

	sq. km	sq. mi	FIA Plots
Area of Region	30,449	11,756	1,087

**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	4			23	26	Increase	26	35	Very Good	11	13	Likely	1	1
Hickory	6			32	58	No Change	12	7	Good	18	24	Infill	6	8
Maple	6	Abundant	6	40	16	Decrease	39	35	Fair	13	9	Migrate	2	8
Oak	17	Common	33	FIA	9	New	13	14	Poor	12	11		9	17
Pine	5	Rare	47			Unknown	14	13	Very Poor	23	20			
Other	48	Absent	16				<b>104</b>	<b>104</b>	FIA Only	6	6			
	<b>86</b>		<b>102</b>						Unknown	5	4			
										<b>88</b>	<b>87</b>			

**Potential Changes in Climate Variables**

**Temperature (°F)**

	Scenario	2009	2039	2069	2099	
Annual Average	CCSM45	55.4	57.3	59.6	59.8	
	CCSM85	55.4	57.7	60.2	63.2	
	GFDL45	55.4	58.1	60.7	61.5	
	GFDL85	55.4	58.4	61.8	65.4	
	HAD45	55.4	57.8	61.1	62.4	
	HAD85	55.4	58.3	62.7	66.8	
Growing Season (May—Sep)	CCSM45	70.2	72.0	74.1	74.7	
	CCSM85	70.2	72.4	75.1	79.0	
	GFDL45	70.2	73.3	76.5	77.8	
	GFDL85	70.2	73.8	78.0	82.0	
	HAD45	70.2	73.4	76.5	78.2	
	HAD85	70.2	73.7	80.0	83.8	
Coldest Month Average	CCSM45	32.7	34.6	35.8	36.1	
	CCSM85	32.7	35.5	36.4	37.9	
	GFDL45	32.7	36.5	36.5	37.0	
	GFDL85	32.7	34.7	35.8	36.5	
	HAD45	32.7	32.9	35.1	35.4	
	HAD85	32.7	34.2	35.8	37.6	
Warmest Month Average	CCSM45	75.3	77.2	78.5	78.7	
	CCSM85	75.3	77.6	79.3	81.1	
	GFDL45	75.3	78.7	80.6	81.4	
	GFDL85	75.3	79.2	82.0	84.2	
	HAD45	75.3	79.3	81.9	82.8	
	HAD85	75.3	80.6	85.2	87.1	

**Precipitation (in)**

	Scenario	2009	2039	2069	2099	
Annual Total	CCSM45	50.4	53.0	57.0	56.0	
	CCSM85	50.4	56.4	57.5	61.6	
	GFDL45	50.4	56.2	57.8	61.9	
	GFDL85	50.4	55.3	59.2	62.0	
	HAD45	50.4	49.6	52.8	53.2	
	HAD85	50.4	51.3	48.1	51.7	
Growing Season (May—Sep)	CCSM45	21.9	22.5	23.8	23.4	
	CCSM85	21.9	23.7	22.4	24.1	
	GFDL45	21.9	24.9	24.4	25.6	
	GFDL85	21.9	23.9	24.8	25.5	
	HAD45	21.9	21.8	20.7	21.1	
	HAD85	21.9	22.1	17.9	19.3	

**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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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
red maple	Acer rubrum	WDH	High	96.7	1238.7	9.2	Sm. dec.	Lg. dec.	High	Abundant	Good	Good			1	1
white oak	Quercus alba	WDH	Medium	91.5	1229.0	10.0	No change	Sm. dec.	High	Abundant	Very Good	Good			1	2
yellow-poplar	Liriodendron tulipifera	WDH	High	89.7	1147.9	8.9	Lg. dec.	Lg. dec.	High	Abundant	Good	Good			1	3
chestnut oak	Quercus prinus	NDH	High	76.3	879.1	7.8	Sm. dec.	Sm. dec.	High	Abundant	Good	Good			1	4
Virginia pine	Pinus virginiana	NDH	High	64.1	642.9	7.3	Sm. dec.	Sm. dec.	Medium	Abundant	Fair	Fair			0	5
sugar maple	Acer saccharum	WDH	High	65.6	501.4	4.6	Sm. dec.	Lg. dec.	High	Abundant	Good	Good			1	6
scarlet oak	Quercus coccinea	WDL	Medium	70.5	464.6	4.7	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	7
sourwood	Oxydendrum arboreum	NDL	High	90.6	422.3	3.4	Sm. dec.	Lg. dec.	High	Common	Fair	Fair			1	8
American beech	Fagus grandifolia	WDH	High	59.2	392.6	4.8	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor			0	9
pignut hickory	Carya glabra	WDL	Medium	79.3	390.4	3.5	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor			0	10
black oak	Quercus velutina	WDH	High	71.2	372.6	3.7	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	11
blackgum	Nyssa sylvatica	WDL	Medium	87.2	350.5	2.8	No change	Sm. inc.	High	Common	Good	Very Good			1	12
mockernut hickory	Carya alba	WDL	Medium	65.4	287.1	3.1	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	13
loblolly pine	Pinus taeda	WDH	High	10.7	245.8	16.6	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good	Infill ++	Infill ++	1	14
northern red oak	Quercus rubra	WDH	Medium	55.4	226.6	2.7	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	15
shortleaf pine	Pinus echinata	WDH	High	45.1	219.2	3.4	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	16
eastern hemlock	Tsuga canadensis	NSH	High	31.4	195.6	5.1	Lg. dec.	Lg. dec.	Low	Common	Very Poor	Very Poor			0	17
sassafras	Sassafras albidum	WSL	Low	59.4	162.5	1.9	Sm. dec.	No change	Medium	Common	Poor	Fair			1	18
sweetgum	Liquidambar styraciflua	WDH	High	21.3	148.0	4.1	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	19
eastern white pine	Pinus strobus	WDH	High	21.9	146.6	5.3	Lg. dec.	Lg. dec.	Low	Common	Very Poor	Very Poor			0	20
shagbark hickory	Carya ovata	WSL	Medium	42.3	136.9	2.1	No change	Sm. dec.	Medium	Common	Fair	Poor			1	21
white ash	Fraxinus americana	WDL	Medium	38.5	134.1	2.0	Sm. inc.	Sm. inc.	Low	Common	Fair	Fair			1	22
black cherry	Prunus serotina	WDL	Medium	37.3	128.8	2.2	Lg. inc.	Lg. inc.	Low	Common	Good	Good			1	23
black locust	Robinia pseudoacacia	NDH	Low	33.6	126.2	2.4	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	24
flowering dogwood	Cornus florida	WDL	Medium	68.2	125.8	1.3	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	25
eastern redcedar	Juniperus virginiana	WDH	Medium	19.1	117.4	2.7	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	26
southern red oak	Quercus falcata	WDL	Medium	24.9	113.0	3.3	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	27
pitch pine	Pinus rigida	NSH	High	19.1	101.7	4.3	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	28
sycamore	Platanus occidentalis	NSL	Low	19.4	101.1	3.8	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	29
post oak	Quercus stellata	WDH	High	24.6	96.5	2.9	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	30
green ash	Fraxinus pennsylvanica	WSH	Low	24.2	88.7	2.0	Sm. inc.	Lg. inc.	Medium	Common	Good	Very Good			1	31
American basswood	Tilia americana	WSL	Medium	23.7	83.7	2.5	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	32
sweet birch	Betula lenta	NDH	High	27.2	78.0	2.1	Lg. dec.	Lg. dec.	Low	Common	Very Poor	Very Poor			0	33
eastern redbud	Cercis canadensis	NSL	Low	36.8	76.0	1.4	No change	No change	Medium	Common	Fair	Fair			1	34
chinkapin oak	Quercus muehlenbergii	NSL	Medium	15.3	63.9	2.5	No change	Sm. dec.	Medium	Common	Fair	Poor			1	35
bitternut hickory	Carya cordiformis	WSL	Low	23.4	60.4	1.5	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	36
black walnut	Juglans nigra	WDH	Low	20.7	57.1	1.8	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	37
American hornbeam; muscle	Carpinus caroliniana	WSL	Low	26	53.0	1.5	Sm. inc.	Lg. inc.	Medium	Common	Good	Very Good			1	38
slippery elm	Ulmus rubra	WSL	Low	25	51.0	1.2	No change	Sm. inc.	Medium	Common	Fair	Good			1	39
American elm	Ulmus americana	WDH	Medium	18.3	47.1	1.6	Sm. inc.	Lg. inc.	Medium	Rare	Fair	Good			1	40
yellow buckeye	Aesculus flava	NSL	Low	15.7	42.6	1.3	Lg. dec.	Lg. dec.	Low	Rare	Very Poor	Very Poor			0	41
cucumber tree	Magnolia acuminata	NSL	Low	21.4	42.0	1.3	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	42
boxelder	Acer negundo	WSH	Low	4.1	32.2	3.1	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	1	43
winged elm	Ulmus alata	WDL	Medium	13.3	24.8	1.0	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			1	44
serviceberry	Amelanchier spp.	NSL	Low	20.4	21.9	0.8	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	45
paulownia	Paulownia tomentosa	NSL	FIA	3.2	20.6	5.4	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	46
shellbark hickory	Carya laciniosa	NSL	Low	8.5	19.3	1.2	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	47

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EcoMap 2007

Climate Change Atlas Tree Species

USDA Forest Service  
Northern Research Station  
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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
river birch	Betula nigra	NSL	Low	5.3	18.1	3.1	Sm. dec.	No change	Medium	Rare	Very Poor	Poor		Infill +	1	48
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	14.8	17.2	0.8	Lg. inc.	Lg. inc.	High	Rare	Good	Good			1	49
silver maple	Acer saccharinum	NSH	Low	1.5	17.0	9.0	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor		Infill +	2	50
red mulberry	Morus rubra	NSL	Low	10.3	15.6	0.9	Lg. dec.	Sm. inc.	Medium	Rare	Very Poor	Fair			1	51
American holly	Ilex opaca	NSL	Medium	10.8	15.4	1.3	Lg. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	52
ailanthus	Ailanthus altissima	NSL	FIA	5.8	14.6	1.3	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	53
bigleaf magnolia	Magnolia macrophylla	NSL	Low	10.1	13.9	1.2	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	54
hackberry	Celtis occidentalis	WDH	Medium	4	12.9	1.5	No change	Sm. inc.	High	Rare	Fair	Good	Infill +	Infill ++	1	55
common persimmon	Diospyros virginiana	NSL	Low	5.3	12.2	1.0	No change	Lg. inc.	High	Rare	Fair	Good			1	56
blackjack oak	Quercus marilandica	NSL	Medium	3.1	8.9	0.9	Lg. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	2	57
butternut	Juglans cinerea	NSLX	FIA	2.9	6.7	1.7	Unknown	Unknown	Low	Rare	FIA Only	FIA Only			0	58
sand hickory	Carya pallida	NSL	FIA	3.5	6.4	1.7	Unknown	Unknown	NA	Rare	FIA Only	FIA Only			0	59
black willow	Salix nigra	NSH	Low	1.9	6.0	2.3	Sm. dec.	Lg. inc.	Low	Rare	Very Poor	Fair		Infill +	2	60
pawpaw	Asimina triloba	NSL	Low	6.2	5.3	0.6	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	61
Shumard oak	Quercus shumardii	NSL	Low	0.9	4.8	4.6	Sm. dec.	No change	High	Rare	Poor	Fair		Infill +	2	62
mountain or Fraser magnolia	Magnolia fraseri	NSL	Low	3.6	4.7	1.0	Sm. dec.	Sm. dec.	Low	Rare	Very Poor	Very Poor			0	63
sugarberry	Celtis laevigata	NDH	Medium	0.1	4.6	2.4	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	64
water tupelo	Nyssa aquatica	NSH	Medium	0.1	4.6	5.4	Sm. dec.	Sm. dec.	Low	Rare	Very Poor	Very Poor			0	65
yellow birch	Betula alleghaniensis	NDL	High	1.3	3.2	0.5	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	66
bigtooth aspen	Populus grandidentata	NSL	Medium	2.2	3.1	0.8	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	67
Ohio buckeye	Aesculus glabra	NSL	Low	2.2	2.8	0.9	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	68
water oak	Quercus nigra	WDH	High	0.8	2.2	1.0	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	69
blue ash	Fraxinus quadrangulata	NSL	Low	0.1	2.0	0.2	Sm. dec.	Sm. dec.	Low	Rare	Very Poor	Very Poor			0	70
pin oak	Quercus palustris	NSH	Low	1	1.7	1.7	Sm. dec.	No change	Low	Rare	Very Poor	Very Poor			2	71
bur oak	Quercus macrocarpa	NDH	Medium	0.3	1.6	4.9	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor			0	72
black maple	Acer nigrum	NSH	Low	0.3	1.5	4.6	Lg. dec.	Lg. dec.	High	Rare	Poor	Poor			0	73
American chestnut	Castanea dentata	NSLX	FIA	2	1.3	0.5	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	74
shingle oak	Quercus imbricaria	NDH	Medium	0.3	1.2	3.7	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	75
striped maple	Acer pensylvanicum	NSL	Medium	1.3	1.0	0.4	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	76
willow oak	Quercus phellos	NSL	Low	0.2	0.7	0.4	No change	Lg. inc.	Medium	Rare	Poor	Good	Infill +		2	77
Siberian elm	Ulmus pumila	NDH	FIA	0.3	0.5	1.4	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	78
honeylocust	Gleditsia triacanthos	NSH	Low	0.7	0.4	0.3	Lg. inc.	Lg. inc.	High	Rare	Good	Good			2	79
cherrybark oak; swamp red o.	Quercus pagoda	NSL	Medium	0.1	0.4	0.2	No change	Lg. inc.	Medium	Rare	Poor	Good			2	80
Osage-orange	Maclura pomifera	NDH	Medium	0.6	0.4	0.6	No change	Lg. inc.	High	Rare	Fair	Good	Infill +		2	81
laurel oak	Quercus laurifolia	NDH	Medium	0.1	0.3	0.4	Sm. inc.	Lg. inc.	Medium	Rare	Fair	Good			2	82
wild plum	Prunus americana	NSLX	FIA	0.3	0.2	0.7	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	83
rock elm	Ulmus thomasii	NSLX	FIA	0.1	0.2	0.1	Unknown	Unknown	Low	Rare	FIA Only	FIA Only			0	84
Kentucky coffeetree	Gymnocladus dioicus	NSLX	FIA	0.3	0.2	0.5	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	85
black ash	Fraxinus nigra	WSH	Medium	0	0.2	0.1	Sm. dec.	No change	Low	Rare	Very Poor	Very Poor			0	86
ashe juniper	Juniperus ashei	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	87
slash pine	Pinus elliotii	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate ++	3	88
longleaf pine	Pinus palustris	NSH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	89
northern white-cedar	Thuja occidentalis	WSH	High	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	90
florida maple	Acer barbatum	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Likely +	Likely +	3	91
mountain maple	Acer spicatum	NSL	Low	0	0	0	Unknown	New Habitat	High	Absent	Unknown	New Habitat			3	92
cittamwood/gum bumelia	Sideroxylon lanuginosum ssp.	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate ++	3	93
pecan	Carya illinoensis	NSH	Low	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat		Migrate +	3	94



# Section 221H

## EcoMap 2007

### Climate Change Atlas Tree Species

#### Current and Potential Future Habitat, Capability, and Migration

USDA Forest Service  
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Iverson, Peters, Prasad, Matthews

Common Name	Scientific Name	Range	MR	%Cell	FIAsum	FIAiv	ChngCl45	ChngCl85	Adap	Abund	Capabil45	Capabil85	SHIFT45	SHIFT85	SSO	N
black hickory	<i>Carya texana</i>	NDL	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	95
silverbell	<i>Halesia spp.</i>	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	96
southern magnolia	<i>Magnolia grandiflora</i>	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	97
sweetbay	<i>Magnolia virginiana</i>	NSL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	98
pin cherry	<i>Prunus pensylvanica</i>	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	99
swamp white oak	<i>Quercus bicolor</i>	NSL	Low	0	0	0	Unknown	Unknown	Medium	Modeled	Unknown	Unknown			0	100
swamp chestnut oak	<i>Quercus michauxii</i>	NSL	Low	0	0	0	Unknown	Unknown	Medium	Modeled	Unknown	Unknown			0	101
live oak	<i>Quercus virginiana</i>	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	102
bluejack oak	<i>Quercus incana</i>	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	103
cedar elm	<i>Ulmus crassifolia</i>	NDH	Medium	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat			3	104