

**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	94

**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	16	24	Increase	15	21	Very Good	5	6	Likely	4	4
Hickory	4			Medium	26	41	No Change	17	12	Good	16	16	Infill	36	38
Maple	5	Abundant	1	Low	30	9	Decrease	22	21	Fair	7	10	Migrate	3	6
Oak	11	Common	23	FIA	5		New	14	14	Poor	13	11			
Pine	3	Rare	35				Unknown	9	9	Very Poor	9	6			
Other	32	Absent	17							FIA Only	2	2			
	<b>59</b>		<b>76</b>		<b>77</b>	<b>74</b>		<b>77</b>	<b>77</b>	Unknown	4	4			
											<b>56</b>	<b>55</b>			

**Potential Changes in Climate Variables**

**Temperature (°F)**

	Scenario	2009	2039	2069	2099	
Annual Average	CCSM45	52.1	53.8	56.2	56.4	
	CCSM85	52.1	54.4	56.9	60.0	
	GFDL45	52.1	57.1	57.8	58.6	
	GFDL85	52.1	55.3	58.5	62.9	
	HAD45	52.1	54.9	58.5	59.9	
	HAD85	52.1	55.3	59.9	64.5	
Growing Season (May—Sep)	CCSM45	68.5	70.2	72.4	72.9	
	CCSM85	68.5	70.9	73.5	77.4	
	GFDL45	68.5	74.7	75.4	76.7	
	GFDL85	68.5	72.5	76.8	81.5	
	HAD45	68.5	71.9	75.3	77.2	
	HAD85	68.5	72.2	78.3	83.0	
Coldest Month Average	CCSM45	26.2	27.4	29.2	29.6	
	CCSM85	26.2	28.8	29.8	31.5	
	GFDL45	26.2	29.9	30.4	31.1	
	GFDL85	26.2	29.0	30.2	31.2	
	HAD45	26.2	27.1	29.7	29.8	
	HAD85	26.2	28.4	30.7	32.9	
Warmest Month Average	CCSM45	73.9	75.5	76.8	77.3	
	CCSM85	73.9	76.4	78.1	80.2	
	GFDL45	73.9	77.1	79.2	80.1	
	GFDL85	73.9	77.8	80.4	83.2	
	HAD45	73.9	77.8	80.6	81.8	
	HAD85	73.9	79.3	83.7	86.6	

**Precipitation (in)**

	Scenario	2009	2039	2069	2099	
Annual Total	CCSM45	40.0	41.4	43.2	43.3	
	CCSM85	40.0	41.6	43.0	45.8	
	GFDL45	40.0	44.1	46.1	48.4	
	GFDL85	40.0	41.5	47.3	49.5	
	HAD45	40.0	41.8	42.3	42.1	
	HAD85	40.0	41.6	38.7	42.6	
Growing Season (May—Sep)	CCSM45	18.6	19.1	19.3	19.7	
	CCSM85	18.6	18.0	18.3	18.5	
	GFDL45	18.6	20.6	19.8	20.9	
	GFDL85	18.6	18.7	19.5	20.0	
	HAD45	18.6	19.5	16.9	18.1	
	HAD85	18.6	18.4	15.3	15.8	

**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
sugar maple	Acer saccharum	WDH	High	35.9	672.4	18.5	Sm. dec.	Sm. dec.	High	Abundant	Good	Good	Infill ++	Infill ++	1	1
white ash	Fraxinus americana	WDL	Medium	60.6	418.8	11.8	Sm. dec.	Sm. dec.	Low	Common	Poor	Poor	Infill +	Infill +	0	2
black walnut	Juglans nigra	WDH	Low	56	221.2	9.9	No change	No change	Medium	Common	Fair	Fair	Infill +	Infill +	1	3
red maple	Acer rubrum	WDH	High	16.4	221.2	12.4	Sm. dec.	Sm. dec.	High	Common	Fair	Fair	Infill +	Infill +	1	4
black locust	Robinia pseudoacacia	NDH	Low	11.5	203.2	7.3	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor	Infill +	Infill +	0	5
black cherry	Prunus serotina	WDL	Medium	36.1	200.1	6.4	No change	Sm. dec.	Low	Common	Poor	Poor	Infill +	Infill +	0	6
American elm	Ulmus americana	WDH	Medium	59.8	198.2	6.6	Sm. inc.	Sm. inc.	Medium	Common	Good	Good	Infill ++	Infill ++	1	7
shagbark hickory	Carya ovata	WSL	Medium	34.4	149.6	6.6	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor	Infill +	Infill +	0	8
white oak	Quercus alba	WDH	Medium	25.4	147.3	8.0	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good	Infill ++	Infill ++	1	9
boxelder	Acer negundo	WSH	Low	44.8	140.7	11.9	No change	No change	High	Common	Good	Good	Infill ++	Infill ++	1	10
hackberry	Celtis occidentalis	WDH	Medium	40.1	138.5	5.5	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good	Infill ++	Infill ++	1	11
yellow-poplar	Liriodendron tulipifera	WDH	High	11.2	127.7	10.8	Sm. dec.	Lg. dec.	High	Common	Fair	Fair	Infill +	Infill +	1	12
eastern redcedar	Juniperus virginiana	WDH	Medium	10.1	120.2	16.3	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good	Infill ++	Infill ++	1	13
bitternut hickory	Carya cordiformis	WSL	Low	26.5	114.7	7.5	No change	No change	High	Common	Good	Good	Infill ++	Infill ++	1	14
pignut hickory	Carya glabra	WDL	Medium	20.9	94.9	5.5	No change	Sm. dec.	Medium	Common	Fair	Poor	Infill +	Infill +	1	15
American beech	Fagus grandifolia	WDH	High	13.4	87.5	6.6	Sm. dec.	Lg. dec.	Medium	Common	Poor	Poor	Infill +	Infill +	2	16
northern red oak	Quercus rubra	WDH	Medium	30.1	77.9	5.1	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good	Infill ++	Infill ++	1	17
sycamore	Platanus occidentalis	NSL	Low	21.8	77.3	7.4	Sm. inc.	Sm. inc.	Medium	Common	Good	Good	Infill ++	Infill ++	1	18
slippery elm	Ulmus rubra	WSL	Low	29	73.1	3.5	Sm. inc.	Sm. inc.	Medium	Common	Good	Good	Infill ++	Infill ++	1	19
silver maple	Acer saccharinum	NSH	Low	12.1	72.7	8.5	Sm. dec.	No change	High	Common	Fair	Good	Infill +	Infill ++	2	20
chestnut oak	Quercus prinus	NDH	High	7.8	63.6	7.0	No change	Sm. dec.	High	Common	Good	Fair	Infill ++	Infill +	2	21
mockernut hickory	Carya alba	WDL	Medium	7.9	59.2	6.8	No change	No change	High	Common	Good	Good	Infill ++	Infill ++	1	22
honeylocust	Gleditsia triacanthos	NSH	Low	38.4	57.2	5.2	No change	Sm. inc.	High	Common	Good	Very Good	Infill ++	Infill ++	1	23
black oak	Quercus velutina	WDH	High	13.1	50.4	4.5	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good	Infill ++	Infill ++	1	24
sassafras	Sassafras albidum	WSL	Low	9.4	44.7	4.4	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	1	25
green ash	Fraxinus pennsylvanica	WSH	Low	24.2	36.8	8.3	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	1	26
blackgum	Nyssa sylvatica	WDL	Medium	7.8	36.4	4.1	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	1	27
chinkapin oak	Quercus muehlenbergii	NSL	Medium	12.3	35.2	4.1	No change	Sm. inc.	Medium	Rare	Poor	Fair	Infill +	Infill +	1	28
shingle oak	Quercus imbricaria	NDH	Medium	6.3	32.2	5.9	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	29
eastern redbud	Cercis canadensis	NSL	Low	15.1	24.0	2.8	No change	Sm. inc.	Medium	Rare	Poor	Fair	Infill +	Infill +	1	30
Osage-orange	Maclura pomifera	NDH	Medium	10.2	23.7	7.0	Lg. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	2	31
blue ash	Fraxinus quadrangulata	NSL	Low	4	22.5	5.3	Sm. dec.	Sm. dec.	Low	Rare	Very Poor	Very Poor			0	32
pin oak	Quercus palustris	NSH	Low	3.5	22.5	7.8	No change	No change	Low	Rare	Very Poor	Very Poor			2	33
ailanthus	Ailanthus altissima	NSL	FIA	6.1	22.0	3.3	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	34
eastern cottonwood	Populus deltoides	NSH	Low	10.7	21.6	16.2	No change	Sm. inc.	Medium	Rare	Poor	Fair	Infill +	Infill +	2	35
Ohio buckeye	Aesculus glabra	NSL	Low	16.8	21.0	3.3	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	36
American basswood	Tilia americana	WSL	Medium	2.1	18.2	8.7	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	37
black willow	Salix nigra	NSH	Low	10.4	16.3	9.1	Sm. dec.	Lg. inc.	Low	Rare	Very Poor	Fair		Infill +	2	38
bur oak	Quercus macrocarpa	NDH	Medium	15.9	12.6	8.2	Sm. dec.	Sm. inc.	High	Rare	Poor	Good			2	39
eastern white pine	Pinus strobus	WDH	High	4.6	12.4	3.6	Very Lg. dec.	Very Lg. dec.	Low	Rare	Lost	Lost			0	40
white mulberry	Morus alba	NSL	FIA	19.1	9.3	2.3	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	41
pawpaw	Asimina triloba	NSL	Low	7	8.6	1.1	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	42
scarlet oak	Quercus coccinea	WDL	Medium	2.6	7.5	2.0	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	43
swamp white oak	Quercus bicolor	NSL	Low	5.5	6.6	2.0	Sm. dec.	Very Lg. dec.	Medium	Rare	Very Poor	Lost			0	44
northern catalpa	Catalpa speciosa	NSHX	FIA	1	5.7	5.0	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	45
American hornbeam; muscle	Carpinus caroliniana	WSL	Low	5	5.6	1.0	Sm. dec.	No change	Medium	Rare	Very Poor	Poor		Infill +	1	46
bigtooth aspen	Populus grandidentata	NSL	Medium	4.2	4.3	16.5	Very Lg. dec.	Very Lg. dec.	Medium	Rare	Lost	Lost			0	47



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shortleaf pine	Pinus echinata	WDH	High	1	4.0	3.5	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	48
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	2.8	3.9	0.6	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	2	49
black maple	Acer nigrum	NSH	Low	0.9	1.7	1.3	Sm. dec.	Lg. dec.	High	Rare	Poor	Poor			0	50
pitch pine	Pinus rigida	NSH	High	1.8	1.5	0.6	Very Lg. dec.	Very Lg. dec.	Medium	Rare	Lost	Lost			0	51
post oak	Quercus stellata	WDH	High	1.5	1.4	1.9	Lg. inc.	Lg. inc.	High	Rare	Good	Good			2	52
serviceberry	Amelanchier spp.	NSL	Low	1	0.9	0.9	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	53
black ash	Fraxinus nigra	WSH	Medium	0.3	0.8	0.2	Very Lg. dec.	Very Lg. dec.	Low	Rare	Lost	Lost			0	54
common persimmon	Diospyros virginiana	NSL	Low	0.7	0.7	0.5	Lg. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	2	55
chokecherry	Prunus virginiana	NSLX	FIA	0.7	0.7	0.5	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	56
paulownia	Paulownia tomentosa	NSL	FIA	1	0.5	0.4	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	57
red mulberry	Morus rubra	NSL	Low	3.8	0.3	0.9	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	58
flowering dogwood	Cornus florida	WDL	Medium	2.4	0.2	0.4	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	2	59
loblolly pine	Pinus taeda	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Likely +	Likely +	3	60
Virginia pine	Pinus virginiana	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Likely +	Likely +	3	61
striped maple	Acer pensylvanicum	NSL	Medium	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	62
yellow buckeye	Aesculus flava	NSL	Low	0	0	0	Unknown	Unknown	Low	Modeled	Unknown	Unknown			0	63
pecan	Carya illinoensis	NSH	Low	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat			3	64
shellbark hickory	Carya laciniosa	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	65
black hickory	Carya texana	NDL	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	66
sugarberry	Celtis laevigata	NDH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate ++	3	67
sweetgum	Liquidambar styraciflua	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Likely +	Likely +	3	68
sourwood	Oxydendrum arboreum	NDL	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Likely +	Likely +	3	69
redbay	Persea borbonia	NSL	Low	0	0	0	Unknown	Unknown	High	Absent	Unknown	Unknown			0	70
southern red oak	Quercus falcata	WDL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	71
cherrybark oak; swamp red o.	Quercus pagoda	NSL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	72
blackjack oak	Quercus marilandica	NSL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	73
water oak	Quercus nigra	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate ++	3	74
Shumard oak	Quercus shumardii	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate ++	3	75
bluejack oak	Quercus incana	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	76
winged elm	Ulmus alata	WDL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	77