

	sq. km	sq. mi	FIA Plots
Area of Region	14,204	5,484.3	554

**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		
		Abundant	Common	Reliability	Adaptability	Scenario	Scenario	Scenario	Scenario	SHIFT	SHIFT	
				High		RCP45	RCP85	RCP45	RCP85	RCP45	RCP85	
Ash	3			23	19	Increase	18	21	Very Good	4	4	
Hickory	5			22	43	No Change	12	11	Good	14	16	
Maple	7	Abundant	9	Low	28	15	Decrease	20	18	Fair	9	12
Oak	7	Common	10	FIA	7		New	15	19	Poor	15	10
Pine	4	Rare	38			Unknown	15	11	Very Poor	7	6	
Other	31	Absent	23							FIA Only	4	4
										Unknown	8	4
											<b>61</b>	<b>56</b>
											<b>18</b>	<b>26</b>

**Potential Changes in Climate Variables**

**Temperature (°F)**

	Scenario	2009	2039	2069	2099
Annual Average	CCSM45	43.1	45.0	47.4	47.5
	CCSM85	43.1	45.5	48.1	51.4
	GFDL45	43.1	46.0	49.5	50.9
	GFDL85	43.1	46.7	50.9	55.8
	HAD45	43.1	46.2	49.4	51.1
HAD85	43.1	46.2	50.4	56.0	
Growing Season May—Sep	CCSM45	60.4	62.6	64.4	64.9
	CCSM85	60.4	62.8	65.3	69.2
	GFDL45	60.4	63.6	67.5	69.1
	GFDL85	60.4	64.4	69.0	74.2
	HAD45	60.4	63.5	66.2	68.5
HAD85	60.4	63.1	67.6	73.8	
Coldest Month Average	CCSM45	15.9	17.7	19.9	20.2
	CCSM85	15.9	18.9	20.1	22.6
	GFDL45	15.9	19.1	21.4	22.5
	GFDL85	15.9	20.0	22.2	24.9
	HAD45	15.9	18.6	21.6	21.9
HAD85	15.9	19.7	22.3	25.9	
Warmest Month Average	CCSM45	66.3	68.9	70.0	70.1
	CCSM85	66.3	69.3	70.9	73.0
	GFDL45	66.3	69.3	71.4	72.7
	GFDL85	66.3	70.4	73.3	76.1
	HAD45	66.3	69.6	71.1	72.5
HAD85	66.3	69.3	71.9	76.2	

**Precipitation (in)**

	Scenario	2009	2039	2069	2099
Annual Total	CCSM45	50.7	50.0	48.2	53.6
	CCSM85	50.7	50.5	52.2	54.7
	GFDL45	50.7	55.4	57.7	56.0
	GFDL85	50.7	53.2	56.3	58.8
	HAD45	50.7	53.5	55.3	54.7
HAD85	50.7	54.9	54.8	58.0	
Growing Season May—Sep	CCSM45	23.1	23.3	21.7	23.5
	CCSM85	23.1	22.7	23.8	22.8
	GFDL45	23.1	23.6	22.5	22.8
	GFDL85	23.1	23.2	22.7	21.9
	HAD45	23.1	24.8	23.6	24.5
HAD85	23.1	23.5	23.4	24.8	

**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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Section M211C

EcoMap 2007  
Climate Change Atlas Tree Species

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
sugar maple	Acer saccharum	WDH	High	97.6	2333.0	16.1	Sm. dec.	Sm. dec.	High	Abundant	Good	Good			1	1
red maple	Acer rubrum	WDH	High	94.8	1619.4	11.0	Sm. inc.	No change	High	Abundant	Very Good	Very Good			1	2
American beech	Fagus grandifolia	WDH	High	93.2	1224.1	9.2	Sm. dec.	Sm. dec.	Medium	Abundant	Fair	Fair			0	3
eastern hemlock	Tsuga canadensis	NSH	High	67.9	1129.7	9.3	No change	Sm. dec.	Low	Abundant	Fair	Fair			0	4
yellow birch	Betula alleghaniensis	NDL	High	86.9	887.2	7.8	Sm. dec.	Sm. dec.	Medium	Abundant	Fair	Fair			0	5
white ash	Fraxinus americana	WDL	Medium	84.1	736.0	5.1	No change	No change	Low	Abundant	Fair	Fair			0	6
eastern white pine	Pinus strobus	WDH	High	48	658.3	5.6	Sm. inc.	Sm. inc.	Low	Abundant	Good	Good			1	7
red spruce	Picea rubens	NDH	High	71.2	552.4	6.0	Sm. dec.	Sm. dec.	Low	Abundant	Fair	Fair			0	8
northern red oak	Quercus rubra	WDH	Medium	41.4	503.1	5.3	Lg. inc.	Lg. inc.	High	Abundant	Very Good	Very Good			1	9
paper birch	Betula papyrifera	WDH	High	78.6	460.5	3.9	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor			0	10
black cherry	Prunus serotina	WDL	Medium	69.7	367.1	3.2	Sm. inc.	Sm. inc.	Low	Common	Fair	Fair			1	11
balsam fir	Abies balsamea	NDH	High	44.7	342.4	6.3	Sm. dec.	Sm. dec.	Low	Common	Poor	Poor			0	12
sweet birch	Betula lenta	NDH	High	36.8	265.5	3.1	Lg. inc.	Sm. inc.	Low	Common	Good	Fair			1	13
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	46	192.9	2.2	Sm. dec.	No change	High	Common	Fair	Good			1	14
striped maple	Acer pensylvanicum	NSL	Medium	72.1	156.9	1.7	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor			0	15
quaking aspen	Populus tremuloides	WDL	High	31.3	137.3	2.4	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	16
American elm	Ulmus americana	WDH	Medium	21.1	115.7	2.4	No change	Sm. inc.	Medium	Common	Fair	Good			1	17
pin cherry	Prunus pensylvanica	NSL	Low	23.3	54.6	2.0	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	18
bigtooth aspen	Populus grandidentata	NSL	Medium	12.1	51.6	1.8	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	19
chestnut oak	Quercus prinus	NDH	High	6.4	48.2	2.2	Lg. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	2	20
bitternut hickory	Carya cordiformis	WSL	Low	9.7	45.2	2.8	No change	No change	High	Rare	Fair	Fair			1	21
American basswood	Tilia americana	WSL	Medium	10.8	42.5	0.9	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			1	22
slippery elm	Ulmus americana	WSL	Low	0.7	36.0	1.9	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			2	23
white oak	Quercus alba	WDH	Medium	5.2	35.8	1.4	Lg. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	2	24
green ash	Fraxinus pennsylvanica	WSH	Low	4.1	35.6	2.5	No change	Sm. inc.	Medium	Rare	Poor	Fair	Infill +	Infill +	2	25
northern white-cedar	Thuja occidentalis	WSH	High	2.3	34.6	4.9	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	26
serviceberry	Amelanchier spp.	NSL	Low	23.5	31.6	0.8	No change	No change	Medium	Rare	Poor	Poor			1	27
gray birch	Betula populifolia	NSL	Low	12.7	29.4	1.4	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	28
black ash	Fraxinus nigra	WSH	Medium	7.1	29.0	1.3	Lg. dec.	Lg. dec.	Low	Rare	Very Poor	Very Poor			0	29
Norway spruce	Picea abies	NSH	FIA	4.4	28.2	4.1	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	30
butternut	Juglans cinerea	NSLX	FIA	3.9	27.7	3.7	Unknown	Unknown	Low	Rare	FIA Only	FIA Only			0	31
balsam poplar	Populus balsamifera	NSH	Medium	2.2	25.5	4.6	Very Lg. dec.	Very Lg. dec.	Medium	Rare	Lost	Lost			0	32
black locust	Robinia pseudoacacia	NDH	Low	0.5	22.0	5.3	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	1	33
boxelder	Acer negundo	WSH	Low	0.9	20.1	13.0	Sm. dec.	No change	High	Rare	Poor	Fair	Infill +	Infill +	2	34
scarlet oak	Quercus coccinea	WDL	Medium	2.3	19.1	2.1	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	35
American hornbeam; muscle	Carpinus caroliniana	WSL	Low	8.7	18.3	1.2	No change	No change	Medium	Rare	Poor	Poor			1	36
pignut hickory	Carya glabra	WDL	Medium	3.7	15.4	0.9	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	2	37
silver maple	Acer saccharinum	NSH	Low	0.2	13.4	4.1	Sm. dec.	No change	High	Rare	Poor	Fair		Infill +	2	38
shagbark hickory	Carya ovata	WSL	Medium	2.4	13.3	0.8	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	1	39
black oak	Quercus velutina	WDH	High	1.8	11.6	1.8	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	2	40
red pine	Pinus resinosa	NSH	Medium	0.1	11.4	2.0	No change	No change	Low	Rare	Very Poor	Very Poor			2	41
white spruce	Picea glauca	NSL	Medium	0.6	9.3	3.7	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	42
bur oak	Quercus macrocarpa	NDH	Medium	0.2	9.2	0.8	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor			0	43
Scots pine	Pinus sylvestris	NSH	FIA	1	7.1	3.8	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	44
American mountain-ash	Sorbus americana	NSL	Low	8.1	6.1	0.7	Lg. dec.	Lg. dec.	Low	Rare	Very Poor	Very Poor			0	45
eastern redcedar	Juniperus virginiana	WDH	Medium	0.6	5.9	0.8	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	46
tamarack (native)	Larix laricina	NSH	High	3.9	4.5	1.0	Lg. dec.	Lg. dec.	Low	Rare	Very Poor	Very Poor			0	47



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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	7.9	4.1	0.4	Lg. dec.	Lg. dec.	High	Rare	Poor	Poor			1	48
eastern cottonwood	Populus deltoides	NSH	Low	1.3	2.3	1.5	No change	Sm. inc.	Medium	Rare	Poor	Fair	Infill +	Infill +	2	49
bear oak; scrub oak	Quercus ilicifolia	NSLX	FIA	0.5	1.6	1.7	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	50
Norway maple	Acer platanoides	NSL	FIA	2	1.4	0.7	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	51
American chestnut	Castanea dentata	NSLX	FIA	0.8	1.3	0.3	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	52
chokecherry	Prunus virginiana	NSLX	FIA	0.7	1.0	1.4	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	53
flowering dogwood	Cornus florida	WDL	Medium	0.5	0.8	0.8	No change	Lg. inc.	Medium	Rare	Poor	Good			2	54
pitch pine	Pinus rigida	NSH	High	0.3	0.8	0.5	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	55
shellbark hickory	Carya laciniosa	NSL	Low	0.4	0.5	0.4	Lg. dec.	Very Lg. dec.	Medium	Rare	Very Poor	Lost			0	56
mockernut hickory	Carya alba	WDL	Medium	0.7	0.4	0.5	Lg. inc.	Lg. inc.	High	Rare	Good	Good			2	57
shortleaf pine	Pinus echinata	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	58
Virginia pine	Pinus virginiana	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	59
cittamwood/gum bumelia	Sideroxylon lanuginosum ssp.	NSL	Low	0	0	0	Unknown	Unknown	High	Absent	Unknown	Unknown			0	60
pecan	Carya illinoensis	NSH	Low	0	0	0	Unknown	New Habitat	Low	Absent	Unknown	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
sugarberry	Celtis laevigata	NDH	Medium	0	0	0	Unknown	New Habitat	Medium	Absent	Unknown	New Habitat			0	63
eastern redbud	Cercis canadensis	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	64
common persimmon	Diospyros virginiana	NSL	Low	0	0	0	Unknown	New Habitat	High	Absent	Unknown	New Habitat		Migrate +	3	65
black walnut	Juglans nigra	WDH	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Likely +	Likely +	3	66
sweetgum	Liquidambar styraciflua	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate ++	3	67
yellow-poplar	Liriodendron tulipifera	WDH	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Likely +	Likely +	3	68
southern magnolia	Magnolia grandiflora	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	69
bigleaf magnolia	Magnolia macrophylla	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	70
mountain or Fraser magnolia	Magnolia fraseri	NSL	Low	0	0	0	Unknown	New Habitat	Low	Absent	Unknown	New Habitat			0	71
blackgum	Nyssa sylvatica	WDL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Likely +	Likely +	3	72
sourwood	Oxydendrum arboreum	NDL	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			3	73
redbay	Persea borbonia	NSL	Low	0	0	0	Unknown	Unknown	High	Absent	Unknown	Unknown			0	74
sycamore	Platanus occidentalis	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Likely +	Likely +	3	75
swamp white oak	Quercus bicolor	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate ++	Migrate ++	3	76
chinkapin oak	Quercus muehlenbergii	NSL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	77
pin oak	Quercus palustris	NSH	Low	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	78
post oak	Quercus stellata	WDH	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate ++	3	79
sassafras	Sassafras albidum	WSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Likely +	Likely +	3	80

