

Current and Potential Future Habitat, Capability, and Migration

	sq. km	sq. mi	FIA Plots
Area of Region	62,790	24,243	679

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	Scenario	Scenario	Scenario	SHIFT	SHIFT			
				High	Low	RCP45	RCP85	RCP45	RCP85	RCP45	RCP85			
Ash	3			13	22	Increase	13	14	Very Good	2	2	Likely	0	0
Hickory	2			26	39	No Change	19	13	Good	15	11	Infill	27	27
Maple	7	Abundant	0	30	13	Decrease	15	20	Fair	6	10	Migrate	4	12
Oak	5	Common	19	9		New	15	18	Poor	12	12			
Pine	4	Rare	37			Unknown	16	13	Very Poor	12	12			
Other	35	Absent	21						FIA Only	5	5			
	56		77	78	74		78	78	Unknown	7	4		31	39
										59	56			

Potential Changes in Climate Variables

Temperature (°F)

	Scenario	2009	2039	2069	2099	
Annual Average	CCSM45	44.7	46.6	49.5	49.9	
	CCSM85	44.7	47.4	50.5	54.0	
	GFDL45	44.7	50.2	50.1	51.5	
	GFDL85	44.7	47.9	51.2	56.0	
	HAD45	44.7	47.6	51.4	53.2	
	HAD85	44.7	48.3	52.8	58.0	
Growing Season (May—Sep)	CCSM45	65.3	67.3	69.8	70.4	
	CCSM85	65.3	68.2	71.1	75.2	
	GFDL45	65.3	72.0	71.6	73.6	
	GFDL85	65.3	69.1	72.8	78.5	
	HAD45	65.3	68.2	71.1	73.3	
	HAD85	65.3	68.4	73.0	78.2	
Coldest Month Average	CCSM45	11.7	13.6	16.0	16.5	
	CCSM85	11.7	13.9	16.1	18.5	
	GFDL45	11.7	15.4	16.7	17.1	
	GFDL85	11.7	15.4	17.1	19.7	
	HAD45	11.7	13.2	17.4	17.3	
	HAD85	11.7	16.8	20.4	23.7	
Warmest Month Average	CCSM45	71.6	74.0	75.6	76.2	
	CCSM85	71.6	75.5	77.4	79.9	
	GFDL45	71.6	74.9	76.4	78.0	
	GFDL85	71.6	75.7	77.6	81.3	
	HAD45	71.6	74.6	76.5	77.8	
	HAD85	71.6	75.8	78.3	81.8	

Precipitation (in)

	Scenario	2009	2039	2069	2099	
Annual Total	CCSM45	31.8	32.3	32.1	31.5	
	CCSM85	31.8	31.3	31.6	32.0	
	GFDL45	31.8	34.9	37.4	35.0	
	GFDL85	31.8	35.3	38.0	37.0	
	HAD45	31.8	34.1	33.6	33.9	
	HAD85	31.8	33.2	33.1	35.4	
Growing Season (May—Sep)	CCSM45	20.1	20.0	19.4	19.3	
	CCSM85	20.1	19.1	18.6	18.0	
	GFDL45	20.1	21.9	23.1	21.0	
	GFDL85	20.1	22.3	22.7	21.2	
	HAD45	20.1	20.6	19.3	19.3	
	HAD85	20.1	19.7	18.0	18.0	

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 222M

EcoMap 2007
Climate Change Atlas Tree Species

USDA Forest Service
Northern Research Station
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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
bur oak	Quercus macrocarpa	NDH	Medium	45.4	462.8	14.5	No change	Sm. dec.	High	Common	Good	Fair	Infill ++	Infill +	1	1
quaking aspen	Populus tremuloides	WDH	High	32.4	411.4	12.9	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor	Infill +	Infill +	0	2
American basswood	Tilia americana	WSL	Medium	39.8	293.8	10.4	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor	Infill +	Infill +	0	3
American elm	Ulmus americana	WDH	Medium	64.4	291.4	8.4	No change	No change	Medium	Common	Fair	Fair	Infill +	Infill +	1	4
boxelder	Acer negundo	WSH	Low	50.4	290.2	11.4	No change	Sm. dec.	High	Common	Good	Fair	Infill ++	Infill +	1	5
northern red oak	Quercus rubra	WDH	Medium	33	256.1	8.8	Sm. dec.	Sm. dec.	High	Common	Fair	Fair	Infill +	Infill +	1	6
green ash	Fraxinus pennsylvanica	WSH	Low	47.8	254.7	8.9	Sm. inc.	Sm. inc.	Medium	Common	Good	Good	Infill ++	Infill ++	1	7
sugar maple	Acer saccharum	WDH	High	23.9	164.3	9.3	No change	No change	High	Common	Good	Good	Infill ++	Infill ++	2	8
black ash	Fraxinus nigra	WSH	Medium	21.2	143.1	5.7	No change	Sm. dec.	Low	Common	Poor	Poor	Infill +	Infill +	0	9
northern pin oak	Quercus ellipsoidalis	NSH	Medium	16.6	129.2	10.9	No change	Sm. dec.	High	Common	Good	Fair	Infill ++	Infill +	2	10
red pine	Pinus resinosa	NSH	Medium	5.4	123.1	13.9	No change	No change	Low	Common	Poor	Poor	Infill +	Infill +	2	11
paper birch	Betula papyrifera	WDH	High	16.8	116.7	5.0	No change	Sm. dec.	Medium	Common	Fair	Poor	Infill +	Infill +	1	12
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	33	103.2	5.0	No change	Sm. dec.	High	Common	Good	Fair	Infill ++	Infill +	1	13
tamarack (native)	Larix laricina	NSH	High	4.2	92.7	17.5	No change	No change	Low	Common	Poor	Poor	Infill +	Infill +	2	14
black cherry	Prunus serotina	WDL	Medium	35.5	84.8	5.0	Sm. inc.	Sm. inc.	Low	Common	Fair	Fair	Infill +	Infill +	1	15
red maple	Acer rubrum	WDH	High	11.3	70.1	5.2	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good	Infill ++	Infill ++	2	16
silver maple	Acer saccharinum	NSH	Low	13.1	65.4	16.0	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good	Infill ++	Infill ++	2	17
bigtooth aspen	Populus grandidentata	NSL	Medium	8.9	61.9	7.2	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor	Infill +	Infill +	2	18
white oak	Quercus alba	WDH	Medium	9.5	53.7	8.1	No change	No change	High	Common	Good	Good	Infill ++	Infill ++	2	19
eastern redcedar	Juniperus virginiana	WDH	Medium	15	46.2	8.2	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	2	20
slippery elm	Ulmus rubra	WSL	Low	28.2	41.2	3.6	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	1	21
white spruce	Picea glauca	NSL	Medium	6	41.0	12.1	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			2	22
eastern white pine	Pinus strobus	WDH	High	4.6	37.8	7.3	No change	No change	Low	Rare	Very Poor	Very Poor			2	23
hackberry	Celtis occidentalis	WDH	Medium	24.1	31.2	6.0	Lg. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	2	24
black walnut	Juglans nigra	WDH	Low	11	30.8	11.3	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	25
eastern cottonwood	Populus deltoides	NSH	Low	7	30.4	13.5	Sm. inc.	Sm. inc.	Medium	Rare	Fair	Fair	Infill +	Infill +	2	26
Siberian elm	Ulmus pumila	NDH	FIA	7.5	23.7	11.6	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	27
jack pine	Pinus banksiana	NSH	Medium	1.6	21.7	5.6	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	2	28
black willow	Salix nigra	NSH	Low	7.1	21.3	11.1	Sm. dec.	No change	Low	Rare	Very Poor	Very Poor			2	29
balsam fir	Abies balsamea	NDH	High	1.9	21.2	7.5	No change	No change	Low	Rare	Very Poor	Very Poor			2	30
balsam poplar	Populus balsamifera	NSH	Medium	3.3	19.5	3.7	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			2	31
white ash	Fraxinus americana	WDL	Medium	6.8	17.6	3.6	No change	No change	Low	Rare	Very Poor	Very Poor			2	32
bitternut hickory	Carya cordiformis	WSL	Low	12.1	16.5	3.1	Sm. inc.	Sm. inc.	High	Rare	Good	Good			2	33
Scots pine	Pinus sylvestris	NSH	FIA	1.5	12.6	6.8	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	34
butternut	Juglans cinerea	NSLX	FIA	4.7	9.4	2.2	Unknown	Unknown	Low	Rare	FIA Only	FIA Only			0	35
northern white-cedar	Thuja occidentalis	WSH	High	0.3	8.0	16.0	No change	Lg. inc.	Medium	Rare	Poor	Good	Infill +		2	36
chokecherry	Prunus virginiana	NSLX	FIA	11.2	6.0	0.9	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	37
yellow birch	Betula alleghaniensis	NDL	High	2.3	6.0	2.7	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	38
serviceberry	Amelanchier spp.	NSL	Low	2.3	5.5	1.8	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	39
red mulberry	Morus rubra	NSL	Low	6	5.2	11.0	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	40
black locust	Robinia pseudoacacia	NDH	Low	1.4	4.0	11.0	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	41
black oak	Quercus velutina	WDH	High	2.1	3.9	5.8	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	42
shagbark hickory	Carya ovata	WSL	Medium	4.6	3.6	3.3	Lg. inc.	Sm. inc.	Medium	Rare	Good	Fair		Infill +	2	43
black maple	Acer nigrum	NSH	Low	1.3	3.3	22.5	Lg. dec.	Lg. dec.	High	Rare	Poor	Poor			0	44
honeylocust	Gleditsia triacanthos	NSH	Low	2.4	3.3	5.5	Sm. inc.	Lg. inc.	High	Rare	Good	Good			2	45
black spruce	Picea mariana	NSH	High	0.1	2.3	6.7	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			2	46
wild plum	Prunus americana	NSLX	FIA	2.8	1.5	3.3	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	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	0.2	1.2	7.8	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	48
pin cherry	<i>Prunus pensylvanica</i>	NSL	Low	0.7	0.8	1.2	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	49
peachleaf willow	<i>Salix amygdaloides</i>	NSLX	FIA	1.4	0.8	2.9	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	50
rock elm	<i>Ulmus thomasii</i>	NSLX	FIA	0.8	0.8	2.6	Unknown	Unknown	Low	Rare	FIA Only	FIA Only			0	51
Norway maple	<i>Acer platanoides</i>	NSL	FIA	0.1	0.7	1.4	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	52
river birch	<i>Betula nigra</i>	NSL	Low	0.9	0.5	2.8	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	53
mountain maple	<i>Acer spicatum</i>	NSL	Low	0.7	0.3	0.8	Sm. dec.	Lg. dec.	High	Rare	Poor	Poor			0	54
American mountain-ash	<i>Sorbus americana</i>	NSL	Low	0.2	0.3	1.9	Sm. dec.	Sm. dec.	Low	Rare	Very Poor	Very Poor			0	55
American hornbeam; muscley	<i>Carpinus caroliniana</i>	WSL	Low	0.7	0.2	0.4	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	56
striped maple	<i>Acer pensylvanicum</i>	NSL	Medium	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	57
gray birch	<i>Betula populifolia</i>	NSL	Low	0	0	0	Unknown	Unknown	Medium	Modeled	Unknown	Unknown			0	58
cittamwood/gum bumelia	<i>Sideroxylon lanuginosum ssp.</i>	NSL	Low	0	0	0	Unknown	New Habitat	High	Absent	Unknown	New Habitat			3	59
pecan	<i>Carya illinoensis</i>	NSH	Low	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat			3	60
black hickory	<i>Carya texana</i>	NDL	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	61
mockernut hickory	<i>Carya alba</i>	WDL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate +	3	62
sugarberry	<i>Celtis laevigata</i>	NDH	Medium	0	0	0	Unknown	New Habitat	Medium	Absent	Unknown	New Habitat			3	63
eastern redbud	<i>Cercis canadensis</i>	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	64
common persimmon	<i>Diospyros virginiana</i>	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate +	3	65
Osage-orange	<i>Maclura pomifera</i>	NDH	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	66
sycamore	<i>Platanus occidentalis</i>	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	67
swamp white oak	<i>Quercus bicolor</i>	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	68
shingle oak	<i>Quercus imbricaria</i>	NDH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	69
laurel oak	<i>Quercus laurifolia</i>	NDH	Medium	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	70
blackjack oak	<i>Quercus marilandica</i>	NSL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			3	71
chinkapin oak	<i>Quercus muehlenbergii</i>	NSL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	72
pin oak	<i>Quercus palustris</i>	NSH	Low	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat		Migrate +	3	73
Shumard oak	<i>Quercus shumardii</i>	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			3	74
post oak	<i>Quercus stellata</i>	WDH	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate ++	Migrate ++	3	75
bluejack oak	<i>Quercus incana</i>	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	76
sassafras	<i>Sassafras albidum</i>	WSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	77
winged elm	<i>Ulmus alata</i>	WDL	Medium	0	0	0	Unknown	New Habitat	Medium	Absent	Unknown	New Habitat			3	78

