

Current and Potential Future Habitat, Capability, and Migration

	sq. km	sq. mi	FIA Plots
Area of Region	59,749	23,069	127

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	1			High	7	13	Increase	4	5	Very Good	0	0
Hickory	1			Medium	14	32	No Change	9	8	Good	3	3
Maple	2	Abundant	0	Low	23	4	Decrease	14	14	Fair	4	5
Oak	7	Common	1	FIA	9		New	6	6	Poor	13	12
Pine	0	Rare	35				Unknown	20	20	Very Poor	6	6
Other	25	Absent	14							FIA Only	5	5
	<b>36</b>		<b>50</b>		<b>53</b>	<b>49</b>		<b>53</b>	<b>53</b>	Unknown	11	11
											<b>42</b>	<b>42</b>

Potential Changes in Climate Variables

Temperature (°F)

	Scenario	2009	2039	2069	2099	
Annual Average	CCSM45	58.9	60.8	62.5	63.1	
	CCSM85	58.9	61.3	63.2	66.2	
	GFDL45	58.9	65.2	63.8	65.2	
	GFDL85	58.9	61.9	64.9	69.1	
	HAD45	58.9	61.3	64.0	64.9	
	HAD85	58.9	61.6	66.2	69.0	
Growing Season (May—Sep)	CCSM45	76.0	78.1	80.0	80.6	
	CCSM85	76.0	78.7	80.7	84.3	
	GFDL45	76.0	84.5	82.1	84.5	
	GFDL85	76.0	80.0	83.6	88.9	
	HAD45	76.0	78.0	80.3	80.9	
	HAD85	76.0	78.6	83.5	85.8	
Coldest Month (Average)	CCSM45	34.1	36.2	37.1	37.9	
	CCSM85	34.1	36.4	37.0	38.7	
	GFDL45	34.1	37.6	37.7	38.0	
	GFDL85	34.1	35.2	36.5	37.2	
	HAD45	34.1	35.2	37.4	37.4	
	HAD85	34.1	37.3	39.4	41.0	
Warmest Month (Average)	CCSM45	82.6	84.8	86.3	86.8	
	CCSM85	82.6	85.7	86.7	88.8	
	GFDL45	82.6	87.5	88.4	90.4	
	GFDL85	82.6	87.6	89.4	93.8	
	HAD45	82.6	84.4	85.9	86.1	
	HAD85	82.6	85.9	88.1	89.3	

Precipitation (in)

	Scenario	2009	2039	2069	2099	
Annual Total	CCSM45	29.4	29.0	29.5	28.6	
	CCSM85	29.4	29.1	30.6	30.3	
	GFDL45	29.4	30.7	33.9	31.4	
	GFDL85	29.4	31.2	33.8	32.0	
	HAD45	29.4	32.1	30.7	32.1	
	HAD85	29.4	30.1	27.0	31.3	
Growing Season (May—Sep)	CCSM45	16.7	15.3	15.4	15.3	
	CCSM85	16.7	16.1	16.3	16.0	
	GFDL45	16.7	17.4	19.3	17.8	
	GFDL85	16.7	18.5	20.0	18.4	
	HAD45	16.7	18.1	18.0	18.2	
	HAD85	16.7	16.2	14.3	16.4	

**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 332F

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
eastern redcedar	Juniperus virginiana	WDH	Medium	26.5	100.5	35.7	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor	Infill +	Infill +	2	1
American elm	Ulmus americana	WDH	Medium	24.2	46.9	17.1	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	2
black locust	Robinia pseudoacacia	NDH	Low	9.1	30.5	33.1	No change	Sm. dec.	Medium	Rare	Poor	Very Poor	Infill +		2	3
eastern cottonwood	Populus deltoides	NSH	Low	9.3	24.6	28.1	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	4
hackberry	Celtis occidentalis	WDH	Medium	13	23.6	8.3	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor	Infill +	Infill +	2	5
black willow	Salix nigra	NSH	Low	9.2	21.2	16.6	Sm. dec.	Sm. dec.	Low	Rare	Very Poor	Very Poor			2	6
red mulberry	Morus rubra	NSL	Low	10.2	19.8	16.8	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			2	7
Osage-orange	Maclura pomifera	NDH	Medium	11	17.2	15.0	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor	Infill +	Infill +	2	8
Siberian elm	Ulmus pumila	NDH	FIA	8.3	16.3	18.8	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	9
black walnut	Juglans nigra	WDH	Low	7.9	10.8	10.7	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			2	10
honeylocust	Gleditsia triacanthos	NSH	Low	4.9	10.3	15.9	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor	Infill +	Infill +	2	11
post oak	Quercus stellata	WDH	High	3.9	9.3	17.7	Sm. inc.	Sm. inc.	High	Rare	Good	Good			2	12
cittamwood/gum bumelia	Sideroxylon lanuginosum ssp.	NSL	Low	7.8	8.9	12.3	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	2	13
blackjack oak	Quercus marilandica	NSL	Medium	5.8	7.0	12.5	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	2	14
green ash	Fraxinus pennsylvanica	WSH	Low	6.4	6.1	7.6	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	15
northern catalpa	Catalpa speciosa	NSHX	FIA	4	5.2	13.0	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	16
ashe juniper	Juniperus ashei	NDH	High	0.7	4.2	100.0	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			0	17
bur oak	Quercus macrocarpa	NDH	Medium	2.2	4.1	14.2	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor			0	18
peachleaf willow	Salix amygdaloides	NSLX	FIA	1.4	4.0	48.3	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	19
sugarberry	Celtis laevigata	NDH	Medium	2.4	3.9	3.2	No change	Sm. inc.	Medium	Rare	Poor	Fair	Infill +	Infill +	2	20
white mulberry	Morus alba	NSL	FIA	1.7	3.1	12.9	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	21
wild plum	Prunus americana	NSLX	FIA	1.6	1.3	9.5	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	22
slippery elm	Ulmus rubra	WSL	Low	1.9	1.2	4.9	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	23
pecan	Carya illinoensis	NSH	Low	1.1	1.0	3.5	Lg. inc.	Lg. inc.	Low	Rare	Fair	Fair	Infill +	Infill +	2	24
common persimmon	Diospyros virginiana	NSL	Low	0.5	1.0	16.4	Very Lg. dec.	Very Lg. dec.	High	Rare	Lost	Lost			0	25
paulownia	Paulownia tomentosa	NSL	FIA	0.4	0.9	10.5	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	26
chinkapin oak	Quercus muehlenbergii	NSL	Medium	1	0.7	5.1	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	27
Kentucky coffeetree	Gymnocladus dioicus	NSLX	FIA	1.6	0.6	2.6	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	28
boxelder	Acer negundo	WDH	Low	0.5	0.5	2.4	No change	No change	High	Rare	Fair	Fair		Infill +	2	29
sugar maple	Acer saccharum	WDH	High	0.7	0.3	7.4	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor			0	30
winged elm	Ulmus alata	WDL	Medium	1.4	0.2	2.8	Sm. dec.	No change	Medium	Rare	Very Poor	Poor			0	31
black oak	Quercus velutina	WDH	High	0.6	0.2	4.4	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	32
rock elm	Ulmus thomasii	NSLX	FIA	0.7	0.2	5.5	Unknown	Unknown	Low	Rare	FIA Only	FIA Only			0	33
Shumard oak	Quercus shumardii	NSL	Low	0.3	0.1	1.0	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor			0	34
ailanthus	Ailanthus altissima	NSL	FIA	0.4	0.1	1.0	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	35
northern red oak	Quercus rubra	WDH	Medium	0.7	0.0	0.6	Lg. inc.	Sm. inc.	High	Rare	Good	Good			2	36
slash pine	Pinus elliottii	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	37
spruce pine	Pinus glabra	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	38
longleaf pine	Pinus palustris	NSH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	39
striped maple	Acer pensylvanicum	NSL	Medium	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	40
Ohio buckeye	Aesculus glabra	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	41
serviceberry	Amelanchier spp.	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	42
pawpaw	Asimina triloba	NSL	Low	0	0	0	Unknown	Unknown	Medium	Modeled	Unknown	Unknown			0	43
shellbark hickory	Carya laciniosa	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	44
black hickory	Carya texana	NDL	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	45
eastern redbud	Cercis canadensis	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	46
bigleaf magnolia	Magnolia macrophylla	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	47



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Common Name	Scientific Name	Range	MR	%Cell	FIAsum	FIAiv	ChngCl45	ChngCl85	Adap	Abund	Capabil45	Capabil85	SHIFT45	SHIFT85	SSO	N
eastern hophornbeam; ironw	<i>Ostrya virginiana</i>	WSL	Low	0	0	0	Unknown	Unknown	High	Modeled	Unknown	Unknown			0	48
pin cherry	<i>Prunus pensylvanica</i>	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	49
cherrybark oak; swamp red o.	<i>Quercus pagoda</i>	NSL	Medium	0	0	0	Unknown	Unknown	Medium	Modeled	Unknown	Unknown			0	50
swamp chestnut oak	<i>Quercus michauxii</i>	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	51
live oak	<i>Quercus virginiana</i>	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate ++	Migrate ++	3	52
cedar elm	<i>Ulmus crassifolia</i>	NDH	Medium	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat	Migrate ++	Migrate ++	3	53