

**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	140

**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	4			High	15	24	Increase	17	17	Very Good	6	6	Likely	2	2
Hickory	5			Medium	27	41	No Change	14	16	Good	13	10	Infill	14	15
Maple	5	Abundant	2	Low	32	12	Decrease	23	21	Fair	8	16	Migrate	5	9
Oak	9	Common	22	FIA	6		New	15	16	Poor	12	7			
Pine	3	Rare	36				Unknown	11	10	Very Poor	14	12			
Other	34	Absent	19							FIA Only	3	3			
	<b>60</b>		<b>79</b>		<b>80</b>	<b>77</b>		<b>80</b>	<b>80</b>	Unknown	5	4			
											<b>61</b>	<b>58</b>			

**Potential Changes in Climate Variables**

**Temperature (°F)**

	Scenario	2009	2039	2069	2099	
Annual Average	CCSM45	52.7	54.3	56.7	56.9	
	CCSM85	52.7	54.9	57.5	60.5	
	GFDL45	52.7	57.6	58.2	59.1	
	GFDL85	52.7	55.8	59.2	63.3	
	HAD45	52.7	55.4	59.0	60.4	
HAD85	52.7	55.9	60.5	65.1		
Growing Season (May—Sep)	CCSM45	69.4	71.0	73.1	73.7	
	CCSM85	69.4	71.7	74.3	78.2	
	GFDL45	69.4	75.4	76.1	77.5	
	GFDL85	69.4	73.3	77.5	82.2	
	HAD45	69.4	72.7	76.1	78.0	
HAD85	69.4	73.0	79.1	83.8		
Coldest Month Average	CCSM45	26.4	27.7	29.5	29.9	
	CCSM85	26.4	29.1	30.1	31.8	
	GFDL45	26.4	30.2	30.6	31.3	
	GFDL85	26.4	29.2	30.3	31.2	
	HAD45	26.4	27.4	30.1	30.1	
HAD85	26.4	28.8	31.2	33.4		
Warmest Month Average	CCSM45	75.0	76.5	77.8	78.4	
	CCSM85	75.0	77.6	79.3	81.3	
	GFDL45	75.0	78.2	80.2	81.2	
	GFDL85	75.0	78.9	81.5	84.3	
	HAD45	75.0	78.8	81.7	82.8	
HAD85	75.0	80.5	84.9	87.8		

**Precipitation (in)**

	Scenario	2009	2039	2069	2099	
Annual Total	CCSM45	41.6	42.4	44.4	44.4	
	CCSM85	41.6	42.8	44.2	46.6	
	GFDL45	41.6	46.2	48.6	50.8	
	GFDL85	41.6	43.7	49.7	52.3	
	HAD45	41.6	43.8	44.8	44.3	
HAD85	41.6	43.6	41.1	44.7		
Growing Season (May—Sep)	CCSM45	19.1	19.3	19.6	19.5	
	CCSM85	19.1	18.2	18.3	18.5	
	GFDL45	19.1	21.1	20.4	21.5	
	GFDL85	19.1	19.5	20.4	20.8	
	HAD45	19.1	19.8	17.6	18.6	
HAD85	19.1	19.0	15.8	16.0		

**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
white ash	Fraxinus americana	WDL	Medium	85.2	692.1	11.4	Sm. dec.	Sm. dec.	Low	Abundant	Fair	Fair			0	1
sugar maple	Acer saccharum	WDH	High	76	533.3	11.1	Sm. dec.	Sm. dec.	High	Abundant	Good	Good			1	2
black walnut	Juglans nigra	WDH	Low	69	254.6	5.9	No change	No change	Medium	Common	Fair	Fair			1	3
Osage-orange	Maclura pomifera	NDH	Medium	53.2	249.3	6.9	No change	No change	High	Common	Good	Good			1	4
black locust	Robinia pseudoacacia	NDH	Low	47.8	241.4	7.2	Sm. dec.	No change	Medium	Common	Poor	Fair			1	5
American elm	Ulmus americana	WDH	Medium	70.9	237.6	5.3	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	6
black cherry	Prunus serotina	WDL	Medium	73.3	202.0	4.4	No change	Sm. dec.	Low	Common	Poor	Poor			0	7
hackberry	Celtis occidentalis	WDH	Medium	64.2	195.0	4.8	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	8
eastern redcedar	Juniperus virginiana	WDH	Medium	43.1	194.4	6.6	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	9
red maple	Acer rubrum	WDH	High	8	167.4	11.6	Sm. dec.	Sm. dec.	High	Common	Fair	Fair	Infill +	Infill +	1	10
bitternut hickory	Carya cordiformis	WSL	Low	36.7	146.7	3.9	Sm. inc.	No change	High	Common	Very Good	Good			1	11
slippery elm	Ulmus rubra	WSL	Low	45.5	137.2	2.9	No change	No change	Medium	Common	Fair	Fair			1	12
boxelder	Acer negundo	WSH	Low	48.4	131.3	5.2	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	13
honeylocust	Gleditsia triacanthos	NSH	Low	32	120.4	4.4	No change	Sm. inc.	High	Common	Good	Very Good			1	14
sycamore	Platanus occidentalis	NSL	Low	32.7	101.3	5.5	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	15
Ohio buckeye	Aesculus glabra	NSL	Low	36.1	101.0	3.9	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	16
shagbark hickory	Carya ovata	WSL	Medium	21.6	96.8	4.0	Sm. inc.	No change	Medium	Common	Good	Fair			1	17
chinkapin oak	Quercus muehlenbergii	NSL	Medium	27.7	90.8	3.4	No change	No change	Medium	Common	Fair	Fair	Infill +	Infill +	1	18
northern red oak	Quercus rubra	WDH	Medium	40.5	85.5	3.7	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	19
eastern cottonwood	Populus deltoides	NSH	Low	14.2	79.0	7.0	Sm. dec.	No change	Medium	Common	Poor	Fair	Infill +	Infill +	1	20
green ash	Fraxinus pennsylvanica	WSH	Low	32.5	74.8	3.8	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	21
white mulberry	Morus alba	NSL	FIA	33.9	67.4	7.5	Unknown	Unknown	NA	Common	NNIS	NNIS			0	22
yellow-poplar	Liriodendron tulipifera	WDH	High	20.1	63.8	4.9	No change	Sm. dec.	High	Common	Good	Fair			1	23
yellow buckeye	Aesculus flava	NSL	Low	2.5	51.4	13.3	Lg. dec.	Lg. dec.	Low	Common	Very Poor	Very Poor			0	24
pin oak	Quercus palustris	NSH	Low	3.7	49.5	11.1	No change	No change	Low	Rare	Very Poor	Very Poor			2	25
American beech	Fagus grandifolia	WDH	High	15.1	47.4	2.8	Sm. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			2	26
shellbark hickory	Carya laciniosa	NSL	Low	4.9	44.9	14.1	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	27
blue ash	Fraxinus quadrangulata	NSL	Low	27	41.6	2.6	Lg. dec.	Lg. dec.	Low	Rare	Very Poor	Very Poor			0	28
white oak	Quercus alba	WDH	Medium	15.3	41.4	2.9	Lg. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	1	29
sassafras	Sassafras albidum	WSL	Low	10.2	39.0	2.6	Sm. inc.	Sm. dec.	Medium	Rare	Fair	Very Poor	Infill +		1	30
eastern redbud	Cercis canadensis	NSL	Low	34.5	38.2	1.9	No change	Sm. inc.	Medium	Rare	Poor	Fair			1	31
black oak	Quercus velutina	WDH	High	8.8	35.8	2.3	Sm. inc.	Sm. inc.	Medium	Rare	Fair	Fair	Infill +	Infill +	2	32
American basswood	Tilia americana	WSL	Medium	27.2	29.1	4.1	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	33
black maple	Acer nigrum	NSH	Low	3.9	28.1	13.9	Lg. dec.	Lg. dec.	High	Rare	Poor	Poor			0	34
Norway spruce	Picea abies	NSH	FIA	1	24.6	23.5	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	35
eastern white pine	Pinus strobus	WDH	High	2.2	24.2	5.0	Lg. dec.	Very Lg. dec.	Low	Rare	Very Poor	Lost			0	36
pignut hickory	Carya glabra	WDL	Medium	15.6	20.7	1.6	Lg. inc.	Sm. inc.	Medium	Rare	Good	Fair	Infill ++	Infill +	1	37
mockernut hickory	Carya alba	WDL	Medium	14.3	17.7	2.2	Sm. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	1	38
silver maple	Acer saccharinum	NSH	Low	7.5	16.7	2.3	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	2	39
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	13.9	15.5	1.2	Sm. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	2	40
pawpaw	Asimina triloba	NSL	Low	11	14.8	1.4	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	41
ailanthus	Ailanthus altissima	NSL	FIA	12.3	12.7	3.0	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	42
black willow	Salix nigra	NSH	Low	14.2	12.1	3.6	Sm. dec.	Lg. inc.	Low	Rare	Very Poor	Fair		Infill +	1	43
blackgum	Nyssa sylvatica	WDL	Medium	1.8	11.2	2.4	Sm. dec.	No change	High	Rare	Poor	Fair	Infill +	Infill +	2	44
scarlet oak	Quercus coccinea	WDL	Medium	2	10.0	2.2	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			2	45
swamp white oak	Quercus bicolor	NSL	Low	7.2	9.4	13.4	Sm. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	46
shingle oak	Quercus imbricaria	NDH	Medium	2.2	9.2	0.7	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	47



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sweetgum	Liquidambar styraciflua	WDH	High	2.5	9.2	2.2	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	48
northern catalpa	Catalpa speciosa	NSHX	FIA	0.7	6.7	0.5	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	49
bur oak	Quercus macrocarpa	NDH	Medium	2.9	6.3	1.8	Sm. dec.	No change	High	Rare	Poor	Fair		Infill +	2	50
flowering dogwood	Cornus florida	WDL	Medium	9.2	6.0	0.6	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	1	51
Kentucky coffeetree	Gymnocladus dioicus	NSLX	FIA	1	5.2	5.0	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	52
red mulberry	Morus rubra	NSL	Low	2	5.1	0.6	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	53
red pine	Pinus resinosa	NSH	Medium	4.4	4.8	2.8	Lg. dec.	Lg. dec.	Low	Rare	Very Poor	Very Poor			0	54
American hornbeam; musclev	Carpinus caroliniana	WSL	Low	2.7	4.3	0.5	No change	No change	Medium	Rare	Poor	Poor			0	55
rock elm	Ulmus thomasii	NSLX	FIA	1.1	3.5	0.8	Unknown	Unknown	Low	Rare	FIA Only	FIA Only			0	56
Virginia pine	Pinus virginiana	NDH	High	4.2	2.9	1.9	Lg. dec.	Very Lg. dec.	Medium	Rare	Very Poor	Lost			0	57
sugarberry	Celtis laevigata	NDH	Medium	1	1.0	0.9	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	58
black ash	Fraxinus nigra	WSH	Medium	1	0.7	0.6	Lg. dec.	Lg. dec.	Low	Rare	Very Poor	Very Poor			0	59
sourwood	Oxydendrum arboreum	NDL	High	0.6	0.6	0.3	Very Lg. dec.	Very Lg. dec.	High	Rare	Lost	Lost			0	60
ashe juniper	Juniperus ashei	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	61
shortleaf pine	Pinus echinata	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	62
loblolly pine	Pinus taeda	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate ++	3	63
serviceberry	Amelanchier spp.	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	64
cittamwood/gum bumelia	Sideroxylon lanuginosum ssp.	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			3	65
pecan	Carya illinoensis	NSH	Low	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat		Migrate ++	3	66
black hickory	Carya texana	NDL	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	67
common persimmon	Diospyros virginiana	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Likely +	Likely +	3	68
bigleaf magnolia	Magnolia macrophylla	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	69
pin cherry	Prunus pensylvanica	NSL	Low	0	0	0	Unknown	New Habitat	Medium	Absent	Unknown	New Habitat			3	70
northern pin oak	Quercus ellipsoidalis	NSH	Medium	0	0	0	Unknown	Unknown	High	Modeled	Unknown	Unknown			0	71
southern red oak	Quercus falcata	WDL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	72
cherrybark oak; swamp red o	Quercus pagoda	NSL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	73
blackjack oak	Quercus marilandica	NSL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	74
water oak	Quercus nigra	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate ++	3	75
Shumard oak	Quercus shumardii	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Likely +	Likely +	3	76
post oak	Quercus stellata	WDH	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate ++	Migrate ++	3	77
bluejack oak	Quercus incana	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	78
winged elm	Ulmus alata	WDL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate ++	Migrate ++	3	79
cedar elm	Ulmus crassifolia	NDH	Medium	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat			0	80