

**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	9,412.7	3,634.3	188

**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	19	24	Increase	15	18	Very Good	10	11	Likely	2	2
Hickory	4			Medium	29	44	No Change	7	10	Good	8	11	Infill	2	7
Maple	7	Abundant	4	Low	29	11	Decrease	32	26	Fair	5	5	Migrate	9	13
Oak	8	Common	21	FIA	6		New	18	19	Poor	13	10		<b>13</b>	<b>22</b>
Pine	5	Rare	35				Unknown	11	10	Very Poor	13	11			
Other	34	Absent	22					<b>83</b>	<b>83</b>	FIA Only	2	2			
	<b>60</b>		<b>82</b>		<b>83</b>	<b>79</b>				Unknown	5	4			
											<b>56</b>	<b>54</b>			

**Potential Changes in Climate Variables**

**Temperature (°F)**

	Scenario	2009	2039	2069	2099	
Annual Average	CCSM45	49.8	51.6	54.1	54.3	
	CCSM85	49.8	52.1	54.7	57.9	
	GFDL45	49.8	52.8	55.7	56.9	
	GFDL85	49.8	53.3	56.9	61.2	
	HAD45	49.8	52.7	56.1	57.7	
HAD85	49.8	52.8	57.2	62.2		
Growing Season (May—Sep)	CCSM45	65.8	67.6	69.9	70.4	
	CCSM85	65.8	68.1	70.7	74.7	
	GFDL45	65.8	69.1	73.1	74.7	
	GFDL85	65.8	70.3	74.5	79.3	
	HAD45	65.8	69.2	72.3	74.4	
HAD85	65.8	68.9	74.4	79.9		
Coldest Month Average	CCSM45	25.1	26.9	28.7	29.1	
	CCSM85	25.1	27.9	29.1	30.8	
	GFDL45	25.1	28.1	29.1	29.8	
	GFDL85	25.1	28.3	29.5	31.1	
	HAD45	25.1	26.3	28.9	29.1	
HAD85	25.1	27.2	29.3	31.8		
Warmest Month Average	CCSM45	71.5	73.5	74.8	75.2	
	CCSM85	71.5	74.1	75.7	78.1	
	GFDL45	71.5	74.7	77.1	78.4	
	GFDL85	71.5	76.3	78.8	81.8	
	HAD45	71.5	75.2	77.4	78.9	
HAD85	71.5	75.9	79.6	83.3		

**Precipitation (in)**

	Scenario	2009	2039	2069	2099	
Annual Total	CCSM45	42.7	45.0	44.6	46.4	
	CCSM85	42.7	44.4	46.3	48.9	
	GFDL45	42.7	46.9	48.3	48.4	
	GFDL85	42.7	43.9	49.1	50.0	
	HAD45	42.7	44.6	44.9	44.7	
HAD85	42.7	45.6	42.3	45.3		
Growing Season (May—Sep)	CCSM45	20.3	21.4	21.0	21.5	
	CCSM85	20.3	20.6	21.2	21.4	
	GFDL45	20.3	21.7	21.2	20.9	
	GFDL85	20.3	19.7	20.9	20.5	
	HAD45	20.3	21.6	19.3	20.0	
HAD85	20.3	21.2	18.1	18.6		

**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
black cherry	Prunus serotina	WDL	Medium	84.1	2463.4	23.4	Lg. dec.	Lg. dec.	Low	Abundant	Poor	Poor			0	1
red maple	Acer rubrum	WDH	High	79.9	1638.6	15.8	Sm. dec.	Lg. dec.	High	Abundant	Good	Good			1	2
northern red oak	Quercus rubra	WDH	Medium	54	632.1	8.7	No change	No change	High	Abundant	Very Good	Very Good			1	3
sugar maple	Acer saccharum	WDH	High	38.6	524.0	12.1	No change	No change	High	Abundant	Very Good	Very Good			1	4
yellow-poplar	Liriodendron tulipifera	WDH	High	41.1	492.1	10.4	Sm. inc.	No change	High	Common	Very Good	Good			1	5
white ash	Fraxinus americana	WDL	Medium	57.6	475.2	7.2	Sm. dec.	Sm. dec.	Low	Common	Poor	Poor			0	6
black locust	Robinia pseudoacacia	NDH	Low	40.1	467.1	9.5	Lg. dec.	Sm. dec.	Medium	Common	Poor	Poor			0	7
sweet birch	Betula lenta	NDH	High	34.3	311.6	7.3	Lg. dec.	Lg. dec.	Low	Common	Very Poor	Very Poor			0	8
black oak	Quercus velutina	WDH	High	31.6	242.8	5.8	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	9
sassafras	Sassafras albidum	WSL	Low	40.9	238.7	4.8	No change	No change	Medium	Common	Fair	Fair			1	10
white oak	Quercus alba	WDH	Medium	28.2	233.1	6.2	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	11
bigtooth aspen	Populus grandidentata	NSL	Medium	16.4	228.4	8.7	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	12
American elm	Ulmus americana	WDH	Medium	26.9	155.6	5.8	Sm. dec.	Sm. inc.	Medium	Common	Poor	Good			1	13
Scots pine	Pinus sylvestris	NSH	FIA	5.5	131.8	15.6	Unknown	Unknown	NA	Common	NNIS	NNIS			0	14
eastern white pine	Pinus strobus	WDH	High	7.8	120.7	7.7	Sm. dec.	Sm. dec.	Low	Common	Poor	Poor			0	15
chestnut oak	Quercus prinus	NDH	High	21.2	117.0	4.8	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	16
American beech	Fagus grandifolia	WDH	High	16	105.4	5.1	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	17
slippery elm	Ulmus rubra	WSL	Low	19.3	101.5	5.1	Sm. dec.	No change	Medium	Common	Poor	Fair			1	18
quaking aspen	Populus tremuloides	WDH	High	5.4	95.9	10.1	Very Lg. dec.	Very Lg. dec.	Medium	Common	Lost	Lost			0	19
black walnut	Juglans nigra	WDH	Low	18.1	91.8	4.6	Sm. inc.	Lg. inc.	Medium	Common	Good	Very Good			1	20
scarlet oak	Quercus coccinea	WDL	Medium	10.9	79.1	4.9	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	21
blackgum	Nyssa sylvatica	WDL	Medium	25	77.9	2.6	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	22
bitternut hickory	Carya cordiformis	WSL	Low	15.5	77.3	5.4	No change	Lg. inc.	High	Common	Good	Very Good			1	23
American basswood	Tilia americana	WSL	Medium	10.6	66.9	4.6	No change	Sm. dec.	Medium	Common	Fair	Poor			1	24
pignut hickory	Carya glabra	WDL	Medium	13.6	60.2	3.7	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	25
cucumbertree	Magnolia acuminata	NSL	Low	15.7	48.3	2.4	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	26
shagbark hickory	Carya ovata	WSL	Medium	13.1	48.2	2.6	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			1	27
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	14.1	47.7	2.7	Sm. dec.	Sm. inc.	High	Rare	Poor	Good			1	28
black maple	Acer nigrum	NSH	Low	1.5	46.1	17.5	Lg. dec.	Lg. dec.	High	Rare	Poor	Poor			0	29
ailanthus	Ailanthus altissima	NSL	FIA	5.3	44.1	5.4	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	30
eastern hemlock	Tsuga canadensis	NSH	High	6	42.8	4.9	Sm. dec.	Sm. dec.	Low	Rare	Very Poor	Very Poor			0	31
boxelder	Acer negundo	WSH	Low	6.6	42.0	7.0	No change	No change	High	Rare	Fair	Fair	Infill +		1	32
Norway spruce	Picea abies	NSH	FIA	4.9	32.8	5.9	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	33
American hornbeam; muscle	Carpinus caroliniana	WSL	Low	5.8	31.9	4.9	Sm. dec.	No change	Medium	Rare	Very Poor	Poor			1	34
yellow birch	Betula alleghaniensis	NDL	High	7.3	30.1	2.8	Lg. dec.	Very Lg. dec.	Medium	Rare	Very Poor	Lost			0	35
red pine	Pinus resinosa	NSH	Medium	5.2	29.4	3.9	Very Lg. dec.	Very Lg. dec.	Low	Rare	Lost	Lost			0	36
sycamore	Platanus occidentalis	NSL	Low	4.3	29.3	4.3	Sm. inc.	Lg. inc.	Medium	Rare	Fair	Good	Infill +	Infill ++	1	37
flowering dogwood	Cornus florida	WDL	Medium	12.4	24.8	1.9	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			1	38
shingle oak	Quercus imbricaria	NDH	Medium	6.3	23.8	2.9	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	39
striped maple	Acer pensylvanicum	NSL	Medium	8.4	23.5	2.4	Sm. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	40
silver maple	Acer saccharinum	NSH	Low	3.2	22.5	7.1	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor	Infill +		2	41
jack pine	Pinus banksiana	NSH	Medium	0.5	21.5	10.3	Lg. dec.	Lg. dec.	High	Rare	Poor	Poor			0	42
serviceberry	Amelanchier spp.	NSL	Low	14.6	19.6	1.3	Lg. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	43
Osage-orange	Maclura pomifera	NDH	Medium	5	17.9	4.1	Sm. dec.	No change	High	Rare	Poor	Fair	Infill +		2	44
honeylocust	Gleditsia triacanthos	NSH	Low	0.6	14.2	8.1	Sm. dec.	No change	High	Rare	Poor	Fair	Infill +		2	45
pin cherry	Prunus pensylvanica	NSL	Low	7.9	12.8	1.4	Very Lg. dec.	Very Lg. dec.	Medium	Rare	Lost	Lost			0	46
Virginia pine	Pinus virginiana	NDH	High	0.5	10.3	4.9	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	47

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USDA Forest Service  
Northern Research Station  
Landscape Change Research Group  
Iverson, Peters, Prasad, Matthews

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Common Name	Scientific Name	Range	MR	%Cell	FIAsum	FIAiv	ChngCl45	ChngCl85	Adap	Abund	Capabil45	Capabil85	SHIFT45	SHIFT85	SSO	N
white spruce	<i>Picea glauca</i>	NSL	Medium	1.7	9.4	4.0	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	48
mockernut hickory	<i>Carya alba</i>	WDL	Medium	9.4	8.7	1.1	Lg. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	1	49
hackberry	<i>Celtis occidentalis</i>	WDL	Medium	6.5	5.8	1.3	No change	Lg. inc.	High	Rare	Fair	Good		Infill ++	2	50
balsam poplar	<i>Populus balsamifera</i>	NSH	Medium	0.7	5.6	3.4	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	51
butternut	<i>Juglans cinerea</i>	NSLX	FIA	2.1	5.3	2.5	Unknown	Unknown	Low	Rare	FIA Only	FIA Only			0	52
Norway maple	<i>Acer platanoides</i>	NSL	FIA	0.8	4.6	3.2	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	53
swamp white oak	<i>Quercus bicolor</i>	NSL	Low	1.1	4.4	4.2	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	54
chokecherry	<i>Prunus virginiana</i>	NSLX	FIA	2.1	4.0	1.9	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	55
pin oak	<i>Quercus palustris</i>	NSH	Low	1.1	3.5	3.3	Sm. dec.	No change	Low	Rare	Very Poor	Very Poor			2	56
gray birch	<i>Betula populifolia</i>	NSL	Low	0.5	2.2	1.0	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	57
sweetgum	<i>Liquidambar styraciflua</i>	WDH	High	1.1	2.2	2.1	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	58
black ash	<i>Fraxinus nigra</i>	WSH	Medium	1.1	0.9	0.9	Very Lg. dec.	Very Lg. dec.	Low	Rare	Lost	Lost			0	59
American holly	<i>Ilex opaca</i>	NSL	Medium	1.1	0.6	0.6	Very Lg. dec.	Very Lg. dec.	Medium	Rare	Lost	Lost			0	60
Atlantic white-cedar	<i>Chamaecyparis thyoides</i>	NSH	Low	0	0	0	Unknown	Unknown	Low	Absent	Unknown	Unknown			0	61
eastern redcedar	<i>Juniperus virginiana</i>	WDH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate ++	Migrate ++	3	62
shortleaf pine	<i>Pinus echinata</i>	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	63
pitch pine	<i>Pinus rigida</i>	NSH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate ++	3	64
loblolly pine	<i>Pinus taeda</i>	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate ++	3	65
florida maple	<i>Acer barbatum</i>	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate +	3	66
Ohio buckeye	<i>Aesculus glabra</i>	NSL	Low	0	0	0	Unknown	Unknown	Medium	Modeled	Unknown	Unknown			0	67
cittamwood/gum bumelia	<i>Sideroxylon lanuginosum ssp.</i>	NSL	Low	0	0	0	Unknown	New Habitat	High	Absent	Unknown	New Habitat			0	68
black hickory	<i>Carya texana</i>	NDL	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	69
sugarberry	<i>Celtis laevigata</i>	NDH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	70
eastern redbud	<i>Cercis canadensis</i>	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate ++	Migrate ++	3	71
common persimmon	<i>Diospyros virginiana</i>	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	72
green ash	<i>Fraxinus pennsylvanica</i>	WSH	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Likely +	Likely +	3	73
bigleaf magnolia	<i>Magnolia macrophylla</i>	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	74
mountain or Fraser magnolia	<i>Magnolia fraseri</i>	NSL	Low	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat			0	75
red mulberry	<i>Morus rubra</i>	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Likely +	Likely +	3	76
sourwood	<i>Oxydendrum arboreum</i>	NDL	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	77
southern red oak	<i>Quercus falcata</i>	WDL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	78
blackjack oak	<i>Quercus marilandica</i>	NSL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate ++	3	79
chinkapin oak	<i>Quercus muehlenbergii</i>	NSL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	80
post oak	<i>Quercus stellata</i>	WDH	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate ++	Migrate ++	3	81
bluejack oak	<i>Quercus incana</i>	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	82
winged elm	<i>Ulmus alata</i>	WDL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	83