

	sq. km	sq. mi	FIA Plots
Area of Region	20,385	7,870.7	973

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	17	19	Increase	19	18	Very Good	5	7	Likely	3	3
Hickory	1			Medium	25	37	No Change	8	9	Good	16	11	Infill	7	9
Maple	5	Abundant	6	Low	23	13	Decrease	16	16	Fair	4	9	Migrate	3	8
Oak	7	Common	22	FIA	6		New	17	18	Poor	12	11			
Pine	4	Rare	21				Unknown	11	10	Very Poor	6	4			
Other	29	Absent	21							FIA Only	4	4			
	49		70		71	69		71	71	Unknown	5	4			
											52	50			

Potential Changes in Climate Variables

Temperature (°F)

	Scenario	2009	2039	2069	2099	
Annual Average	CCSM45	42.5	44.2	47.4	47.3	
	CCSM85	42.5	45.0	48.1	51.6	
	GFDL45	42.5	45.7	48.5	49.9	
	GFDL85	42.5	46.0	49.7	54.8	
	HAD45	42.5	45.8	49.2	51.1	
	HAD85	42.5	46.2	50.3	56.2	
Growing Season (May—Sep)	CCSM45	61.4	63.1	65.7	65.7	
	CCSM85	61.4	63.8	66.5	70.5	
	GFDL45	61.4	65.6	69.2	71.3	
	GFDL85	61.4	66.0	70.6	76.5	
	HAD45	61.4	64.7	66.8	69.2	
	HAD85	61.4	64.4	68.3	74.0	
Coldest Month (Average)	CCSM45	13.1	14.5	17.3	17.1	
	CCSM85	13.1	15.1	17.5	20.0	
	GFDL45	13.1	15.8	17.7	18.1	
	GFDL85	13.1	16.8	18.4	21.2	
	HAD45	13.1	14.9	19.0	19.1	
	HAD85	13.1	17.7	20.9	25.2	
Warmest Month (Average)	CCSM45	67.6	69.7	71.1	71.5	
	CCSM85	67.6	70.6	72.4	74.5	
	GFDL45	67.6	71.8	73.6	75.1	
	GFDL85	67.6	72.6	75.1	78.1	
	HAD45	67.6	70.9	71.8	73.6	
	HAD85	67.6	71.2	73.2	77.2	

Precipitation (in)

	Scenario	2009	2039	2069	2099	
Annual Total	CCSM45	30.3	30.9	30.5	31.2	
	CCSM85	30.3	30.8	30.8	31.7	
	GFDL45	30.3	32.6	34.5	33.8	
	GFDL85	30.3	32.8	35.7	36.1	
	HAD45	30.3	31.2	32.7	32.9	
	HAD85	30.3	32.1	33.4	34.8	
Growing Season (May—Sep)	CCSM45	16.9	17.1	16.2	17.0	
	CCSM85	16.9	17.1	16.7	16.2	
	GFDL45	16.9	17.8	18.5	17.9	
	GFDL85	16.9	18.2	18.6	18.0	
	HAD45	16.9	16.6	16.1	16.2	
	HAD85	16.9	17.0	15.3	15.8	

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 212T

EcoMap 2007
Climate Change Atlas Tree Species

USDA Forest Service
Northern Research Station
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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
northern white-cedar	Thuja occidentalis	WSH	High	74.2	1431.9	14.3	Sm. dec.	Sm. dec.	Medium	Abundant	Fair	Fair			0	1
sugar maple	Acer saccharum	WDH	High	65.4	1310.4	13.2	Sm. dec.	Sm. dec.	High	Abundant	Good	Good			1	2
red maple	Acer rubrum	WDH	High	80.4	1048.7	8.9	No change	No change	High	Abundant	Very Good	Very Good			1	3
quaking aspen	Populus tremuloides	WDH	High	83.2	1018.2	8.8	No change	No change	Medium	Abundant	Good	Good			1	4
balsam fir	Abies balsamea	NDH	High	79	693.0	6.4	Lg. dec.	Lg. dec.	Low	Abundant	Poor	Poor			0	5
red pine	Pinus resinosa	NSH	Medium	41	516.6	8.9	No change	No change	Low	Abundant	Fair	Fair			0	6
eastern white pine	Pinus strobus	WDH	High	55.5	486.9	6.2	No change	No change	Low	Common	Poor	Poor			0	7
black ash	Fraxinus nigra	WSH	Medium	69.8	467.8	5.2	Sm. dec.	Sm. dec.	Low	Common	Poor	Poor			0	8
green ash	Fraxinus pennsylvanica	WSH	Low	40.7	376.2	6.0	Sm. inc.	Lg. inc.	Medium	Common	Good	Very Good			1	9
American basswood	Tilia americana	WSL	Medium	46.8	308.4	4.0	Sm. inc.	No change	Medium	Common	Good	Fair			1	10
tamarack (native)	Larix laricina	NSH	High	43.1	294.2	5.1	No change	No change	Low	Common	Poor	Poor			0	11
paper birch	Betula papyrifera	WDH	High	74.5	288.3	2.7	Sm. inc.	No change	Medium	Common	Good	Fair			1	12
northern red oak	Quercus rubra	WDH	Medium	44.5	282.6	4.5	Lg. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	13
eastern hemlock	Tsuga canadensis	NSH	High	44.2	280.2	4.7	Lg. dec.	Lg. dec.	Low	Common	Very Poor	Very Poor			0	14
white spruce	Picea glauca	NSL	Medium	55.6	251.9	3.2	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	15
American elm	Ulmus americana	WDH	Medium	57.1	228.6	2.9	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	16
bigtooth aspen	Populus grandidentata	NSL	Medium	41.6	224.7	3.8	Sm. inc.	No change	Medium	Common	Good	Fair			1	17
balsam poplar	Populus balsamifera	NSH	Medium	38.1	219.5	4.9	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	18
white ash	Fraxinus americana	WDL	Medium	44.5	213.3	3.2	Sm. inc.	Sm. inc.	Low	Common	Fair	Fair			1	19
black spruce	Picea mariana	NSH	High	43.7	204.3	3.3	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	20
northern pin oak	Quercus ellipsoidalis	NSH	Medium	21.7	192.9	7.1	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	21
black cherry	Prunus serotina	WDL	Medium	59	189.0	2.0	Lg. inc.	Lg. inc.	Low	Common	Good	Good			1	22
jack pine	Pinus banksiana	NSH	Medium	18.2	162.2	6.3	Sm. dec.	Sm. dec.	High	Common	Fair	Fair			1	23
yellow birch	Betula alleghaniensis	NDL	High	49.1	149.0	2.0	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor			0	24
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	45.1	82.3	1.3	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	25
American beech	Fagus grandifolia	WDH	High	22.5	63.3	2.3	Sm. inc.	Lg. inc.	Medium	Common	Good	Very Good	Infill ++	Infill ++	1	26
boxelder	Acer negundo	WSH	Low	7.6	61.3	4.6	No change	No change	High	Common	Good	Good	Infill ++	Infill ++	1	27
Scots pine	Pinus sylvestris	NSH	FIA	4.2	52.0	9.5	Unknown	Unknown	NA	Common	NNIS	NNIS			0	28
eastern cottonwood	Populus deltoides	NSH	Low	3	49.5	10.1	No change	Sm. inc.	Medium	Rare	Poor	Fair	Infill +	Infill +	2	29
silver maple	Acer saccharinum	NSH	Low	3.6	39.3	4.4	Lg. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	1	30
white oak	Quercus alba	WDH	Medium	10.8	28.9	1.5	Lg. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	2	31
bitternut hickory	Carya cordiformis	WSL	Low	10.3	20.9	1.2	Sm. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	1	32
serviceberry	Amelanchier spp.	NSL	Low	15.8	18.1	0.8	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	33
black willow	Salix nigra	NSH	Low	3.9	16.2	4.9	No change	Sm. inc.	Low	Rare	Very Poor	Poor		Infill +	2	34
slippery elm	Ulmus rubra	WSL	Low	4.9	15.4	2.2	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			2	35
pin cherry	Prunus pensylvanica	NSL	Low	10.1	11.3	0.5	Lg. dec.	Very Lg. dec.	Medium	Rare	Very Poor	Lost			0	36
bur oak	Quercus macrocarpa	NDH	Medium	6	10.8	1.3	Lg. inc.	Lg. inc.	High	Rare	Good	Good			2	37
American hornbeam; musclev	Carpinus caroliniana	WSL	Low	6.8	10.4	0.8	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	38
honeylocust	Gleditsia triacanthos	NSH	Low	0.1	9.5	3.0	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor	Infill +	Infill +	2	39
peachleaf willow	Salix amygdaloides	NSLX	FIA	1.7	9.5	4.6	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	40
rock elm	Ulmus thomasii	NSLX	FIA	2.1	8.1	2.4	Unknown	Unknown	Low	Rare	FIA Only	FIA Only			0	41
chokecherry	Prunus virginiana	NSLX	FIA	9.9	5.4	0.3	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	42
mountain maple	Acer spicatum	NSL	Low	4.6	3.9	0.6	Lg. dec.	Lg. dec.	High	Rare	Poor	Poor			1	43
swamp white oak	Quercus bicolor	NSL	Low	0.8	2.8	0.4	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	44
black oak	Quercus velutina	WDH	High	0.7	2.1	1.7	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	45
pin oak	Quercus palustris	NSH	Low	0.5	1.2	2.5	Sm. inc.	Lg. inc.	Low	Rare	Poor	Fair		Infill +	2	46
black locust	Robinia pseudoacacia	NDH	Low	0.5	1.0	2.0	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	47



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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	0.5	0.7	1.4	Unknown	Unknown	NA	Rare	NNIS	NNIS				0	48
butternut	<i>Juglans cinerea</i>	NSLX	FIA	0.3	0.5	0.7	Unknown	Unknown	Low	Rare	FIA Only	FIA Only				0	49
eastern redcedar	<i>Juniperus virginiana</i>	WDH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Likely +	Likely +		3	50
striped maple	<i>Acer pensylvanicum</i>	NSL	Medium	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown				0	51
pignut hickory	<i>Carya glabra</i>	WDL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +		3	52
shagbark hickory	<i>Carya ovata</i>	WSL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Likely +	Likely +		3	53
black hickory	<i>Carya texana</i>	NDL	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat				0	54
mockernut hickory	<i>Carya alba</i>	WDL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate +		3	55
hackberry	<i>Celtis occidentalis</i>	WDH	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Likely +	Likely +		3	56
eastern redbud	<i>Cercis canadensis</i>	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat				3	57
flowering dogwood	<i>Cornus florida</i>	WDL	Medium	0	0	0	Unknown	New Habitat	Medium	Absent	Unknown	New Habitat				3	58
American holly	<i>Ilex opaca</i>	NSL	Medium	0	0	0	Unknown	Unknown	Medium	Modeled	Unknown	Unknown				0	59
black walnut	<i>Juglans nigra</i>	WDH	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate ++	Migrate +		3	60
sweetgum	<i>Liquidambar styraciflua</i>	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat				0	61
yellow-poplar	<i>Liriodendron tulipifera</i>	WDH	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate +		3	62
Osage-orange	<i>Maclura pomifera</i>	NDH	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate +		3	63
bigleaf magnolia	<i>Magnolia macrophylla</i>	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown				0	64
red mulberry	<i>Morus rubra</i>	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat				3	65
blackgum	<i>Nyssa sylvatica</i>	WDL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate +		3	66
sycamore	<i>Platanus occidentalis</i>	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +		3	67
scarlet oak	<i>Quercus coccinea</i>	WDL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat				3	68
post oak	<i>Quercus stellata</i>	WDH	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat				3	69
sassafras	<i>Sassafras albidum</i>	WSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +		3	70
American mountain-ash	<i>Sorbus americana</i>	NSL	Low	0	0	0	Unknown	Unknown	Low	Absent	Unknown	Unknown				0	71

