

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 9,273.2 3,580.4 250

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	22	Increase	19	22	Very Good	7	8	Likely	1	1
Hickory	4			Medium	26	No Change	7	8	Good	14	16	Infill	3	6
Maple	5	Abundant	9	Low	25	Decrease	25	21	Fair	8	8	Migrate	3	11
Oak	8	Common	20	FIA	7	New	14	18	Poor	14	12		7	18
Pine	5	Rare	29			Unknown	15	11	Very Poor	4	4			
Other	33	Absent	21				80	80	FIA Only	3	3			
	58		79						Unknown	8	4			
										58	55			

Potential Changes in Climate Variables

Temperature (°F)

	Scenario	2009	2039	2069	2099	
Annual Average	CCSM45	47.1	49.1	51.4	51.6	
	CCSM85	47.1	49.4	52.1	55.3	
	GFDL45	47.1	50.2	53.2	54.4	
	GFDL85	47.1	50.6	54.4	58.9	
	HAD45	47.1	50.1	53.5	55.2	
	HAD85	47.1	50.2	54.5	59.7	
Growing Season (May—Sep)	CCSM45	63.7	65.8	67.8	68.3	
	CCSM85	63.7	66.0	68.6	72.6	
	GFDL45	63.7	67.1	70.9	72.4	
	GFDL85	63.7	68.1	72.4	77.2	
	HAD45	63.7	67.0	70.0	72.3	
	HAD85	63.7	66.6	71.6	77.5	
Coldest Month Average	CCSM45	21.6	23.6	25.5	25.8	
	CCSM85	21.6	24.2	25.5	27.4	
	GFDL45	21.6	24.8	26.1	26.8	
	GFDL85	21.6	25.1	26.6	28.5	
	HAD45	21.6	23.4	26.2	26.4	
	HAD85	21.6	24.5	26.6	29.5	
Warmest Month Average	CCSM45	69.7	72.0	73.2	73.5	
	CCSM85	69.7	72.3	74.1	76.3	
	GFDL45	69.7	72.7	75.1	76.3	
	GFDL85	69.7	74.1	76.7	79.8	
	HAD45	69.7	73.3	75.1	76.7	
	HAD85	69.7	73.4	76.5	80.7	

Precipitation (in)

	Scenario	2009	2039	2069	2099	
Annual Total	CCSM45	41.8	42.6	43.0	46.2	
	CCSM85	41.8	43.2	45.1	46.9	
	GFDL45	41.8	46.2	48.5	47.8	
	GFDL85	41.8	43.5	47.7	49.8	
	HAD45	41.8	43.2	44.2	43.4	
	HAD85	41.8	45.3	43.1	46.5	
Growing Season (May—Sep)	CCSM45	19.9	20.8	21.0	22.1	
	CCSM85	19.9	20.7	21.5	21.3	
	GFDL45	19.9	20.7	20.8	21.0	
	GFDL85	19.9	19.6	20.4	20.5	
	HAD45	19.9	20.4	18.7	18.9	
	HAD85	19.9	20.4	18.6	19.8	

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	88	2063.9	17.1	Sm. dec.	Sm. dec.	High	Abundant	Good	Good			1	1
sugar maple	Acer saccharum	WDH	High	69.1	1182.1	13.8	Sm. dec.	Sm. dec.	High	Abundant	Good	Good			1	2
white ash	Fraxinus americana	WDL	Medium	62.1	856.5	9.2	No change	No change	Low	Abundant	Fair	Fair			0	3
eastern hemlock	Tsuga canadensis	NSH	High	69.4	823.3	9.2	Lg. dec.	Lg. dec.	Low	Abundant	Poor	Poor			0	4
American beech	Fagus grandifolia	WDH	High	49	588.3	9.6	Sm. dec.	Sm. dec.	Medium	Abundant	Fair	Fair			0	5
sweet birch	Betula lenta	NDH	High	66.5	577.6	6.3	Sm. dec.	Sm. dec.	Low	Abundant	Fair	Fair			0	6
black cherry	Prunus serotina	WDL	Medium	59.3	562.9	6.8	Sm. inc.	No change	Low	Abundant	Good	Fair			1	7
northern red oak	Quercus rubra	WDH	Medium	53.2	549.5	7.7	Sm. inc.	Sm. inc.	High	Abundant	Very Good	Very Good			1	8
eastern white pine	Pinus strobus	WDH	High	51.3	531.6	8.4	Sm. dec.	Sm. dec.	Low	Abundant	Fair	Fair			0	9
chestnut oak	Quercus prinus	NDH	High	33.5	439.2	9.1	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	10
white oak	Quercus alba	WDH	Medium	29.7	216.1	5.4	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	11
yellow birch	Betula alleghaniensis	NDL	High	30.1	182.0	5.3	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	12
American elm	Ulmus americana	WDH	Medium	16.7	170.2	6.3	Sm. dec.	No change	Medium	Common	Poor	Fair			1	13
American basswood	Tilia americana	WSL	Medium	26.3	149.1	4.4	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	14
bigtooth aspen	Populus grandidentata	NSL	Medium	23.3	132.5	4.3	Sm. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	15
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	33.6	117.8	2.2	No change	Sm. inc.	High	Common	Good	Very Good			1	16
black locust	Robinia pseudoacacia	NDH	Low	6	110.5	6.7	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	17
black oak	Quercus velutina	WDH	High	27.5	109.0	3.3	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	18
black walnut	Juglans nigra	WDH	Low	9.5	89.3	7.0	No change	No change	Medium	Common	Fair	Fair			1	19
blackgum	Nyssa sylvatica	WDL	Medium	17.4	83.9	3.1	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	20
quaking aspen	Populus tremuloides	WDH	High	16.1	81.6	3.3	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	21
white spruce	Picea glauca	NSL	Medium	0.1	80.8	6.2	Very Lg. dec.	Very Lg. dec.	Medium	Common	Lost	Lost			0	22
pignut hickory	Carya glabra	WDL	Medium	16.2	76.7	3.4	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	23
paper birch	Betula papyrifera	WDH	High	6.4	69.3	3.1	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	24
serviceberry	Amelanchier spp.	NSL	Low	30.7	62.7	1.6	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor			0	25
pitch pine	Pinus rigida	NSH	High	2.3	59.1	17.7	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor			0	26
scarlet oak	Quercus coccinea	WDL	Medium	14.6	52.6	2.4	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	27
striped maple	Acer pensylvanicum	NSL	Medium	23.7	51.9	1.9	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	28
pin cherry	Prunus pensylvanica	NSL	Low	13.8	51.5	3.8	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	29
bitternut hickory	Carya cordiformis	WSL	Low	10.2	50.0	3.7	No change	Lg. inc.	High	Rare	Fair	Good			1	30
Virginia pine	Pinus virginiana	NDH	High	11.4	44.6	5.1	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	1	31
yellow-poplar	Liriodendron tulipifera	WDH	High	9.1	39.4	3.1	Lg. inc.	Lg. inc.	High	Rare	Good	Good			1	32
shagbark hickory	Carya ovata	WSL	Medium	12.5	36.6	1.7	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			1	33
black ash	Fraxinus nigra	WSH	Medium	1.1	35.9	33.3	Very Lg. dec.	Very Lg. dec.	Low	Rare	Lost	Lost			0	34
red spruce	Picea rubens	NDH	High	3.5	35.1	6.6	Lg. dec.	Lg. dec.	Low	Rare	Very Poor	Very Poor			0	35
sassafras	Sassafras albidum	WSL	Low	6	29.8	2.3	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			1	36
red pine	Pinus resinosa	NSH	Medium	6.6	29.3	7.1	Very Lg. dec.	Very Lg. dec.	Low	Rare	Lost	Lost			0	37
hackberry	Celtis occidentalis	WDH	Medium	2	26.2	12.1	Sm. dec.	No change	High	Rare	Poor	Fair		Infill +	2	38
gray birch	Betula populifolia	NSL	Low	7.8	23.9	2.5	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	39
American hornbeam; musclev	Carpinus caroliniana	WSL	Low	12.3	23.8	1.3	No change	Lg. inc.	Medium	Rare	Poor	Good			1	40
Scots pine	Pinus sylvestris	NSH	FIA	8.4	23.5	3.6	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	41
eastern redcedar	Juniperus virginiana	WDH	Medium	3.6	14.3	3.2	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	2	42
mockernut hickory	Carya alba	WDL	Medium	4.7	12.7	1.7	Lg. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	1	43
butternut	Juglans cinerea	NSLX	FIA	3.2	11.8	3.7	Unknown	Unknown	Low	Rare	FIA Only	FIA Only			0	44
sycamore	Platanus occidentalis	NSL	Low	0.9	10.9	8.4	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	45
ailanthus	Ailanthus altissima	NSL	FIA	0.4	6.7	2.3	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	46
Norway maple	Acer platanoides	NSL	FIA	1.7	6.1	2.1	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	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
Norway spruce	<i>Picea abies</i>	NSH	FIA	2.4	5.2	1.1	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	48
river birch	<i>Betula nigra</i>	NSL	Low	1.8	5.2	1.9	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			2	49
cucumbertree	<i>Magnolia acuminata</i>	NSL	Low	2.2	3.6	1.7	Sm. dec.	No change	Medium	Rare	Very Poor	Poor	Infill +		2	50
green ash	<i>Fraxinus pennsylvanica</i>	WSH	Low	1.1	2.2	2.0	Sm. inc.	Lg. inc.	Medium	Rare	Fair	Good			2	51
pin oak	<i>Quercus palustris</i>	NSH	Low	2	1.4	0.5	Very Lg. dec.	No change	Low	Rare	Lost	Very Poor			2	52
flowering dogwood	<i>Cornus florida</i>	WDL	Medium	2.2	1.4	0.6	No change	No change	Medium	Rare	Poor	Poor	Infill +		2	53
boxelder	<i>Acer negundo</i>	WSH	Low	1.1	0.9	0.9	No change	Lg. inc.	High	Rare	Fair	Good			2	54
bear oak; scrub oak	<i>Quercus ilicifolia</i>	NSLX	FIA	1.1	0.7	0.6	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	55
northern pin oak	<i>Quercus ellipsoidalis</i>	NSH	Medium	0.4	0.5	0.2	Lg. dec.	Lg. dec.	High	Rare	Poor	Poor			0	56
slippery elm	<i>Ulmus rubra</i>	WSL	Low	1.6	0.5	0.2	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	57
American chestnut	<i>Castanea dentata</i>	NSLX	FIA	0.8	0.3	0.2	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	58
shortleaf pine	<i>Pinus echinata</i>	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate ++		3	59
loblolly pine	<i>Pinus taeda</i>	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate ++		3	60
northern white-cedar	<i>Thuja occidentalis</i>	WSH	High	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	61
florida maple	<i>Acer barbatum</i>	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			3	62
black maple	<i>Acer nigrum</i>	NSH	Low	0	0	0	Unknown	Unknown	High	Modeled	Unknown	Unknown			0	63
mountain maple	<i>Acer spicatum</i>	NSL	Low	0	0	0	Unknown	Unknown	High	Absent	Unknown	Unknown			0	64
cittamwood/gum bumelia	<i>Sideroxylon lanuginosum ssp.</i>	NSL	Low	0	0	0	Unknown	New Habitat	High	Absent	Unknown	New Habitat			0	65
black hickory	<i>Carya texana</i>	NDL	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	66
sugarberry	<i>Celtis laevigata</i>	NDH	Medium	0	0	0	Unknown	New Habitat	Medium	Absent	Unknown	New Habitat			0	67
eastern redbud	<i>Cercis canadensis</i>	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	68
common persimmon	<i>Diospyros virginiana</i>	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +		3	69
sweetgum	<i>Liquidambar styraciflua</i>	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate ++		3	70
bigleaf magnolia	<i>Magnolia macrophylla</i>	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	71
mountain or Fraser magnolia	<i>Magnolia fraseri</i>	NSL	Low	0	0	0	Unknown	New Habitat	Low	Absent	Unknown	New Habitat			0	72
sourwood	<i>Oxydendrum arboreum</i>	NDL	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	73
eastern cottonwood	<i>Populus deltoides</i>	NSH	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Likely +	Likely +	3	74
southern red oak	<i>Quercus falcata</i>	WDL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate ++		3	75
cherrybark oak; swamp red o.	<i>Quercus pagoda</i>	NSL	Medium	0	0	0	Unknown	New Habitat	Medium	Absent	Unknown	New Habitat			3	76
blackjack oak	<i>Quercus marilandica</i>	NSL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate ++		3	77
chinkapin oak	<i>Quercus muehlenbergii</i>	NSL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +		3	78
post oak	<i>Quercus stellata</i>	WDH	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	79
winged elm	<i>Ulmus alata</i>	WDL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate ++		3	80