

# One x One Degree

## Climate Change Atlas Tree Species

### Current and Potential Future Habitat, Capability, and Migration

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

sq. km	sq. mi	FIA Plots	
Area of Region	8,837.4	3,412.1	298

### 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				
Ash	3			Reliability	Adaptability	Scenario RCP45	Scenario RCP85	Scenario RCP45	Scenario RCP85	SHIFT RCP45	SHIFT RCP85		
Hickory	0	Abundant	8	High	20	15	Increase	13	15	Likely	4	4	
Maple	6	Common	12	Medium	19	33	No Change	5	5	Infill	3	5	
Oak	2	Rare	22	Low	22	15	Decrease	20	18	Migrate	6	15	
Pine	3	Absent	23	FIA	4		New	19	22				
Other	28						Unknown	8	5				
<b>42</b>		<b>65</b>			<b>65</b>	<b>63</b>		<b>65</b>	<b>65</b>			<b>13</b>	<b>24</b>
												<b>43</b>	<b>39</b>

### Potential Changes in Climate Variables

#### Temperature (°F)

Scenario	2009	2039	2069	2099	
Annual CCSM45	41.8	43.7	46.3	46.3	
Average CCSM85	41.8	44.3	47.1	50.5	
GFDL45	41.8	45.1	48.5	50.1	
GFDL85	41.8	45.5	50.0	55.2	
HAD45	41.8	45.1	48.3	50.1	
HAD85	41.8	45.2	49.3	55.2	
Growing Season CCSM45	60.2	62.3	64.2	64.6	
CCSM85	60.2	62.5	65.1	69.0	
GFDL45	60.2	63.7	67.3	69.1	
GFDL85	60.2	64.2	68.9	74.4	
HAD45	60.2	63.3	66.0	68.4	
HAD85	60.2	62.9	67.4	73.7	
Coldest Month CCSM45	12.8	14.5	16.9	17.1	
CCSM85	12.8	15.8	17.1	19.8	
GFDL45	12.8	16.0	18.6	19.9	
GFDL85	12.8	17.1	19.6	22.7	
HAD45	12.8	15.6	18.9	19.3	
HAD85	12.8	17.1	19.7	23.7	
Warmest Month CCSM45	66.2	68.5	69.8	69.8	
CCSM85	66.2	69.0	70.8	72.9	
GFDL45	66.2	69.1	71.3	72.6	
GFDL85	66.2	70.1	73.0	75.9	
HAD45	66.2	69.5	70.9	72.4	
HAD85	66.2	69.1	71.8	76.2	

#### Precipitation (in)

Scenario	2009	2039	2069	2099	
Annual CCSM45	46.0	44.9	44.0	48.1	
Total CCSM85	46.0	46.5	46.7	47.9	
GFDL45	46.0	50.2	52.5	51.3	
GFDL85	46.0	48.3	51.0	52.2	
HAD45	46.0	49.2	51.0	50.8	
HAD85	46.0	50.4	49.7	53.5	
Growing Season CCSM45	21.9	21.7	20.2	22.0	
CCSM85	21.9	21.7	21.8	20.6	
GFDL45	21.9	22.4	21.6	21.6	
GFDL85	21.9	22.1	21.7	20.2	
HAD45	21.9	23.3	22.5	23.8	
HAD85	21.9	22.7	22.0	24.0	

**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-DPC30 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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Common Name	Scientific Name	Range	MR	%Cell	FIAsum	FIAiv	ChngCl45	ChngCl85	Adap	Abund	Capabil45	Capabil85	SHIFT45	SHIFT85	SSO	N
sugar maple	Acer saccharum	WDH	High	96.9	2345.3	18.8	Sm. dec.	Sm. dec.	High	Abundant	Good	Good			1	1
red maple	Acer rubrum	WDH	High	91.3	1289.8	10.7	Sm. inc.	Sm. inc.	High	Abundant	Very Good	Very Good			1	2
eastern hemlock	Tsuga canadensis	NSH	High	62.7	1017.8	11.6	No change	Sm. dec.	Low	Abundant	Fair	Fair			0	3
balsam fir	Abies balsamea	NDH	High	72.6	941.0	9.5	Sm. dec.	Sm. dec.	Low	Abundant	Fair	Fair			0	4
yellow birch	Betula alleghaniensis	NDL	High	87.6	839.2	7.5	Sm. dec.	Sm. dec.	Medium	Abundant	Fair	Fair			0	5
eastern white pine	Pinus strobus	WDH	High	45	704.8	9.2	Sm. inc.	No change	Low	Abundant	Good	Fair			1	6
American beech	Fagus grandifolia	WDH	High	84	624.1	5.8	No change	No change	Medium	Abundant	Good	Good			1	7
red spruce	Picea rubens	NDH	High	78.3	511.6	5.3	Sm. dec.	Sm. dec.	Low	Abundant	Fair	Fair			0	8
white ash	Fraxinus americana	WDL	Medium	78.5	465.2	4.2	Sm. inc.	Sm. inc.	Low	Common	Fair	Fair			1	9
paper birch	Betula papyrifera	WDH	High	80.6	460.3	4.3	No change	No change	Medium	Common	Fair	Fair			1	10
northern white-cedar	Thuja occidentalis	WSH	High	30.8	353.9	10.0	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor			0	11
black cherry	Prunus serotina	WDL	Medium	63.9	266.2	3.2	Sm. inc.	Lg. inc.	Low	Common	Fair	Good			1	12
quaking aspen	Populus tremuloides	WDH	High	50.3	262.7	3.5	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	13
striped maple	Acer pensylvanicum	NSL	Medium	66.1	132.0	1.5	Sm. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	14
white spruce	Picea glauca	NSL	Medium	25.5	126.7	4.7	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor			0	15
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	38.2	121.8	2.2	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	16
northern red oak	Quercus rubra	WDH	Medium	14.5	105.2	3.3	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	17
American elm	Ulmus americana	WDH	Medium	35.4	95.1	2.3	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	18
gray birch	Betula populifolia	NSL	Low	31.8	78.4	2.1	Sm. dec.	No change	Medium	Common	Poor	Fair			1	19
pin cherry	Prunus pensylvanica	NSL	Low	32.7	65.9	1.6	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	20
bigtooth aspen	Populus grandidentata	NSL	Medium	14.9	42.0	1.6	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			1	21
balsam poplar	Populus balsamifera	NSH	Medium	12	39.3	1.8	Lg. dec.	Very Lg. dec.	Medium	Rare	Very Poor	Lost			0	22
Norway spruce	Picea abies	NSH	FIA	3	31.7	7.6	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	23
black ash	Fraxinus nigra	WSH	Medium	21	27.3	0.9	Sm. dec.	Lg. dec.	Low	Rare	Very Poor	Very Poor			0	24
Scots pine	Pinus sylvestris	NSH	FIA	4.3	25.3	4.9	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	25
tamarack (native)	Larix laricina	NSH	High	7.3	25.2	2.6	Lg. dec.	Lg. dec.	Low	Rare	Very Poor	Very Poor			0	26
American basswood	Tilia americana	WSL	Medium	13.2	23.2	1.2	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			1	27
silver maple	Acer saccharinum	NSH	Low	1.1	21.5	19.0	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor			0	28
eastern cottonwood	Populus deltoides	NSH	Low	1.1	12.0	10.6	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	29
mountain maple	Acer spicatum	NSL	Low	11.4	11.0	0.8	Lg. dec.	Lg. dec.	High	Rare	Poor	Poor			1	30
serviceberry	Amelanchier spp.	NSL	Low	12.5	9.8	0.6	Sm. dec.	Sm. inc.	Medium	Rare	Very Poor	Fair			1	31
American mountain-ash	Sorbus americana	NSL	Low	7.6	8.1	0.7	Lg. dec.	Lg. dec.	Low	Rare	Very Poor	Very Poor			0	32
white oak	Quercus alba	WDH	Medium	1.3	6.5	2.3	Lg. inc.	Lg. inc.	High	Rare	Good	Good			2	33
butternut	Juglans cinerea	NSLX	FIA	5.1	6.3	1.1	Unknown	Unknown	Low	Rare	FIA Only	FIA Only			0	34
black spruce	Picea mariana	NSH	High	1.1	5.7	5.0	Very Lg. dec.	Very Lg. dec.	Medium	Rare	Lost	Lost			0	35
American hornbeam; muscle	Carpinus caroliniana	WSL	Low	1.2	4.4	1.6	No change	Sm. inc.	Medium	Rare	Poor	Fair		Infill +	2	36
boxelder	Acer negundo	WSH	Low	1	2.9	2.3	Sm. dec.	No change	High	Rare	Poor	Fair		Infill +	2	37
green ash	Fraxinus pennsylvanica	WSH	Low	3.9	2.7	0.5	No change	Lg. inc.	Medium	Rare	Poor	Good	Infill +	Infill ++	2	38
chokecherry	Prunus virginiana	NSLX	FIA	3.7	2.6	0.4	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	39
red pine	Pinus resinosa	NSH	Medium	0.6	1.4	0.6	Lg. inc.	Lg. inc.	Low	Rare	Fair	Fair	Infill +	Infill +	2	40
Atlantic white-cedar	Chamaecyparis thyoides	NSH	Low	1.1	0.8	0.7	Sm. dec.	Lg. dec.	Low	Rare	Very Poor	Very Poor			0	41
sweet birch	Betula lenta	NDH	High	0.5	0.5	0.2	Lg. inc.	Lg. inc.	Low	Rare	Fair	Fair	Infill +	Infill +	2	42
eastern redcedar	Juniperus virginiana	WDH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Likely +	Likely +	3	43
pitch pine	Pinus rigida	NSH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	44
bitternut hickory	Carya cordiformis	WSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Likely +	Likely +	3	45
pignut hickory	Carya glabra	WDL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	46
shagbark hickory	Carya ovata	WSL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Likely +	Likely +	3	47



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mockernut hickory	<i>Carya alba</i>	WDL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate +	3	48
flowering dogwood	<i>Cornus florida</i>	WDL	Medium	0	0	0	Unknown	New Habitat	Medium	Absent	Unknown	New Habitat		Migrate +	3	49
common persimmon	<i>Diospyros virginiana</i>	NSL	Low	0	0	0	Unknown	New Habitat	High	Absent	Unknown	New Habitat			0	50
black walnut	<i>Juglans nigra</i>	WDH	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	51
sweetgum	<i>Liquidambar styraciflua</i>	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate ++	3	52
yellow-poplar	<i>Liriodendron tulipifera</i>	WDH	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate ++	3	53
southern magnolia	<i>Magnolia grandiflora</i>	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	54
mountain or Fraser magnolia	<i>Magnolia fraseri</i>	NSL	Low	0	0	0	Unknown	New Habitat	Low	Absent	Unknown	New Habitat			0	55
blackgum	<i>Nyssa sylvatica</i>	WDL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	56
sycamore	<i>Platanus occidentalis</i>	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	57
swamp white oak	<i>Quercus bicolor</i>	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	58
scarlet oak	<i>Quercus coccinea</i>	WDL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	59
pin oak	<i>Quercus palustris</i>	NSH	Low	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat		Migrate +	3	60
chestnut oak	<i>Quercus prinus</i>	NDH	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	61
post oak	<i>Quercus stellata</i>	WDH	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			3	62
black oak	<i>Quercus velutina</i>	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	63
black locust	<i>Robinia pseudoacacia</i>	NDH	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Likely +	Likely +	3	64
sassafras	<i>Sassafras albidum</i>	WSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	65