

**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	8,985.5	3,469.3	321

**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	23	18	Increase	14	19	Very Good	7	6	Likely	3	2
Hickory	2			Medium	22	41	No Change	11	4	Good	8	8	Infill	6	8
Maple	4	Abundant	8	Low	24	14	Decrease	13	15	Fair	7	10	Migrate	4	13
Oak	5	Common	10	FIA	5		New	21	25	Poor	8	7		<b>13</b>	<b>23</b>
Pine	3	Rare	25				Unknown	15	11	Very Poor	6	5			
Other	27	Absent	30					<b>74</b>	<b>74</b>	FIA Only	4	4			
	<b>43</b>		<b>73</b>		<b>74</b>	<b>73</b>				Unknown	10	6			
											<b>50</b>	<b>46</b>			

**Potential Changes in Climate Variables**

**Temperature (°F)**

	Scenario	2009	2039	2069	2099	
Annual Average	CCSM45	44.7	46.6	48.9	49.1	
	CCSM85	44.7	47.1	49.7	52.9	
	GFDL45	44.7	47.5	50.8	52.2	
	GFDL85	44.7	48.0	52.2	57.0	
	HAD45	44.7	47.7	50.8	52.5	
HAD85	44.7	47.8	51.9	57.4		
Growing Season (May—Sep)	CCSM45	62.2	64.3	66.1	66.5	
	CCSM85	62.2	64.5	67.0	70.7	
	GFDL45	62.2	65.2	68.8	70.3	
	GFDL85	62.2	65.7	70.3	75.3	
	HAD45	62.2	65.1	67.7	70.1	
HAD85	62.2	64.7	69.4	75.3		
Coldest Month (Average)	CCSM45	17.6	19.3	21.3	21.7	
	CCSM85	17.6	20.5	21.7	24.0	
	GFDL45	17.6	20.8	22.9	24.2	
	GFDL85	17.6	21.6	23.8	26.5	
	HAD45	17.6	20.3	23.1	23.3	
HAD85	17.6	21.6	23.9	27.4		
Warmest Month (Average)	CCSM45	68.4	70.8	71.9	72.0	
	CCSM85	68.4	71.2	72.8	74.7	
	GFDL45	68.4	71.2	73.1	74.4	
	GFDL85	68.4	71.9	74.7	77.5	
	HAD45	68.4	71.5	72.9	74.3	
HAD85	68.4	71.0	73.6	77.8		

**Precipitation (in)**

	Scenario	2009	2039	2069	2099	
Annual Total	CCSM45	47.8	46.8	44.5	50.7	
	CCSM85	47.8	46.9	49.1	52.2	
	GFDL45	47.8	51.9	54.7	53.1	
	GFDL85	47.8	50.2	52.9	55.5	
	HAD45	47.8	51.2	53.8	52.4	
HAD85	47.8	52.3	52.2	54.6		
Growing Season (May—Sep)	CCSM45	20.6	21.1	19.1	20.9	
	CCSM85	20.6	19.9	21.2	20.9	
	GFDL45	20.6	20.7	19.9	20.0	
	GFDL85	20.6	21.0	19.8	19.4	
	HAD45	20.6	22.4	22.3	22.5	
HAD85	20.6	21.2	21.1	22.6		

**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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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
red maple	Acer rubrum	WDH	High	98.8	2264.5	16.4	No change	Sm. dec.	High	Abundant	Very Good	Good			1	1
eastern white pine	Pinus strobus	WDH	High	86.3	1931.2	16.9	Sm. dec.	Sm. dec.	Low	Abundant	Fair	Fair			0	2
eastern hemlock	Tsuga canadensis	NSH	High	90.6	1522.9	12.0	Sm. dec.	Lg. dec.	Low	Abundant	Fair	Poor			0	3
northern red oak	Quercus rubra	WDH	Medium	91.4	1250.8	10.1	No change	No change	High	Abundant	Very Good	Very Good			1	4
American beech	Fagus grandifolia	WDH	High	81.1	854.8	7.2	Sm. dec.	Sm. dec.	Medium	Abundant	Fair	Fair			0	5
sugar maple	Acer saccharum	WDH	High	75.5	589.8	5.6	Sm. inc.	Sm. inc.	High	Abundant	Very Good	Very Good			1	6
paper birch	Betula papyrifera	WDH	High	85.6	522.7	4.2	Sm. dec.	Sm. dec.	Medium	Abundant	Fair	Fair			0	7
yellow birch	Betula alleghaniensis	NDL	High	70.4	500.7	4.3	No change	Sm. dec.	Medium	Abundant	Good	Fair			1	8
balsam fir	Abies balsamea	NDH	High	38.1	450.3	6.6	Lg. dec.	Lg. dec.	Low	Common	Very Poor	Very Poor			0	9
white ash	Fraxinus americana	WDL	Medium	70.8	386.6	4.0	Sm. inc.	Sm. inc.	Low	Common	Fair	Fair			1	10
red spruce	Picea rubens	NDH	High	51.3	348.4	4.4	Sm. dec.	Sm. dec.	Low	Common	Poor	Poor			0	11
sweet birch	Betula lenta	NDH	High	40.6	197.5	3.5	Lg. inc.	Sm. inc.	Low	Common	Good	Fair			1	12
white oak	Quercus alba	WDH	Medium	27.5	125.6	3.2	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	13
black oak	Quercus velutina	WDH	High	18	94.4	3.9	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good	Infill ++	Infill ++	1	14
quaking aspen	Populus tremuloides	WDH	High	32.9	90.9	2.0	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	15
black cherry	Prunus serotina	WDL	Medium	37.1	90.4	1.8	Lg. inc.	Lg. inc.	Low	Common	Good	Good			1	16
striped maple	Acer pensylvanicum	NSL	Medium	36.6	86.5	1.6	Sm. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	17
bigtooth aspen	Populus grandidentata	NSL	Medium	21.2	80.1	2.7	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	18
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	26.4	47.6	1.3	No change	Sm. inc.	High	Rare	Fair	Good			1	19
pin cherry	Prunus pensylvanica	NSL	Low	12.8	40.5	2.4	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	20
red pine	Pinus resinosa	NSH	Medium	12	37.8	2.6	No change	Sm. inc.	Low	Rare	Very Poor	Poor		Infill +	1	21
gray birch	Betula populifolia	NSL	Low	29	37.3	1.1	No change	Sm. inc.	Medium	Rare	Poor	Fair			1	22
Siberian elm	Ulmus pumila	NDH	FIA	0.6	37.1	19.1	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	23
pitch pine	Pinus rigida	NSH	High	7.7	35.1	3.3	No change	No change	Medium	Rare	Poor	Poor			1	24
American basswood	Tilia americana	WSL	Medium	15.3	25.2	0.9	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			1	25
American elm	Ulmus americana	WDH	Medium	16.2	23.2	1.1	No change	Sm. inc.	Medium	Rare	Poor	Fair	Infill +	Infill +	1	26
black ash	Fraxinus nigra	WSH	Medium	3.1	22.3	5.8	Lg. dec.	Lg. dec.	Low	Rare	Very Poor	Very Poor			2	27
shagbark hickory	Carya ovata	WSL	Medium	2.7	17.9	1.5	Sm. inc.	Sm. inc.	Medium	Rare	Fair	Fair	Infill +	Infill +	2	28
American mountain-ash	Sorbus americana	NSL	Low	6.1	10.9	0.8	Sm. dec.	Lg. dec.	Low	Rare	Very Poor	Very Poor			0	29
scarlet oak	Quercus coccinea	WDL	Medium	3.3	9.3	2.8	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	2	30
white spruce	Picea glauca	NSL	Medium	3.3	8.3	2.5	Very Lg. dec.	Very Lg. dec.	Medium	Rare	Lost	Lost			0	31
tamarack (native)	Larix laricina	NSH	High	2.9	8.0	2.4	No change	No change	Low	Rare	Very Poor	Very Poor			2	32
serviceberry	Amelanchier spp.	NSL	Low	5.8	6.8	0.7	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	1	33
balsam poplar	Populus balsamifera	NSH	Medium	2.2	4.8	2.2	Very Lg. dec.	Very Lg. dec.	Medium	Rare	Lost	Lost			0	34
blackgum	Nyssa sylvatica	WDL	Medium	3.3	3.3	1.0	Lg. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	2	35
American hornbeam; musclev	Carpinus caroliniana	WSL	Low	0.7	3.0	0.4	No change	Sm. inc.	Medium	Rare	Poor	Fair		Infill +	2	36
bear oak; scrub oak	Quercus ilicifolia	NSLX	FIA	2	2.3	1.0	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	37
mountain maple	Acer spicatum	NSL	Low	2.5	1.7	0.2	Lg. dec.	Lg. dec.	High	Rare	Poor	Poor			1	38
butternut	Juglans cinerea	NSLX	FIA	1.1	1.5	1.4	Unknown	Unknown	Low	Rare	FIA Only	FIA Only			0	39
American chestnut	Castanea dentata	NSLX	FIA	1.9	1.5	0.6	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	40
eastern redcedar	Juniperus virginiana	WDH	Medium	1.1	1.1	1.0	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	41
pignut hickory	Carya glabra	WDL	Medium	0.6	0.4	0.2	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	42
chokecherry	Prunus virginiana	NSLX	FIA	1.1	0.2	0.2	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	43
black spruce	Picea mariana	NSH	High	0	0	0	New Habitat	Unknown	Medium	Absent	New Habitat	Unknown	Likely +		3	44
jack pine	Pinus banksiana	NSH	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate +	3	45
sand pine	Pinus clausa	NDH	High	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat			0	46
shortleaf pine	Pinus echinata	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	47

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USDA Forest Service  
Northern Research Station  
Landscape Change Research Group  
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Common Name	Scientific Name	Range	MR	%Cell	FIAsum	FIAiv	ChngCl45	ChngCl85	Adap	Abund	Capabil45	Capabil85	SHIFT45	SHIFT85	SSO	N
Table Mountain pine	<i>Pinus pungens</i>	NSL	Low	0	0	0	Unknown	New Habitat	High	Absent	Unknown	New Habitat			0	48
Virginia pine	<i>Pinus virginiana</i>	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	49
Ohio buckeye	<i>Aesculus glabra</i>	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	50
cittamwood/gum bumelia	<i>Sideroxylon lanuginosum</i> ssp.	NSL	Low	0	0	0	Unknown	Unknown	High	Absent	Unknown	Unknown			0	51
bitternut hickory	<i>Carya cordiformis</i>	WSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Likely +	Likely +	3	52
pecan	<i>Carya illinoensis</i>	NSH	Low	0	0	0	Unknown	New Habitat	Low	Absent	Unknown	New Habitat			0	53
black hickory	<i>Carya texana</i>	NDL	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	54
mockernut hickory	<i>Carya alba</i>	WDL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	55
sugarberry	<i>Celtis laevigata</i>	NDH	Medium	0	0	0	Unknown	New Habitat	Medium	Absent	Unknown	New Habitat			0	56
eastern redbud	<i>Cercis canadensis</i>	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	57
flowering dogwood	<i>Cornus florida</i>	WDL	Medium	0	0	0	Unknown	New Habitat	Medium	Absent	Unknown	New Habitat		Migrate +	3	58
common persimmon	<i>Diospyros virginiana</i>	NSL	Low	0	0	0	Unknown	New Habitat	High	Absent	Unknown	New Habitat			3	59
green ash	<i>Fraxinus pennsylvanica</i>	WSH	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	60
black walnut	<i>Juglans nigra</i>	WDH	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	61
sweetgum	<i>Liquidambar styraciflua</i>	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate ++	3	62
yellow-poplar	<i>Liriodendron tulipifera</i>	WDH	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	63
cucumbertree	<i>Magnolia acuminata</i>	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	64
bigleaf magnolia	<i>Magnolia macrophylla</i>	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	65
redbay	<i>Persea borbonia</i>	NSL	Low	0	0	0	Unknown	Unknown	High	Absent	Unknown	Unknown			0	66
sycamore	<i>Platanus occidentalis</i>	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	67
swamp white oak	<i>Quercus bicolor</i>	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	68
southern red oak	<i>Quercus falcata</i>	WDL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate +	3	69
chestnut oak	<i>Quercus prinus</i>	NDH	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate ++	Migrate ++	3	70
post oak	<i>Quercus stellata</i>	WDH	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			3	71
black locust	<i>Robinia pseudoacacia</i>	NDH	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Likely +	Likely +	3	72
sassafras	<i>Sassafras albidum</i>	WSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	73
slippery elm	<i>Ulmus rubra</i>	WSL	Low	0	0	0	Unknown	Unknown	Medium	Modeled	Unknown	Unknown			0	74