

**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    10,533    4,066.9      379

**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	15	25	Increase	34	36	Very Good	13	16	Likely	4	4
Hickory	7		Medium	34	55	No Change	14	18	Good	18	19	Infill	13	14
Maple	4	Abundant	Low	37	9	Decrease	24	18	Fair	11	11	Migrate	2	3
Oak	18	Common	FIA	3		New	8	9	Poor	13	11			
Pine	6	Rare				Unknown	9	8	Very Poor	14	12			
Other	38	Absent							FIA Only	3	3			
	<b>75</b>	<b>87</b>		<b>89</b>	<b>89</b>		<b>89</b>	<b>89</b>	Unknown	6	5		<b>19</b>	<b>21</b>
										<b>78</b>	<b>77</b>			

**Potential Changes in Climate Variables**

**Temperature (°F)**

Scenario	2009	2039	2069	2099
Annual	65.2	66.8	68.6	68.8
Average	65.2	67.1	69.6	71.9
GFDL45	65.2	67.9	69.4	70.3
GFDL85	65.2	67.7	70.8	74.1
HAD45	65.2	67.6	70.4	71.6
HAD85	65.2	67.9	71.7	75.5
Growing Season	77.7	79.2	80.5	81.0
May—Sep	77.7	79.4	81.7	84.6
GFDL45	77.7	80.7	82.1	83.8
GFDL85	77.7	80.6	83.7	87.8
HAD45	77.7	80.9	83.5	84.4
HAD85	77.7	81.1	86.4	89.6
Coldest Month	46.1	48.4	49.3	49.2
Average	46.1	48.8	50.1	51.2
GFDL45	46.1	49.7	49.7	49.8
GFDL85	46.1	47.5	48.4	49.0
HAD45	46.1	46.6	48.3	49.2
HAD85	46.1	48.0	49.3	51.1
Warmest Month	81.3	82.6	83.0	83.2
Average	81.3	82.9	83.8	85.5
GFDL45	81.3	84.9	84.8	86.1
GFDL85	81.3	84.3	85.7	88.1
HAD45	81.3	85.3	87.0	87.2
HAD85	81.3	85.8	89.0	90.0

**Precipitation (in)**

Scenario	2009	2039	2069	2099
Annual	59.9	63.3	67.8	65.6
Total	59.9	63.5	64.2	68.7
GFDL45	59.9	66.4	72.8	70.0
GFDL85	59.9	65.2	67.3	68.9
HAD45	59.9	58.6	61.2	63.9
HAD85	59.9	62.4	55.7	60.2
Growing Season	23.4	24.2	25.0	24.6
May—Sep	23.4	22.5	23.2	23.5
GFDL45	23.4	27.0	31.4	28.2
GFDL85	23.4	27.6	29.7	31.3
HAD45	23.4	22.3	23.7	23.4
HAD85	23.4	23.2	19.3	19.6

**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
loblolly pine	Pinus taeda	WDH	High	97.1	5304.8	40.2	No change	No change	Medium	Abundant	Good	Good			1	1
sweetgum	Liquidambar styraciflua	WDH	High	96.7	1279.5	9.5	No change	No change	Medium	Abundant	Good	Good			1	2
water oak	Quercus nigra	WDH	High	95.2	983.7	7.6	Sm. inc.	Sm. inc.	Medium	Abundant	Very Good	Very Good			1	3
white oak	Quercus alba	WDH	Medium	63.1	345.3	4.2	No change	No change	High	Common	Good	Good			1	4
shortleaf pine	Pinus echinata	WDH	High	60.6	332.8	4.3	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	5
yellow-poplar	Liriodendron tulipifera	WDH	High	50.8	259.0	3.3	No change	Sm. dec.	High	Common	Good	Fair			1	6
southern red oak	Quercus falcata	WDL	Medium	71.6	249.2	2.6	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	7
blackgum	Nyssa sylvatica	WDL	Medium	72.7	240.8	2.3	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	8
black cherry	Prunus serotina	WDL	Medium	72.9	233.5	2.6	No change	No change	Low	Common	Poor	Poor			0	9
winged elm	Ulmus alata	WDL	Medium	60.7	182.8	2.3	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	10
American hornbeam; muscle	Carpinus caroliniana	WSL	Low	60.1	180.4	2.3	Sm. inc.	Lg. inc.	Medium	Common	Good	Very Good			1	11
cherrybark oak; swamp red o	Quercus pagoda	NSL	Medium	43.5	172.1	2.8	Sm. inc.	Lg. inc.	Medium	Common	Good	Very Good			1	12
American beech	Fagus grandifolia	WDH	High	47.2	152.0	2.5	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	13
post oak	Quercus stellata	WDH	High	44.6	125.4	2.1	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	14
red maple	Acer rubrum	WDH	High	70.2	120.1	1.3	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	15
mockernut hickory	Carya alba	WDL	Medium	42.5	100.7	1.6	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	16
pignut hickory	Carya glabra	WDL	Medium	40.8	95.8	1.8	Sm. dec.	No change	Medium	Common	Poor	Fair			1	17
flowering dogwood	Cornus florida	WDL	Medium	56.2	92.7	1.1	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	18
southern magnolia	Magnolia grandiflora	NSL	Low	29.5	72.5	1.9	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	19
spruce pine	Pinus glabra	NSL	Low	18	69.6	3.1	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	20
swamp chestnut oak	Quercus michauxii	NSL	Low	15.2	65.9	3.4	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	21
eastern hophornbeam; ironw	Ostrya virginiana	NSL	Low	44.7	65.0	1.0	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	22
sugarberry	Celtis laevigata	NDH	Medium	13.5	62.8	2.2	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	23
American elm	Ulmus americana	WDH	Medium	28.9	60.1	1.3	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	24
common persimmon	Diospyros virginiana	NSL	Low	38.3	59.3	1.2	Sm. dec.	Sm. inc.	High	Common	Fair	Very Good			1	25
sweetbay	Magnolia virginiana	NSL	Medium	17.7	54.2	2.0	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	26
sourwood	Oxydendrum arboreum	NDL	High	33.5	44.1	0.9	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor			1	27
sassafras	Sassafras albidum	WSL	Low	26.1	43.6	1.0	Sm. inc.	Lg. inc.	Medium	Rare	Fair	Good			1	28
willow oak	Quercus phellos	NSL	Low	18.4	43.1	1.8	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			1	29
swamp tupelo	Nyssa biflora	NDH	Medium	6	42.1	3.8	No change	No change	Low	Rare	Very Poor	Very Poor			0	30
laurel oak	Quercus laurifolia	NDH	Medium	21.3	40.8	1.4	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			1	31
sycamore	Platanus occidentalis	NSL	Low	8.8	39.3	2.0	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	1	32
American holly	Ilex opaca	NSL	Medium	24.9	31.8	1.0	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			1	33
pecan	Carya illinoensis	NSH	Low	6.4	31.4	3.0	No change	No change	Low	Rare	Very Poor	Very Poor			0	34
eastern redcedar	Juniperus virginiana	WDH	Medium	15.8	31.0	1.5	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	1	35
water tupelo	Nyssa aquatica	NSH	Medium	3.5	27.8	5.5	Sm. dec.	No change	Low	Rare	Very Poor	Very Poor			2	36
blackjack oak	Quercus marilandica	NSL	Medium	6.7	25.3	1.3	Lg. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	1	37
slash pine	Pinus elliottii	NDH	High	1.3	21.7	5.5	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	38
green ash	Fraxinus pennsylvanica	WSH	Low	12.7	21.4	0.8	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			1	39
black willow	Salix nigra	NSH	Low	5.9	21.3	3.1	Sm. inc.	Lg. inc.	Low	Rare	Poor	Fair			1	40
overcup oak	Quercus lyrata	NSL	Medium	5.5	20.8	2.1	No change	No change	Low	Rare	Very Poor	Very Poor			2	41
white ash	Fraxinus americana	WDL	Medium	17.4	19.5	0.7	Lg. inc.	Lg. inc.	Low	Rare	Fair	Fair	Infill +	Infill +	1	42
waterlocust	Gleditsia aquatica	NSLX	FIA	0.9	19.0	18.7	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	43
water hickory	Carya aquatica	NSL	Medium	0.5	18.9	2.3	Sm. dec.	No change	Medium	Rare	Very Poor	Poor		Infill +	2	44
boxelder	Acer negundo	WSH	Low	8.1	17.7	0.9	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	1	45
bitternut hickory	Carya cordiformis	WSL	Low	11.1	16.1	0.9	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor	Infill +	Infill +	1	46
black oak	Quercus velutina	WDH	High	14.3	14.8	0.7	Sm. dec.	No change	Medium	Rare	Very Poor	Poor			1	47

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

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Common Name	Scientific Name	Range	MR	%Cell	FIAsum	FIAiv	ChngCl45	ChngCl85	Adap	Abund	Capabil45	Capabil85	SHIFT45	SHIFT85	SSO	N
Shumard oak	Quercus shumardii	NSL	Low	10	14.4	1.3	Sm. dec.	Sm. inc.	High	Rare	Poor	Good	Infill +	Infill ++	1	48
longleaf pine	Pinus palustris	NSH	Medium	9.4	14.1	0.7	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	1	49
slippery elm	Ulmus rubra	WSL	Low	13.7	13.8	0.7	Sm. inc.	Lg. inc.	Medium	Rare	Fair	Good			1	50
red mulberry	Morus rubra	NSL	Low	11.5	13.3	0.7	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	51
nuttall oak	Quercus texana	NSH	Medium	1.2	12.0	3.0	Sm. dec.	No change	High	Rare	Poor	Fair			0	52
bigleaf magnolia	Magnolia macrophylla	NSL	Low	11	9.7	0.7	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	53
redbay	Persea borbonia	NSL	Low	6.2	8.9	0.7	No change	No change	High	Rare	Fair	Fair			1	54
honeylocust	Gleditsia triacanthos	NSH	Low	3.9	8.8	0.9	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	2	55
river birch	Betula nigra	NSL	Low	1.2	8.4	2.7	Sm. inc.	Lg. inc.	Medium	Rare	Fair	Good	Infill +	Infill ++	2	56
cucumbertree	Magnolia acuminata	NSL	Low	5.6	4.7	0.8	Sm. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	57
eastern cottonwood	Populus deltoides	NSH	Low	0.3	4.6	1.4	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	58
florida maple	Acer barbatum	NSL	Low	2.8	4.0	1.4	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	2	59
bald cypress	Taxodium distichum	NSH	Medium	1.9	3.9	2.1	Sm. inc.	Sm. inc.	Medium	Rare	Fair	Fair	Infill +	Infill +	2	60
northern red oak	Quercus rubra	WDH	Medium	3.6	3.9	1.0	Sm. dec.	Lg. dec.	High	Rare	Poor	Poor			0	61
chinkapin oak	Quercus muehlenbergii	NSL	Medium	2.3	3.8	0.7	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	62
scarlet oak	Quercus coccinea	WDL	Medium	2	3.8	0.6	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	63
black locust	Robinia pseudoacacia	NDH	Low	1.7	2.6	1.2	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	64
turkey oak	Quercus laevis	NSH	Medium	2.8	2.4	0.9	Lg. dec.	Lg. dec.	High	Rare	Poor	Poor			0	65
silver maple	Acer saccharinum	NSH	Low	1.5	2.3	0.9	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor			0	66
black walnut	Juglans nigra	WDH	Low	1.5	2.0	0.9	Very Lg. dec.	Very Lg. dec.	Medium	Rare	Lost	Lost			0	67
eastern redbud	Cercis canadensis	NSL	Low	2.3	1.7	0.5	Very Lg. dec.	Very Lg. dec.	Medium	Rare	Lost	Lost			0	68
black hickory	Carya texana	NDL	High	0.9	1.3	1.4	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	69
American basswood	Tilia americana	WSL	Medium	0.1	0.9	0.1	Very Lg. dec.	Very Lg. dec.	Medium	Rare	Lost	Lost			0	70
Virginia pine	Pinus virginiana	NDH	High	0.8	0.7	0.6	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	71
shagbark hickory	Carya ovata	WSL	Medium	0.3	0.5	0.1	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	72
serviceberry	Amelanchier spp.	NSL	Low	0.9	0.3	0.3	Sm. inc.	Sm. inc.	Medium	Rare	Fair	Fair			0	73
chokecherry	Prunus virginiana	NSLX	FIA	0.9	0.3	0.3	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	74
durand oak	Quercus sinuata var. sinuata	NSL	FIA	0.9	0.2	0.2	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	75
Table Mountain pine	Pinus pungens	NSL	Low	0	0	0	Unknown	Unknown	High	Absent	Unknown	Unknown			0	76
striped maple	Acer pensylvanicum	NSL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	77
pawpaw	Asimina triloba	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Likely +	Likely +	3	78
cittamwood/gum bumelia	Sideroxylon lanuginosum ssp.	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate +	3	79
shellbark hickory	Carya laciniosa	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	80
black ash	Fraxinus nigra	WSH	Medium	0	0	0	Unknown	New Habitat	Low	Absent	Unknown	New Habitat			3	81
silverbell	Halesia spp.	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Likely +	Likely +	3	82
Osage-orange	Maclura pomifera	NDH	Medium	0	0	0	Unknown	Unknown	High	Modeled	Unknown	Unknown			0	83
water elm	Planera aquatica	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Likely +	Likely +	3	84
pin cherry	Prunus pensylvanica	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Likely +	Likely +	3	85
swamp white oak	Quercus bicolor	NSL	Low	0	0	0	Unknown	Unknown	Medium	Modeled	Unknown	Unknown			0	86
chestnut oak	Quercus prinus	NDH	High	0	0	0	Unknown	Unknown	High	Absent	Unknown	Unknown			0	87
live oak	Quercus virginiana	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate ++	Migrate ++	3	88
cedar elm	Ulmus crassifolia	NDH	Medium	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	89