

**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    6,830.1    2,637.1      477

**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	Scenario	Scenario	Scenario	SHIFT	SHIFT				
				High	16	18	Increase	16	15	Very Good	8	8	Likely	0	0
Ash	3			Medium	22	30	No Change	2	4	Good	9	9	Infill	3	3
Hickory	0			Low	21	12	Decrease	15	14	Fair	6	7	Migrate	9	12
Maple	4	Abundant	10	FIA	2		New	20	22	Poor	7	6			
Oak	5	Common	16				Unknown	8	6	Very Poor	2	2			
Pine	4	Rare	9							FIA Only	1	1			
Other	19	Absent	25							Unknown	6	4			
	<b>35</b>		<b>60</b>		<b>61</b>	<b>60</b>		<b>61</b>	<b>61</b>		<b>39</b>	<b>37</b>		<b>12</b>	<b>15</b>

**Potential Changes in Climate Variables**

**Temperature (°F)**

	Scenario	2009	2039	2069	2099	
Annual Average	CCSM45	40.9	42.5	45.6	45.8	
	CCSM85	40.9	43.4	46.6	50.2	
	GFDL45	40.9	44.0	46.9	48.5	
	GFDL85	40.9	44.4	48.1	53.4	
	HAD45	40.9	44.2	47.7	49.7	
	HAD85	40.9	44.7	48.9	54.7	
Growing Season (May—Sep)	CCSM45	60.8	62.5	65.1	65.3	
	CCSM85	60.8	63.4	66.3	70.4	
	GFDL45	60.8	64.5	68.1	70.3	
	GFDL85	60.8	65.2	69.3	75.5	
	HAD45	60.8	64.2	67.0	69.3	
	HAD85	60.8	64.1	68.4	74.3	
Coldest Month Average	CCSM45	9.0	10.5	13.0	13.2	
	CCSM85	9.0	10.3	12.7	15.3	
	GFDL45	9.0	12.4	14.4	15.0	
	GFDL85	9.0	13.2	15.0	18.4	
	HAD45	9.0	11.0	15.3	15.1	
	HAD85	9.0	14.7	17.6	21.5	
Warmest Month Average	CCSM45	67.5	69.4	70.9	71.4	
	CCSM85	67.5	70.5	72.4	74.9	
	GFDL45	67.5	71.4	73.0	74.6	
	GFDL85	67.5	72.2	74.4	77.7	
	HAD45	67.5	71.2	72.5	74.3	
	HAD85	67.5	71.5	73.6	77.7	

**Precipitation (in)**

	Scenario	2009	2039	2069	2099	
Annual Total	CCSM45	31.8	33.3	32.9	32.9	
	CCSM85	31.8	31.2	32.1	32.2	
	GFDL45	31.8	35.1	36.4	34.3	
	GFDL85	31.8	34.7	38.1	37.1	
	HAD45	31.8	33.5	32.5	33.4	
	HAD85	31.8	33.3	34.2	35.6	
Growing Season (May—Sep)	CCSM45	19.1	19.6	18.5	18.8	
	CCSM85	19.1	18.4	18.2	17.0	
	GFDL45	19.1	21.2	20.9	19.6	
	GFDL85	19.1	20.8	22.0	19.8	
	HAD45	19.1	19.0	17.3	17.7	
	HAD85	19.1	18.7	17.0	16.9	

**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
quaking aspen	Populus tremuloides	WDH	High	97	2360.3	15.2	Sm. dec.	Sm. dec.	Medium	Abundant	Fair	Fair			0	1
red maple	Acer rubrum	WDH	High	96.3	1201.3	7.6	Sm. inc.	No change	High	Abundant	Very Good	Very Good			1	2
red pine	Pinus resinosa	NSH	Medium	66.3	1114.9	12.2	Sm. dec.	Sm. dec.	Low	Abundant	Fair	Fair			0	3
balsam fir	Abies balsamea	NDH	High	85	984.0	7.1	Lg. dec.	Lg. dec.	Low	Abundant	Poor	Poor			0	4
jack pine	Pinus banksiana	NSH	Medium	44.3	695.8	12.2	Sm. dec.	Sm. dec.	High	Abundant	Good	Good			1	5
sugar maple	Acer saccharum	WDH	High	67.5	691.3	6.4	Sm. inc.	Sm. inc.	High	Abundant	Very Good	Very Good			1	6
black ash	Fraxinus nigra	WSH	Medium	65.4	677.5	7.0	Sm. dec.	Sm. dec.	Low	Abundant	Fair	Fair			0	7
paper birch	Betula papyrifera	WDH	High	95.2	624.5	3.8	Sm. dec.	Sm. dec.	Medium	Abundant	Fair	Fair			0	8
northern red oak	Quercus rubra	WDH	Medium	71.1	576.4	5.5	Sm. inc.	Sm. inc.	High	Abundant	Very Good	Very Good			1	9
bigtooth aspen	Populus grandidentata	NSL	Medium	62.8	572.3	5.8	Sm. dec.	Sm. dec.	Medium	Abundant	Fair	Fair			0	10
northern pin oak	Quercus ellipsoidalis	NSH	Medium	47.1	469.4	7.7	No change	No change	High	Common	Good	Good			1	11
eastern white pine	Pinus strobus	WDH	High	61.9	389.1	4.1	Sm. inc.	Sm. inc.	Low	Common	Fair	Fair			1	12
tamarack (native)	Larix laricina	NSH	High	38	291.4	5.1	No change	No change	Low	Common	Poor	Poor			0	13
black spruce	Picea mariana	NSH	High	41.2	265.1	4.8	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	14
American basswood	Tilia americana	WSL	Medium	47.9	227.3	2.5	Lg. inc.	Sm. inc.	Medium	Common	Very Good	Good			1	15
white spruce	Picea glauca	NSL	Medium	56.3	216.6	2.3	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor			0	16
northern white-cedar	Thuja occidentalis	WSH	High	26.7	211.1	4.8	Sm. inc.	Lg. inc.	Medium	Common	Good	Very Good			1	17
yellow birch	Betula alleghaniensis	NDL	High	41.2	127.4	1.8	Sm. dec.	No change	Medium	Common	Poor	Fair			1	18
bur oak	Quercus macrocarpa	NDH	Medium	32.1	103.5	2.0	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good	Infill ++	Infill ++	1	19
American elm	Ulmus americana	WDH	Medium	26.5	68.9	1.7	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	20
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	50.9	66.8	0.9	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	21
eastern hemlock	Tsuga canadensis	NSH	High	12.9	65.6	2.1	Lg. inc.	Lg. inc.	Low	Common	Good	Good	Infill ++	Infill ++	1	22
black cherry	Prunus serotina	WDL	Medium	48	61.5	0.8	Lg. inc.	Lg. inc.	Low	Common	Good	Good			1	23
balsam poplar	Populus balsamifera	NSH	Medium	17.3	58.1	1.8	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	24
green ash	Fraxinus pennsylvanica	WSH	Low	31.9	56.7	0.9	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	25
white ash	Fraxinus americana	WDL	Medium	22.6	54.5	1.2	Lg. inc.	Lg. inc.	Low	Common	Good	Good			1	26
white oak	Quercus alba	WDH	Medium	4.3	38.4	1.7	Lg. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	2	27
American hornbeam; muscle	Carpinus caroliniana	WSL	Low	18.6	32.9	1.0	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	28
serviceberry	Amelanchier spp.	NSL	Low	36.8	18.4	0.3	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	29
chokecherry	Prunus virginiana	NSLX	FIA	19.9	17.5	0.6	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	30
silver maple	Acer saccharinum	NSH	Low	1.5	8.7	5.9	Lg. inc.	Lg. inc.	High	Rare	Good	Good			2	31
pin cherry	Prunus pensylvanica	NSL	Low	10.3	5.8	0.5	Very Lg. dec.	Very Lg. dec.	Medium	Rare	Lost	Lost			0	32
Scots pine	Pinus sylvestris	NSH	FIA	1.3	3.8	2.4	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	33
mountain maple	Acer spicatum	NSL	Low	5.5	3.1	0.2	Lg. dec.	Lg. dec.	High	Rare	Poor	Poor			1	34
swamp white oak	Quercus bicolor	NSL	Low	0.7	0.6	0.2	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	35
eastern redcedar	Juniperus virginiana	WDH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	36
boxelder	Acer negundo	WSH	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate ++	Migrate ++	3	37
black maple	Acer nigrum	NSH	Low	0	0	0	Unknown	Unknown	High	Modeled	Unknown	Unknown			0	38
bitternut hickory	Carya cordiformis	WSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	39
pignut hickory	Carya glabra	WDL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	40
shagbark hickory	Carya ovata	WSL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	41
mockernut hickory	Carya alba	WDL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			0	42
hackberry	Celtis occidentalis	WDH	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate +	3	43
flowering dogwood	Cornus florida	WDL	Medium	0	0	0	Unknown	New Habitat	Medium	Absent	Unknown	New Habitat			0	44
American beech	Fagus grandifolia	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	45
blue ash	Fraxinus quadrangulata	NSL	Low	0	0	0	Unknown	Unknown	Low	Absent	Unknown	Unknown			0	46
black walnut	Juglans nigra	WDH	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	47

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

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
sweetgum	Liquidambar styraciflua	WDH	High	0	0	0	Unknown	New Habitat	Medium	Absent	Unknown	New Habitat			0	48
yellow-poplar	Liriodendron tulipifera	WDH	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			0	49
bigleaf magnolia	Magnolia macrophylla	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	50
blackgum	Nyssa sylvatica	WDL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			0	51
sycamore	Platanus occidentalis	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	52
eastern cottonwood	Populus deltoides	NSH	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	53
scarlet oak	Quercus coccinea	WDL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	54
pin oak	Quercus palustris	NSH	Low	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat			0	55
post oak	Quercus stellata	WDH	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			0	56
black oak	Quercus velutina	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate ++	Migrate ++	3	57
black locust	Robinia pseudoacacia	NDH	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	58
black willow	Salix nigra	NSH	Low	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat		Migrate +	3	59
American mountain-ash	Sorbus americana	NSL	Low	0	0	0	Unknown	Unknown	Low	Absent	Unknown	Unknown			0	60
slippery elm	Ulmus rubra	WSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	61