

**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	9,683.1	3,738.7	191

**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	18	23	Increase	18	22	Very Good	8	9	Likely	1	1
Hickory	5			Medium	26	44	No Change	18	13	Good	16	14	Infill	7	7
Maple	5	Abundant	3	Low	32	11	Decrease	22	23	Fair	8	11	Migrate	4	6
Oak	10	Common	28	FIA	3		New	13	14	Poor	14	12			
Pine	4	Rare	30				Unknown	8	7	Very Poor	10	10			
Other	34	Absent	18							FIA Only	2	2			
	<b>61</b>		<b>79</b>		<b>79</b>	<b>78</b>		<b>79</b>	<b>79</b>	Unknown	5	4			
											<b>63</b>	<b>62</b>			

**Potential Changes in Climate Variables**

**Temperature (°F)**

	Scenario	2009	2039	2069	2099	
Annual Average	CCSM45	54.8	56.6	59.0	59.2	
	CCSM85	54.8	57.1	59.8	62.9	
	GFDL45	54.8	58.6	60.4	61.2	
	GFDL85	54.8	57.9	61.4	65.2	
	HAD45	54.8	57.5	61.0	62.4	
	HAD85	54.8	58.0	62.6	66.9	
Growing Season (May—Sep)	CCSM45	70.8	72.5	74.7	75.3	
	CCSM85	70.8	73.1	75.9	79.9	
	GFDL45	70.8	75.4	77.5	78.8	
	GFDL85	70.8	74.6	78.9	83.3	
	HAD45	70.8	74.1	77.4	79.3	
	HAD85	70.8	74.5	80.8	85.1	
Coldest Month Average	CCSM45	29.9	31.2	32.8	33.3	
	CCSM85	29.9	32.6	33.6	35.3	
	GFDL45	29.9	33.9	34.1	34.7	
	GFDL85	29.9	32.4	33.5	34.2	
	HAD45	29.9	30.8	33.4	33.5	
	HAD85	29.9	32.2	34.2	36.2	
Warmest Month Average	CCSM45	76.3	77.8	79.2	79.7	
	CCSM85	76.3	78.6	80.4	82.3	
	GFDL45	76.3	79.7	81.6	82.6	
	GFDL85	76.3	80.3	83.0	85.5	
	HAD45	76.3	80.2	83.0	84.1	
	HAD85	76.3	82.0	86.6	88.9	

**Precipitation (in)**

	Scenario	2009	2039	2069	2099	
Annual Total	CCSM45	44.2	45.3	49.2	48.1	
	CCSM85	44.2	47.2	48.5	51.9	
	GFDL45	44.2	49.4	51.3	54.6	
	GFDL85	44.2	47.0	52.5	55.7	
	HAD45	44.2	46.2	48.0	47.1	
	HAD85	44.2	45.5	43.2	47.2	
Growing Season (May—Sep)	CCSM45	19.8	19.5	21.0	20.3	
	CCSM85	19.8	19.6	19.1	20.1	
	GFDL45	19.8	22.3	21.1	22.2	
	GFDL85	19.8	20.6	21.1	21.7	
	HAD45	19.8	20.4	18.4	18.9	
	HAD85	19.8	19.5	15.9	16.5	

**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
eastern redcedar	Juniperus virginiana	WDH	Medium	63.7	1128.1	17.6	No change	No change	Medium	Abundant	Good	Good			1	1
white ash	Fraxinus americana	WDL	Medium	75.1	685.3	9.0	Sm. dec.	Sm. dec.	Low	Abundant	Fair	Fair			0	2
black walnut	Juglans nigra	WDH	Low	72.2	574.5	8.8	Sm. dec.	Sm. dec.	Medium	Abundant	Fair	Fair			0	3
black locust	Robinia pseudoacacia	NDH	Low	60.5	459.5	8.4	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor			0	4
sugar maple	Acer saccharum	WDH	High	54.4	416.5	8.0	No change	No change	High	Common	Good	Good			1	5
hackberry	Celtis occidentalis	WDH	Medium	61.3	346.0	6.4	No change	No change	High	Common	Good	Good			1	6
chinkapin oak	Quercus muehlenbergii	NSL	Medium	55.4	312.9	6.4	No change	Sm. dec.	Medium	Common	Fair	Poor			1	7
American elm	Ulmus americana	WDH	Medium	60.7	271.0	4.5	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	8
green ash	Fraxinus pennsylvanica	WSH	Low	54.6	263.4	5.6	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	9
slippery elm	Ulmus rubra	WSL	Low	54	217.1	3.8	No change	Sm. inc.	Medium	Common	Fair	Good			1	10
black cherry	Prunus serotina	WDL	Medium	49.3	203.8	4.2	Sm. dec.	Sm. dec.	Low	Common	Poor	Poor			0	11
honeylocust	Gleditsia triacanthos	NSH	Low	42.4	177.9	4.7	No change	Sm. inc.	High	Common	Good	Very Good			1	12
bitternut hickory	Carya cordiformis	WSL	Low	50.8	172.5	3.8	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	13
boxelder	Acer negundo	WSH	Low	45.5	165.2	4.2	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	14
shagbark hickory	Carya ovata	WSL	Medium	36.1	161.1	4.8	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	15
northern red oak	Quercus rubra	WDH	Medium	27.5	158.0	5.1	Sm. inc.	No change	High	Common	Very Good	Good			1	16
Osage-orange	Maclura pomifera	NDH	Medium	27	152.6	7.0	Sm. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	17
white oak	Quercus alba	WDH	Medium	21.1	149.2	6.8	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	18
Shumard oak	Quercus shumardii	NSL	Low	24.5	134.1	5.7	No change	Sm. inc.	High	Common	Good	Very Good			1	19
shellbark hickory	Carya laciniosa	NSL	Low	27.3	129.7	3.9	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor			0	20
sassafras	Sassafras albidum	WSL	Low	28.5	126.7	3.2	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor			0	21
Ohio buckeye	Aesculus glabra	NSL	Low	41	122.9	3.1	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	22
sycamore	Platanus occidentalis	NSL	Low	24	117.5	5.9	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	23
eastern redbud	Cercis canadensis	NSL	Low	52.6	115.7	2.5	No change	No change	Medium	Common	Fair	Fair			1	24
yellow-poplar	Liriodendron tulipifera	WDH	High	15.7	86.0	3.9	No change	Sm. dec.	High	Common	Good	Fair			1	25
red maple	Acer rubrum	WDH	High	10	73.5	2.9	No change	No change	High	Common	Good	Good			1	26
pignut hickory	Carya glabra	WDL	Medium	24.1	69.3	3.0	Sm. inc.	No change	Medium	Common	Good	Fair			1	27
scarlet oak	Quercus coccinea	WDL	Medium	24.4	66.4	3.5	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor			0	28
mockernut hickory	Carya alba	WDL	Medium	20.5	59.1	3.1	Sm. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	29
yellow buckeye	Aesculus flava	NSL	Low	10.7	57.4	1.9	Lg. dec.	Lg. dec.	Low	Common	Very Poor	Very Poor			0	30
black oak	Quercus velutina	WDH	High	11.4	55.5	3.4	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	31
American basswood	Tilia americana	WSL	Medium	14.8	42.2	3.6	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	32
post oak	Quercus stellata	WDH	High	1.9	29.1	11.7	Lg. inc.	Lg. inc.	High	Rare	Good	Good			2	33
silver maple	Acer saccharinum	NSH	Low	1	24.9	9.0	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	2	34
pin oak	Quercus palustris	NSH	Low	1.5	24.0	4.3	Sm. dec.	Sm. dec.	Low	Rare	Very Poor	Very Poor			2	35
shingle oak	Quercus imbricaria	NDH	Medium	11.7	21.1	1.8	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	36
blue ash	Fraxinus quadrangulata	NSL	Low	10	19.0	2.3	No change	No change	Low	Rare	Very Poor	Very Poor			0	37
pawpaw	Asimina triloba	NSL	Low	8.7	17.5	1.2	Lg. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	38
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	12.6	16.0	1.2	Lg. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	1	39
flowering dogwood	Cornus florida	WDL	Medium	12.3	14.2	1.2	Sm. inc.	Sm. inc.	Medium	Rare	Fair	Fair			1	40
blackgum	Nyssa sylvatica	WDL	Medium	4.6	9.7	0.8	No change	No change	High	Rare	Fair	Fair		Infill +	1	41
bur oak	Quercus macrocarpa	NDH	Medium	2	9.3	2.0	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor			0	42
American beech	Fagus grandifolia	WDH	High	4.5	7.9	1.0	No change	No change	Medium	Rare	Poor	Poor	Infill +		2	43
American hornbeam; muscle	Carpinus caroliniana	WSL	Low	9.3	7.7	1.6	No change	Sm. inc.	Medium	Rare	Poor	Fair			1	44
common persimmon	Diospyros virginiana	NSL	Low	4.7	7.3	1.3	Lg. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	1	45
black maple	Acer nigrum	NSH	Low	1	6.2	6.0	Lg. dec.	Lg. dec.	High	Rare	Poor	Poor			0	46
ailanthus	Ailanthus altissima	NSL	FIA	4.7	6.1	0.6	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	47



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sweetgum	Liquidambar styraciflua	WDH	High	0.2	4.9	0.9	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	48
red mulberry	Morus rubra	NSL	Low	4.1	4.7	0.8	No change	Sm. inc.	Medium	Rare	Poor	Fair	Infill +	Infill +	2	49
butternut	Juglans cinerea	NSLX	FIA	2.1	4.4	2.2	Unknown	Unknown	Low	Rare	FIA Only	FIA Only			0	50
black willow	Salix nigra	NSH	Low	2.1	4.0	1.9	Sm. dec.	No change	Low	Rare	Very Poor	Very Poor			2	51
eastern cottonwood	Populus deltoides	NSH	Low	1	4.0	3.8	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	52
Kentucky coffeetree	Gymnocladus dioicus	NSLX	FIA	5.3	3.7	1.2	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	53
eastern white pine	Pinus strobus	WDH	High	1	2.9	2.9	Very Lg. dec.	Very Lg. dec.	Low	Rare	Lost	Lost			0	54
cucumbertree	Magnolia acuminata	NSL	Low	4.1	2.7	10.6	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	55
sourwood	Oxydendrum arboreum	NDL	High	2.1	2.3	1.1	Lg. dec.	Lg. dec.	High	Rare	Poor	Poor			0	56
Virginia pine	Pinus virginiana	NDH	High	1	1.4	1.3	No change	Very Lg. dec.	Medium	Rare	Poor	Lost	Infill +		2	57
shortleaf pine	Pinus echinata	WDH	High	1	1.2	1.2	Very Lg. dec.	Sm. inc.	Medium	Rare	Lost	Fair		Infill +	2	58
yellow birch	Betula alleghaniensis	NDL	High	2	1.2	0.5	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	59
pitch pine	Pinus rigida	NSH	High	1	0.5	0.5	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	60
winged elm	Ulmus alata	WDL	Medium	1.5	0.1	0.2	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	61
ashe juniper	Juniperus ashei	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	62
loblolly pine	Pinus taeda	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	63
striped maple	Acer pensylvanicum	NSL	Medium	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	64
serviceberry	Amelanchier spp.	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	65
cittamwood/gum bumelia	Sideroxylon lanuginosum ssp.	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			3	66
pecan	Carya illinoensis	NSH	Low	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat		Migrate ++	3	67
black hickory	Carya texana	NDL	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	68
sugarberry	Celtis laevigata	NDH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	69
black ash	Fraxinus nigra	WSH	Medium	0	0	0	Unknown	New Habitat	Low	Absent	Unknown	New Habitat			3	70
bigleaf magnolia	Magnolia macrophylla	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	71
pin cherry	Prunus pensylvanica	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	72
southern red oak	Quercus falcata	WDL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Likely +	Likely +	3	73
cherrybark oak; swamp red o.	Quercus pagoda	NSL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	74
blackjack oak	Quercus marilandica	NSL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	75
swamp chestnut oak	Quercus michauxii	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	76
water oak	Quercus nigra	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	77
live oak	Quercus virginiana	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	78
cedar elm	Ulmus crassifolia	NDH	Medium	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat			0	79