

**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      356

**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	14	21	Increase	13	10	Very Good	7	6	Likely	0	0
Hickory	2			Medium	25	36	No Change	11	12	Good	13	11	Infill	3	3
Maple	4	Abundant	8	Low	23	9	Decrease	18	20	Fair	7	11	Migrate	6	13
Oak	7	Common	24	FIA	7		New	17	19	Poor	6	5		9	16
Pine	4	Rare	17				Unknown	10	8	Very Poor	7	6			
Other	29	Absent	19							FIA Only	4	4			
	<b>49</b>		<b>68</b>		<b>69</b>	<b>66</b>		<b>69</b>	<b>69</b>	Unknown	3	1			
											<b>47</b>	<b>44</b>			

**Potential Changes in Climate Variables**

**Temperature (°F)**

	Scenario	2009	2039	2069	2099	
Annual Average	CCSM45	45.6	47.7	50.6	50.7	
	CCSM85	45.6	48.4	51.2	54.7	
	GFDL45	45.6	48.5	51.2	52.5	
	GFDL85	45.6	48.9	52.4	57.1	
	HAD45	45.6	48.6	52.3	54.1	
	HAD85	45.6	49.1	53.7	58.9	
Growing Season (May—Sep)	CCSM45	64.9	67.1	69.6	69.9	
	CCSM85	64.9	67.9	70.4	74.6	
	GFDL45	64.9	68.1	71.5	73.6	
	GFDL85	64.9	69.0	72.9	78.6	
	HAD45	64.9	68.1	70.9	73.2	
	HAD85	64.9	68.2	73.1	78.3	
Coldest Month (Average)	CCSM45	14.7	16.6	19.4	19.5	
	CCSM85	14.7	17.3	19.3	21.6	
	GFDL45	14.7	18.1	19.7	20.0	
	GFDL85	14.7	18.5	20.2	22.5	
	HAD45	14.7	15.8	20.0	19.9	
	HAD85	14.7	19.2	22.5	25.9	
Warmest Month (Average)	CCSM45	71.1	73.6	75.1	75.7	
	CCSM85	71.1	74.9	76.7	79.0	
	GFDL45	71.1	74.5	76.0	77.7	
	GFDL85	71.1	75.5	77.5	81.2	
	HAD45	71.1	74.4	76.2	77.5	
	HAD85	71.1	75.6	78.4	82.1	

**Precipitation (in)**

	Scenario	2009	2039	2069	2099	
Annual Total	CCSM45	34.3	34.1	34.2	34.0	
	CCSM85	34.3	33.7	34.7	34.4	
	GFDL45	34.3	36.9	40.7	38.5	
	GFDL85	34.3	38.1	41.1	40.2	
	HAD45	34.3	35.5	36.7	36.6	
	HAD85	34.3	35.9	35.1	37.9	
Growing Season (May—Sep)	CCSM45	20.8	20.4	20.1	20.6	
	CCSM85	20.8	20.0	20.5	19.1	
	GFDL45	20.8	21.8	24.0	22.1	
	GFDL85	20.8	22.8	23.3	21.7	
	HAD45	20.8	20.7	19.9	20.3	
	HAD85	20.8	20.8	18.2	18.9	

**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
American elm	Ulmus americana	WDH	Medium	86.5	1046.7	9.0	No change	No change	Medium	Abundant	Good	Good			1	1
white oak	Quercus alba	WDH	Medium	73.2	696.4	6.9	Sm. inc.	No change	High	Abundant	Very Good	Very Good			1	2
northern red oak	Quercus rubra	WDH	Medium	71.1	686.9	6.8	No change	Sm. dec.	High	Abundant	Very Good	Good			1	3
sugar maple	Acer saccharum	WDH	High	61.4	663.1	9.1	No change	No change	High	Abundant	Very Good	Very Good			1	4
red maple	Acer rubrum	WDH	High	61.6	625.6	7.9	Sm. dec.	Lg. dec.	High	Abundant	Good	Good			1	5
boxelder	Acer negundo	WSH	Low	54.3	607.1	8.1	No change	No change	High	Abundant	Very Good	Very Good			1	6
shagbark hickory	Carya ovata	WSL	Medium	73.2	537.5	5.9	No change	Sm. dec.	Medium	Abundant	Good	Fair			1	7
black cherry	Prunus serotina	WDL	Medium	84.8	523.7	4.3	Sm. inc.	No change	Low	Abundant	Good	Fair			1	8
black oak	Quercus velutina	WDH	High	45.9	499.9	7.3	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	9
bitternut hickory	Carya cordiformis	WSL	Low	68.4	454.6	4.7	No change	No change	High	Common	Good	Good			1	10
quaking aspen	Populus tremuloides	WDH	High	44.4	411.6	6.5	Sm. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	11
paper birch	Betula papyrifera	WDH	High	56.9	400.4	5.3	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	12
eastern white pine	Pinus strobus	WDH	High	28.6	400.4	9.4	Lg. dec.	Lg. dec.	Low	Common	Very Poor	Very Poor			0	13
American basswood	Tilia americana	WSL	Medium	64.5	386.1	4.7	Sm. inc.	No change	Medium	Common	Good	Fair			1	14
bigtooth aspen	Populus grandidentata	NSL	Medium	50.7	366.0	5.7	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	15
black walnut	Juglans nigra	WDH	Low	28.7	307.4	7.0	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	16
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	62.4	278.4	3.8	No change	Sm. dec.	High	Common	Good	Fair			1	17
white ash	Fraxinus americana	WDL	Medium	52.1	265.9	4.0	Sm. inc.	Sm. inc.	Low	Common	Fair	Fair			1	18
slippery elm	Ulmus rubra	WSL	Low	60.7	261.1	3.2	No change	No change	Medium	Common	Fair	Fair			1	19
red pine	Pinus resinosa	NSH	Medium	19.7	257.0	9.3	Lg. dec.	Lg. dec.	Low	Common	Very Poor	Very Poor			0	20
bur oak	Quercus macrocarpa	NDH	Medium	38.8	241.4	3.7	Lg. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	21
silver maple	Acer saccharinum	NSH	Low	9.4	204.3	16.1	No change	No change	High	Common	Good	Good			1	22
northern pin oak	Quercus ellipsoidal	NSH	Medium	25.6	175.8	4.2	Lg. dec.	Lg. dec.	High	Common	Fair	Fair			1	23
jack pine	Pinus banksiana	NSH	Medium	11.4	142.4	6.6	Lg. dec.	Lg. dec.	High	Common	Fair	Fair			1	24
green ash	Fraxinus pennsylvanica	WSH	Low	22.3	139.4	5.3	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	25
eastern redcedar	Juniperus virginiana	WDH	Medium	18.6	126.9	4.3	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	26
black ash	Fraxinus nigra	WSH	Medium	23.5	105.8	3.9	Lg. dec.	Lg. dec.	Low	Common	Very Poor	Very Poor			0	27
red mulberry	Morus rubra	NSL	Low	10.5	98.9	8.9	Sm. dec.	No change	Medium	Common	Poor	Fair			1	28
black locust	Robinia pseudoacacia	NDH	Low	9.6	92.8	7.4	No change	No change	Medium	Common	Fair	Fair			1	29
black willow	Salix nigra	NSH	Low	7.3	75.1	9.6	Sm. dec.	Sm. dec.	Low	Common	Poor	Poor			0	30
river birch	Betula nigra	NSL	Low	4	62.5	12.8	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor			0	31
swamp white oak	Quercus bicolor	NSL	Low	7.9	60.5	6.1	No change	No change	Medium	Common	Fair	Fair	Infill +	Infill +	1	32
hackberry	Celtis occidentalis	WDH	Medium	20.3	40.7	1.2	Lg. inc.	Lg. inc.	High	Rare	Good	Good			1	33
butternut	Juglans cinerea	NSLX	FIA	10.9	27.0	2.1	Unknown	Unknown	Low	Rare	FIA Only	FIA Only			0	34
eastern cottonwood	Populus deltoides	NSH	Low	6.7	21.7	3.3	Sm. inc.	Lg. inc.	Medium	Rare	Fair	Good	Infill +	Infill ++	1	35
Scots pine	Pinus sylvestris	NSH	FIA	1.4	20.3	3.9	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	36
yellow birch	Betula alleghaniensis	NDL	High	5.3	14.5	2.3	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	37
white mulberry	Morus alba	NSL	FIA	8.6	12.5	1.4	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	38
American hornbeam; musclev	Carpinus caroliniana	WSL	Low	14.3	11.3	0.5	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	39
white spruce	Picea glauca	NSL	Medium	2.7	11.0	2.4	Very Lg. dec.	Very Lg. dec.	Medium	Rare	Lost	Lost			0	40
peachleaf willow	Salix amygdaloides	NSLX	FIA	2.2	10.7	4.8	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	41
wild plum	Prunus americana	NSLX	FIA	2.2	9.9	4.4	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	42
honeylocust	Gleditsia triacanthos	NSH	Low	1.1	6.4	5.8	Lg. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	2	43
serviceberry	Amelanchier spp.	NSL	Low	3.4	5.8	1.0	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	44
pin cherry	Prunus pensylvanica	NSL	Low	0.1	3.3	0.3	Lg. dec.	Very Lg. dec.	Medium	Rare	Very Poor	Lost			0	45
chinkapin oak	Quercus muehlenbergii	NSL	Medium	1.1	2.7	2.4	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	46
northern catalpa	Catalpa speciosa	NSHX	FIA	1.1	2.5	2.2	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	47

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Climate Change Atlas Tree Species

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		
balsam fir	Abies balsamea	NDH	High	1.1	1.4	1.2	Very Lg. dec.	Very Lg. dec.	Low	Rare	Lost	Lost				0	48	
Siberian elm	Ulmus pumila	NDH	FIA	1	1.2	0.9	Unknown	Unknown	NA	Rare	NNIS	NNIS					0	49
loblolly pine	Pinus taeda	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat					3	50
cittamwood/gum bumelia	Sideroxylon lanuginosum ssp.	NSL	Low	0	0	0	Unknown	New Habitat	High	Absent	Unknown	New Habitat					3	51
pignut hickory	Carya glabra	WDL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +			3	52
black hickory	Carya texana	NDL	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat					3	53
mockernut hickory	Carya alba	WDL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate +			3	54
sugarberry	Celtis laevigata	NDH	Medium	0	0	0	Unknown	New Habitat	Medium	Absent	Unknown	New Habitat					3	55
eastern redbud	Cercis canadensis	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +			3	56
common persimmon	Diospyros virginiana	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate +			3	57
American beech	Fagus grandifolia	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +			3	58
sweetgum	Liquidambar styraciflua	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat					3	59
yellow-poplar	Liriodendron tulipifera	WDH	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate +			3	60
Osage-orange	Maclura pomifera	NDH	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate +			3	61
blackgum	Nyssa sylvatica	WDL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate +			3	62
sycamore	Platanus occidentalis	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +			3	63
balsam poplar	Populus balsamifera	NSH	Medium	0	0	0	Unknown	Unknown	Medium	Modeled	Unknown	Unknown					0	64
shingle oak	Quercus imbricaria	NDH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +			3	65
blackjack oak	Quercus marilandica	NSL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat					3	66
pin oak	Quercus palustris	NSH	Low	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat		Migrate +			3	67
post oak	Quercus stellata	WDH	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate ++			3	68
sassafras	Sassafras albidum	WSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +			3	69