

sq. km sq. mi FIA Plots
Area of Region 94,704 36,565 2,800

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	27	RCP45	RCP85	RCP45	RCP85	RCP45	RCP85			
Ash	4			Medium	36	Increase	30	35	Very Good	9	12	Likely	2	2
Hickory	8			Low	38	No Change	24	26	Good	18	18	Infill	22	25
Maple	5	Abundant	3	FIA	6	Decrease	26	19	Fair	10	14	Migrate	0	0
Oak	19	Common	21			New	9	9	Poor	25	22			
Pine	4	Rare	62			Unknown	8	8	Very Poor	18	13			
Other	46	Absent	11							FIA Only	4	4		
										Unknown	2	2		
											86	85		

Potential Changes in Climate Variables

Temperature (°F)

Scenario	2009	2039	2069	2099		
Annual	CCSM45	63.9	65.5	67.3	67.6	
Average	CCSM85	63.9	66.0	68.4	70.9	
	GFDL45	63.9	66.8	68.1	69.4	
	GFDL85	63.9	66.6	69.5	72.9	
	HAD45	63.9	66.2	69.1	70.1	
	HAD85	63.9	66.5	70.7	74.3	
Growing Season	CCSM45	77.8	79.4	80.8	81.3	
	CCSM85	77.8	80.0	82.2	85.5	
May—Sep	GFDL45	77.8	81.4	82.6	85.0	
	GFDL85	77.8	81.4	84.5	88.8	
	HAD45	77.8	80.8	83.5	84.1	
	HAD85	77.8	81.1	86.5	89.6	
Coldest Month	CCSM45	43.0	45.5	46.5	46.5	
	CCSM85	43.0	45.6	46.8	48.2	
Average	GFDL45	43.0	46.8	46.9	46.9	
	GFDL85	43.0	44.1	45.4	45.9	
	HAD45	43.0	43.8	45.6	46.2	
	HAD85	43.0	45.2	46.9	48.7	
Warmest Month	CCSM45	82.9	84.2	84.8	84.9	
	CCSM85	82.9	84.9	85.6	87.3	
Average	GFDL45	82.9	87.6	87.6	89.3	
	GFDL85	82.9	87.1	88.6	91.7	
	HAD45	82.9	86.5	87.9	88.0	
	HAD85	82.9	87.2	90.1	91.1	

Precipitation (in)

Scenario	2009	2039	2069	2099		
Annual	CCSM45	51.1	51.3	55.8	54.5	
Total	CCSM85	51.1	52.5	56.1	56.7	
	GFDL45	51.1	53.9	61.7	54.9	
	GFDL85	51.1	53.6	57.3	57.7	
	HAD45	51.1	50.7	51.9	55.6	
	HAD85	51.1	54.2	47.1	50.9	
Growing Season	CCSM45	19.2	19.7	19.9	19.9	
	CCSM85	19.2	18.7	18.5	18.7	
May—Sep	GFDL45	19.2	21.0	25.1	21.5	
	GFDL85	19.2	21.4	23.1	23.0	
	HAD45	19.2	18.4	18.2	18.6	
	HAD85	19.2	19.3	14.6	15.0	

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-DGP30 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 231E

EcoMap 2007
Climate Change Atlas Tree Species

USDA Forest Service
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
loblolly pine	Pinus taeda	WDH	High	85.8	3668.6	38.9	No change	No change	Medium	Abundant	Good	Good			1	1
sweetgum	Liquidambar styraciflua	WDH	High	87.7	1229.4	12.9	No change	No change	Medium	Abundant	Good	Good			1	2
water oak	Quercus nigra	WDH	High	76.2	512.6	6.0	Lg. inc.	Lg. inc.	Medium	Abundant	Very Good	Very Good			1	3
shortleaf pine	Pinus echinata	WDH	High	53.1	443.0	7.3	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	4
post oak	Quercus stellata	WDH	High	53.9	382.5	6.1	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	5
winged elm	Ulmus alata	WDL	Medium	77.8	380.3	4.3	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	6
southern red oak	Quercus falcata	WDL	Medium	68.5	371.3	4.8	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	7
willow oak	Quercus phellos	NSL	Low	39.2	243.9	5.8	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	8
white oak	Quercus alba	WDH	Medium	50.8	234.1	4.1	No change	Sm. inc.	High	Common	Good	Very Good			1	9
red maple	Acer rubrum	WDH	High	55.2	171.8	2.8	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	10
cherrybark oak; swamp red o.	Quercus pagoda	NSL	Medium	43.5	167.4	3.6	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	11
green ash	Fraxinus pennsylvanica	WSH	Low	34.6	154.0	3.7	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	12
blackgum	Nyssa sylvatica	WDL	Medium	54	151.6	2.5	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	13
eastern redcedar	Juniperus virginiana	WDH	Medium	25.7	137.5	4.5	Sm. inc.	Lg. inc.	Medium	Common	Good	Very Good			1	14
sugarberry	Celtis laevigata	NDH	Medium	24	130.4	5.2	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	15
mockernut hickory	Carya alba	WDL	Medium	40.2	124.5	2.6	Sm. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	16
American hornbeam; musclev	Carpinus caroliniana	WSL	Low	35.5	110.8	2.8	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	17
overcup oak	Quercus lyrata	NSL	Medium	13.4	91.1	6.2	No change	Sm. inc.	Low	Common	Poor	Fair			1	18
American elm	Ulmus americana	WDH	Medium	26.4	82.5	2.9	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	19
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	28.9	68.7	2.1	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	20
bald cypress	Taxodium distichum	NSH	Medium	6.8	64.4	8.8	No change	No change	Medium	Common	Fair	Fair	Infill +	Infill +	1	21
American holly	Ilex opaca	NSL	Medium	29.3	57.4	1.8	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	22
black willow	Salix nigra	NSH	Low	8.2	57.4	5.2	No change	No change	Low	Common	Poor	Poor			0	23
black hickory	Carya texana	NDL	High	21.3	55.5	2.1	Sm. inc.	Lg. inc.	Medium	Common	Good	Very Good			1	24
Osage-orange	Maclura pomifera	NDH	Medium	7	49.0	7.0	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	1	25
flowering dogwood	Cornus florida	WDL	Medium	31.8	46.9	1.3	Sm. inc.	Sm. inc.	Medium	Rare	Fair	Fair			1	26
white ash	Fraxinus americana	WDL	Medium	19.2	46.5	2.0	Sm. inc.	Sm. inc.	Low	Rare	Poor	Poor			1	27
black cherry	Prunus serotina	WDL	Medium	30.9	45.1	1.3	Sm. inc.	Lg. inc.	Low	Rare	Poor	Fair			1	28
common persimmon	Diospyros virginiana	NSL	Low	20.4	43.1	1.9	Sm. dec.	Sm. inc.	High	Rare	Poor	Good			1	29
cedar elm	Ulmus crassifolia	NDH	Medium	6.6	37.1	5.2	Lg. inc.	Lg. inc.	Low	Rare	Fair	Fair	Infill +	Infill +	1	30
honeylocust	Gleditsia triacanthos	NSH	Low	9	35.8	3.4	No change	No change	High	Rare	Fair	Fair			1	31
river birch	Betula nigra	NSL	Low	5.8	34.0	5.7	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	1	32
sassafras	Sassafras albidum	WSL	Low	19.3	33.5	1.6	Sm. inc.	Lg. inc.	Medium	Rare	Fair	Good			1	33
blackjack oak	Quercus marilandica	NSL	Medium	11.1	32.6	2.3	Lg. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	1	34
water hickory	Carya aquatica	NSL	Medium	6.5	31.7	4.4	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	1	35
boxelder	Acer negundo	WSH	Low	6.3	28.8	4.3	Sm. dec.	No change	High	Rare	Poor	Fair	Infill +	Infill +	1	36
American beech	Fagus grandifolia	WDH	High	9.6	26.7	2.5	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	37
black oak	Quercus velutina	WDH	High	10.9	25.6	1.7	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	38
pecan	Carya illinoensis	NSH	Low	5.2	21.8	4.3	No change	Sm. inc.	Low	Rare	Very Poor	Poor		Infill +	1	39
bitternut hickory	Carya cordiformis	WSL	Low	6.4	21.1	2.7	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor	Infill +	Infill +	1	40
eastern cottonwood	Populus deltoides	NSH	Low	1.5	21.1	12.1	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			2	41
water elm	Planera aquatica	NSL	Low	4.4	20.9	5.2	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	1	42
sycamore	Platanus occidentalis	NSL	Low	5.6	19.7	3.4	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			2	43
slippery elm	Ulmus rubra	WSL	Low	9.3	19.6	2.0	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	1	44
swamp chestnut oak	Quercus michauxii	NSL	Low	8.7	18.5	2.1	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	1	45
Shumard oak	Quercus shumardii	NSL	Low	4.8	18.0	2.9	Sm. dec.	No change	High	Rare	Poor	Fair	Infill +	Infill +	2	46
shagbark hickory	Carya ovata	WSL	Medium	6.4	16.9	2.4	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	47



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Nuttall oak	Quercus texana	NSH	Medium	3.3	15.1	4.7	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor			0	48
sweetbay	Magnolia virginiana	NSL	Medium	5.6	12.5	2.1	No change	Sm. inc.	Medium	Rare	Poor	Fair	Infill +	Infill +	1	49
red mulberry	Morus rubra	NSL	Low	9.7	11.9	1.1	Sm. dec.	No change	Medium	Rare	Very Poor	Poor			1	50
pignut hickory	Carya glabra	WDL	Medium	7.2	11.4	1.4	Sm. dec.	No change	Medium	Rare	Very Poor	Poor		Infill +	1	51
florida maple	Acer barbatum	NSL	Low	5.7	11.2	1.7	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor	Infill +	Infill +	1	52
slash pine	Pinus elliottii	NDH	High	1.5	10.5	5.8	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	53
eastern redbud	Cercis canadensis	NSL	Low	5.5	10.3	1.7	Sm. dec.	No change	Medium	Rare	Very Poor	Poor		Infill +	1	54
silver maple	Acer saccharinum	NSH	Low	0.6	8.1	9.9	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor			0	55
black walnut	Juglans nigra	WDH	Low	1.6	7.4	2.6	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	56
cittamwood/gum bumelia	Sideroxylon lanuginosum ssp.	NSL	Low	2.5	7.0	2.2	Lg. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	2	57
bluejack oak	Quercus incana	NSL	Low	2.3	6.8	2.3	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	58
laurel oak	Quercus laurifolia	NDH	Medium	3.3	6.5	1.8	Sm. inc.	Lg. inc.	Medium	Rare	Fair	Good	Infill +	Infill ++	2	59
hackberry	Celtis occidentalis	WDH	Medium	1.4	5.6	2.2	Sm. dec.	No change	High	Rare	Poor	Fair	Infill +	Infill +	2	60
waterlocust	Gleditsia aquatica	NSLX	FIA	1.3	5.5	4.0	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	61
northern red oak	Quercus rubra	WDH	Medium	2.6	4.6	1.1	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor	Infill +	Infill +	2	62
longleaf pine	Pinus palustris	NSH	Medium	0.9	3.9	3.0	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	63
swamp tupelo	Nyssa biflora	NDH	Medium	1	3.8	3.0	No change	No change	Low	Rare	Very Poor	Very Poor			2	64
water tupelo	Nyssa aquatica	NSH	Medium	1.3	3.5	2.3	No change	No change	Low	Rare	Very Poor	Very Poor			2	65
black locust	Robinia pseudoacacia	NDH	Low	1.1	3.5	2.3	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	66
American basswood	Tilia americana	WSL	Medium	1.6	2.6	1.0	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			2	67
bur oak	Quercus macrocarpa	NDH	Medium	0.4	2.3	5.1	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor			0	68
chinkapin oak	Quercus muehlenbergii	NSL	Medium	0.8	1.8	1.9	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	69
wild plum	Prunus americana	NSLX	FIA	1.4	1.8	1.0	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	70
southern magnolia	Magnolia grandiflora	NSL	Low	1	1.3	1.2	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	71
ailanthus	Ailanthus altissima	NSL	FIA	0.2	1.1	5.3	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	72
swamp white oak	Quercus bicolor	NSL	Low	0.3	1.1	3.5	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	73
pin cherry	Prunus pensylvanica	NSL	Low	1	1.1	1.1	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	74
sugar maple	Acer saccharum	WDH	High	0.4	0.7	1.6	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor			0	75
redbay	Persea borbonia	NSL	Low	0.5	0.5	1.0	No change	No change	High	Rare	Fair	Fair			0	76
yellow-poplar	Liriodendron tulipifera	WDH	High	0	0.4	0.4	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	2	77
live oak	Quercus virginiana	NDH	High	0.3	0.2	0.7	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	78
sourwood	Oxydendrum arboreum	NDL	High	0.1	0.2	1.6	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	2	79
serviceberry	Amelanchier spp.	NSL	Low	0.3	0.2	0.2	No change	No change	Medium	Rare	Poor	Poor			0	80
Ohio buckeye	Aesculus glabra	NSL	Low	0.1	0.1	1.3	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	81
pawpaw	Asimina triloba	NSL	Low	0.3	0.1	0.3	Lg. dec.	Very Lg. dec.	Medium	Rare	Very Poor	Lost			0	82
white mulberry	Morus alba	NSL	FIA	0.1	0.1	0.2	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	83
shellbark hickory	Carya laciniosa	NSL	Low	0.1	0.1	0.7	No change	No change	Medium	Rare	Poor	Poor			0	84
Carolina ash	Fraxinus caroliniana	NSL	FIA	0.1	0.0	0.1	Unknown	Unknown	NA	Rare	FIA Only	FIA Only			0	85
Texas ash	Fraxinus texensis	NDH	FIA	0.3	0.0	0.8	Unknown	Unknown	NA	Rare	FIA Only	FIA Only			0	86
Atlantic white-cedar	Chamaecyparis thyoides	NSH	Low	0	0	0	Unknown	Unknown	Low	Absent	Unknown	Unknown			0	87
ashe juniper	Juniperus ashei	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	88
Virginia pine	Pinus virginiana	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	89
striped maple	Acer pensylvanicum	NSL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	90
black ash	Fraxinus nigra	WSH	Medium	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat	Likely +	Likely +	3	91
silverbell	Halesia spp.	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Likely +	Likely +	3	92
cucumbertree	Magnolia acuminata	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	93
bigleaf magnolia	Magnolia macrophylla	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	94



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Common Name	Scientific Name	Range	MR	%Cell	FIAsum	FIaiv	ChngCl45	ChngCl85	Adap	Abund	Capabil45	Capabil85	SHIFT45	SHIFT85	SSO	N
scarlet oak	Quercus coccinea	WDL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	95
turkey oak	Quercus laevis	NSH	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			3	96
chestnut oak	Quercus prinus	NDH	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			3	97