

	sq. km	sq. mi	FIA Plots
Area of Region	28,586	11,037	971

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	4			High	23	27	Increase	29	34	Very Good	10	12	Likely	1	2
Hickory	7			Medium	30	55	No Change	19	15	Good	20	21	Infill	12	16
Maple	7	Abundant	6	Low	42	18	Decrease	24	23	Fair	15	13	Migrate	3	9
Oak	11	Common	29	FIA	11		New	15	17	Poor	12	14		16	27
Pine	6	Rare	48				Unknown	19	17	Very Poor	13	10			
Other	48	Absent	22							FIA Only	6	6			
	83		105		106	100		106	106	Unknown	8	6			
											84	82			

Potential Changes in Climate Variables

Temperature (°F)

	Scenario	2009	2039	2069	2099	
Annual Average	CCSM45	53.8	55.7	58.0	58.2	
	CCSM85	53.8	56.2	58.6	61.6	
	GFDL45	53.8	56.5	59.3	60.1	
	GFDL85	53.8	57.0	60.4	64.2	
	HAD45	53.8	56.3	59.6	60.9	
	HAD85	53.8	56.7	61.0	65.2	
Growing Season (May—Sep)	CCSM45	68.5	70.4	72.6	73.1	
	CCSM85	68.5	70.8	73.4	77.4	
	GFDL45	68.5	71.7	75.1	76.4	
	GFDL85	68.5	72.4	76.6	80.8	
	HAD45	68.5	71.6	74.9	76.5	
	HAD85	68.5	71.9	77.8	82.1	
Coldest Month (Average)	CCSM45	31.3	33.2	34.5	34.8	
	CCSM85	31.3	34.1	35.0	36.4	
	GFDL45	31.3	35.0	35.2	35.8	
	GFDL85	31.3	33.6	34.6	35.6	
	HAD45	31.3	31.8	33.9	34.2	
	HAD85	31.3	32.6	34.2	35.9	
Warmest Month (Average)	CCSM45	73.5	75.7	76.9	77.2	
	CCSM85	73.5	75.9	77.6	79.4	
	GFDL45	73.5	77.2	79.1	80.0	
	GFDL85	73.5	78.3	81.0	83.3	
	HAD45	73.5	77.4	79.8	80.8	
	HAD85	73.5	78.6	82.6	85.1	

Precipitation (in)

	Scenario	2009	2039	2069	2099	
Annual Total	CCSM45	48.1	51.0	53.7	53.8	
	CCSM85	48.1	53.3	54.4	58.8	
	GFDL45	48.1	52.8	53.9	57.5	
	GFDL85	48.1	51.1	55.6	57.3	
	HAD45	48.1	48.3	49.8	49.8	
	HAD85	48.1	49.5	46.9	49.2	
Growing Season (May—Sep)	CCSM45	22.3	24.0	24.9	24.7	
	CCSM85	22.3	24.7	23.7	25.8	
	GFDL45	22.3	24.6	24.1	25.5	
	GFDL85	22.3	23.1	24.3	24.8	
	HAD45	22.3	22.8	21.3	21.7	
	HAD85	22.3	22.8	20.1	21.0	

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 M221C

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
yellow-poplar	Liriodendron tulipifera	WDH	High	95.6	1681.3	12.5	Sm. dec.	Lg. dec.	High	Abundant	Good	Good			1	1
red maple	Acer rubrum	WDH	High	94	1338.9	9.5	Sm. dec.	Sm. dec.	High	Abundant	Good	Good			1	2
chestnut oak	Quercus prinus	NDH	High	78.1	907.8	8.1	No change	No change	High	Abundant	Very Good	Very Good			1	3
sugar maple	Acer saccharum	WDH	High	87.2	779.2	6.3	Sm. dec.	Sm. dec.	High	Abundant	Good	Good			1	4
white oak	Quercus alba	WDH	Medium	73.9	662.2	5.7	Sm. inc.	Sm. inc.	High	Abundant	Very Good	Very Good			1	5
American beech	Fagus grandifolia	WDH	High	78.6	615.7	5.3	No change	Sm. dec.	Medium	Abundant	Good	Fair			1	6
northern red oak	Quercus rubra	WDH	Medium	72.9	446.7	4.2	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	7
black locust	Robinia pseudoacacia	NDH	Low	71.5	436.0	4.7	No change	No change	Medium	Common	Fair	Fair			1	8
scarlet oak	Quercus coccinea	WDL	Medium	56	320.8	3.7	No change	No change	Medium	Common	Fair	Fair			1	9
pignut hickory	Carya glabra	WDL	Medium	66.3	320.6	3.1	Sm. inc.	No change	Medium	Common	Good	Fair			1	10
black oak	Quercus velutina	WDH	High	63	318.9	3.4	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	11
sourwood	Oxydendrum arboreum	NDL	High	77.9	304.1	2.6	No change	Sm. dec.	High	Common	Good	Fair			1	12
sweet birch	Betula lenta	NDH	High	65.5	296.3	3.2	Sm. dec.	Sm. dec.	Low	Common	Poor	Poor			0	13
eastern hemlock	Tsuga canadensis	NSH	High	41.1	261.0	4.9	No change	No change	Low	Common	Poor	Poor			0	14
American basswood	Tilia americana	WSL	Medium	50.8	254.3	3.8	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor			0	15
sassafras	Sassafras albidum	WSL	Low	60.2	227.1	2.5	No change	No change	Medium	Common	Fair	Fair			1	16
mockernut hickory	Carya alba	WDL	Medium	53.1	214.4	2.6	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	17
Virginia pine	Pinus virginiana	NDH	High	24.3	212.3	4.6	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	18
blackgum	Nyssa sylvatica	WDL	Medium	67.2	211.6	2.2	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	19
white ash	Fraxinus americana	WDL	Medium	51.4	202.4	2.6	Sm. inc.	Sm. inc.	Low	Common	Fair	Fair			1	20
black cherry	Prunus serotina	WDL	Medium	34.2	201.2	3.4	Sm. inc.	Sm. inc.	Low	Common	Fair	Fair			1	21
sycamore	Platanus occidentalis	NSL	Low	26.8	166.1	5.1	Sm. inc.	Lg. inc.	Medium	Common	Good	Very Good			1	22
cucumber tree	Magnolia acuminata	NSL	Low	52.4	155.6	2.2	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor			0	23
yellow buckeye	Aesculus flava	NSL	Low	25.3	115.8	3.2	Lg. dec.	Lg. dec.	Low	Common	Very Poor	Very Poor			0	24
eastern white pine	Pinus strobus	WDH	High	11.2	104.0	5.9	Lg. inc.	Lg. inc.	Low	Common	Good	Good			1	25
shagbark hickory	Carya ovata	WSL	Medium	36.5	85.6	1.5	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	26
sweetgum	Liquidambar styraciflua	WDH	High	11.3	83.9	4.0	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good	Infill ++	Infill ++	1	27
flowering dogwood	Cornus florida	WDL	Medium	38.9	81.2	1.1	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	28
bitternut hickory	Carya cordiformis	WSL	Low	31.7	75.3	1.6	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	29
American elm	Ulmus americana	WDH	Medium	22.1	74.6	2.2	No change	Lg. inc.	Medium	Common	Fair	Very Good			1	30
eastern redbud	Cercis canadensis	NSL	Low	28.3	66.1	1.7	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	31
ailanthus	Ailanthus altissima	NSL	FIA	16.8	61.8	2.9	Unknown	Unknown	NA	Common	NNIS	NNIS			0	32
yellow birch	Betula alleghaniensis	NDL	High	11.9	54.8	3.1	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	33
mountain or Fraser magnolia	Magnolia fraseri	NSL	Low	18.8	52.9	2.0	Sm. dec.	Sm. dec.	Low	Common	Poor	Poor			0	34
pitch pine	Pinus rigida	NSH	High	11.9	51.1	2.5	No change	No change	Medium	Common	Fair	Fair			1	35
eastern redcedar	Juniperus virginiana	WDH	Medium	4.1	50.0	2.6	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	1	36
shortleaf pine	Pinus echinata	WDH	High	9.1	49.6	2.2	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	1	37
black walnut	Juglans nigra	WDH	Low	15.3	47.6	1.4	Sm. inc.	Lg. inc.	Medium	Rare	Fair	Good			1	38
paulownia	Paulownia tomentosa	NSL	FIA	12.8	40.1	2.7	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	39
American hornbeam; musclev	Carpinus caroliniana	WSL	Low	21	39.8	1.4	Sm. inc.	Lg. inc.	Medium	Rare	Fair	Good			1	40
slippery elm	Ulmus rubra	WSL	Low	21.2	39.6	1.2	No change	Sm. inc.	Medium	Rare	Poor	Fair			1	41
serviceberry	Amelanchier spp.	NSL	Low	24.7	35.9	1.0	Sm. dec.	No change	Medium	Rare	Very Poor	Poor			1	42
boxelder	Acer negundo	WSH	Low	5.9	32.3	3.1	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	1	43
southern red oak	Quercus falcata	WDL	Medium	6.3	27.5	1.4	Lg. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	1	44
chinkapin oak	Quercus muehlenbergii	NSL	Medium	4.3	24.4	1.3	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	1	45
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	16	18.9	0.8	Lg. inc.	Lg. inc.	High	Rare	Good	Good			1	46
river birch	Betula nigra	NSL	Low	2.1	18.3	7.3	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			2	47



Section M221C

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Common Name	Scientific Name	Range	MR	%Cell	FIAsum	FIAiv	ChngCl45	ChngCl85	Adap	Abund	Capabil45	Capabil85	SHIFT45	SHIFT85	SSO	N
striped maple	Acer pensylvanicum	NSL	Medium	9.2	16.3	1.0	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	48
green ash	Fraxinus pennsylvanica	WSH	Low	10.2	15.0	0.8	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	1	49
pawpaw	Asimina triloba	NSL	Low	7.6	14.6	1.0	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	50
black willow	Salix nigra	NSH	Low	2.9	13.8	4.2	No change	Sm. inc.	Low	Rare	Very Poor	Poor		Infill +	2	51
red mulberry	Morus rubra	NSL	Low	5.9	12.8	0.8	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	1	52
common persimmon	Diospyros virginiana	NSL	Low	2.8	11.7	0.8	No change	Lg. inc.	High	Rare	Fair	Good	Infill +	Infill ++	1	53
loblolly pine	Pinus taeda	WDH	High	1.6	10.1	4.3	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	54
American chestnut	Castanea dentata	NSLX	FIA	3.9	9.5	1.8	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	55
post oak	Quercus stellata	WDH	High	4.5	7.7	1.1	Lg. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	2	56
pin cherry	Prunus pennsylvanica	NSL	Low	1.9	7.1	1.1	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	57
bigleaf magnolia	Magnolia macrophylla	NSL	Low	4.5	6.4	1.0	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	58
butternut	Juglans cinerea	NSLX	FIA	3.6	5.7	1.3	Unknown	Unknown	Low	Rare	FIA Only	FIA Only			0	59
black maple	Acer nigrum	NSH	Low	1.7	4.6	2.6	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor			0	60
bigtooth aspen	Populus grandidentata	NSL	Medium	1.4	3.8	2.7	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	61
Norway spruce	Picea abies	NSH	FIA	0.1	3.7	3.6	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	62
winged elm	Ulmus alata	WDL	Medium	2.6	3.6	0.7	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	2	63
American holly	Ilex opaca	NSL	Medium	3.8	3.4	0.7	Sm. dec.	No change	Medium	Rare	Very Poor	Poor		Infill +	2	64
hackberry	Celtis occidentalis	WDH	Medium	2	3.2	0.9	No change	Lg. inc.	High	Rare	Fair	Good	Infill +		2	65
Ohio buckeye	Aesculus glabra	NSL	Low	1	2.9	2.7	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	66
silver maple	Acer saccharinum	NSH	Low	0.7	2.8	4.0	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor			0	67
shellbark hickory	Carya laciniosa	NSL	Low	1.1	1.8	0.7	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	68
northern catalpa	Catalpa speciosa	NSHX	FIA	0.7	1.7	2.5	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	69
Table Mountain pine	Pinus pungens	NSL	Low	0.1	0.9	0.6	No change	No change	High	Rare	Fair	Fair		Infill +	2	70
willow oak	Quercus phellos	NSL	Low	0.3	0.8	2.4	No change	No change	Medium	Rare	Poor	Poor		Infill +	2	71
sand hickory	Carya pallida	NSL	FIA	0.3	0.8	2.3	Unknown	Unknown	NA	Rare	FIA Only	FIA Only			0	72
rock elm	Ulmus thomasii	NSLX	FIA	0.3	0.8	2.3	Unknown	Unknown	Low	Rare	FIA Only	FIA Only			0	73
Shumard oak	Quercus shumardii	NSL	Low	0.3	0.7	1.9	Sm. inc.	Lg. inc.	High	Rare	Good	Good			2	74
chokecherry	Prunus virginiana	NSLX	FIA	0.5	0.6	0.6	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	75
eastern cottonwood	Populus deltoides	NSH	Low	0.7	0.6	0.8	Very Lg. dec.	Very Lg. dec.	Medium	Rare	Lost	Lost			0	76
honeylocust	Gleditsia triacanthos	NSH	Low	0.7	0.5	0.7	No change	Lg. inc.	High	Rare	Fair	Good			2	77
blackjack oak	Quercus marilandica	NSL	Medium	0.3	0.5	0.3	Lg. inc.	Lg. inc.	High	Rare	Good	Good			2	78
pecan	Carya illinoensis	NSH	Low	0.2	0.3	0.6	Lg. inc.	Lg. inc.	Low	Rare	Fair	Fair		Infill +	2	79
white mulberry	Morus alba	NSL	FIA	0.3	0.3	0.8	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	80
black ash	Fraxinus nigra	WSH	Medium	0.3	0.2	0.7	Lg. dec.	No change	Low	Rare	Very Poor	Very Poor			0	81
blue ash	Fraxinus quadrangulata	NSL	Low	0.3	0.2	0.6	Very Lg. dec.	Very Lg. dec.	Low	Rare	Lost	Lost			0	82
Norway maple	Acer platanoides	NSL	FIA	0.3	0.1	0.3	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	83
Atlantic white-cedar	Chamaecyparis thyoides	NSH	Low	0	0	0	Unknown	Unknown	Low	Absent	Unknown	Unknown			0	84
ashe juniper	Juniperus ashei	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	85
slash pine	Pinus elliottii	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate ++	3	86
longleaf pine	Pinus palustris	NSH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	87
northern white-cedar	Thuja occidentalis	WSH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	88
florida maple	Acer barbatum	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	89
mountain maple	Acer spicatum	NSL	Low	0	0	0	Unknown	Unknown	High	Absent	Unknown	Unknown			0	90
cittamwood/gum bumelia	Sideroxylon lanuginosum ssp.	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			3	91
black hickory	Carya texana	NDL	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	92
sugarberry	Celtis laevigata	NDH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Likely +	Likely +	3	93
silverbell	Halesia spp.	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	94



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Common Name	Scientific Name	Range	MR	%Cell	FIAsum	FIAiv	ChngCl45	ChngCl85	Adap	Abund	Capabil45	Capabil85	SHIFT45	SHIFT85	SSO	N
Osage-orange	Maclura pomifera	NDH	Medium	0	0	0	Unknown	New Habitat	High	Absent	Unknown	New Habitat		Likely +	3	95
southern magnolia	Magnolia grandiflora	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	96
swamp tupelo	Nyssa biflora	NDH	Medium	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat			3	97
redbay	Persea borbonia	NSL	Low	0	0	0	Unknown	Unknown	High	Absent	Unknown	Unknown			0	98
cherrybark oak; swamp red o.	Quercus pagoda	NSL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	99
shingle oak	Quercus imbricaria	NDH	Medium	0	0	0	Unknown	Unknown	Medium	Modeled	Unknown	Unknown			0	100
overcup oak	Quercus lyrata	NSL	Medium	0	0	0	Unknown	New Habitat	Low	Absent	Unknown	New Habitat		Migrate +	3	101
water oak	Quercus nigra	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	102
live oak	Quercus virginiana	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	103
bluejack oak	Quercus incana	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	104
American mountain-ash	Sorbus americana	NSL	Low	0	0	0	Unknown	Unknown	Low	Absent	Unknown	Unknown			0	105
cedar elm	Ulmus crassifolia	NDH	Medium	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat			0	106