<i>Picea abies</i>	NSH	FIA	1.9	12.5	5.4	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	48
mountain or Fraser magnolia	<i>Magnolia fraseri</i>	NSL	Low	3.9	11.7	1.3	No change	No change	Low	Rare	Very Poor	Very Poor			0	49
American chestnut	<i>Castanea dentata</i>	NSLX	FIA	15.1	10.1	0.6	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	50
boxelder	<i>Acer negundo</i>	WSH	Low	4.1	7.5	1.8	No change	Sm. inc.	High	Rare	Fair	Good		Infill ++	2	51
red pine	<i>Pinus resinosa</i>	NSH	Medium	1	7.3	7.1	Very Lg. dec.	Very Lg. dec.	Low	Rare	Lost	Lost			0	52
hackberry	<i>Celtis occidentalis</i>	WDH	Medium	4.1	5.7	1.4	No change	Lg. inc.	High	Rare	Fair	Good	Infill +	Infill ++	2	53
swamp chestnut oak	<i>Quercus michauxii</i>	NSL	Low	1	3.7	3.7	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	54
pawpaw	<i>Asimina triloba</i>	NSL	Low	2	2.5	1.2	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	55
Scots pine	<i>Pinus sylvestris</i>	NSH	FIA	1	2.2	2.2	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	56
southern red oak	<i>Quercus falcata</i>	WDL	Medium	1	2.0	2.0	Lg. inc.	Lg. inc.	High	Rare	Good	Good			2	57
paulownia	<i>Paulownia tomentosa</i>	NSL	FIA	1	1.8	1.8	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	58
shingle oak	<i>Quercus imbricaria</i>	NDH	Medium	1	1.7	1.7	Sm. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	59
bigtooth aspen	<i>Populus grandidentata</i>	NSL	Medium	2	1.7	0.8	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	60
bear oak; scrub oak	<i>Quercus ilicifolia</i>	NSLX	FIA	2	1.6	0.8	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	61
common persimmon	<i>Diospyros virginiana</i>	NSL	Low	1.1	1.5	0.2	Lg. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	2	62
pin cherry	<i>Prunus pensylvanica</i>	NSL	Low	1.9	1.2	0.5	Very Lg. dec.	Very Lg. dec.	Medium	Rare	Lost	Lost			0	63
American holly	<i>Ilex opaca</i>	NSL	Medium	0.8	0.6	0.5	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	64
bur oak	<i>Quercus macrocarpa</i>	NDH	Medium	1	0.6	0.6	Very Lg. dec.	Very Lg. dec.	High	Rare	Lost	Lost			0	65
yellow birch	<i>Betula alleghaniensis</i>	NDL	High	1	0.4	0.4	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	1	66
rock elm	<i>Ulmus thomasii</i>	NSLX	FIA	1	0.4	0.4	Unknown	Unknown	Low	Rare	FIA Only	FIA Only			0	67
black ash	<i>Fraxinus nigra</i>	WSH	Medium	1	0.3	0.3	No change	No change	Low	Rare	Very Poor	Very Poor			0	68
southern magnolia	<i>Magnolia grandiflora</i>	NSL	Low	1	0.2	0.2	No change	Lg. dec.	Medium	Rare	Poor	Very Poor			0	69
northern white-cedar	<i>Thuja occidentalis</i>	WSH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	70
florida maple	<i>Acer barbatum</i>	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	71
black maple	<i>Acer nigrum</i>	NSH	Low	0	0	0	Unknown	Unknown	High	Absent	Unknown	Unknown			0	72
cittamwood/gum bumelia	<i>Sideroxylon lanuginosum</i> ssp.	NSL	Low	0	0	0	Unknown	New Habitat	High	Absent	Unknown	New Habitat			0	73
pecan	<i>Carya illinoensis</i>	NSH	Low	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat		Migrate +	3	74
shellbark hickory	<i>Carya laciniosa</i>	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	75
black hickory	<i>Carya texana</i>	NDL	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	76
sugarberry	<i>Celtis laevigata</i>	NDH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate ++	3	77
honeylocust	<i>Gleditsia triacanthos</i>	NSH	Low	0	0	0	Unknown	New Habitat	High	Absent	Unknown	New Habitat		Migrate +	3	78
silverbell	<i>Halesia</i> spp.	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	79
sweetgum	<i>Liquidambar styraciflua</i>	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate ++	Migrate ++	3	80
bigleaf magnolia	<i>Magnolia macrophylla</i>	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	81
red mulberry	<i>Morus rubra</i>	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	82
redbay	<i>Persea borbonia</i>	NSL	Low	0	0	0	Unknown	Unknown	High	Absent	Unknown	Unknown			0	83
blackjack oak	<i>Quercus marilandica</i>	NSL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Likely +	Likely +	3	84
water oak	<i>Quercus nigra</i>	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	85
Shumard oak	<i>Quercus shumardii</i>	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate +	3	86
bluejack oak	<i>Quercus incana</i>	NSL	Low	0	0	0	Unknown	New Habitat	Medium	Absent	Unknown	New Habitat		Migrate +	3	87
winged elm	<i>Ulmus alata</i>	WDL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	88