

### Current and Potential Future Habitat, Capability, and Migration

	sq. km	sq. mi	FIA Plots
Area of Region	8,500.0	3,281.9	260

#### 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	Medium	Low	FIA	RCP45	RCP85	RCP45	RCP85	RCP45	RCP85		
Ash	2			22	24	Increase		26	31	Very Good	10	11	Likely	2	2
Hickory	6			31	52	No Change		12	9	Good	17	19	Infill	12	14
Maple	5	Abundant	6	38	16	Decrease		29	27	Fair	9	11	Migrate	1	9
Oak	14	Common	24	4		New		15	15	Poor	14	12			
Pine	5	Rare	41			Unknown		13	13	Very Poor	17	14			
Other	39	Absent	22							FIA Only	2	2			
	71		93					95	95	Unknown	9	9			
											78	78			

#### Potential Changes in Climate Variables

##### Temperature (°F)

	Scenario	2009	2039	2069	2099	
Annual Average	CCSM45	58.6	60.4	62.6	62.7	
	CCSM85	58.6	60.8	63.3	66.0	
	GFDL45	58.6	61.2	63.4	64.2	
	GFDL85	58.6	61.2	64.6	68.0	
	HAD45	58.6	60.8	63.8	65.1	
HAD85	58.6	61.2	65.6	69.4		
Growing Season (May—Sep)	CCSM45	72.8	74.5	76.5	77.0	
	CCSM85	72.8	74.8	77.5	81.0	
	GFDL45	72.8	75.6	78.2	79.6	
	GFDL85	72.8	75.8	79.8	83.7	
	HAD45	72.8	76.0	78.8	80.3	
HAD85	72.8	76.0	82.4	85.9		
Coldest Month Average	CCSM45	37.1	39.3	40.3	40.3	
	CCSM85	37.1	39.9	40.8	42.1	
	GFDL45	37.1	40.5	40.5	40.9	
	GFDL85	37.1	38.8	39.9	40.4	
	HAD45	37.1	36.8	38.9	39.2	
HAD85	37.1	38.1	39.5	41.1		
Warmest Month Average	CCSM45	77.7	79.6	80.5	80.6	
	CCSM85	77.7	79.7	81.3	83.1	
	GFDL45	77.7	80.4	81.8	82.7	
	GFDL85	77.7	80.7	83.1	85.1	
	HAD45	77.7	81.9	84.0	84.6	
HAD85	77.7	82.5	87.0	88.4		

##### Precipitation (in)

	Scenario	2009	2039	2069	2099	
Annual Total	CCSM45	55.0	57.9	61.4	60.2	
	CCSM85	55.0	59.3	60.8	66.5	
	GFDL45	55.0	62.5	64.5	69.0	
	GFDL85	55.0	62.2	65.4	67.7	
	HAD45	55.0	53.1	58.6	59.6	
HAD85	55.0	58.0	52.1	57.5		
Growing Season (May—Sep)	CCSM45	21.4	22.2	22.9	23.2	
	CCSM85	21.4	22.3	21.5	23.8	
	GFDL45	21.4	26.0	26.6	27.6	
	GFDL85	21.4	25.3	27.2	28.1	
	HAD45	21.4	20.6	21.5	21.4	
HAD85	21.4	22.7	16.8	19.4		

**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.

**Cite as:** Iverson, L.R.; Prasad, A.M.; Peters, M.P.; Matthews, S.N. 2019. Facilitating Adaptive Forest Management under Climate Change: A Spatially Specific Synthesis of 125 Species for Habitat Changes and Assisted Migration over the Eastern United States. *Forests*. 10(11): 989. <https://doi.org/10.3390/f10110989>.

# Chickamauga and Chattanooga

## National Park 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
loblolly pine	Pinus taeda	WDH	High	55.3	1126.3	20.4	Sm. inc.	Sm. inc.	Medium	Abundant	Very Good	Very Good			1	1
chestnut oak	Quercus prinus	NDH	High	67.1	987.8	14.7	Sm. dec.	Sm. dec.	High	Abundant	Good	Good			1	2
Virginia pine	Pinus virginiana	NDH	High	78.8	844.3	10.7	Lg. dec.	Lg. dec.	Medium	Abundant	Fair	Fair			0	3
red maple	Acer rubrum	WDH	High	80	669.8	8.4	Sm. dec.	Sm. dec.	High	Abundant	Good	Good			1	4
white oak	Quercus alba	WDH	Medium	74.1	630.8	8.5	Sm. inc.	Sm. inc.	High	Abundant	Very Good	Very Good			1	5
yellow-poplar	Liriodendron tulipifera	WDH	High	70.6	575.4	8.2	Sm. dec.	Lg. dec.	High	Abundant	Good	Good			1	6
sweetgum	Liquidambar styraciflua	WDH	High	61.2	496.7	8.1	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	7
pignut hickory	Carya glabra	WDL	Medium	61.2	287.2	4.7	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor			0	8
shortleaf pine	Pinus echinata	WDH	High	55.3	286.1	5.2	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	9
sourwood	Oxydendrum arboreum	NDL	High	62.4	274.8	4.4	Lg. dec.	Lg. dec.	High	Common	Fair	Fair			1	10
mockernut hickory	Carya alba	WDL	Medium	65.9	266.2	4.0	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	11
blackgum	Nyssa sylvatica	WDL	Medium	74.1	235.8	3.2	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	12
black oak	Quercus velutina	WDH	High	56.5	207.7	3.7	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	13
scarlet oak	Quercus coccinea	WDL	Medium	48.2	203.5	4.2	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	14
black cherry	Prunus serotina	WDL	Medium	52.9	200.3	3.8	Sm. inc.	Sm. inc.	Low	Common	Fair	Fair			1	15
southern red oak	Quercus falcata	WDL	Medium	38.8	186.9	4.8	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	16
eastern redcedar	Juniperus virginiana	WDH	Medium	29.4	181.4	6.2	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	17
post oak	Quercus stellata	WDH	High	41.2	160.7	3.9	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	18
red mulberry	Morus rubra	NSL	Low	5.9	121.8	20.7	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	19
northern red oak	Quercus rubra	WDH	Medium	47.1	121.6	2.6	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	20
sugarberry	Celtis laevigata	NDH	Medium	7.1	107.1	15.2	No change	No change	Medium	Common	Fair	Fair	Infill +	Infill +	1	21
green ash	Fraxinus pennsylvanica	WSH	Low	23.5	100.0	4.3	Sm. inc.	Lg. inc.	Medium	Common	Good	Very Good			1	22
winged elm	Ulmus alata	WDL	Medium	34.1	97.8	2.9	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	23
sassafras	Sassafras albidum	WSL	Low	37.6	80.9	2.2	Sm. dec.	Sm. inc.	Medium	Common	Poor	Good			1	24
flowering dogwood	Cornus florida	WDL	Medium	42.4	78.8	1.9	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	25
shagbark hickory	Carya ovata	WSL	Medium	30.6	77.6	2.5	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor			0	26
boxelder	Acer negundo	WSH	Low	7.1	73.3	10.4	No change	No change	High	Common	Good	Good			1	27
sugar maple	Acer saccharum	WDH	High	18.8	58.2	3.1	Lg. dec.	Lg. dec.	High	Common	Fair	Fair			1	28
eastern white pine	Pinus strobus	WDH	High	5.9	55.7	9.5	No change	No change	Low	Common	Poor	Poor	Infill +	Infill +	0	29
black walnut	Juglans nigra	WDH	Low	12.9	50.2	3.9	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	30
hackberry	Celtis occidentalis	WDH	Medium	9.4	48.2	5.1	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	1	31
black locust	Robinia pseudoacacia	NDH	Low	12.9	42.7	3.3	Sm. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	32
common persimmon	Diospyros virginiana	NSL	Low	8.2	41.9	5.1	No change	No change	High	Rare	Fair	Fair			1	33
eastern hemlock	Tsuga canadensis	NSH	High	10.6	40.3	3.8	No change	Sm. dec.	Low	Rare	Very Poor	Very Poor			0	34
blackjack oak	Quercus marilandica	NSL	Medium	11.8	40.1	3.4	Lg. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	1	35
white ash	Fraxinus americana	WDL	Medium	24.7	39.4	1.6	Lg. inc.	Lg. inc.	Low	Rare	Fair	Fair			1	36
American beech	Fagus grandifolia	WDH	High	15.3	38.3	2.5	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	1	37
American elm	Ulmus americana	WDH	Medium	16.5	37.9	2.3	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	1	38
eastern redbud	Cercis canadensis	NSL	Low	23.5	35.8	1.5	Lg. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	39
silver maple	Acer saccharinum	NSH	Low	1.2	34.4	29.2	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor			0	40
slippery elm	Ulmus rubra	WSL	Low	11.8	32.7	2.8	Sm. dec.	Sm. inc.	Medium	Rare	Very Poor	Fair			1	41
American basswood	Tilia americana	WSL	Medium	4.7	32.3	6.9	Sm. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	42
water oak	Quercus nigra	WDH	High	12.9	30.2	2.3	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	1	43
sycamore	Platanus occidentalis	NSL	Low	7.1	28.1	4.0	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	1	44
chinkapin oak	Quercus muehlenbergii	NSL	Medium	5.9	25.0	4.3	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	1	45
American hornbeam; musclev	Carpinus caroliniana	WSL	Low	8.2	21.9	2.7	No change	Sm. inc.	Medium	Rare	Poor	Fair			1	46
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	15.3	21.5	1.4	Lg. inc.	Lg. inc.	High	Rare	Good	Good			1	47



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florida maple	Acer barbatum	NSL	Low	14.1	20.5	1.5	Sm. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	1	48
willow oak	Quercus phellos	NSL	Low	3.5	16.8	4.8	Sm. dec.	No change	Medium	Rare	Very Poor	Poor		Infill +	2	49
water tupelo	Nyssa aquatica	NSH	Medium	1.2	16.4	13.9	Sm. dec.	Sm. dec.	Low	Rare	Very Poor	Very Poor			0	50
sand hickory	Carya pallida	NSL	FIA	3.5	12.2	3.5	Unknown	Unknown	NA	Rare	FIA Only	FIA Only			0	51
paulownia	Paulownia tomentosa	NSL	FIA	1.2	7.5	6.4	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	52
shellbark hickory	Carya laciniosa	NSL	Low	3.5	7.4	2.1	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	53
bitternut hickory	Carya cordiformis	WSL	Low	4.7	5.8	1.2	Lg. dec.	Lg. dec.	High	Rare	Poor	Poor			0	54
sweet birch	Betula lenta	NDH	High	3.5	5.2	1.5	Sm. dec.	Lg. dec.	Low	Rare	Very Poor	Very Poor			0	55
swamp chestnut oak	Quercus michauxii	NSL	Low	2.4	4.6	2.0	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	56
cherrybark oak; swamp red o	Quercus pagoda	NSL	Medium	3.5	3.7	1.0	No change	Lg. inc.	Medium	Rare	Poor	Good	Infill +		2	57
American holly	Ilex opaca	NSL	Medium	2.4	3.7	1.6	No change	No change	Medium	Rare	Poor	Poor		Infill +	1	58
river birch	Betula nigra	NSL	Low	1.2	3.1	2.7	Sm. inc.	Lg. inc.	Medium	Rare	Fair	Good	Infill +	Infill ++	2	59
black willow	Salix nigra	NSH	Low	2.4	3.1	1.3	No change	Lg. inc.	Low	Rare	Very Poor	Fair		Infill +	2	60
ailanthus	Ailanthus altissima	NSL	FIA	3.5	3.0	0.9	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	61
serviceberry	Amelanchier spp.	NSL	Low	3.5	2.7	0.8	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	62
yellow buckeye	Aesculus flava	NSL	Low	2.4	2.5	1.1	Lg. dec.	Lg. dec.	Low	Rare	Very Poor	Very Poor			0	63
honeylocust	Gleditsia triacanthos	NSH	Low	3.5	1.8	0.5	Lg. inc.	Lg. inc.	High	Rare	Good	Good			2	64
pin cherry	Prunus pensylvanica	NSL	Low	1.2	1.4	1.2	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	65
longleaf pine	Pinus palustris	NSH	Medium	1.2	0.9	0.7	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	66
rock elm	Ulmus thomasii	NSLX	FIA	1.2	0.8	0.7	Unknown	Unknown	Low	Rare	FIA Only	FIA Only			0	67
yellow birch	Betula alleghaniensis	NDL	High	1.2	0.7	0.6	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	68
mountain or Fraser magnolia	Magnolia fraseri	NSL	Low	1.2	0.4	0.3	Lg. dec.	Lg. dec.	Low	Rare	Very Poor	Very Poor			0	69
bigleaf magnolia	Magnolia macrophylla	NSL	Low	1.2	0.3	0.2	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	70
laurel oak	Quercus laurifolia	NDH	Medium	1.2	0.2	0.2	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	71
ashe juniper	Juniperus ashei	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	72
slash pine	Pinus elliotii	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate ++	3	73
northern white-cedar	Thuja occidentalis	WSH	High	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	74
striped maple	Acer pensylvanicum	NSL	Medium	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	75
mountain maple	Acer spicatum	NSL	Low	0	0	0	Unknown	Unknown	High	Absent	Unknown	Unknown			0	76
Ohio buckeye	Aesculus glabra	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	77
pawpaw	Asimina triloba	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	78
cittamwood/gum bumelia	Sideroxylon lanuginosum ssp.	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate ++	3	79
pecan	Carya illinoensis	NSH	Low	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat		Migrate +	3	80
black hickory	Carya texana	NDL	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	81
black ash	Fraxinus nigra	WSH	Medium	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat			3	82
blue ash	Fraxinus quadrangulata	NSL	Low	0	0	0	Unknown	Unknown	Low	Absent	Unknown	Unknown			0	83
silverbell	Halesia spp.	NSL	Low	0	0	0	New Habitat	Unknown	Medium	Absent	New Habitat	Unknown			3	84
Osage-orange	Maclura pomifera	NDH	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate +	3	85
cucumbertree	Magnolia acuminata	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Likely +	Likely +	3	86
southern magnolia	Magnolia grandiflora	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	87
sweetbay	Magnolia virginiana	NSL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	88
swamp tupelo	Nyssa biflora	NDH	Medium	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat			3	89
bigtooth aspen	Populus grandidentata	NSL	Medium	0	0	0	Unknown	Unknown	Medium	Modeled	Unknown	Unknown			0	90
pin oak	Quercus palustris	NSH	Low	0	0	0	Unknown	Unknown	Low	Modeled	Unknown	Unknown			0	91
Shumard oak	Quercus shumardii	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Likely +	Likely +	3	92
live oak	Quercus virginiana	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate ++	3	93
bluejack oak	Quercus incana	NSL	Low	0	0	0	Unknown	New Habitat	Medium	Absent	Unknown	New Habitat		Migrate +	3	94



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cedar elm	Ulmus crassifolia	NDH	Medium	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat			3	95