

	sq. km	sq. mi	FIA Plots
Area of Region	7,151.9	2,761.3	146

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	18	Increase	18	18	Very Good	10	11	Likely	1	1
Hickory	2			Medium	23	34	No Change	5	4	Good	8	7	Infill	23	22
Maple	4	Abundant	4	Low	22	13	Decrease	21	22	Fair	7	6	Migrate	5	11
Oak	6	Common	24	FIA	7		New	16	16	Poor	8	8		29	34
Pine	4	Rare	23				Unknown	8	8	Very Poor	6	7			
Other	32	Absent	17							FIA Only	4	4			
	51		68		68	65		68	68	Unknown	1	1			
											44	44			

Potential Changes in Climate Variables

Temperature (°F)

	Scenario	2009	2039	2069	2099	
Annual Average	CCSM45	45.1	47.0	50.1	50.0	
	CCSM85	45.1	47.8	50.7	54.1	
	GFDL45	45.1	49.3	50.9	52.2	
	GFDL85	45.1	48.5	52.1	56.9	
	HAD45	45.1	48.3	51.6	53.5	
HAD85	45.1	48.6	52.9	58.5		
Growing Season (May—Sep)	CCSM45	63.8	65.7	68.1	68.3	
	CCSM85	63.8	66.4	68.9	72.8	
	GFDL45	63.8	69.0	70.9	72.9	
	GFDL85	63.8	68.0	72.3	77.8	
	HAD45	63.8	67.0	69.1	71.3	
HAD85	63.8	66.7	70.7	76.1		
Coldest Month Average	CCSM45	16.0	17.5	20.5	20.5	
	CCSM85	16.0	18.5	20.9	23.1	
	GFDL45	16.0	18.8	20.6	21.0	
	GFDL85	16.0	19.8	21.3	23.8	
	HAD45	16.0	17.4	21.4	21.7	
HAD85	16.0	20.2	23.7	27.6		
Warmest Month Average	CCSM45	70.1	72.5	73.8	74.2	
	CCSM85	70.1	73.3	75.1	77.0	
	GFDL45	70.1	73.7	75.4	76.9	
	GFDL85	70.1	74.7	77.0	80.1	
	HAD45	70.1	73.3	74.4	76.0	
HAD85	70.1	73.8	76.0	79.7		

Precipitation (in)

	Scenario	2009	2039	2069	2099	
Annual Total	CCSM45	30.6	30.4	30.1	30.9	
	CCSM85	30.6	31.1	31.2	31.8	
	GFDL45	30.6	32.8	35.5	34.7	
	GFDL85	30.6	33.9	36.7	36.8	
	HAD45	30.6	31.0	32.7	33.0	
HAD85	30.6	32.3	32.6	34.6		
Growing Season (May—Sep)	CCSM45	17.2	17.0	16.4	17.3	
	CCSM85	17.2	17.4	17.2	16.5	
	GFDL45	17.2	17.8	19.3	18.5	
	GFDL85	17.2	18.9	19.0	18.5	
	HAD45	17.2	16.5	15.8	16.3	
HAD85	17.2	17.1	14.9	15.4		

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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EcoMap 2007
Climate Change Atlas Tree Species

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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
green ash	Fraxinus pennsylvanica	WSH	Low	77.9	1708.0	15.0	Sm. dec.	Sm. dec.	Medium	Abundant	Fair	Fair			0	1
red maple	Acer rubrum	WDH	High	51.4	693.7	9.0	Sm. dec.	Sm. dec.	High	Abundant	Good	Good			1	2
northern white-cedar	Thuja occidentalis	WSH	High	40.2	688.0	10.2	Lg. dec.	Lg. dec.	Medium	Abundant	Fair	Fair	Infill +	Infill +	0	3
American elm	Ulmus americana	WDH	Medium	75.9	503.9	5.2	Sm. inc.	Sm. inc.	Medium	Abundant	Very Good	Very Good			1	4
white ash	Fraxinus americana	WDL	Medium	51.2	477.3	7.3	No change	No change	Low	Common	Poor	Poor			0	5
quaking aspen	Populus tremuloides	WDH	High	34.6	438.8	8.0	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor	Infill +	Infill +	0	6
black ash	Fraxinus nigra	WSH	Medium	50.1	433.2	5.0	Lg. dec.	Lg. dec.	Low	Common	Very Poor	Very Poor			0	7
silver maple	Acer saccharinum	NSH	Low	28	415.8	10.7	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good	Infill ++	Infill ++	1	8
eastern white pine	Pinus strobus	WDH	High	25.8	408.7	9.9	Sm. dec.	Lg. dec.	Low	Common	Poor	Very Poor	Infill +		0	9
American basswood	Tilia americana	WSL	Medium	49.9	384.8	6.1	No change	Sm. dec.	Medium	Common	Fair	Poor			1	10
sugar maple	Acer saccharum	WDH	High	35.4	370.8	6.6	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good	Infill ++	Infill ++	1	11
boxelder	Acer negundo	WSH	Low	36.5	215.5	6.0	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good	Infill ++	Infill ++	1	12
northern red oak	Quercus rubra	WDH	Medium	33.6	198.2	5.1	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good	Infill ++	Infill ++	1	13
black willow	Salix nigra	NSH	Low	19.3	191.0	8.0	Lg. dec.	Lg. dec.	Low	Common	Very Poor	Very Poor			0	14
tamarack (native)	Larix laricina	NSH	High	19.2	153.6	7.6	Lg. dec.	Lg. dec.	Low	Common	Very Poor	Very Poor			0	15
American beech	Fagus grandifolia	WDH	High	17.1	152.5	7.5	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor	Infill +	Infill +	2	16
paper birch	Betula papyrifera	WDH	High	39.9	151.1	3.3	No change	No change	Medium	Common	Fair	Fair	Infill +	Infill +	1	17
eastern cottonwood	Populus deltoides	NSH	Low	13.7	140.9	5.8	Sm. inc.	Lg. inc.	Medium	Common	Good	Very Good	Infill ++	Infill ++	1	18
bur oak	Quercus macrocarpa	NDH	Medium	28.9	133.1	5.3	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good	Infill ++	Infill ++	2	19
black cherry	Prunus serotina	WDL	Medium	36	123.5	2.9	Lg. inc.	Lg. inc.	Low	Common	Good	Good			1	20
red pine	Pinus resinosa	NSH	Medium	13.4	97.8	5.7	Sm. dec.	Sm. dec.	Low	Common	Poor	Poor	Infill +	Infill +	2	21
yellow birch	Betula alleghaniensis	NDL	High	29	95.4	2.2	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor	Infill +	Infill +	0	22
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	26.2	83.1	2.4	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good	Infill ++	Infill ++	1	23
bitternut hickory	Carya cordiformis	WSL	Low	15.2	77.9	3.5	Sm. inc.	Lg. inc.	High	Common	Very Good	Very Good	Infill ++	Infill ++	1	24
bigtooth aspen	Populus grandidentata	NSL	Medium	10.6	67.6	3.3	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor	Infill +	Infill +	0	25
swamp white oak	Quercus bicolor	NSL	Low	14.5	61.9	3.5	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good	Infill ++	Infill ++	1	26
white spruce	Picea glauca	NSL	Medium	9.1	60.7	4.2	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor	Infill +	Infill +	0	27
white oak	Quercus alba	WDH	Medium	20.5	58.5	2.5	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good	Infill ++	Infill ++	2	28
slippery elm	Ulmus rubra	WSL	Low	14.8	49.0	1.4	Sm. inc.	Sm. inc.	Medium	Rare	Fair	Fair	Infill +	Infill +	1	29
eastern hemlock	Tsuga canadensis	NSH	High	16.1	36.4	1.8	Very Lg. dec.	Very Lg. dec.	Low	Rare	Lost	Lost			0	30
northern pin oak	Quercus ellipsoidalis	NSH	Medium	6.8	36.1	1.5	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	2	31
hackberry	Celtis occidentalis	WDH	Medium	3.8	35.6	7.4	Sm. inc.	Sm. inc.	High	Rare	Good	Good			2	32
balsam fir	Abies balsamea	NDH	High	4.4	33.6	1.5	Sm. dec.	Sm. dec.	Low	Rare	Very Poor	Very Poor			0	33
Scots pine	Pinus sylvestris	NSH	FIA	2.5	27.1	3.5	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	34
honeylocust	Gleditsia triacanthos	NSH	Low	1.2	27.1	16.4	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	2	35
chokecherry	Prunus virginiana	NSLX	FIA	6.1	23.4	1.4	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	36
shagbark hickory	Carya ovata	WSL	Medium	18.9	23.4	6.3	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	2	37
Norway spruce	Picea abies	NSH	FIA	1.4	17.1	12.2	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	38
balsam poplar	Populus balsamifera	NSH	Medium	5.7	16.7	2.1	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	39
peachleaf willow	Salix amygdaloides	NSLX	FIA	2.3	12.0	1.6	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	40
Siberian elm	Ulmus pumila	NDH	FIA	1.1	11.2	6.1	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	41
eastern redcedar	Juniperus virginiana	WDH	Medium	5	10.1	25.8	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	42
American hornbeam; muscle	Carpinus caroliniana	WSL	Low	13.3	6.0	0.7	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	43
black oak	Quercus velutina	WDH	High	0.4	5.0	1.0	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	44
jack pine	Pinus banksiana	NSH	Medium	0.4	3.4	0.6	Very Lg. dec.	Very Lg. dec.	High	Rare	Lost	Lost			0	45
black walnut	Juglans nigra	WDH	Low	0.5	3.2	0.9	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	46
butternut	Juglans cinerea	NSLX	FIA	1.2	2.1	1.3	Unknown	Unknown	Low	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			
serviceberry	Amelanchier spp.	NSL	Low	5.6	1.7	0.3	Very Lg. dec.	Very Lg. dec.	Medium	Rare	Lost	Lost				0	48		
black spruce	Picea mariana	NSH	High	1	1.2	0.1	Very Lg. dec.	Very Lg. dec.	Medium	Rare	Lost	Lost					0	49	
pin cherry	Prunus pensylvanica	NSL	Low	0.6	0.7	0.2	Very Lg. dec.	Very Lg. dec.	Medium	Rare	Lost	Lost					0	50	
rock elm	Ulmus thomasii	NSLX	FIA	5.4	0.5	1.4	Unknown	Unknown	Low	Rare	FIA Only	FIA Only					0	51	
Ohio buckeye	Aesculus glabra	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +				3	52	
pignut hickory	Carya glabra	WDL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +			3	53	
black hickory	Carya texana	NDL	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat						3	54
mockernut hickory	Carya alba	WDL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate +			3	55	
eastern redbud	Cercis canadensis	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat						3	56
yellow-poplar	Liriodendron tulipifera	WDH	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat						3	57
Osage-orange	Maclura pomifera	NDH	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate +			3	58	
red mulberry	Morus rubra	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat						3	59
sycamore	Platanus occidentalis	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +			3	60	
shingle oak	Quercus imbricaria	NDH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat						3	61
blackjack oak	Quercus marilandica	NSL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat						3	62
chinkapin oak	Quercus muehlenbergii	NSL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat						3	63
pin oak	Quercus palustris	NSH	Low	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat						3	64
post oak	Quercus stellata	WDH	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat						3	65
black locust	Robinia pseudoacacia	NDH	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Likely +	Likely +			3	66	
sassafras	Sassafras albidum	WSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat						3	67
American mountain-ash	Sorbus americana	NSL	Low	0	0	0	Unknown	Unknown	Low	Absent	Unknown	Unknown						0	68

