

Current and Potential Future Habitat, Capability, and Migration

	sq. km	sq. mi	FIA Plots
Area of Region	24,088	9,300.4	891

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			16	25	Increase	25	31	Very Good	12	14	Likely	1	1
Hickory	6			38	57	No Change	23	23	Good	12	14	Infill	20	25
Maple	3	Abundant	7	38	12	Decrease	28	22	Fair	10	12	Migrate	0	1
Oak	17	Common	19	5		New	6	9	Poor	21	17			
Pine	7	Rare	55			Unknown	15	12	Very Poor	20	17			
Other	44	Absent	15						FIA Only	5	5			
	81		96	97	94		97	97	Unknown	10	7		21	27
										90	86			

Potential Changes in Climate Variables

Temperature (°F)

	Scenario	2009	2039	2069	2099	
Annual Average	CCSM45	67.5	69.0	70.7	70.7	
	CCSM85	67.5	69.2	71.4	73.7	
	GFDL45	67.5	70.2	71.9	72.6	
	GFDL85	67.5	69.9	72.9	76.3	
	HAD45	67.5	69.5	71.9	73.2	
	HAD85	67.5	69.8	73.0	76.5	
Growing Season May—Sep	CCSM45	78.8	80.0	81.3	81.6	
	CCSM85	78.8	80.0	82.3	84.8	
	GFDL45	78.8	81.4	83.0	84.2	
	GFDL85	78.8	81.3	84.2	88.1	
	HAD45	78.8	81.5	83.6	84.8	
	HAD85	78.8	81.6	85.7	88.8	
Coldest Month Average	CCSM45	50.1	52.3	53.2	52.9	
	CCSM85	50.1	52.2	53.4	54.5	
	GFDL45	50.1	53.2	53.5	53.8	
	GFDL85	50.1	52.0	53.1	53.9	
	HAD45	50.1	50.1	51.5	52.4	
	HAD85	50.1	51.3	52.4	54.1	
Warmest Month Average	CCSM45	81.8	82.9	83.5	83.7	
	CCSM85	81.8	83.0	84.1	85.5	
	GFDL45	81.8	84.2	84.8	85.6	
	GFDL85	81.8	84.0	85.4	87.5	
	HAD45	81.8	84.9	86.0	86.5	
	HAD85	81.8	85.0	87.4	88.7	

Precipitation (in)

	Scenario	2009	2039	2069	2099	
Annual Total	CCSM45	60.6	64.3	67.3	67.5	
	CCSM85	60.6	63.8	66.8	68.5	
	GFDL45	60.6	67.8	71.1	71.4	
	GFDL85	60.6	66.2	70.8	69.0	
	HAD45	60.6	58.0	61.2	64.7	
	HAD85	60.6	62.6	56.8	59.8	
Growing Season May—Sep	CCSM45	30.0	32.6	33.4	33.3	
	CCSM85	30.0	30.7	33.2	33.0	
	GFDL45	30.0	35.7	37.7	36.4	
	GFDL85	30.0	35.4	39.0	38.5	
	HAD45	30.0	28.9	29.6	30.5	
	HAD85	30.0	29.6	24.6	25.4	

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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Section 232L

EcoMap 2007
Climate Change Atlas Tree Species

USDA Forest Service
Northern Research Station
Landscape Change Research Group
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
slash pine	Pinus elliottii	NDH	High	78.5	4287.6	31.6	No change	No change	Medium	Abundant	Good	Good				1 1
loblolly pine	Pinus taeda	WDH	High	50	1494.3	15.7	Sm. inc.	Sm. inc.	Medium	Abundant	Very Good	Very Good				1 2
longleaf pine	Pinus palustris	NSH	Medium	34.4	785.4	9.8	Sm. inc.	Sm. inc.	Medium	Abundant	Very Good	Very Good				1 3
water oak	Quercus nigra	WDH	High	61.5	552.6	4.6	Sm. inc.	Sm. inc.	Medium	Abundant	Very Good	Very Good				1 4
swamp tupelo	Nyssa biflora	NDH	Medium	54.3	552.3	5.8	Sm. inc.	Sm. inc.	Low	Abundant	Good	Good				1 5
laurel oak	Quercus laurifolia	NDH	Medium	51.5	549.6	5.4	Sm. inc.	Sm. inc.	Medium	Abundant	Very Good	Very Good				1 6
sweetbay	Magnolia virginiana	NSL	Medium	58.7	502.9	4.4	Sm. inc.	Sm. inc.	Medium	Abundant	Very Good	Very Good				1 7
pond cypress	Taxodium ascendens	NSH	Medium	39.2	454.8	8.0	Sm. inc.	Lg. inc.	Medium	Common	Good	Very Good				1 8
sand pine	Pinus clausa	NDH	High	8.6	441.8	16.2	No change	No change	Low	Common	Poor	Poor	Infill +	Infill +		0 9
sweetgum	Liquidambar styraciflua	WDH	High	43.8	364.9	4.3	Sm. inc.	Sm. inc.	Medium	Common	Good	Good				1 10
red maple	Acer rubrum	WDH	High	55.6	272.7	2.8	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good				1 11
blackgum	Nyssa sylvatica	WDL	Medium	40.2	243.2	2.9	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good				1 12
bald cypress	Taxodium distichum	NSH	Medium	30.6	242.4	5.3	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good				1 13
live oak	Quercus virginiana	NDH	High	30.8	227.6	3.5	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good				1 14
water tupelo	Nyssa aquatica	NSH	Medium	16.7	176.3	5.7	No change	Sm. dec.	Low	Common	Poor	Poor				0 15
cabbage palmetto	Sabal palmetto	NDH	Medium	11.5	104.1	6.2	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good				0 16
green ash	Fraxinus pennsylvanica	WSH	Low	21.7	101.3	2.9	Sm. inc.	Lg. inc.	Medium	Common	Good	Very Good				1 17
pond pine	Pinus serotina	NSH	Medium	8	96.2	8.1	No change	No change	Low	Common	Poor	Poor	Infill +	Infill +		0 18
turkey oak	Quercus laevis	NSH	Medium	11.9	87.2	2.8	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good	Infill ++	Infill ++		1 19
redbay	Persea borbonia	NSL	Low	29.2	86.6	1.8	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good				1 20
American hornbeam; muscle	Carpinus caroliniana	WSL	Low	19.2	74.2	2.7	Sm. inc.	Sm. inc.	Medium	Common	Good	Good				1 21
loblolly-bay	Gordonia lasianthus	NSH	Medium	8	62.0	5.9	No change	No change	Medium	Common	Fair	Fair	Infill +	Infill +		1 22
southern magnolia	Magnolia grandiflora	NSL	Low	15.4	55.8	1.7	Sm. inc.	Sm. inc.	Medium	Common	Good	Good				1 23
yellow-poplar	Liriodendron tulipifera	WDH	High	9.2	53.7	2.2	No change	No change	High	Common	Good	Good				1 24
black cherry	Prunus serotina	WDL	Medium	14.9	50.8	1.2	Lg. inc.	Lg. inc.	Low	Common	Good	Good				1 25
spruce pine	Pinus glabra	NSL	Low	9.3	50.7	3.3	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor				0 26
American elm	Ulmus americana	WDH	Medium	19.8	39.8	1.5	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++		1 27
American holly	Ilex opaca	NSL	Medium	16.3	34.6	1.1	Sm. inc.	Sm. inc.	Medium	Rare	Fair	Fair				1 28
Atlantic white-cedar	Chamaecyparis thyoides	NSH	Low	4.7	31.6	4.7	No change	No change	Low	Rare	Very Poor	Very Poor				2 29
common persimmon	Cornus virginiana	NSL	Low	15.1	31.1	1.1	Lg. dec.	Lg. dec.	High	Rare	Poor	Poor				1 30
willow oak	Quercus phellos	NSL	Low	5.8	30.3	2.5	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +		2 31
southern red oak	Quercus falcata	WDL	Medium	9.5	28.6	1.1	No change	Sm. inc.	High	Rare	Fair	Good	Infill +	Infill ++		1 32
pumpkin ash	Fraxinus profunda	NSH	FIA	5.4	26.9	3.5	Unknown	Unknown	NA	Rare	FIA Only	FIA Only				0 33
post oak	Quercus stellata	WDH	High	5.9	26.4	1.2	No change	Sm. inc.	High	Rare	Fair	Good	Infill +	Infill ++		2 34
swamp chestnut oak	Quercus michauxii	NSL	Low	6.6	25.7	2.5	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +		2 35
black willow	Salix nigra	NSH	Low	6.7	22.4	1.4	No change	No change	Low	Rare	Very Poor	Very Poor				0 36
flowering dogwood	Cornus florida	WDL	Medium	11.2	22.3	0.8	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor				0 37
pignut hickory	Carya glabra	WDL	Medium	5.5	20.9	2.2	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor				0 38
American beech	Fagus grandifolia	WDH	High	4.8	20.6	2.6	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +		2 39
shortleaf pine	Pinus echinata	WDH	High	2.2	20.2	4.0	No change	Sm. inc.	Medium	Rare	Poor	Fair	Infill +	Infill +		2 40
bluejack oak	Quercus incana	NSL	Low	6.6	18.4	1.3	Sm. dec.	No change	Medium	Rare	Very Poor	Poor		Infill +		1 41
water hickory	Carya aquatica	NSL	Medium	3.7	18.1	2.5	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +		2 42
white oak	Quercus alba	WDH	Medium	4.4	17.5	1.7	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +		2 43
overcup oak	Quercus lyrata	NSL	Medium	4.9	17.3	1.3	No change	No change	Low	Rare	Very Poor	Very Poor				2 44
mockernut hickory	Carya alba	WDL	Medium	6.5	16.7	0.9	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +		1 45
Carolina ash	Fraxinus caroliniana	NSL	FIA	4.7	13.8	1.6	Unknown	Unknown	NA	Rare	FIA Only	FIA Only				0 46
cherrybark oak; swamp red o	Quercus pagoda	NSL	Medium	3.2	11.9	1.9	No change	Sm. inc.	Medium	Rare	Poor	Fair	Infill +	Infill +		2 47



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Common Name	Scientific Name	Range	MR	%Cell	FIAsum	FIAiv	ChngCl45	ChngCl85	Adap	Abund	Capabil45	Capabil85	SHIFT45	SHIFT85	SSO	N
pecan	Carya illinoensis	NSH	Low	1.6	11.1	3.3	Sm. dec.	No change	Low	Rare	Very Poor	Very Poor			2	48
river birch	Betula nigra	NSL	Low	3.2	10.4	2.3	No change	Sm. inc.	Medium	Rare	Poor	Fair	Infill +	Infill +	1	49
eastern redcedar	Juniperus virginiana	WDH	Medium	4.2	9.6	1.7	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			2	50
blackjack oak	Quercus marilandica	NSL	Medium	1.9	5.9	1.2	Sm. dec.	No change	High	Rare	Poor	Fair	Infill +	Infill +	2	51
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	4	5.6	0.9	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	1	52
slippery elm	Ulmus rubra	WSL	Low	2.7	5.5	0.8	Sm. dec.	No change	Medium	Rare	Very Poor	Poor		Infill +	2	53
sourwood	Oxydendrum arboreum	NDL	High	2.4	5.4	1.3	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor			0	54
white ash	Fraxinus americana	WDL	Medium	1.2	3.8	3.0	Sm. dec.	Sm. dec.	Low	Rare	Very Poor	Very Poor			2	55
sycamore	Platanus occidentalis	NSL	Low	1.8	3.8	1.0	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	56
eastern cottonwood	Populus deltoides	NSH	Low	0.1	3.6	2.3	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			2	57
winged elm	Ulmus alata	WDL	Medium	3.3	3.2	0.4	Sm. inc.	Lg. inc.	Medium	Rare	Fair	Good	Infill +	Infill ++	2	58
water elm	Planera aquatica	NSL	Low	1.1	3.2	1.0	Sm. dec.	No change	Medium	Rare	Very Poor	Poor		Infill +	2	59
hackberry	Celtis occidentalis	WDH	Medium	1.4	2.9	0.8	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor		Infill +	2	60
red mulberry	Morus rubra	NSL	Low	0.9	2.4	0.7	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	61
sugarberry	Celtis laevigata	NDH	Medium	1.7	2.2	0.3	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	62
northern red oak	Quercus rubra	WDH	Medium	0.4	1.9	4.1	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor			0	63
sassafras	Sassafras albidum	WSL	Low	2.2	1.9	0.7	Sm. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			2	64
florida maple	Acer barbatum	NSL	Low	0.3	1.7	3.2	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor			0	65
American basswood	Tilia americana	WSL	Medium	0.8	1.4	1.7	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	66
Nuttall oak	Quercus texana	NSH	Medium	2	1.3	0.6	Sm. dec.	No change	High	Rare	Poor	Fair			0	67
wild plum	Prunus americana	NSLX	FIA	0.6	1.0	1.1	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	68
silver maple	Acer saccharinum	NSH	Low	0.8	1.0	1.1	No change	No change	High	Rare	Fair	Fair			0	69
black oak	Quercus velutina	WDH	High	0.3	0.8	0.1	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	70
cittamwood/gum bumelia	Sideroxylon lanuginosum ssp.	NSL	Low	0.4	0.6	1.3	Lg. dec.	Lg. inc.	High	Rare	Poor	Good			2	71
eastern redbud	Cercis canadensis	NSL	Low	0.8	0.5	0.5	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	72
bitternut hickory	Carya cordiformis	WSL	Low	0.4	0.3	0.8	Lg. dec.	Very Lg. dec.	High	Rare	Poor	Lost			0	73
Shumard oak	Quercus shumardii	NSL	Low	0.4	0.3	0.8	Very Lg. dec.	Very Lg. dec.	High	Rare	Lost	Lost			0	74
black locust	Robinia pseudoacacia	NDH	Low	0.4	0.3	0.8	Sm. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	75
pin cherry	Prunus pensylvanica	NSL	Low	0.1	0.2	0.1	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	76
cedar elm	Ulmus crassifolia	NDH	Medium	0.1	0.2	0.1	Lg. inc.	Lg. inc.	Low	Rare	Fair	Fair		Infill +	2	77
pawpaw	Asimina triloba	NSL	Low	0.4	0.1	0.3	Sm. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	78
silverbell	Halesia spp.	NSL	Low	0.4	0.1	0.3	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			0	79
waterlocust	Gleditsia aquatica	NSLX	FIA	0.4	0.1	0.2	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	80
sand hickory	Carya pallida	NSL	FIA	0.4	0.0	0.1	Unknown	Unknown	NA	Rare	FIA Only	FIA Only			0	81
Table Mountain pine	Pinus pungens	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			3	82
boxelder	Acer negundo	WSH	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Likely +	Likely +	3	83
striped maple	Acer pensylvanicum	NSL	Medium	0	0	0	Unknown	New Habitat	Medium	Absent	Unknown	New Habitat			3	84
mountain maple	Acer spicatum	NSL	Low	0	0	0	Unknown	Unknown	High	Absent	Unknown	Unknown			0	85
serviceberry	Amelanchier spp.	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	86
shellbark hickory	Carya laciniosa	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	87
shagbark hickory	Carya ovata	WSL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	88
black hickory	Carya texana	NDL	High	0	0	0	Unknown	New Habitat	Medium	Absent	Unknown	New Habitat		Migrate +	3	89
black ash	Fraxinus nigra	WSH	Medium	0	0	0	Unknown	New Habitat	Low	Absent	Unknown	New Habitat			3	90
black walnut	Juglans nigra	WDH	Low	0	0	0	Unknown	Unknown	Medium	Modeled	Unknown	Unknown			0	91
cucumbertree	Magnolia acuminata	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	92
bigleaf magnolia	Magnolia macrophylla	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	93
quaking aspen	Populus tremuloides	WDH	High	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
scarlet oak	Quercus coccinea	WDL	Medium	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	95
chinkapin oak	Quercus muehlenbergii	NSL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	96
chestnut oak	Quercus prinus	NDH	High	0	0	0	Unknown	Unknown	High	Absent	Unknown	Unknown			0	97