

Current and Potential Future Habitat, Capability, and Migration

	sq. km	sq. mi	FIA Plots
Area of Region	51,161	19,753	1,419

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	16	24	Increase	14	12	Very Good	10	6	Likely	0	0
Hickory	2			Medium	30	47	No Change	11	12	Good	6	11	Infill	9	10
Maple	6	Abundant	3	Low	32	13	Decrease	22	23	Fair	11	7	Migrate	9	17
Oak	7	Common	28	FIA	11		New	20	23	Poor	6	10		18	27
Pine	4	Rare	27				Unknown	22	19	Very Poor	13	11			
Other	36	Absent	28							FIA Only	6	6			
	<b>58</b>		<b>86</b>		<b>89</b>	<b>84</b>		<b>89</b>	<b>89</b>	Unknown	11	8			
											<b>63</b>	<b>59</b>			

Potential Changes in Climate Variables

Temperature (°F)

Scenario	2009	2039	2069	2099		
Annual	CCSM45	45.6	47.6	50.6	50.8	
Average	CCSM85	45.6	48.4	51.3	54.7	
	GFDL45	45.6	49.3	51.2	52.5	
	GFDL85	45.6	48.9	52.3	57.1	
	HAD45	45.6	48.6	52.3	54.2	
	HAD85	45.6	49.1	53.7	58.9	
Growing Season	CCSM45	65.2	67.4	69.9	70.3	
	CCSM85	65.2	68.2	70.9	75.0	
May—Sep	GFDL45	65.2	69.6	71.8	73.9	
	GFDL85	65.2	69.3	73.2	78.9	
	HAD45	65.2	68.4	71.3	73.5	
	HAD85	65.2	68.5	73.4	78.6	
Coldest Month	CCSM45	14.1	16.0	18.6	18.9	
	CCSM85	14.1	16.7	18.7	21.0	
Average	GFDL45	14.1	17.7	19.1	19.5	
	GFDL85	14.1	17.9	19.6	22.0	
	HAD45	14.1	15.2	19.5	19.4	
	HAD85	14.1	18.8	22.2	25.5	
Warmest Month	CCSM45	71.5	74.0	75.5	76.1	
	CCSM85	71.5	75.3	77.1	79.5	
Average	GFDL45	71.5	74.9	76.4	78.1	
	GFDL85	71.5	75.9	77.8	81.6	
	HAD45	71.5	74.7	76.6	77.9	
	HAD85	71.5	76.0	78.7	82.3	

Precipitation (in)

Scenario	2009	2039	2069	2099		
Annual	CCSM45	34.2	34.3	34.1	33.9	
Total	CCSM85	34.2	33.5	34.2	34.3	
	GFDL45	34.2	37.1	40.3	38.1	
	GFDL85	34.2	37.8	40.7	39.7	
	HAD45	34.2	36.0	36.6	36.5	
	HAD85	34.2	35.8	35.5	38.0	
Growing Season	CCSM45	20.9	20.6	20.0	20.4	
	CCSM85	20.9	19.9	19.9	18.9	
May—Sep	GFDL45	20.9	22.1	23.9	21.8	
	GFDL85	20.9	22.8	23.2	21.5	
	HAD45	20.9	21.0	20.0	20.3	
	HAD85	20.9	20.6	18.5	18.9	

**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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Common Name	Scientific Name	Range	MR	%Cell	FIAsum	FIAiv	ChngCl45	ChngCl85	Adap	Abund	Capabil45	Capabil85	SHIFT45	SHIFT85	SSO	N
American elm	Ulmus americana	WDH	Medium	82.5	811.6	11.1	No change	No change	Medium	Abundant	Good	Good			1	1
boxelder	Acer negundo	WDH	Low	65.6	607.8	11.0	No change	Sm. dec.	High	Abundant	Very Good	Good			1	2
northern red oak	Quercus rubra	WSH	Medium	58.3	537.5	9.5	No change	Sm. dec.	High	Abundant	Very Good	Good			1	3
white oak	Quercus alba	WDH	Medium	56	412.7	7.3	Sm. inc.	No change	High	Common	Very Good	Good			1	4
black cherry	Prunus serotina	WDL	Medium	75.7	404.7	5.7	Sm. inc.	No change	Low	Common	Fair	Poor			1	5
American basswood	Tilia americana	WSL	Medium	61.3	394.7	7.5	No change	Sm. dec.	Medium	Common	Fair	Poor			1	6
bur oak	Quercus macrocarpa	NDH	Medium	45.6	386.8	9.7	Sm. inc.	No change	High	Common	Very Good	Good			1	7
red maple	Acer rubrum	WDH	High	28	362.2	9.5	Sm. dec.	Lg. dec.	High	Common	Fair	Fair	Infill +	Infill +	1	8
sugar maple	Acer saccharum	WDH	High	41.1	337.2	9.0	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	9
black walnut	Juglans nigra	WDH	Low	42	297.9	9.3	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	10
black oak	Quercus velutina	WDH	High	31.9	270.9	8.3	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	11
shagbark hickory	Carya ovata	WSL	Medium	42.1	266.4	7.1	No change	Sm. dec.	Medium	Common	Fair	Poor			1	12
quaking aspen	Populus tremuloides	WDH	High	35.2	242.6	6.0	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor			0	13
paper birch	Betula papyrifera	WDH	High	36	223.6	5.8	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	14
eastern white pine	Pinus strobus	WDH	High	19.8	220.5	9.3	Lg. dec.	Lg. dec.	Low	Common	Very Poor	Very Poor			0	15
slippery elm	Ulmus rubra	WSL	Low	56.7	211.2	4.4	No change	No change	Medium	Common	Fair	Fair			1	16
bitternut hickory	Carya cordiformis	WSL	Low	47.7	210.5	4.9	No change	No change	High	Common	Good	Good			1	17
silver maple	Acer saccharinum	NSH	Low	14.1	209.3	15.7	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	18
bigtooth aspen	Populus grandidentata	NSL	Medium	29.4	172.5	5.2	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	19
northern pin oak	Quercus ellipsoidalis	NSH	Medium	23.9	162.7	6.2	Sm. dec.	Lg. dec.	High	Common	Fair	Fair	Infill +	Infill +	1	20
white ash	Fraxinus americana	WDL	Medium	34.4	158.9	5.0	Sm. inc.	Sm. inc.	Low	Common	Fair	Fair			1	21
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	42.3	153.6	4.1	No change	No change	High	Common	Good	Good			1	22
red pine	Pinus resinosa	NSH	Medium	12.5	146.3	11.0	Sm. dec.	Sm. dec.	Low	Common	Poor	Poor	Infill +	Infill +	0	23
eastern redcedar	Juniperus virginiana	WDH	Medium	24.5	135.6	7.3	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	24
green ash	Fraxinus pennsylvanica	WSH	Low	24.2	120.5	4.9	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	25
hackberry	Celtis occidentalis	WDH	Medium	33	94.7	3.3	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	26
black ash	Fraxinus nigra	WSH	Medium	22	84.9	4.0	Lg. dec.	Lg. dec.	Low	Common	Very Poor	Very Poor			0	27
jack pine	Pinus banksiana	NSH	Medium	6	61.0	6.7	Sm. dec.	Sm. dec.	High	Common	Fair	Fair	Infill +	Infill +	2	28
black locust	Robinia pseudoacacia	NDH	Low	5.5	59.9	8.0	No change	Sm. inc.	Medium	Common	Fair	Good	Infill +	Infill ++	1	29
red mulberry	Morus alba	NSL	Low	6.9	54.1	6.6	No change	No change	Medium	Common	Fair	Fair	Infill +	Infill +	1	30
eastern cottonwood	Populus deltoides	NSH	Low	10.1	51.8	5.9	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good	Infill ++	Infill ++	1	31
black willow	Salix nigra	NSH	Low	4.2	32.9	9.1	Sm. dec.	No change	Low	Rare	Very Poor	Very Poor			0	32
white spruce	Picea glauca	NSL	Medium	4.1	32.7	8.2	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	33
black maple	Acer nigrum	NSH	Low	4	24.1	13.2	Sm. dec.	Lg. dec.	High	Rare	Poor	Poor			0	34
butternut	Juglans cinerea	NSLX	FIA	10.6	23.3	2.0	Unknown	Unknown	Low	Rare	FIA Only	FIA Only			0	35
swamp white oak	Quercus bicolor	NSL	Low	3	19.6	5.6	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	36
white mulberry	Morus alba	NSL	FIA	6.7	19.4	4.6	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	37
river birch	Betula nigra	NSL	Low	3.2	17.9	4.9	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	38
Scots pine	Pinus sylvestris	NSH	FIA	1.4	14.0	7.8	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	39
Siberian elm	Ulmus pumila	NDH	FIA	3.2	13.2	7.3	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	40
wild plum	Prunus americana	NSLX	FIA	3.4	11.8	3.7	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	41
American hornbeam; muscle	Carpinus caroliniana	WSL	Low	6.4	9.3	1.3	Sm. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	42
chokecherry	Prunus virginiana	NSLX	FIA	8.7	9.3	1.2	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	43
serviceberry	Amelanchier spp.	NSL	Low	3.4	8.8	1.8	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	44
peachleaf willow	Salix amygdaloides	NSLX	FIA	0.6	8.4	14.3	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	45
chinkapin oak	Quercus muehlenbergii	NSL	Medium	1	8.2	8.4	Sm. inc.	Sm. inc.	Medium	Rare	Fair	Fair	Infill +	Infill +	2	46
yellow birch	Betula alleghaniensis	NDL	High	2.6	8.0	2.0	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			2	47

Section 222L

EcoMap 2007  
Climate Change Atlas Tree Species

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	0.6	6.6	11.2	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	48
honeylocust	<i>Gleditsia triacanthos</i>	NSH	Low	1.5	3.5	3.3	Lg. inc.	Lg. inc.	High	Rare	Good	Good			2	49
balsam fir	<i>Abies balsamea</i>	NDH	High	0.6	2.9	5.0	Lg. dec.	Lg. dec.	Low	Rare	Very Poor	Very Poor			0	50
rock elm	<i>Ulmus thomasii</i>	NSLX	FIA	1.5	2.8	1.8	Unknown	Unknown	Low	Rare	FIA Only	FIA Only			0	51
tamarack (native)	<i>Larix laricina</i>	NSH	High	0.2	1.9	9.5	Sm. dec.	No change	Low	Rare	Very Poor	Very Poor			2	52
pin cherry	<i>Prunus pensylvanica</i>	NSL	Low	1.3	1.6	0.9	Lg. dec.	Very Lg. dec.	Medium	Rare	Very Poor	Lost			0	53
northern white-cedar	<i>Thuja occidentalis</i>	WSH	High	0.2	1.1	1.4	Lg. dec.	No change	Medium	Rare	Very Poor	Poor	Infill +		2	54
Norway maple	<i>Acer platanoides</i>	NSL	FIA	0.1	0.9	3.1	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	55
northern catalpa	<i>Catalpa speciosa</i>	NSHX	FIA	0.3	0.5	1.3	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	56
black spruce	<i>Picea mariana</i>	NSH	High	0.2	0.4	2.2	Sm. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	57
balsam poplar	<i>Populus balsamifera</i>	NSH	Medium	0.1	0.1	0.3	Very Lg. dec.	Very Lg. dec.	Medium	Rare	Lost	Lost			0	58
slash pine	<i>Pinus elliotii</i>	NDH	High	0	0	0	Unknown	New Habitat	Medium	Absent	Unknown	New Habitat			0	59
striped maple	<i>Acer pensylvanicum</i>	NSL	Medium	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	60
mountain maple	<i>Acer spicatum</i>	NSL	Low	0	0	0	Unknown	Unknown	High	Absent	Unknown	Unknown			0	61
Ohio buckeye	<i>Aesculus glabra</i>	NSL	Low	0	0	0	Unknown	Unknown	Medium	Modeled	Unknown	Unknown			0	62
pawpaw	<i>Asimina triloba</i>	NSL	Low	0	0	0	Unknown	Unknown	Medium	Modeled	Unknown	Unknown			0	63
gray birch	<i>Betula populifolia</i>	NSL	Low	0	0	0	Unknown	Unknown	Medium	Modeled	Unknown	Unknown			0	64
cittamwood/gum bumelia	<i>Sideroxylon lanuginosum</i> ssp.	NSL	Low	0	0	0	Unknown	New Habitat	High	Absent	Unknown	New Habitat			3	65
pignut hickory	<i>Carya glabra</i>	WDL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +		3	66
pecan	<i>Carya illinoensis</i>	NSH	Low	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat	Migrate ++		3	67
black hickory	<i>Carya texana</i>	NDL	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	68
mockernut hickory	<i>Carya alba</i>	WDL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	69
sugarberry	<i>Celtis laevigata</i>	NDH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	70
eastern redbud	<i>Cercis canadensis</i>	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	71
flowering dogwood	<i>Cornus florida</i>	WDL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +		3	72
common persimmon	<i>Diospyros virginiana</i>	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +		3	73
American beech	<i>Fagus grandifolia</i>	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	74
blue ash	<i>Fraxinus quadrangulata</i>	NSL	Low	0	0	0	Unknown	Unknown	Low	Absent	Unknown	Unknown			0	75
yellow-poplar	<i>Liriodendron tulipifera</i>	WDH	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +		3	76
Osage-orange	<i>Maclura pomifera</i>	NDH	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	77
mountain or Fraser magnolia	<i>Magnolia fraseri</i>	NSL	Low	0	0	0	Unknown	Unknown	Low	Absent	Unknown	Unknown			0	78
blackgum	<i>Nyssa sylvatica</i>	WDL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	79
sycamore	<i>Platanus occidentalis</i>	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	80
scarlet oak	<i>Quercus coccinea</i>	WDL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	81
shingle oak	<i>Quercus imbricaria</i>	NDH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	82
laurel oak	<i>Quercus laurifolia</i>	NDH	Medium	0	0	0	Unknown	New Habitat	Medium	Absent	Unknown	New Habitat			0	83
blackjack oak	<i>Quercus marilandica</i>	NSL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate ++		3	84
Shumard oak	<i>Quercus shumardii</i>	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +		3	85
post oak	<i>Quercus stellata</i>	WDH	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	86
bluejack oak	<i>Quercus incana</i>	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	87
sassafras	<i>Sassafras albidum</i>	WSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +		3	88
winged elm	<i>Ulmus alata</i>	WDL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	89

