

Current and Potential Future Habitat, Capability, and Migration

	sq. km	sq. mi	FIA Plots
Area of Region	8,890.3	3,432.5	466

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	20	19	Increase	16	17	Very Good	8	8
Hickory	2			Medium	23	38	No Change	11	11	Good	12	14
Maple	5	Abundant	9	Low	21	11	Decrease	15	14	Fair	6	4
Oak	6	Common	17	FIA	5		New	19	21	Poor	10	11
Pine	4	Rare	21				Unknown	8	6	Very Poor	3	3
Other	27	Absent	21							FIA Only	4	4
	47		68		69	68		69	69	Unknown	3	1
											46	45

Potential Changes in Climate Variables

Temperature (°F)

	Scenario	2009	2039	2069	2099	
Annual Average	CCSM45	44.6	46.5	49.6	49.7	
	CCSM85	44.6	47.3	50.3	53.7	
	GFDL45	44.6	47.6	50.3	51.6	
	GFDL85	44.6	47.9	51.4	56.3	
	HAD45	44.6	47.7	51.3	53.1	
HAD85	44.6	48.1	52.5	58.0		
Growing Season (May—Sep)	CCSM45	64.0	66.0	68.7	68.9	
	CCSM85	64.0	66.9	69.5	73.7	
	GFDL45	64.0	67.4	70.7	72.8	
	GFDL85	64.0	68.1	72.1	77.8	
	HAD45	64.0	67.2	70.0	72.3	
HAD85	64.0	67.3	71.9	77.4		
Coldest Month Average	CCSM45	13.5	15.2	18.1	18.3	
	CCSM85	13.5	15.9	18.2	20.5	
	GFDL45	13.5	17.0	18.7	19.1	
	GFDL85	13.5	17.7	19.3	22.0	
	HAD45	13.5	14.9	19.1	19.0	
HAD85	13.5	18.2	21.5	25.0		
Warmest Month Average	CCSM45	70.2	72.7	74.2	74.7	
	CCSM85	70.2	74.0	75.7	78.1	
	GFDL45	70.2	73.7	75.3	76.9	
	GFDL85	70.2	74.6	76.7	80.3	
	HAD45	70.2	73.6	75.2	76.7	
HAD85	70.2	74.7	77.3	81.2		

Precipitation (in)

	Scenario	2009	2039	2069	2099	
Annual Total	CCSM45	32.7	32.9	32.6	32.8	
	CCSM85	32.7	32.5	33.1	33.2	
	GFDL45	32.7	35.3	38.0	36.1	
	GFDL85	32.7	36.1	38.7	37.6	
	HAD45	32.7	33.6	34.8	35.0	
HAD85	32.7	34.0	34.5	36.5		
Growing Season (May—Sep)	CCSM45	20.0	19.7	19.1	19.9	
	CCSM85	20.0	19.7	19.7	18.6	
	GFDL45	20.0	21.0	22.4	20.6	
	GFDL85	20.0	21.8	21.9	20.3	
	HAD45	20.0	19.7	19.0	19.4	
HAD85	20.0	19.8	17.8	18.3		

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 222R

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
red maple	Acer rubrum	WDH	High	87.9	1883.2	12.0	Sm. dec.	Sm. dec.	High	Abundant	Good	Good			1	1
eastern white pine	Pinus strobus	WDH	High	87.2	1686.6	12.6	Lg. dec.	Lg. dec.	Low	Abundant	Poor	Poor			0	2
quaking aspen	Populus tremuloides	WDH	High	78	1208.3	10.9	Sm. dec.	Lg. dec.	Medium	Abundant	Fair	Fair			0	3
jack pine	Pinus banksiana	NSH	Medium	68.2	1171.1	13.3	Sm. dec.	Lg. dec.	High	Abundant	Good	Good			1	4
black oak	Quercus velutina	WDH	High	72.1	1097.8	9.8	No change	No change	Medium	Abundant	Good	Good			1	5
red pine	Pinus resinosa	NSH	Medium	67.2	1092.7	9.9	Sm. dec.	Sm. dec.	Low	Abundant	Fair	Fair			0	6
northern pin oak	Quercus ellipsoidalis	NSH	Medium	78.1	896.0	8.0	Sm. dec.	Sm. dec.	High	Abundant	Good	Good			1	7
white oak	Quercus alba	WDH	Medium	70	647.4	4.9	Sm. inc.	Sm. inc.	High	Abundant	Very Good	Very Good			1	8
northern red oak	Quercus rubra	WDH	Medium	53.9	619.8	4.5	No change	No change	High	Abundant	Very Good	Very Good			1	9
bigtooth aspen	Populus grandidentata	NSL	Medium	48.4	316.9	3.9	No change	No change	Medium	Common	Fair	Fair			1	10
black cherry	Prunus serotina	WDL	Medium	58.9	219.0	1.6	Lg. inc.	Lg. inc.	Low	Common	Good	Good			1	11
tamarack (native)	Larix laricina	NSH	High	17.7	215.1	6.5	Sm. dec.	Sm. dec.	Low	Common	Poor	Poor			0	12
paper birch	Betula papyrifera	WDH	High	53.6	214.6	2.1	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	13
American elm	Ulmus americana	WDH	Medium	27.2	165.5	1.7	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	14
boxelder	Acer negundo	WSH	Low	10.7	150.7	3.9	No change	No change	High	Common	Good	Good			1	15
bur oak	Quercus macrocarpa	NDH	Medium	32	144.9	2.5	Lg. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	16
white ash	Fraxinus americana	WDL	Medium	17.3	95.9	1.6	Lg. inc.	Lg. inc.	Low	Common	Good	Good			1	17
green ash	Fraxinus pennsylvanica	WSH	Low	22.1	87.8	2.6	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	18
black ash	Fraxinus nigra	WSH	Medium	10.5	85.3	2.7	Sm. inc.	No change	Low	Common	Fair	Poor			1	19
black spruce	Picea mariana	NSH	High	6.3	82.6	3.2	Sm. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	20
silver maple	Acer saccharinum	NSH	Low	11.9	79.3	4.4	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	21
bitternut hickory	Carya cordiformis	WSL	Low	8.8	76.6	2.0	No change	No change	High	Common	Good	Good			1	22
American basswood	Tilia americana	WSL	Medium	15.7	75.0	1.8	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	23
river birch	Betula nigra	NSL	Low	5.6	69.5	9.1	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor	Infill +		0	24
sugar maple	Acer saccharum	WDH	High	7.6	64.2	1.4	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good	Infill ++	Infill ++	1	25
white spruce	Picea glauca	NSL	Medium	4.2	61.2	4.6	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor			0	26
shagbark hickory	Carya ovata	WSL	Medium	5.8	46.8	1.1	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	1	27
serviceberry	Amelanchier spp.	NSL	Low	10.9	38.2	0.9	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	28
Scots pine	Pinus sylvestris	NSH	FIA	10	37.5	1.8	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	29
black locust	Robinia pseudoacacia	NDH	Low	3.3	30.7	5.8	Sm. inc.	Lg. inc.	Medium	Rare	Fair	Good	Infill +	Infill ++	1	30
swamp white oak	Quercus bicolor	NSL	Low	5.1	28.1	4.3	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	31
American hornbeam; musclev	Carpinus caroliniana	WSL	Low	13	26.9	0.6	Lg. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	32
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	5.5	25.4	0.6	Sm. inc.	Sm. inc.	High	Rare	Good	Good			1	33
slippery elm	Ulmus rubra	WSL	Low	3.2	24.8	0.9	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	1	34
butternut	Juglans cinerea	NSLX	FIA	2	12.3	1.0	Unknown	Unknown	Low	Rare	FIA Only	FIA Only			0	35
eastern redcedar	Juniperus virginiana	WDH	Medium	3.9	11.8	1.0	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	2	36
pin cherry	Prunus pensylvanica	NSL	Low	5	9.1	0.7	Very Lg. dec.	Very Lg. dec.	Medium	Rare	Lost	Lost			0	37
eastern hemlock	Tsuga canadensis	NSH	High	1.5	8.3	2.1	No change	No change	Low	Rare	Very Poor	Very Poor			2	38
yellow birch	Betula alleghaniensis	NDL	High	4.8	6.3	0.5	No change	Sm. inc.	Medium	Rare	Poor	Fair	Infill +	Infill +	1	39
peachleaf willow	Salix amygdaloides	NSLX	FIA	1.1	6.2	5.5	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	40
black walnut	Juglans nigra	WDH	Low	0.7	4.8	2.7	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	1	41
hackberry	Celtis occidentalis	WDH	Medium	2	4.5	0.7	No change	Sm. inc.	High	Rare	Fair	Good	Infill +		2	42
balsam fir	Abies balsamea	NDH	High	1.4	3.3	0.6	Sm. inc.	Sm. inc.	Low	Rare	Poor	Poor	Infill +	Infill +	2	43
chokecherry	Prunus virginiana	NSLX	FIA	5	3.3	0.3	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	44
rock elm	Ulmus thomasii	NSLX	FIA	0.2	1.9	0.3	Unknown	Unknown	Low	Rare	FIA Only	FIA Only			0	45
red mulberry	Morus rubra	NSL	Low	0.4	1.0	0.3	Very Lg. dec.	No change	Medium	Rare	Lost	Poor			0	46
black maple	Acer nigrum	NSH	Low	0.5	0.9	0.4	Very Lg. dec.	Very Lg. dec.	High	Rare	Lost	Lost			0	47



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shortleaf pine	Pinus echinata	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	48
loblolly pine	Pinus taeda	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	49
Virginia pine	Pinus virginiana	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	50
northern white-cedar	Thuja occidentalis	WSH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Likely +	Likely +	3	51
striped maple	Acer pensylvanicum	NSL	Medium	0	0	0	Unknown	New Habitat	Medium	Absent	Unknown	New Habitat			3	52
cittamwood/gum bumelia	Sideroxylon lanuginosum ssp.	NSL	Low	0	0	0	Unknown	New Habitat	High	Absent	Unknown	New Habitat			0	53
pignut hickory	Carya glabra	WDL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	54
black hickory	Carya texana	NDL	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	55
mockernut hickory	Carya alba	WDL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate +	3	56
eastern redbud	Cercis canadensis	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	57
American beech	Fagus grandifolia	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	58
sweetgum	Liquidambar styraciflua	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	59
yellow-poplar	Liriodendron tulipifera	WDH	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	60
blackgum	Nyssa sylvatica	WDL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	61
sycamore	Platanus occidentalis	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	62
balsam poplar	Populus balsamifera	NSH	Medium	0	0	0	Unknown	Unknown	Medium	Modeled	Unknown	Unknown			0	63
eastern cottonwood	Populus deltoides	NSH	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Likely +	Likely +	3	64
scarlet oak	Quercus coccinea	WDL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	65
blackjack oak	Quercus marilandica	NSL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			3	66
pin oak	Quercus palustris	NSH	Low	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat		Migrate +	3	67
post oak	Quercus stellata	WDH	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			3	68
sassafras	Sassafras albidum	WSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	69

