

National Park
Climate Change Atlas Tree Species
 Current and Potential Future Habitat, Capability, and Migration

	sq. km	sq. mi	FIA Plots
Area of Region	8,600.0	3,320.5	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		Increase	RCP45	RCP85	Very Good	RCP45	RCP85	Likely	RCP45	RCP85
Ash	2			18	23	25	30	13	16	2	2			
Hickory	6			32	51	15	11	11	14	6	6			
Maple	5	Abundant	4	36	13	26	25	17	13			Infill	2	7
Oak	17	Common	32	4		12	13	11	9			Migrate	2	7
Pine	4	Rare	34			12	13	13	13					
Other	36	Absent	18	FIA	4	New	12	13	Poor	11	9			
	70		88			Unknown	12	11	Very Poor	13	13			
							90	90	FIA Only	2	2			
									Unknown	8	7			
										75	74			

Potential Changes in Climate Variables

Temperature (°F)

Scenario	2009	2039	2069	2099	
Annual	59.8	61.5	63.7	64.0	
Average	59.8	61.9	64.6	67.4	
GFDL45	59.8	62.7	64.6	65.4	
GFDL85	59.8	62.4	65.6	69.0	
HAD45	59.8	62.3	65.4	66.7	
HAD85	59.8	62.7	67.2	71.0	
Growing Season	74.5	76.1	77.9	78.5	
May—Sep	74.5	77.5	81.2	85.3	
Coldest Month	37.2	39.4	40.7	40.9	
Average	37.2	40.8	40.9	41.2	
GFDL45	37.2	38.9	40.2	40.6	
GFDL85	37.2	37.9	40.0	40.4	
HAD45	37.2	38.9	40.6	42.3	
Warmest Month	79.6	80.9	81.9	82.1	
Average	79.6	81.4	82.7	84.6	
GFDL45	79.6	83.4	84.2	85.1	
GFDL85	79.6	82.8	84.7	87.0	
HAD45	79.6	84.2	86.7	87.1	
HAD85	79.6	85.3	89.8	91.0	

Precipitation (in)

Scenario	2009	2039	2069	2099	
Annual	55.8	57.5	62.7	61.0	
Total	55.8	59.9	61.4	65.4	
GFDL45	55.8	63.3	67.2	69.3	
GFDL85	55.8	64.0	67.6	71.4	
HAD45	55.8	52.3	58.5	58.8	
HAD85	55.8	55.7	51.0	56.1	
Growing Season	22.0	21.1	21.6	22.0	
May—Sep	22.0	25.2	26.5	27.3	
Coldest Month	22.0	19.5	20.7	19.4	
Average	22.0	20.9	15.7	16.8	

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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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	<i>Pinus taeda</i>	WDH	High	67.4	1499.2	23.8	Sm. inc.	Sm. inc.	Medium	Abundant	Very Good	Very Good			1	1
sweetgum	<i>Liquidambar styraciflua</i>	WDH	High	91.9	932.9	10.6	Sm. inc.	Sm. inc.	Medium	Abundant	Very Good	Very Good			1	2
white oak	<i>Quercus alba</i>	WDH	Medium	77.9	683.2	9.3	Sm. dec.	Sm. dec.	High	Abundant	Good	Good			1	3
shortleaf pine	<i>Pinus echinata</i>	WDH	High	58.1	580.9	10.8	Sm. inc.	Sm. inc.	Medium	Abundant	Very Good	Very Good			1	4
yellow-poplar	<i>Liriodendron tulipifera</i>	WDH	High	76.7	483.9	6.6	Lg. dec.	Lg. dec.	High	Common	Fair	Fair			1	5
red maple	<i>Acer rubrum</i>	WDH	High	79.1	447.2	6.0	No change	No change	High	Common	Good	Good			1	6
southern red oak	<i>Quercus falcata</i>	WDL	Medium	73.3	375.0	5.4	Sm. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	7
pignut hickory	<i>Carya glabra</i>	WDL	Medium	65.1	330.8	5.4	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	8
post oak	<i>Quercus stellata</i>	WDH	High	67.4	312.6	4.9	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	9
eastern redcedar	<i>Juniperus virginiana</i>	WDH	Medium	62.8	290.7	4.9	Sm. inc.	Lg. inc.	Medium	Common	Good	Very Good			1	10
chestnut oak	<i>Quercus prinus</i>	NDH	High	20.9	240.1	11.5	Lg. dec.	Lg. dec.	High	Common	Fair	Fair			1	11
black cherry	<i>Prunus serotina</i>	WDL	Medium	77.9	221.1	3.0	No change	No change	Low	Common	Poor	Poor			0	12
blackgum	<i>Nyssa sylvatica</i>	WDL	Medium	75.6	198.6	2.8	Sm. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	13
winged elm	<i>Ulmus alata</i>	WDL	Medium	62.8	193.3	3.4	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	14
black oak	<i>Quercus velutina</i>	WDH	High	59.3	191.6	3.5	No change	No change	Medium	Common	Fair	Fair			1	15
American beech	<i>Fagus grandifolia</i>	WDH	High	39.5	161.8	4.1	No change	Sm. inc.	Medium	Common	Fair	Good			1	16
green ash	<i>Fraxinus pennsylvanica</i>	WSH	Low	47.7	159.8	3.9	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	17
sourwood	<i>Oxydendrum arboreum</i>	NDL	High	43	131.3	3.1	Lg. dec.	Lg. dec.	High	Common	Fair	Fair			1	18
mockernut hickory	<i>Carya alba</i>	WDL	Medium	53.5	128.7	2.6	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	19
sugarberry	<i>Celtis laevigata</i>	NDH	Medium	20.9	111.1	5.3	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	20
cherrybark oak; swamp red o.	<i>Quercus pagoda</i>	NSL	Medium	29.1	103.0	4.1	Sm. inc.	Lg. inc.	Medium	Common	Good	Very Good			1	21
sugar maple	<i>Acer saccharum</i>	WDH	High	22.1	101.4	4.6	Lg. dec.	Lg. dec.	High	Common	Fair	Fair			1	22
scarlet oak	<i>Quercus coccinea</i>	WDL	Medium	31.4	99.3	3.2	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	23
flowering dogwood	<i>Cornus florida</i>	WDL	Medium	61.6	98.3	1.6	No change	No change	Medium	Common	Fair	Fair			1	24
eastern hophornbeam; ironw	<i>Ostrya virginiana</i>	WSL	Low	36	95.5	2.7	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	25
sycamore	<i>Platanus occidentalis</i>	NSL	Low	25.6	94.4	4.3	No change	Sm. inc.	Medium	Common	Fair	Good			1	26
shagbark hickory	<i>Carya ovata</i>	WSL	Medium	26.7	84.4	3.2	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	27
northern red oak	<i>Quercus rubra</i>	WDH	Medium	34.9	83.5	2.4	Sm. dec.	Sm. dec.	High	Common	Fair	Fair			1	28
boxelder	<i>Acer negundo</i>	WSH	Low	12.8	80.4	6.3	Sm. dec.	No change	High	Common	Fair	Good			1	29
black willow	<i>Salix nigra</i>	NSH	Low	15.1	76.8	6.7	Sm. inc.	Lg. inc.	Low	Common	Fair	Good			1	30
American hornbeam; muscle	<i>Carpinus caroliniana</i>	WSL	Low	33.7	74.0	2.2	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	31
willow oak	<i>Quercus phellos</i>	NSL	Low	17.4	70.1	4.0	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	32
American elm	<i>Ulmus americana</i>	WDH	Medium	24.4	69.1	2.8	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	33
sassafras	<i>Sassafras albidum</i>	WSL	Low	32.6	55.0	1.7	Sm. inc.	Lg. inc.	Medium	Common	Good	Very Good			1	34
slippery elm	<i>Ulmus rubra</i>	WSL	Low	31.4	54.7	2.0	No change	Sm. inc.	Medium	Common	Fair	Good			1	35
common persimmon	<i>Diospyros virginiana</i>	NSL	Low	39.5	50.3	1.4	Lg. dec.	Sm. dec.	High	Common	Fair	Fair			1	36
white ash	<i>Fraxinus americana</i>	WDL	Medium	26.7	47.0	2.0	Sm. inc.	Lg. inc.	Low	Rare	Poor	Fair			1	37
water oak	<i>Quercus nigra</i>	WDH	High	24.4	45.5	2.2	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			1	38
Virginia pine	<i>Pinus virginiana</i>	NDH	High	9.3	44.0	4.7	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	1	39
blackjack oak	<i>Quercus marilandica</i>	NSL	Medium	18.6	41.0	2.2	Lg. inc.	Lg. inc.	High	Rare	Good	Good			1	40
river birch	<i>Betula nigra</i>	NSL	Low	5.8	33.4	5.8	No change	Sm. inc.	Medium	Rare	Poor	Fair			1	41
bitternut hickory	<i>Carya cordiformis</i>	WSL	Low	4.7	31.5	6.8	Lg. dec.	Lg. dec.	High	Rare	Poor	Poor			1	42
eastern redbud	<i>Cercis canadensis</i>	NSL	Low	15.1	25.0	1.7	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	43
chinkapin oak	<i>Quercus muehlenbergii</i>	NSL	Medium	11.6	21.1	1.8	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	44
black locust	<i>Robinia pseudoacacia</i>	NDH	Low	4.7	20.7	4.5	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	45
shellbark hickory	<i>Carya laciniosa</i>	NSL	Low	7	14.9	2.1	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	46
water tupelo	<i>Nyssa aquatica</i>	NSH	Medium	5.8	14.9	2.6	Lg. dec.	Lg. dec.	Low	Rare	Very Poor	Very Poor			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
honeylocust	Gleditsia triacanthos	NSH	Low	4.7	12.2	2.6	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	1	48
silver maple	Acer saccharinum	NSH	Low	4.7	12.2	2.6	Sm. dec.	Lg. dec.	High	Rare	Poor	Poor			0	49
black walnut	Juglans nigra	WDH	Low	7	12.1	1.7	No change	Sm. dec.	Medium	Rare	Poor	Very Poor	Infill +		1	50
eastern cottonwood	Populus deltoides	NSH	Low	2.3	11.9	5.1	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	51
Shumard oak	Quercus shumardii	NSL	Low	10.5	10.5	1.7	No change	Sm. inc.	High	Rare	Fair	Good	Infill +	Infill ++	1	52
bald cypress	Taxodium distichum	NSH	Medium	3.5	9.1	2.6	Very Lg. dec.	Very Lg. dec.	Medium	Rare	Lost	Lost			0	53
American holly	Ilex opaca	NSL	Medium	7	9.0	1.3	No change	No change	Medium	Rare	Poor	Poor			1	54
florida maple	Acer barbatum	NSL	Low	2.3	7.5	3.2	No change	No change	High	Rare	Fair	Fair		Infill +	2	55
pin oak	Quercus palustris	NSH	Low	1.2	6.8	5.9	Sm. dec.	Sm. dec.	Low	Rare	Very Poor	Very Poor			0	56
red mulberry	Morus rubra	NSL	Low	5.8	6.8	1.2	Sm. dec.	No change	Medium	Rare	Very Poor	Poor			1	57
sweetbay	Magnolia virginiana	NSL	Medium	1.2	6.6	5.7	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	2	58
overcup oak	Quercus lyrata	NSL	Medium	3.5	6.1	1.7	No change	No change	Low	Rare	Very Poor	Very Poor			2	59
swamp chestnut oak	Quercus michauxii	NSL	Low	2.3	4.5	1.9	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			2	60
serviceberry	Amelanchier spp.	NSL	Low	8.1	4.2	0.5	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	61
American basswood	Tilia americana	WSL	Medium	1.2	2.9	2.5	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	62
swamp white oak	Quercus bicolor	NSL	Low	1.2	2.9	2.5	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	63
hackberry	Celtis occidentalis	WDH	Medium	2.3	2.8	1.2	Sm. inc.	Sm. inc.	High	Rare	Good	Good	Infill ++	Infill ++	2	64
rock elm	Ulmus thomasii	NSLX	FIA	2.3	2.2	1.0	Unknown	Unknown	Low	Rare	FIA Only	FIA Only			0	65
sand hickory	Carya pallida	NSL	FIA	2.3	2.2	0.9	Unknown	Unknown	NA	Rare	FIA Only	FIA Only			0	66
swamp tupelo	Nyssa biflora	NDH	Medium	1.2	1.1	1.0	Lg. inc.	Lg. inc.	Low	Rare	Fair	Fair			0	67
ailanthus	Ailanthus altissima	NSL	FIA	2.3	1.1	0.5	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	68
white mulberry	Morus alba	NSL	FIA	1.2	0.6	0.6	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	69
slash pine	Pinus elliotii	NDH	High	1.2	0.5	0.4	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	70
ashe juniper	Juniperus ashei	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	71
longleaf pine	Pinus palustris	NSH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	72
striped maple	Acer pensylvanicum	NSL	Medium	0	0	0	Unknown	New Habitat	Medium	Absent	Unknown	New Habitat			3	73
Ohio buckeye	Aesculus glabra	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	74
yellow buckeye	Aesculus flava	NSL	Low	0	0	0	Unknown	Unknown	Low	Absent	Unknown	Unknown			0	75
pawpaw	Asimina triloba	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	76
sweet birch	Betula lenta	NDH	High	0	0	0	Unknown	Unknown	Low	Absent	Unknown	Unknown			0	77
cittamwood/gum bumelia	Sideroxylon lanuginosum ssp.	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate ++	3	78
pecan	Carya illinoensis	NSH	Low	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat	Likely +	Likely +	3	79
black hickory	Carya texana	NDL	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	80
black ash	Fraxinus nigra	WSH	Medium	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat			3	81
silverbell	Halesia spp.	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	82
Osage-orange	Maclura pomifera	NDH	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate ++	3	83
cucumbertree	Magnolia acuminata	NSL	Low	0	0	0	Unknown	Unknown	Medium	Modeled	Unknown	Unknown			0	84
southern magnolia	Magnolia grandiflora	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	85
water elm	Planera aquatica	NSL	Low	0	0	0	Unknown	Unknown	Medium	Modeled	Unknown	Unknown			0	86
laurel oak	Quercus laurifolia	NDH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Likely +	Likely +	3	87
live oak	Quercus virginiana	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate ++	3	88
bluejack oak	Quercus incana	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	89
cedar elm	Ulmus crassifolia	NDH	Medium	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat		Migrate ++	3	90