

**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	8,445.2	3,260.7	108

**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	12	21	Increase	8	11	Very Good	1	2	Likely	0	0
Hickory	4			Medium	23	35	No Change	12	8	Good	9	9	Infill	23	23
Maple	5	Abundant	1	Low	27	9	Decrease	29	30	Fair	10	10	Migrate	5	8
Oak	7	Common	18	FIA	7		New	10	10	Poor	14	11		<b>28</b>	<b>31</b>
Pine	5	Rare	37				Unknown	10	10	Very Poor	12	13			
Other	32	Absent	13					<b>69</b>	<b>69</b>	FIA Only	3	3			
	<b>56</b>		<b>69</b>		<b>69</b>	<b>65</b>				Unknown	3	3			
											<b>52</b>	<b>51</b>			

**Potential Changes in Climate Variables**

**Temperature (°F)**

	Scenario	2009	2039	2069	2099	
Annual Average	CCSM45	49.7	51.6	54.1	54.3	
	CCSM85	49.7	52.3	54.9	57.9	
	GFDL45	49.7	54.9	55.3	56.2	
	GFDL85	49.7	52.8	56.3	60.6	
	HAD45	49.7	52.7	56.3	57.9	
	HAD85	49.7	53.0	57.7	62.7	
Growing Season (May-Sep)	CCSM45	67.3	69.2	71.4	71.9	
	CCSM85	67.3	70.1	72.5	76.1	
	GFDL45	67.3	73.7	73.9	75.5	
	GFDL85	67.3	71.1	75.3	80.3	
	HAD45	67.3	70.7	73.6	75.8	
	HAD85	67.3	70.5	76.2	81.3	
Coldest Month Average	CCSM45	21.8	23.4	25.7	25.8	
	CCSM85	21.8	24.4	26.2	27.9	
	GFDL45	21.8	25.5	26.3	26.8	
	GFDL85	21.8	25.2	26.5	27.9	
	HAD45	21.8	23.4	26.9	26.9	
	HAD85	21.8	25.5	28.4	31.2	
Warmest Month Average	CCSM45	73.1	74.9	76.4	77.0	
	CCSM85	73.1	76.5	78.2	80.0	
	GFDL45	73.1	76.0	77.9	79.0	
	GFDL85	73.1	77.2	79.2	82.2	
	HAD45	73.1	76.8	79.0	80.2	
	HAD85	73.1	77.8	81.5	84.9	

**Precipitation (in)**

	Scenario	2009	2039	2069	2099	
Annual Total	CCSM45	39.2	38.5	38.2	38.5	
	CCSM85	39.2	38.9	38.4	39.6	
	GFDL45	39.2	41.6	45.9	46.6	
	GFDL85	39.2	42.1	47.6	49.0	
	HAD45	39.2	40.4	42.7	42.1	
	HAD85	39.2	42.5	39.7	42.9	
Growing Season (May-Sep)	CCSM45	19.6	19.8	19.3	18.5	
	CCSM85	19.6	18.4	18.3	17.7	
	GFDL45	19.6	20.2	22.0	22.5	
	GFDL85	19.6	21.1	22.5	22.4	
	HAD45	19.6	19.7	18.6	19.4	
	HAD85	19.6	19.6	16.5	17.0	

**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-DGP30 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
black cherry	Prunus serotina	WDL	Medium	82.5	595.4	16.1	Sm. dec.	Lg. dec.	Low	Abundant	Fair	Poor			0	1
red maple	Acer rubrum	WDH	High	44.5	320.3	10.4	Sm. dec.	Sm. dec.	High	Common	Fair	Fair	Infill +	Infill +	1	2
silver maple	Acer saccharinum	NSH	Low	21.5	310.6	20.5	No change	No change	High	Common	Good	Good	Infill ++	Infill ++	1	3
sugar maple	Acer saccharum	WDH	High	48.2	302.5	10.9	Sm. dec.	Sm. dec.	High	Common	Fair	Fair	Infill +	Infill +	1	4
sassafras	Sassafras albidum	WSL	Low	44.4	258.9	8.7	Sm. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	5
black oak	Quercus velutina	WDH	High	57.1	251.5	9.0	Sm. inc.	No change	Medium	Common	Good	Fair			1	6
American elm	Ulmus americana	WDH	Medium	68.1	242.2	6.8	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	7
green ash	Fraxinus pennsylvanica	WSH	Low	36.3	234.1	7.4	No change	No change	Medium	Common	Fair	Fair	Infill +	Infill +	1	8
slippery elm	Ulmus rubra	WSL	Low	24	167.6	10.8	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	9
black walnut	Juglans nigra	WDH	Low	35.8	160.8	9.0	No change	No change	Medium	Common	Fair	Fair			1	10
American basswood	Tilia americana	WSL	Medium	28.1	149.5	9.4	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor	Infill +	Infill +	0	11
pin oak	Quercus palustris	NSH	Low	34.1	145.1	11.2	Sm. dec.	Sm. dec.	Low	Common	Poor	Poor	Infill +	Infill +	0	12
northern red oak	Quercus rubra	WDH	Medium	44.6	141.1	4.8	No change	No change	High	Common	Good	Good	Infill ++	Infill ++	1	13
boxelder	Acer negundo	WSH	Low	21.8	130.9	10.5	Sm. dec.	Sm. dec.	High	Common	Fair	Fair	Infill +	Infill +	1	14
Siberian elm	Ulmus pumila	NDH	FIA	1.3	119.8	50.1	Unknown	Unknown	NA	Common	NNIS	NNIS			0	15
yellow-poplar	Liriodendron tulipifera	WDH	High	15.4	112.2	9.4	No change	Sm. dec.	High	Common	Good	Fair	Infill ++	Infill +	1	16
white ash	Fraxinus americana	WDL	Medium	28.9	109.9	6.1	Sm. inc.	Sm. inc.	Low	Common	Fair	Fair	Infill +	Infill +	1	17
white oak	Quercus alba	WDH	Medium	40.3	96.9	5.2	Lg. inc.	Sm. inc.	High	Common	Very Good	Very Good	Infill ++	Infill ++	1	18
eastern cottonwood	Populus deltoides	NSH	Low	15.1	83.5	6.3	Sm. inc.	Lg. inc.	Medium	Common	Good	Very Good	Infill ++	Infill ++	1	19
pignut hickory	Carya glabra	WDL	Medium	25.9	46.4	3.5	No change	Sm. dec.	Medium	Rare	Poor	Very Poor	Infill +		1	20
red pine	Pinus resinosa	NSH	Medium	5.7	46.3	18.9	Lg. dec.	Lg. dec.	Low	Rare	Very Poor	Very Poor			0	21
Osage-orange	Maclura pomifera	NDH	Medium	11.1	41.1	4.2	Lg. dec.	Sm. inc.	High	Rare	Poor	Good		Infill ++	2	22
shagbark hickory	Carya ovata	WSL	Medium	23	39.1	2.8	Sm. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	23
red mulberry	Morus rubra	NSL	Low	22.8	38.5	3.0	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	24
eastern white pine	Pinus strobus	WDH	High	5.9	38.1	18.7	Lg. dec.	Lg. dec.	Low	Rare	Very Poor	Very Poor			0	25
black locust	Robinia pseudoacacia	NDH	Low	18.6	32.9	5.2	No change	Lg. inc.	Medium	Rare	Poor	Good	Infill +	Infill ++	1	26
black willow	Salix nigra	NSH	Low	13.4	31.4	5.1	Sm. dec.	Sm. inc.	Low	Rare	Very Poor	Poor		Infill +	1	27
blackgum	Nyssa sylvatica	WDL	Medium	21.3	29.5	4.2	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor	Infill +	Infill +	1	28
hackberry	Celtis occidentalis	WDH	Medium	26.8	24.1	2.7	Sm. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	1	29
Scots pine	Pinus sylvestris	NSH	FIA	11.1	17.2	4.3	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	30
bitternut hickory	Carya cordiformis	WSL	Low	27.4	16.5	1.3	Sm. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	1	31
bur oak	Quercus macrocarpa	NDH	Medium	5.2	14.4	3.8	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	2	32
northern catalpa	Catalpa speciosa	NSHX	FIA	1.3	14.3	4.7	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	33
swamp white oak	Quercus bicolor	NSL	Low	5.6	13.5	1.5	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	34
white mulberry	Morus alba	NSL	FIA	7.2	10.5	3.2	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	35
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	15.4	9.5	4.2	Lg. dec.	Sm. dec.	High	Rare	Poor	Poor	Infill +	Infill +	2	36
northern pin oak	Quercus ellipsoidalis	NSH	Medium	2.4	9.0	3.8	Lg. dec.	Lg. dec.	High	Rare	Poor	Poor			0	37
Virginia pine	Pinus virginiana	NDH	High	0.7	8.4	4.3	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	38
American beech	Fagus grandifolia	WDH	High	15.9	7.1	2.9	No change	Lg. dec.	Medium	Rare	Poor	Very Poor	Infill +		2	39
sycamore	Platanus occidentalis	NSL	Low	16.7	6.1	1.4	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	2	40
American hornbeam; muscle	Carpinus caroliniana	WSL	Low	5.1	4.5	0.3	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	41
chokecherry	Prunus virginiana	NSLX	FIA	1.2	4.0	3.4	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	42
black maple	Acer nigrum	NSH	Low	1.2	3.7	3.1	Lg. dec.	Lg. dec.	High	Rare	Poor	Poor			0	43
black ash	Fraxinus nigra	WSH	Medium	5	3.6	0.5	Lg. dec.	Lg. dec.	Low	Rare	Very Poor	Very Poor			0	44
mockernut hickory	Carya alba	WDL	Medium	1.2	3.6	3.0	No change	Sm. inc.	High	Rare	Fair	Good	Infill +		2	45
jack pine	Pinus banksiana	NSH	Medium	4.7	3.4	11.4	No change	No change	High	Rare	Fair	Fair		Infill +	2	46
honeylocust	Gleditsia triacanthos	NSH	Low	5.4	2.5	1.5	Lg. dec.	Very Lg. dec.	High	Rare	Poor	Lost			0	47

One x One Degree  
Climate Change Atlas Tree Species

USDA Forest Service  
Northern Research Station  
Landscape Change Research Group  
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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
river birch	Betula nigra	NSL	Low	2.4	2.3	1.0	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	48
quaking aspen	Populus tremuloides	WDH	High	5.1	2.0	2.0	Very Lg. dec.	Very Lg. dec.	Medium	Rare	Lost	Lost			0	49
Ohio buckeye	Aesculus glabra	NSL	Low	5.4	1.9	1.3	Sm. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	50
ailanthus	Ailanthus altissima	NSL	FIA	1.6	1.9	0.4	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	51
serviceberry	Amelanchier spp.	NSL	Low	9.5	1.6	2.7	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	52
bigtooth aspen	Populus grandidentata	NSL	Medium	9.6	1.6	1.4	Very Lg. dec.	Very Lg. dec.	Medium	Rare	Lost	Lost			0	53
pawpaw	Asimina triloba	NSL	Low	1.2	1.1	1.0	Very Lg. dec.	Very Lg. dec.	Medium	Rare	Lost	Lost			0	54
butternut	Juglans cinerea	NSLX	FIA	4.7	1.0	3.2	Unknown	Unknown	Low	Rare	FIA Only	FIA Only			0	55
flowering dogwood	Cornus florida	WDL	Medium	4.7	0.1	0.2	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	56
eastern redcedar	Juniperus virginiana	WDH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate ++	Migrate ++	3	57
loblolly pine	Pinus taeda	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate ++	3	58
pecan	Carya illinoensis	NSH	Low	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat			3	59
black hickory	Carya texana	NDL	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	60
sugarberry	Celtis laevigata	NDH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	61
common persimmon	Diospyros virginiana	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	62
sweetgum	Liquidambar styraciflua	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	63
cucumbertree	Magnolia acuminata	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	64
bigleaf magnolia	Magnolia macrophylla	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	65
blackjack oak	Quercus marilandica	NSL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate ++	3	66
post oak	Quercus stellata	WDH	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate ++	Migrate ++	3	67
bluejack oak	Quercus incana	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	68
winged elm	Ulmus alata	WDL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate ++	3	69