

	sq. km	sq. mi	FIA Plots
Area of Region	29,905	11,546	2,020

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		
		High	Low	Reliability	Adaptability	Scenario RCP45	Scenario RCP85	Scenario RCP45	Scenario RCP85	SHIFT RCP45	SHIFT RCP85	
Ash	3					Increase	18	20	Very Good	7	7	
Hickory	1					No Change	11	10	Good	11	13	
Maple	6	Abundant	4	High	16	18	Decrease	11	10	Fair	9	9
Oak	5	Common	21	Medium	22	32	New	16	17	Poor	8	7
Pine	4	Rare	21	Low	20	12	Unknown	8	7	Very Poor	5	3
Other	27	Absent	18	FIA	6					FIA Only	4	4
	46		64		64	62		64	64		46	44
											12	16

Potential Changes in Climate Variables

Temperature (°F)

Scenario	2009	2039	2069	2099		
Annual	CCSM45	40.8	42.5	45.6	45.6	
Average	CCSM85	40.8	43.3	46.4	50.0	
	GFDL45	40.8	43.8	46.7	48.2	
	GFDL85	40.8	44.2	47.9	53.1	
	HAD45	40.8	44.0	47.5	49.4	
	HAD85	40.8	44.5	48.6	54.5	
Growing Season	CCSM45	60.5	62.3	64.9	65.0	
	CCSM85	60.5	63.1	65.9	70.0	
May—Sep	GFDL45	60.5	64.2	67.9	70.1	
	GFDL85	60.5	64.9	69.2	75.3	
	HAD45	60.5	63.8	66.4	68.8	
	HAD85	60.5	63.7	68.0	73.8	
Coldest Month	CCSM45	9.5	10.8	13.5	13.5	
Average	CCSM85	9.5	11.1	13.3	15.9	
	GFDL45	9.5	12.6	14.6	15.0	
	GFDL85	9.5	13.4	15.2	18.3	
	HAD45	9.5	11.3	15.5	15.4	
	HAD85	9.5	14.6	17.6	21.6	
Warmest Month	CCSM45	66.7	68.7	70.3	70.6	
Average	CCSM85	66.7	69.7	71.6	74.1	
	GFDL45	66.7	70.7	72.3	73.9	
	GFDL85	66.7	71.4	73.8	77.0	
	HAD45	66.7	70.3	71.5	73.2	
	HAD85	66.7	70.7	72.9	76.9	

Precipitation (in)

Scenario	2009	2039	2069	2099		
Annual	CCSM45	31.3	32.6	31.9	32.4	
Total	CCSM85	31.3	31.2	31.5	32.1	
	GFDL45	31.3	34.2	35.6	34.2	
	GFDL85	31.3	34.1	37.0	36.2	
	HAD45	31.3	32.6	33.1	33.4	
	HAD85	31.3	32.4	33.9	35.1	
Growing Season	CCSM45	18.8	19.2	18.0	18.7	
	CCSM85	18.8	18.6	18.2	17.4	
May—Sep	GFDL45	18.8	20.3	20.5	19.4	
	GFDL85	18.8	20.3	20.9	19.2	
	HAD45	18.8	18.6	17.7	17.7	
	HAD85	18.8	18.3	16.8	17.1	

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 212X

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	89.2	1704.3	13.9	Sm. dec.	Sm. dec.	High	Abundant	Good	Good			1	1
quaking aspen	Populus tremuloides	WDH	High	96.7	1701.2	13.4	Sm. dec.	Sm. dec.	Medium	Abundant	Fair	Fair			0	2
red maple	Acer rubrum	WDH	High	97.8	1403.2	10.5	No change	No change	High	Abundant	Very Good	Very Good			1	3
balsam fir	Abies balsamea	NDH	High	88.5	911.8	7.8	Lg. dec.	Sm. dec.	Low	Abundant	Poor	Fair			0	4
black spruce	Picea mariana	NSH	High	60.1	469.0	6.3	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	5
tamarack (native)	Larix laricina	NSH	High	60.1	468.4	6.4	No change	No change	Low	Common	Poor	Poor			0	6
American basswood	Tilia americana	WSL	Medium	69.8	450.1	4.6	No change	No change	Medium	Common	Fair	Fair			1	7
red pine	Pinus resinosa	NSH	Medium	40.1	427.1	8.0	Sm. inc.	Sm. inc.	Low	Common	Fair	Fair			1	8
black ash	Fraxinus nigra	WSH	Medium	64.3	401.4	4.6	No change	No change	Low	Common	Poor	Poor			0	9
northern red oak	Quercus rubra	WDH	Medium	53.2	400.2	5.2	Lg. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	10
paper birch	Betula papyrifera	WDH	High	86.4	386.8	3.4	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	11
eastern white pine	Pinus strobus	WDH	High	50	377.2	5.7	Sm. inc.	Sm. inc.	Low	Common	Fair	Fair			1	12
northern white-cedar	Thuja occidentalis	WSH	High	41.7	310.3	5.7	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	13
yellow birch	Betula alleghaniensis	NDL	High	69.9	243.7	2.5	No change	No change	Medium	Common	Fair	Fair			1	14
bigtooth aspen	Populus grandidentata	NSL	Medium	51.6	221.2	3.2	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	15
black cherry	Prunus serotina	WDL	Medium	76.7	216.3	2.2	Lg. inc.	Lg. inc.	Low	Common	Good	Good			1	16
white spruce	Picea glauca	NSL	Medium	61	211.0	2.7	No change	Sm. inc.	Medium	Common	Fair	Good			1	17
eastern hemlock	Tsuga canadensis	NSH	High	47.9	210.1	3.2	Sm. inc.	No change	Low	Common	Fair	Poor			1	18
American elm	Ulmus americana	WDH	Medium	51.8	162.9	2.2	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	19
white ash	Fraxinus americana	WDL	Medium	53.4	129.7	1.9	Lg. inc.	Lg. inc.	Low	Common	Good	Good			1	20
jack pine	Pinus banksiana	NSH	Medium	16	103.2	4.2	No change	No change	High	Common	Good	Good			1	21
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	62.9	98.2	1.1	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	22
northern pin oak	Quercus ellipsoidalis	NSH	Medium	17.2	87.6	3.3	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good	Infill ++	Infill ++	1	23
bur oak	Quercus macrocarpa	NDH	Medium	15.9	77.4	2.6	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good	Infill ++	Infill ++	1	24
green ash	Fraxinus pennsylvanica	WSH	Low	28.7	71.7	1.8	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	25
American hornbeam; muscle	Carpinus caroliniana	WSL	Low	30.7	40.9	1.1	Sm. dec.	No change	Medium	Rare	Very Poor	Poor			1	26
white oak	Quercus alba	WDH	Medium	7.8	38.6	2.3	Lg. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	2	27
balsam poplar	Populus balsamifera	NSH	Medium	8	33.2	2.1	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	28
chokecherry	Prunus virginiana	NSLX	FIA	18.3	21.5	0.9	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	29
silver maple	Acer saccharinum	NSH	Low	2	15.8	7.9	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	2	30
pin cherry	Prunus pensylvanica	NSL	Low	16.2	12.5	0.7	Lg. dec.	Very Lg. dec.	Medium	Rare	Very Poor	Lost			0	31
boxelder	Acer negundo	WSH	Low	1.8	11.5	5.5	Sm. inc.	Sm. inc.	High	Rare	Good	Good	Infill ++	Infill ++	2	32
bitternut hickory	Carya cordiformis	WSL	Low	9.3	11.4	0.7	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	2	33
serviceberry	Amelanchier spp.	NSL	Low	17.5	9.4	0.3	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	34
butternut	Juglans cinerea	NSLX	FIA	2.7	6.7	2.1	Unknown	Unknown	Low	Rare	FIA Only	FIA Only			0	35
rock elm	Ulmus thomasii	NSLX	FIA	2.8	5.0	1.1	Unknown	Unknown	Low	Rare	FIA Only	FIA Only			0	36
slippery elm	Ulmus rubra	WSL	Low	4	5.0	1.1	No change	Sm. inc.	Medium	Rare	Poor	Fair	Infill +	Infill +	2	37
black maple	Acer nigrum	NSH	Low	0.7	4.5	6.7	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor			0	38
Scots pine	Pinus sylvestris	NSH	FIA	1	2.7	2.7	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	39
American beech	Fagus grandifolia	WDH	High	0.5	2.2	0.7	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	40
Norway spruce	Picea abies	NSH	FIA	0.6	2.1	3.2	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	41
swamp white oak	Quercus bicolor	NSL	Low	1.4	1.7	0.5	No change	Lg. inc.	Medium	Rare	Poor	Good			2	42
mountain maple	Acer spicatum	NSL	Low	2.2	0.9	0.2	Sm. dec.	Lg. dec.	High	Rare	Poor	Poor			1	43
black walnut	Juglans nigra	WDH	Low	0.9	0.8	0.7	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	44
American mountain-ash	Sorbus americana	NSL	Low	0.3	0.2	0.5	Lg. dec.	Lg. dec.	Low	Rare	Very Poor	Very Poor			0	45
peachleaf willow	Salix amygdaloides	NSLX	FIA	0.3	0.1	0.2	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	46
eastern redcedar	Juniperus virginiana	WDH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate ++	Migrate ++	3	47



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Common Name	Scientific Name	Range	MR	%Cell	FIAsum	FIAiv	ChngCl45	ChngCl85	Adap	Abund	Capabil45	Capabil85	SHIFT45	SHIFT85	SSO	N
pignut hickory	<i>Carya glabra</i>	WDL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	48
shagbark hickory	<i>Carya ovata</i>	WSL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	49
black hickory	<i>Carya texana</i>	NDL	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	50
mockernut hickory	<i>Carya alba</i>	WDL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			3	51
sugarberry	<i>Celtis laevigata</i>	NDH	Medium	0	0	0	Unknown	New Habitat	Medium	Absent	Unknown	New Habitat			0	52
hackberry	<i>Celtis occidentalis</i>	WDH	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate +	3	53
yellow-poplar	<i>Liriodendron tulipifera</i>	WDH	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			3	54
bigleaf magnolia	<i>Magnolia macrophylla</i>	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	55
blackgum	<i>Nyssa sylvatica</i>	WDL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate +	3	56
sycamore	<i>Platanus occidentalis</i>	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	57
eastern cottonwood	<i>Populus deltoides</i>	NSH	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	58
scarlet oak	<i>Quercus coccinea</i>	WDL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	59
post oak	<i>Quercus stellata</i>	WDH	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			2	60
black oak	<i>Quercus velutina</i>	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Likely +	Likely +	3	61
black locust	<i>Robinia pseudoacacia</i>	NDH	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Likely +	Likely +	3	62
black willow	<i>Salix nigra</i>	NSH	Low	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat	Likely +	Likely +	3	63
sassafras	<i>Sassafras albidum</i>	WSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	64