

	sq. km	sq. mi	FIA Plots
Area of Region	37,152	14,345	273

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	3			High	10	18	Increase	8	11	Very Good	1	2	Likely	2	2
Hickory	7			Medium	24	37	No Change	23	24	Good	7	9	Infill	29	29
Maple	2	Abundant	0	Low	24	6	Decrease	20	16	Fair	13	13	Migrate	0	0
Oak	15	Common	13	FIA	5		New	2	2	Poor	14	11			
Pine	2	Rare	43				Unknown	10	10	Very Poor	16	16			
Other	27	Absent	6							FIA Only	4	4			
	56		62		63	61		63	63	Unknown	5	5			
											60	60			

Potential Changes in Climate Variables

Temperature (°F)

	Scenario	2009	2039	2069	2099	
Annual Average	CCSM45	65.8	67.3	68.7	69.2	
	CCSM85	65.8	67.8	70.0	72.3	
	GFDL45	65.8	71.1	70.0	71.5	
	GFDL85	65.8	68.5	71.5	75.1	
	HAD45	65.8	67.9	70.5	71.4	
HAD85	65.8	68.3	72.0	75.3		
Growing Season (May—Sep)	CCSM45	79.6	81.0	82.1	82.8	
	CCSM85	79.6	81.8	83.7	86.6	
	GFDL45	79.6	86.5	84.5	87.1	
	GFDL85	79.6	83.3	86.6	91.1	
	HAD45	79.6	81.9	84.2	84.8	
HAD85	79.6	82.4	86.7	89.5		
Coldest Month (Average)	CCSM45	44.9	47.1	47.8	48.1	
	CCSM85	44.9	47.1	48.2	49.5	
	GFDL45	44.9	48.5	48.5	48.6	
	GFDL85	44.9	46.0	47.2	47.7	
	HAD45	44.9	45.3	47.1	47.6	
HAD85	44.9	47.5	49.1	50.8		
Warmest Month (Average)	CCSM45	84.8	85.8	86.5	86.8	
	CCSM85	84.8	86.8	87.4	89.0	
	GFDL45	84.8	89.6	89.8	91.6	
	GFDL85	84.8	89.5	91.2	94.6	
	HAD45	84.8	87.2	88.3	88.6	
HAD85	84.8	88.0	90.1	91.1		

Precipitation (in)

	Scenario	2009	2039	2069	2099	
Annual Total	CCSM45	38.4	38.7	40.8	38.6	
	CCSM85	38.4	38.1	41.4	40.4	
	GFDL45	38.4	38.9	44.9	37.4	
	GFDL85	38.4	38.5	41.3	40.1	
	HAD45	38.4	39.2	38.5	40.4	
HAD85	38.4	40.3	35.4	38.1		
Growing Season (May—Sep)	CCSM45	16.2	17.5	16.8	16.6	
	CCSM85	16.2	16.3	16.4	15.6	
	GFDL45	16.2	17.1	20.6	16.5	
	GFDL85	16.2	17.4	18.6	17.7	
	HAD45	16.2	16.0	15.3	16.4	
HAD85	16.2	16.3	13.3	14.2		

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 255B

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
post oak	Quercus stellata	WDH	High	26.2	243.8	15.1	No change	No change	High	Common	Good	Good	Infill ++	Infill ++	1	1
cedar elm	Ulmus crassifolia	NDH	Medium	63.3	202.3	13.7	Sm. inc.	Sm. inc.	Low	Common	Fair	Fair	Infill +	Infill +	1	2
sugarberry	Celtis laevigata	NDH	Medium	55.1	196.9	14.1	No change	No change	Medium	Common	Fair	Fair	Infill +	Infill +	1	3
eastern redcedar	Juniperus virginiana	WDH	Medium	40.6	131.2	8.5	Sm. inc.	Sm. inc.	Medium	Common	Good	Good	Infill ++	Infill ++	1	4
green ash	Fraxinus pennsylvanica	WSH	Low	39.3	121.4	10.5	No change	No change	Medium	Common	Fair	Fair	Infill +	Infill +	1	5
ashe juniper	Juniperus ashei	NDH	High	11.7	110.2	16.9	No change	No change	Medium	Common	Fair	Fair			0	6
loblolly pine	Pinus taeda	WDH	High	2.4	106.4	20.6	No change	No change	Medium	Common	Fair	Fair	Infill +	Infill +	2	7
winged elm	Ulmus alata	WDL	Medium	30.8	100.9	6.8	No change	Sm. inc.	Medium	Common	Fair	Good	Infill +	Infill ++	1	8
Osage-orange	Maclura pomifera	NDH	Medium	35.2	93.9	9.6	No change	Sm. inc.	High	Common	Good	Very Good	Infill ++	Infill ++	1	9
pecan	Carya illinoensis	NSH	Low	23.7	72.2	8.5	Sm. inc.	Sm. inc.	Low	Common	Fair	Fair	Infill +	Infill +	1	10
honeylocust	Gleditsia triacanthos	NSH	Low	27.3	64.2	6.2	Sm. dec.	No change	High	Common	Fair	Good	Infill +	Infill ++	1	11
live oak	Quercus virginiana	NDH	High	10.8	59.2	8.1	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good	Infill ++	Infill ++	2	12
southern red oak	Quercus falcata	WDL	Medium	7.7	50.2	7.0	No change	No change	High	Common	Good	Good			2	13
water oak	Quercus nigra	WDH	High	9.2	44.3	8.0	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	14
hackberry	Celtis occidentalis	WDH	Medium	22.1	43.6	6.6	Sm. dec.	No change	High	Rare	Poor	Fair	Infill +	Infill +	1	15
American elm	Ulmus americana	WDH	Medium	22.9	39.0	5.0	Sm. inc.	Sm. inc.	Medium	Rare	Fair	Fair	Infill +	Infill +	1	16
willow oak	Quercus phellos	NSL	Low	4	37.6	6.9	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	17
blackjack oak	Quercus marilandica	NSL	Medium	12.7	37.2	3.5	No change	Sm. inc.	High	Rare	Fair	Good	Infill +	Infill ++	1	18
sweetgum	Liquidambar styraciflua	WDH	High	2.2	30.6	8.8	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	19
mockernut hickory	Carya alba	WDL	Medium	4.8	29.5	4.6	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	2	20
bur oak	Quercus macrocarpa	NDH	Medium	5.3	26.9	7.8	Lg. dec.	Lg. dec.	High	Rare	Poor	Poor			0	21
Shumard oak	Quercus shumardii	NSL	Low	10.6	22.0	3.6	Sm. dec.	No change	High	Rare	Poor	Fair	Infill +	Infill +	2	22
cittamwood/gum bumelia	Sideroxylon lanuginosum ssp.	NSL	Low	24.6	20.3	3.3	Lg. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	1	23
white ash	Fraxinus americana	WDL	Medium	3.5	13.7	6.9	No change	No change	Low	Rare	Very Poor	Very Poor			2	24
slippery elm	Ulmus rubra	WSL	Low	6.4	13.1	6.5	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	25
black walnut	Juglans nigra	WDH	Low	3.1	12.3	19.0	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	26
shortleaf pine	Pinus echinata	WDH	High	1.2	11.1	6.0	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	27
Texas ash	Fraxinus texensis	NDH	FIA	4.3	9.6	7.6	Unknown	Unknown	NA	Rare	FIA Only	FIA Only			0	28
black willow	Salix nigra	NSH	Low	8.8	9.2	6.1	No change	No change	Low	Rare	Very Poor	Very Poor			2	29
boxelder	Acer negundo	WSH	Low	7.9	8.7	4.7	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	2	30
red mulberry	Morus rubra	NSL	Low	10.3	7.9	1.7	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			2	31
black hickory	Carya texana	NDL	High	3.4	7.4	2.2	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	32
eastern cottonwood	Populus deltoides	NSH	Low	7	6.8	3.2	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	33
cherrybark oak; swamp red o.	Quercus pagoda	NSL	Medium	2.5	6.6	3.0	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	34
shagbark hickory	Carya ovata	WSL	Medium	1.1	5.7	4.2	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	35
common persimmon	Diospyros virginiana	NSL	Low	10.5	5.1	3.3	Sm. dec.	No change	High	Rare	Poor	Fair	Infill +	Infill +	2	36
water hickory	Carya aquatica	NSL	Medium	0.5	4.1	6.2	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	37
Siberian elm	Ulmus pumila	NDH	FIA	0.2	3.7	9.3	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	38
overcup oak	Quercus lyrata	NSL	Medium	0.4	3.3	1.5	Sm. dec.	Sm. dec.	Low	Rare	Very Poor	Very Poor			2	39
bitternut hickory	Carya cordiformis	WSL	Low	1	2.3	1.6	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor			0	40
pignut hickory	Carya glabra	WDL	Medium	0.9	2.2	2.7	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	41
sycamore	Platanus occidentalis	NSL	Low	0.4	1.7	7.9	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	42
river birch	Betula nigra	NSL	Low	0.3	1.5	5.7	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	43
flowering dogwood	Cornus florida	WDL	Medium	0.8	1.4	1.0	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	44
chinkapin oak	Quercus muehlenbergii	NSL	Medium	2.6	1.4	4.4	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	45
red maple	Acer rubrum	WDH	High	0.5	1.4	1.8	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	2	46
black cherry	Prunus serotina	WDL	Medium	2	1.2	1.5	Sm. dec.	Sm. dec.	Low	Rare	Very Poor	Very Poor			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	
black oak	Quercus velutina	WDH	High	0.9	1.2	1.8	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor				0	48
wild plum	Prunus americana	NSLX	FIA	0.5	1.1	7.2	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only				0	49
eastern redbud	Cercis canadensis	NSL	Low	3.2	0.9	1.2	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor				0	50
blackgum	Nyssa sylvatica	WDL	Medium	0.4	0.5	0.7	Sm. inc.	Sm. inc.	High	Rare	Good	Good				2	51
durand oak	Quercus sinuata var. sinuata	NSL	FIA	1.6	0.5	0.7	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only				0	52
white oak	Quercus alba	WDH	Medium	0.3	0.2	0.9	Lg. inc.	Lg. inc.	High	Rare	Good	Good				2	53
sassafras	Sassafras albidum	WSL	Low	0.3	0.2	0.8	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor				0	54
bear oak; scrub oak	Quercus ilicifolia	NSLX	FIA	0.6	0.1	0.9	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only				0	55
black locust	Robinia pseudoacacia	NDH	Low	1.4	0.1	0.6	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor				0	56
serviceberry	Amelanchier spp.	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown				0	57
American hornbeam; muscle	Carpinus caroliniana	WSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Likely +	Likely +		3	58
bigleaf magnolia	Magnolia macrophylla	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown				0	59
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Likely +	Likely +		3	60
pin cherry	Prunus pensylvanica	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown				0	61
northern red oak	Quercus rubra	WDH	Medium	0	0	0	Unknown	Unknown	High	Modeled	Unknown	Unknown				0	62
American basswood	Tilia americana	WSL	Medium	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown				0	63