

Current and Potential Future Habitat, Capability, and Migration

	sq. km	sq. mi	FIA Plots
Area of Region	26,662	10,294	426

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	2			16	27	Increase	25	27	Very Good	5	6	Likely	1	1
Hickory	9			38	57	No Change	35	35	Good	20	21	Infill	32	33
Maple	4	Abundant	3	39	11	Decrease	20	18	Fair	17	17	Migrate	1	1
Oak	19	Common	24	3		New	6	6	Poor	22	20			
Pine	5	Rare	56			Unknown	10	10	Very Poor	16	16			
Other	44	Absent	11						FIA Only	3	3			
	<b>83</b>		<b>94</b>	<b>96</b>	<b>95</b>		<b>96</b>	<b>96</b>	Unknown	7	7			
										<b>90</b>	<b>90</b>			

Potential Changes in Climate Variables

Temperature (°F)

	Scenario	2009	2039	2069	2099	
Annual Average	CCSM45	65.6	67.2	69.0	69.3	
	CCSM85	65.6	67.5	70.0	72.3	
	GFDL45	65.6	69.2	69.9	70.8	
	GFDL85	65.6	68.2	71.2	74.6	
	HAD45	65.6	68.0	70.8	71.9	
	HAD85	65.6	68.3	72.2	75.9	
Growing Season (May—Sep)	CCSM45	78.7	80.2	81.5	82.0	
	CCSM85	78.7	80.5	82.8	85.7	
	GFDL45	78.7	83.0	83.3	85.2	
	GFDL85	78.7	81.8	85.0	89.2	
	HAD45	78.7	81.9	84.6	85.3	
	HAD85	78.7	82.1	87.4	90.6	
Coldest Month Average	CCSM45	45.7	48.1	49.0	49.1	
	CCSM85	45.7	48.4	49.7	50.9	
	GFDL45	45.7	49.3	49.3	49.3	
	GFDL85	45.7	47.0	48.0	48.6	
	HAD45	45.7	46.5	48.2	49.0	
	HAD85	45.7	47.7	49.1	50.9	
Warmest Month Average	CCSM45	82.7	84.0	84.4	84.6	
	CCSM85	82.7	84.2	85.1	86.7	
	GFDL45	82.7	86.6	86.5	87.9	
	GFDL85	82.7	86.1	87.6	90.2	
	HAD45	82.7	86.6	88.2	88.3	
	HAD85	82.7	87.2	90.3	91.3	

Precipitation (in)

	Scenario	2009	2039	2069	2099	
Annual Total	CCSM45	57.7	60.2	65.8	63.2	
	CCSM85	57.7	60.5	63.1	65.4	
	GFDL45	57.7	62.7	70.5	65.9	
	GFDL85	57.7	61.9	64.0	65.7	
	HAD45	57.7	56.2	58.2	61.8	
	HAD85	57.7	59.8	53.2	58.0	
Growing Season (May—Sep)	CCSM45	21.8	22.1	23.2	22.4	
	CCSM85	21.8	20.8	21.3	21.0	
	GFDL45	21.8	24.4	29.1	25.5	
	GFDL85	21.8	25.1	26.7	27.9	
	HAD45	21.8	21.1	21.6	21.3	
	HAD85	21.8	21.3	17.5	17.9	

**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 234A

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	22.1	840.4	20.9	Sm. inc.	Sm. inc.	Medium	Abundant	Very Good	Very Good			1	1
sugarberry	Celtis laevigata	NDH	Medium	61.6	721.6	12.4	No change	No change	Medium	Abundant	Good	Good			1	2
sweetgum	Liquidambar styraciflua	WDH	High	53	687.8	10.6	No change	No change	Medium	Abundant	Good	Good			1	3
water oak	Quercus nigra	WDH	High	49.9	429.8	7.3	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	4
green ash	Fraxinus pennsylvanica	WSH	Low	59.4	410.4	6.7	No change	No change	Medium	Common	Fair	Fair			1	5
bald cypress	Taxodium distichum	NSH	Medium	20.9	365.3	10.9	Sm. inc.	Sm. inc.	Medium	Common	Good	Good	Infill ++	Infill ++	1	6
willow oak	Quercus phellos	NSL	Low	31	277.2	10.3	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	7
American elm	Ulmus americana	WDH	Medium	50.8	274.6	5.6	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	8
water hickory	Carya aquatica	NSL	Medium	41.6	268.7	7.0	No change	No change	Medium	Common	Fair	Fair			1	9
overcup oak	Quercus lyrata	NSL	Medium	37.9	254.6	7.4	Sm. inc.	Sm. inc.	Low	Common	Fair	Fair			1	10
black willow	Salix nigra	NSH	Low	21	225.2	12.4	Sm. inc.	Lg. inc.	Low	Common	Fair	Good			1	11
Nuttall oak	Quercus texana	NSH	Medium	33.5	218.2	7.0	No change	No change	High	Common	Good	Good			0	12
boxelder	Acer negundo	WSH	Low	27.9	197.1	5.6	No change	No change	High	Common	Good	Good	Infill ++	Infill ++	1	13
red maple	Acer rubrum	WDH	High	31.1	183.2	3.7	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	14
water tupelo	Nyssa aquatica	NSH	Medium	7.8	169.3	9.6	No change	No change	Low	Common	Poor	Poor	Infill +	Infill +	2	15
pecan	Carya illinoensis	NSH	Low	24.1	166.3	6.4	Sm. inc.	Sm. inc.	Low	Common	Fair	Fair	Infill +	Infill +	1	16
cherrybark oak; swamp red oak	Quercus pagoda	NSL	Medium	24.2	151.2	3.8	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	17
winged elm	Ulmus alata	WDL	Medium	40.4	148.0	3.9	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	18
sycamore	Platanus occidentalis	NSL	Low	18.4	128.9	5.7	No change	No change	Medium	Common	Fair	Fair	Infill +	Infill +	1	19
eastern cottonwood	Populus deltoides	NSH	Low	14	100.0	7.9	Sm. dec.	No change	Medium	Common	Poor	Fair	Infill +	Infill +	1	20
southern red oak	Quercus falcata	WDL	Medium	13.1	91.5	4.7	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good	Infill ++	Infill ++	1	21
honeylocust	Gleditsia triacanthos	NSH	Low	28.8	80.3	3.4	Sm. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	22
common persimmon	Diospyros virginiana	NSL	Low	24.3	78.1	3.4	No change	Sm. inc.	High	Common	Good	Very Good			1	23
white oak	Quercus alba	WDH	Medium	10.9	75.7	2.8	No change	No change	High	Common	Good	Good	Infill ++	Infill ++	1	24
American hornbeam; muscley	Carpinus caroliniana	WSL	Low	12.7	66.5	2.5	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	25
slippery elm	Ulmus rubra	WSL	Low	25.1	64.4	2.8	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	26
laurel oak	Quercus laurifolia	NDH	Medium	9.7	53.6	4.7	No change	No change	Medium	Common	Fair	Fair	Infill +	Infill +	2	27
American beech	Fagus grandifolia	WDH	High	5.4	50.0	3.2	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	28
cedar elm	Ulmus crassifolia	NDH	Medium	18.5	48.5	4.8	Lg. inc.	Lg. inc.	Low	Rare	Fair	Fair	Infill +	Infill +	1	29
blackgum	Nyssa sylvatica	WDL	Medium	7	35.0	1.7	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	1	30
yellow-poplar	Liriodendron tulipifera	WDH	High	4.3	32.9	2.7	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	2	31
water elm	Planera aquatica	NSL	Low	5.8	31.3	2.7	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	32
swamp chestnut oak	Quercus michauxii	NSL	Low	6.7	30.6	3.6	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	1	33
post oak	Quercus stellata	WDH	High	11.3	30.1	2.9	Lg. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	2	34
pignut hickory	Carya glabra	WDL	Medium	7.7	27.6	1.3	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	35
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	11	26.8	1.3	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	1	36
bitternut hickory	Carya cordiformis	WSL	Low	3.3	25.3	3.9	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor	Infill +	Infill +	2	37
mockernut hickory	Carya alba	WDL	Medium	10.1	22.1	1.3	Lg. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	1	38
flowering dogwood	Cornus florida	WDL	Medium	13.1	20.5	0.8	No change	No change	Medium	Rare	Poor	Poor			1	39
Shumard oak	Quercus shumardii	NSL	Low	5.1	18.1	2.4	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	2	40
white ash	Fraxinus americana	WDL	Medium	4.9	17.9	1.2	No change	No change	Low	Rare	Very Poor	Very Poor			2	41
spruce pine	Pinus glabra	NSL	Low	1.4	17.1	6.5	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			2	42
black cherry	Prunus serotina	WDL	Medium	9.1	16.9	1.1	No change	No change	Low	Rare	Very Poor	Very Poor			0	43
shortleaf pine	Pinus echinata	WDH	High	4.3	16.0	1.9	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	44
southern magnolia	Magnolia grandiflora	NSL	Low	3	14.5	1.7	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	45
black locust	Robinia pseudoacacia	NDH	Low	2	11.1	1.4	No change	No change	Medium	Rare	Poor	Poor			0	46
sassafras	Sassafras albidum	WSL	Low	2.2	9.8	1.6	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	47



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shagbark hickory	Carya ovata	WSL	Medium	1.8	9.6	2.7	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			2	48
black hickory	Carya texana	NDL	High	1	8.6	2.8	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	49
eastern redcedar	Juniperus virginiana	WDH	Medium	1.7	8.4	1.6	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	50
eastern redbud	Cercis canadensis	NSL	Low	1.5	7.8	2.2	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			2	51
live oak	Quercus virginiana	NDH	High	1.2	7.6	3.2	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	52
swamp tupelo	Nyssa biflora	NDH	Medium	2.1	7.2	1.8	Sm. dec.	No change	Low	Rare	Very Poor	Very Poor			0	53
black oak	Quercus velutina	WDH	High	4	7.2	0.7	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			2	54
red mulberry	Morus rubra	NSL	Low	4.4	6.7	0.9	Sm. dec.	No change	Medium	Rare	Very Poor	Poor		Infill +	2	55
waterlocust	Gleditsia aquatica	NSLX	FIA	2.2	6.6	1.6	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	56
hackberry	Celtis occidentalis	WDH	Medium	2.9	4.8	1.6	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	2	57
slash pine	Pinus elliotii	NDH	High	0.8	4.6	6.1	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	58
sourwood	Oxydendrum arboreum	NDL	High	1.5	4.5	0.9	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor	Infill +		2	59
river birch	Betula nigra	NSL	Low	1	4.5	1.7	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	60
American holly	Ilex opaca	NSL	Medium	2	3.5	0.4	Sm. inc.	Sm. inc.	Medium	Rare	Fair	Fair	Infill +	Infill +	2	61
swamp white oak	Quercus bicolor	NSL	Low	0.9	3.5	3.0	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	62
northern red oak	Quercus rubra	WDH	Medium	0.8	3.2	0.4	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor			0	63
chestnut oak	Quercus prinus	NDH	High	0.4	2.4	6.4	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor			0	64
florida maple	Acer barbatum	NSL	Low	3	2.1	0.4	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	2	65
shellbark hickory	Carya laciniosa	NSL	Low	0.4	1.9	5.1	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	66
Osage-orange	Maclura pomifera	NDH	Medium	0.5	1.5	1.8	No change	No change	High	Rare	Fair	Fair		Infill +	2	67
black walnut	Juglans nigra	WDH	Low	0.7	1.5	0.8	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	68
silverbell	Halesia spp.	NSL	Low	0.3	1.3	3.0	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	69
sand hickory	Carya pallida	NSL	FIA	0.2	0.9	1.0	Unknown	Unknown	NA	Rare	FIA Only	FIA Only			0	70
silver maple	Acer saccharinum	NSH	Low	2.3	0.7	2.5	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor			0	71
bigleaf magnolia	Magnolia macrophylla	NSL	Low	0.3	0.7	0.3	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	72
blackjack oak	Quercus marilandica	NSL	Medium	0.2	0.5	0.6	Lg. inc.	Lg. inc.	High	Rare	Good	Good			2	73
longleaf pine	Pinus palustris	NSH	Medium	0.3	0.5	1.1	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	74
sweetbay	Magnolia virginiana	NSL	Medium	0.6	0.5	0.6	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	75
chinkapin oak	Quercus muehlenbergii	NSL	Medium	0.4	0.5	0.3	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			2	76
American basswood	Tilia americana	WSL	Medium	0.4	0.5	0.4	No change	Lg. dec.	Medium	Rare	Poor	Very Poor			0	77
cucumbertree	Magnolia acuminata	NSL	Low	0.1	0.4	0.1	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	78
pawpaw	Asimina triloba	NSL	Low	1.7	0.2	0.5	No change	Sm. dec.	Medium	Rare	Poor	Very Poor			0	79
serviceberry	Amelanchier spp.	NSL	Low	0.3	0.2	0.3	Sm. inc.	Sm. inc.	Medium	Rare	Fair	Fair			0	80
chokecherry	Prunus virginiana	NSLX	FIA	0	0.1	0.0	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	81
scarlet oak	Quercus coccinea	WDL	Medium	0.3	0.1	0.3	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	82
pond cypress	Taxodium ascendens	NSH	Medium	0.2	0.1	0.2	Lg. dec.	Lg. inc.	Medium	Rare	Very Poor	Good			2	83
Atlantic white-cedar	Chamaecyparis thyoides	NSH	Low	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat			3	84
ashe juniper	Juniperus ashei	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	85
striped maple	Acer pensylvanicum	NSL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	86
sugar maple	Acer saccharum	WDH	High	0	0	0	Unknown	Unknown	High	Absent	Unknown	Unknown			0	87
mountain maple	Acer spicatum	NSL	Low	0	0	0	Unknown	Unknown	High	Absent	Unknown	Unknown			0	88
yellow buckeye	Aesculus flava	NSL	Low	0	0	0	Unknown	Unknown	Low	Absent	Unknown	Unknown			0	89
cittamwood/gum bumelia	Sideroxylon lanuginosum ssp.	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	90
black ash	Fraxinus nigra	WSH	Medium	0	0	0	Unknown	Unknown	Low	Absent	Unknown	Unknown			0	91
loblolly-bay	Gordonia lasianthus	NSH	Medium	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	92
redbay	Persea borbonia	NSL	Low	0	0	0	Unknown	Unknown	High	Modeled	Unknown	Unknown			0	93
pin cherry	Prunus pensylvanica	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Likely +	Likely +	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
bur oak	Quercus macrocarpa	NDH	Medium	0	0	0	Unknown	Unknown	High	Modeled	Unknown	Unknown			0	95
cabbage palmetto	Sabal palmetto	NDH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	96