

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	8,835.9	3,411.6	226

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	23	Increase	RCP45	RCP85	Very Good	6	6	Likely	0	0
Ash	3			Medium	30	No Change	15	15	Good	14	16	Infill	14	14
Hickory	3			Low	31	Decrease	16	16	Fair	11	10	Migrate	8	11
Maple	6	Abundant	8	FIA	5	New	29	32	Poor	14	13			
Oak	6	Common	21			Unknown	10	7	Very Poor	5	3			
Pine	5	Rare	26						FIA Only	3	3			
Other	32	Absent	34						Unknown	5	2			
	55		89		89		89	89		58	53		22	25

Potential Changes in Climate Variables

Temperature (°F)

	Scenario	2009	2039	2069	2099	
Annual Average	CCSM45	43.9	45.8	48.4	48.4	
	CCSM85	43.9	46.4	49.2	52.6	
	GFDL45	43.9	47.6	50.7	52.2	
	GFDL85	43.9	47.7	52.2	57.5	
	HAD45	43.9	47.2	50.6	52.3	
HAD85	43.9	47.3	51.5	57.4		
Growing Season (May—Sep)	CCSM45	62.2	64.3	66.3	66.7	
	CCSM85	62.2	64.6	67.2	71.2	
	GFDL45	62.2	66.1	69.5	71.3	
	GFDL85	62.2	66.4	71.1	76.7	
	HAD45	62.2	65.4	68.2	70.6	
HAD85	62.2	65.1	69.6	75.9		
Coldest Month Average	CCSM45	14.8	16.5	19.0	19.1	
	CCSM85	14.8	17.8	19.2	21.9	
	GFDL45	14.8	18.1	20.7	22.1	
	GFDL85	14.8	19.3	21.7	25.0	
	HAD45	14.8	17.7	21.1	21.5	
HAD85	14.8	19.1	21.8	25.8		
Warmest Month Average	CCSM45	68.4	70.7	72.1	72.2	
	CCSM85	68.4	71.3	73.0	75.2	
	GFDL45	68.4	71.4	73.6	75.0	
	GFDL85	68.4	72.5	75.4	78.3	
	HAD45	68.4	71.8	73.3	74.8	
HAD85	68.4	71.6	74.2	78.8		

Precipitation (in)

	Scenario	2009	2039	2069	2099	
Annual Total	CCSM45	39.7	38.6	38.1	41.4	
	CCSM85	39.7	40.4	40.4	41.0	
	GFDL45	39.7	43.6	45.2	44.4	
	GFDL85	39.7	41.7	44.0	45.2	
	HAD45	39.7	42.3	43.6	43.9	
HAD85	39.7	43.5	42.7	46.4		
Growing Season (May—Sep)	CCSM45	19.4	19.1	17.8	19.5	
	CCSM85	19.4	19.4	19.3	17.9	
	GFDL45	19.4	20.1	19.2	19.2	
	GFDL85	19.4	19.6	19.2	17.8	
	HAD45	19.4	20.4	19.3	20.6	
HAD85	19.4	19.9	18.9	20.4		

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
sugar maple	Acer saccharum	WDH	High	71.5	1289.7	12.2	No change	Sm. dec.	High	Abundant	Very Good	Good			1	1
red maple	Acer rubrum	WDH	High	82.6	1183.5	10.7	No change	No change	High	Abundant	Very Good	Very Good			1	2
balsam fir	Abies balsamea	NDH	High	45.5	754.1	12.4	Lg. dec.	Lg. dec.	Low	Abundant	Poor	Poor			0	3
American beech	Fagus grandifolia	WDH	High	68.2	703.0	7.6	No change	No change	Medium	Abundant	Good	Good			1	4
eastern white pine	Pinus strobus	WDH	High	57.8	632.3	9.8	Sm. inc.	No change	Low	Abundant	Good	Fair			1	5
eastern hemlock	Tsuga canadensis	NSH	High	51.4	629.9	11.1	No change	No change	Low	Abundant	Fair	Fair			0	6
white ash	Fraxinus americana	WDL	Medium	70.3	529.2	6.1	No change	No change	Low	Abundant	Fair	Fair			0	7
paper birch	Betula papyrifera	WDH	High	59.3	518.6	6.7	Sm. dec.	Sm. dec.	Medium	Abundant	Fair	Fair			0	8
American elm	Ulmus americana	WDH	Medium	47.9	382.2	7.8	Sm. dec.	No change	Medium	Common	Poor	Fair			1	9
yellow birch	Betula alleghaniensis	NDL	High	61	374.3	3.8	No change	Sm. dec.	Medium	Common	Fair	Poor			1	10
quaking aspen	Populus tremuloides	WDH	High	47.7	315.4	5.5	No change	No change	Medium	Common	Fair	Fair			1	11
northern white-cedar	Thuja occidentalis	WSH	High	37.4	312.1	8.1	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor			0	12
northern red oak	Quercus rubra	WDH	Medium	43.7	301.2	6.4	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	13
red spruce	Picea rubens	NDH	High	33.5	225.4	4.5	No change	No change	Low	Common	Poor	Poor			0	14
black cherry	Prunus serotina	WDL	Medium	45.8	194.3	3.3	Lg. inc.	Lg. inc.	Low	Common	Good	Good			1	15
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	52.2	142.2	2.6	No change	No change	High	Common	Good	Good			1	16
boxelder	Acer negundo	WSH	Low	3.4	128.0	37.7	Sm. dec.	Sm. dec.	High	Common	Fair	Fair	Infill +	Infill +	1	17
American basswood	Tilia americana	WSL	Medium	39.7	122.7	2.6	Sm. inc.	Lg. inc.	Medium	Common	Good	Very Good			1	18
bigtooth aspen	Populus grandidentata	NSL	Medium	28.8	112.2	2.9	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	19
black ash	Fraxinus nigra	WSH	Medium	17.6	100.3	3.7	Sm. dec.	Lg. dec.	Low	Common	Poor	Very Poor			0	20
gray birch	Betula populifolia	NSL	Low	24.1	99.8	3.5	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	21
bur oak	Quercus macrocarpa	NDH	Medium	7.8	81.1	18.1	Sm. dec.	Sm. dec.	High	Common	Fair	Fair	Infill +	Infill +	2	22
striped maple	Acer pensylvanicum	NSL	Medium	27.3	77.6	1.4	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor			0	23
black locust	Robinia pseudoacacia	NDH	Low	10.2	75.3	13.6	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	24
bitternut hickory	Carya cordiformis	WSL	Low	23	66.7	3.5	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good	Infill ++	Infill ++	1	25
sweet birch	Betula lenta	NDH	High	10.6	66.5	5.8	Lg. inc.	Lg. inc.	Low	Common	Good	Good	Infill ++	Infill ++	2	26
red pine	Pinus resinosa	NSH	Medium	16.2	58.5	2.8	Lg. inc.	Lg. inc.	Low	Common	Good	Good	Infill ++	Infill ++	1	27
green ash	Fraxinus pennsylvanica	WSH	Low	14.8	58.3	4.4	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good	Infill ++	Infill ++	1	28
pin cherry	Prunus pennsylvanica	NSL	Low	11.3	54.4	2.5	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	29
shagbark hickory	Carya ovata	WSL	Medium	9.3	46.6	4.0	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	1	30
eastern redcedar	Juniperus virginiana	WDH	Medium	4.5	44.5	9.8	Sm. inc.	Lg. inc.	Medium	Rare	Fair	Good	Infill +	Infill ++	2	31
silver maple	Acer saccharinum	NSH	Low	2.3	44.0	19.4	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	2	32
butternut	Juglans cinerea	NSLX	FIA	7.8	26.0	2.5	Unknown	Unknown	Low	Rare	FIA Only	FIA Only			0	33
Norway spruce	Picea abies	NSH	FIA	1.5	19.7	4.2	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	34
white spruce	Picea glauca	NSL	Medium	4.5	19.0	4.2	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	1	35
serviceberry	Amelanchier spp.	NSL	Low	15.7	18.7	1.0	No change	Sm. inc.	Medium	Rare	Poor	Fair			1	36
black spruce	Picea mariana	NSH	High	1.1	15.9	13.3	Lg. dec.	Very Lg. dec.	Medium	Rare	Very Poor	Lost			2	37
slippery elm	Ulmus rubra	WSL	Low	2.3	14.2	6.3	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	38
eastern cottonwood	Populus deltoides	NSH	Low	1.1	13.3	11.8	Sm. inc.	Lg. inc.	Medium	Rare	Fair	Good	Infill +		2	39
white oak	Quercus alba	WDH	Medium	4.3	13.1	1.4	Lg. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	2	40
black oak	Quercus velutina	WDH	High	1.1	12.7	11.3	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	41
jack pine	Pinus banksiana	NSH	Medium	1.1	12.2	10.8	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor			0	42
black walnut	Juglans nigra	WDH	Low	1.1	11.5	10.2	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	43
tamarack (native)	Larix laricina	NSH	High	2.8	11.1	0.9	No change	No change	Low	Rare	Very Poor	Very Poor			2	44
pitch pine	Pinus rigida	NSH	High	1.1	9.8	8.7	Sm. inc.	Lg. inc.	Medium	Rare	Fair	Good	Infill +	Infill ++	2	45
balsam poplar	Populus balsamifera	NSH	Medium	5.2	8.1	1.3	Lg. dec.	Very Lg. dec.	Medium	Rare	Very Poor	Lost			0	46
American mountain-ash	Sorbus americana	NSL	Low	4.1	7.3	1.5	Sm. dec.	Sm. dec.	Low	Rare	Very Poor	Very Poor			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	
mountain maple	Acer spicatum	NSL	Low	16.5	7.3	0.5	Lg. dec.	Lg. dec.	High	Rare	Poor	Poor				1	48
American hornbeam; musclev	Carpinus caroliniana	WSL	Low	9.6	6.2	1.1	Sm. dec.	No change	Medium	Rare	Very Poor	Poor		Infill +		1	49
Scots pine	Pinus sylvestris	NSH	FIA	2.4	6.0	1.1	Unknown	Unknown	NA	Rare	NNIS	NNIS				0	50
chestnut oak	Quercus prinus	NDH	High	2.2	3.3	1.5	Lg. inc.	Lg. inc.	High	Rare	Good	Good				2	51
pignut hickory	Carya glabra	WDL	Medium	1.4	3.1	0.6	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good				2	52
chokecherry	Prunus virginiana	NSLX	FIA	2	1.9	0.7	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only				0	53
rock elm	Ulmus thomasii	NSLX	FIA	0.8	1.0	0.6	Unknown	Unknown	Low	Rare	FIA Only	FIA Only				0	54
swamp white oak	Quercus bicolor	NSL	Low	4.5	0.1	0.3	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good				2	55
Table Mountain pine	Pinus pungens	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat				3	56
Virginia pine	Pinus virginiana	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +		3	57
bald cypress	Taxodium distichum	NSH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat				0	58
cittamwood/gum bumelia	Sideroxylon lanuginosum ssp.	NSL	Low	0	0	0	Unknown	New Habitat	High	Absent	Unknown	New Habitat				0	59
water hickory	Carya aquatica	NSL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat				0	60
pecan	Carya illinoensis	NSH	Low	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat				0	61
black hickory	Carya texana	NDL	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat				0	62
mockernut hickory	Carya alba	WDL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate +		3	63
sugarberry	Celtis laevigata	NDH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat				0	64
hackberry	Celtis occidentalis	WDH	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate +		3	65
eastern redbud	Cercis canadensis	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat				3	66
flowering dogwood	Cornus florida	WDL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +		3	67
common persimmon	Diospyros virginiana	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat				0	68
honeylocust	Gleditsia triacanthos	NSH	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat				3	69
sweetgum	Liquidambar styraciflua	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat				3	70
yellow-poplar	Liriodendron tulipifera	WDH	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate ++		3	71
southern magnolia	Magnolia grandiflora	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown				0	72
bigleaf magnolia	Magnolia macrophylla	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown				0	73
mountain or Fraser magnolia	Magnolia fraseri	NSL	Low	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat				0	74
blackgum	Nyssa sylvatica	WDL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate +		3	75
sycamore	Platanus occidentalis	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +		3	76
scarlet oak	Quercus coccinea	WDL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate ++		3	77
northern pin oak	Quercus ellipsoidalis	NSH	Medium	0	0	0	Unknown	New Habitat	High	Absent	Unknown	New Habitat				3	78
shingle oak	Quercus imbricaria	NDH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat				3	79
overcup oak	Quercus lyrata	NSL	Medium	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat				0	80
chinkapin oak	Quercus muehlenbergii	NSL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat				3	81
water oak	Quercus nigra	WDH	High	0	0	0	Unknown	New Habitat	Medium	Absent	Unknown	New Habitat				0	82
pin oak	Quercus palustris	NSH	Low	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat	Migrate +	Migrate +		3	83
willow oak	Quercus phellos	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat				0	84
Shumard oak	Quercus shumardii	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat				0	85
post oak	Quercus stellata	WDH	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat				3	86
black willow	Salix nigra	NSH	Low	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat		Migrate +		3	87
sassafras	Sassafras albidum	WSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +		3	88
winged elm	Ulmus alata	WDL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat				0	89