

Current and Potential Future Habitat, Capability, and Migration

	sq. km	sq. mi	FIA Plots
Area of Region	14,914	5,758.3	559

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	18	19	Increase	16	18	Very Good	7	6	Likely	1	1
Hickory	1			Medium	24	38	No Change	12	8	Good	13	13	Infill	6	8
Maple	6	Abundant	7	Low	24	13	Decrease	17	19	Fair	9	12	Migrate	3	11
Oak	6	Common	22	FIA	6		New	18	20	Poor	8	6			
Pine	4	Rare	22				Unknown	9	7	Very Poor	6	5			
Other	31	Absent	21							FIA Only	4	4			
	51		72		72	70		72	72	Unknown	3	1			
											50	47			

Potential Changes in Climate Variables

Temperature (°F)

	Scenario	2009	2039	2069	2099	
Annual Average	CCSM45	42.8	44.6	47.7	47.8	
	CCSM85	42.8	45.5	48.5	52.1	
	GFDL45	42.8	46.0	48.5	49.9	
	GFDL85	42.8	46.1	49.7	54.8	
	HAD45	42.8	45.9	49.5	51.4	
HAD85	42.8	46.4	50.7	56.4		
Growing Season May—Sep	CCSM45	62.8	64.7	67.4	67.6	
	CCSM85	62.8	65.6	68.4	72.6	
	GFDL45	62.8	66.6	69.7	71.8	
	GFDL85	62.8	66.9	71.0	76.8	
	HAD45	62.8	66.1	68.9	71.2	
HAD85	62.8	66.1	70.6	76.3		
Coldest Month Average	CCSM45	10.7	12.3	15.0	15.2	
	CCSM85	10.7	12.7	15.0	17.5	
	GFDL45	10.7	14.1	16.0	16.4	
	GFDL85	10.7	14.7	16.5	19.5	
	HAD45	10.7	12.2	16.5	16.4	
HAD85	10.7	15.7	18.9	22.6		
Warmest Month Average	CCSM45	69.1	71.3	72.8	73.3	
	CCSM85	69.1	72.5	74.3	76.9	
	GFDL45	69.1	72.7	74.3	75.9	
	GFDL85	69.1	73.6	75.7	79.2	
	HAD45	69.1	72.6	74.1	75.7	
HAD85	69.1	73.4	75.8	79.8		

Precipitation (in)

	Scenario	2009	2039	2069	2099	
Annual Total	CCSM45	31.9	32.7	32.1	32.5	
	CCSM85	31.9	31.6	31.7	32.4	
	GFDL45	31.9	34.8	36.6	34.6	
	GFDL85	31.9	35.0	37.7	36.5	
	HAD45	31.9	33.2	33.7	34.1	
HAD85	31.9	33.1	34.3	35.9		
Growing Season May—Sep	CCSM45	19.7	19.8	18.8	19.4	
	CCSM85	19.7	19.4	18.8	18.1	
	GFDL45	19.7	21.1	21.7	19.9	
	GFDL85	19.7	21.4	21.7	19.7	
	HAD45	19.7	19.6	18.5	18.9	
HAD85	19.7	19.2	17.6	17.9		

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
red maple	Acer rubrum	WDH	High	88.9	1822.2	11.7	Sm. dec.	Sm. dec.	High	Abundant	Good	Good			1	1
quaking aspen	Populus tremuloides	WDH	High	81.4	1637.1	12.1	Sm. dec.	Sm. dec.	Medium	Abundant	Fair	Fair			0	2
sugar maple	Acer saccharum	WDH	High	71.1	973.9	7.6	No change	Sm. dec.	High	Abundant	Very Good	Good			1	3
northern red oak	Quercus rubra	WDH	Medium	67	752.9	6.5	No change	No change	High	Abundant	Very Good	Very Good			1	4
American elm	Ulmus americana	WDH	Medium	76.4	572.4	4.9	Sm. inc.	Sm. inc.	Medium	Abundant	Very Good	Very Good			1	5
paper birch	Betula papyrifera	WDH	High	61.3	531.8	5.0	No change	Sm. dec.	Medium	Abundant	Good	Fair			1	6
black ash	Fraxinus nigra	WSH	Medium	63.9	503.7	5.0	Sm. dec.	Sm. dec.	Low	Abundant	Fair	Fair			0	7
American basswood	Tilia americana	WSL	Medium	68.4	498.9	4.4	No change	No change	Medium	Common	Fair	Fair			1	8
eastern white pine	Pinus strobus	WDH	High	43.5	440.2	4.9	Sm. inc.	No change	Low	Common	Fair	Poor			1	9
white ash	Fraxinus americana	WDL	Medium	65	370.1	3.9	Sm. inc.	Sm. inc.	Low	Common	Fair	Fair			1	10
red pine	Pinus resinosa	NSH	Medium	21.7	358.3	9.8	Sm. inc.	Sm. inc.	Low	Common	Fair	Fair			1	11
bur oak	Quercus macrocarpa	NDH	Medium	44.7	343.4	5.1	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	12
white oak	Quercus alba	WDH	Medium	45.4	316.0	4.2	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	13
green ash	Fraxinus pennsylvanica	WSH	Low	54.4	306.6	3.9	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	14
northern pin oak	Quercus ellipsoidalis	NSH	Medium	15.9	266.8	4.3	Sm. inc.	No change	High	Common	Very Good	Good			1	15
black cherry	Prunus serotina	WDL	Medium	58.2	253.8	2.2	Lg. inc.	Lg. inc.	Low	Common	Good	Good			1	16
bigtooth aspen	Populus grandidentata	NSL	Medium	35.3	253.2	3.0	No change	No change	Medium	Common	Fair	Fair			1	17
balsam fir	Abies balsamea	NDH	High	35.7	234.8	4.4	Lg. dec.	Lg. dec.	Low	Common	Very Poor	Very Poor			0	18
tamarack (native)	Larix laricina	NSH	High	14.7	224.6	6.2	Sm. dec.	Sm. dec.	Low	Common	Poor	Poor			0	19
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	58.8	209.2	2.1	No change	No change	High	Common	Good	Good			1	20
yellow birch	Betula alleghaniensis	NDL	High	46.6	163.3	2.6	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	21
boxelder	Acer negundo	WSH	Low	8.5	149.6	6.2	No change	No change	High	Common	Good	Good			1	22
black spruce	Picea mariana	NSH	High	9.2	128.1	5.8	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor	Infill +	Infill +	0	23
white spruce	Picea glauca	NSL	Medium	23.9	122.4	4.7	Sm. dec.	No change	Medium	Common	Poor	Fair			1	24
bitternut hickory	Carya cordiformis	WSL	Low	30.9	114.5	2.8	No change	Sm. inc.	High	Common	Good	Very Good			1	25
eastern hemlock	Tsuga canadensis	NSH	High	22.1	114.3	3.2	Lg. dec.	Lg. dec.	Low	Common	Very Poor	Very Poor			0	26
silver maple	Acer saccharinum	NSH	Low	11	81.7	7.7	Sm. inc.	Lg. inc.	High	Common	Very Good	Very Good	Infill ++	Infill ++	1	27
jack pine	Pinus banksiana	NSH	Medium	3.2	66.5	1.4	Sm. dec.	Sm. dec.	High	Common	Fair	Fair	Infill +	Infill +	1	28
American hornbeam; musclev	Carpinus caroliniana	WSL	Low	43	61.6	1.2	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor			0	29
northern white-cedar	Thuja occidentalis	WSH	High	3.1	41.8	4.1	No change	Sm. inc.	Medium	Rare	Poor	Fair	Infill +	Infill +	2	30
Scots pine	Pinus sylvestris	NSH	FIA	3.2	39.8	11.7	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	31
black oak	Quercus velutina	WDH	High	2.6	39.3	2.4	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	2	32
butternut	Juglans cinerea	NSLX	FIA	10.8	34.5	1.8	Unknown	Unknown	Low	Rare	FIA Only	FIA Only			0	33
slippery elm	Ulmus rubra	WSL	Low	10	18.4	1.0	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	1	34
chokecherry	Prunus virginiana	NSLX	FIA	6.7	9.8	0.4	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	35
eastern redcedar	Juniperus virginiana	WDH	Medium	0.2	8.1	3.0	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	36
pin cherry	Prunus pensylvanica	NSL	Low	4.5	7.7	0.8	Lg. dec.	Very Lg. dec.	Medium	Rare	Very Poor	Lost			0	37
swamp white oak	Quercus bicolor	NSL	Low	2.6	7.4	1.4	No change	Sm. inc.	Medium	Rare	Poor	Fair		Infill +	2	38
Ohio buckeye	Aesculus glabra	NSL	Low	0.7	7.0	10.4	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	39
serviceberry	Amelanchier spp.	NSL	Low	8	5.0	0.4	Very Lg. dec.	Lg. dec.	Medium	Rare	Lost	Very Poor			0	40
rock elm	Ulmus thomasii	NSLX	FIA	1.5	4.9	0.9	Unknown	Unknown	Low	Rare	FIA Only	FIA Only			0	41
black maple	Acer nigrum	NSH	Low	1	2.6	1.8	Lg. dec.	Very Lg. dec.	High	Rare	Poor	Lost			0	42
Norway spruce	Picea abies	NSH	FIA	1.3	2.2	0.8	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	43
black locust	Robinia pseudoacacia	NDH	Low	0.1	1.7	0.4	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	44
hackberry	Celtis occidentalis	WDH	Medium	0	1.6	0.2	Lg. inc.	Lg. inc.	High	Rare	Good	Good			2	45
black willow	Salix nigra	NSH	Low	0.7	0.7	1.0	No change	Lg. inc.	Low	Rare	Very Poor	Fair		Infill +	2	46
balsam poplar	Populus balsamifera	NSH	Medium	0.2	0.6	0.1	Very Lg. dec.	Very Lg. dec.	Medium	Rare	Lost	Lost			0	47

Section 212Q

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
wild plum	Prunus americana	NSLX	FIA	0.5	0.5	0.5	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	48
black walnut	Juglans nigra	WDH	Low	0.3	0.4	0.2	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	49
mountain maple	Acer spicatum	NSL	Low	0.7	0.3	0.4	No change	Lg. dec.	High	Rare	Fair	Poor			0	50
river birch	Betula nigra	NSL	Low	0.7	0.3	0.4	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	51
Virginia pine	Pinus virginiana	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	52
sweet birch	Betula lenta	NDH	High	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat			0	53
pignut hickory	Carya glabra	WDL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	54
shagbark hickory	Carya ovata	WSL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate ++	Migrate ++	3	55
black hickory	Carya texana	NDL	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	56
mockernut hickory	Carya alba	WDL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			3	57
sugarberry	Celtis laevigata	NDH	Medium	0	0	0	Unknown	New Habitat	Medium	Absent	Unknown	New Habitat			0	58
American beech	Fagus grandifolia	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	59
honeylocust	Gleditsia triacanthos	NSH	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate +	3	60
yellow-poplar	Liriodendron tulipifera	WDH	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			3	61
bigleaf magnolia	Magnolia macrophylla	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	62
red mulberry	Morus rubra	NSL	Low	0	0	0	Unknown	New Habitat	Medium	Absent	Unknown	New Habitat		Migrate +	3	63
blackgum	Nyssa sylvatica	WDL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	64
sycamore	Platanus occidentalis	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	65
eastern cottonwood	Populus deltoides	NSH	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Likely +	Likely +	3	66
scarlet oak	Quercus coccinea	WDL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	67
shingle oak	Quercus imbricaria	NDH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	68
chinkapin oak	Quercus muehlenbergii	NSL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	69
pin oak	Quercus palustris	NSH	Low	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat		Migrate +	3	70
post oak	Quercus stellata	WDH	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			3	71
sassafras	Sassafras albidum	WSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	72

