

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

	sq. km	sq. mi	FIA Plots
Area of Region	8,100.0	3,127.4	214

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	23	Increase	19	20	Very Good	5	4	Likely	0	0
Hickory	4		Medium	24	No Change	10	11	Good	13	18	Infill	11	12
Maple	6	Abundant	Low	32	Decrease	21	19	Fair	16	11	Migrate	4	11
Oak	8	Common	FIA	7	New	20	23	Poor	5	7		15	23
Pine	4	Rare			Unknown	16	13	Very Poor	10	8			
Other	32	Absent				86	86	FIA Only	4	4			
	57	86						Unknown	9	6			
									62	58			

Potential Changes in Climate Variables

Temperature (°F)

	Scenario	2009	2039	2069	2099	
Annual Average	CCSM45	46.0	47.9	50.3	50.4	
	CCSM85	46.0	48.4	51.0	54.3	
	GFDL45	46.0	48.9	52.5	53.8	
	GFDL85	46.0	49.6	53.9	58.7	
	HAD45	46.0	49.1	52.3	54.0	
HAD85	46.0	49.1	53.3	58.9		
Growing Season (May—Sep)	CCSM45	63.5	65.7	67.4	68.0	
	CCSM85	63.5	65.9	68.4	72.2	
	GFDL45	63.5	66.5	70.7	72.3	
	GFDL85	63.5	67.6	72.2	77.4	
	HAD45	63.5	66.6	69.3	71.6	
HAD85	63.5	66.2	70.7	76.9		
Coldest Month	CCSM45	18.5	20.4	22.6	22.9	
	CCSM85	18.5	21.4	22.6	25.0	
	GFDL45	18.5	21.9	24.0	25.0	
	GFDL85	18.5	22.7	24.7	27.4	
	HAD45	18.5	21.1	24.2	24.4	
HAD85	18.5	22.3	24.9	28.3		
Warmest Month	CCSM45	69.4	72.1	73.2	73.3	
	CCSM85	69.4	72.4	74.1	76.2	
	GFDL45	69.4	72.5	74.6	76.0	
	GFDL85	69.4	73.8	76.7	79.5	
	HAD45	69.4	72.8	74.3	75.7	
HAD85	69.4	72.6	75.2	79.7		

Precipitation (in)

	Scenario	2009	2039	2069	2099	
Annual Total	CCSM45	44.2	43.8	42.0	46.7	
	CCSM85	44.2	44.1	45.8	47.8	
	GFDL45	44.2	48.4	50.0	48.6	
	GFDL85	44.2	46.3	49.3	51.5	
	HAD45	44.2	46.5	47.9	47.3	
HAD85	44.2	47.5	47.6	50.3		
Growing Season (May—Sep)	CCSM45	20.4	20.4	19.1	20.6	
	CCSM85	20.4	20.0	21.0	20.0	
	GFDL45	20.4	20.9	19.8	20.0	
	GFDL85	20.4	20.4	20.0	19.4	
	HAD45	20.4	21.9	20.6	21.3	
HAD85	20.4	20.6	20.6	21.7		

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
red maple	Acer rubrum	WDH	High	88.9	1320.5	14.9	No change	Sm. dec.	High	Abundant	Very Good	Good			1	1
sugar maple	Acer saccharum	WDH	High	80.2	1240.2	15.5	Sm. dec.	Sm. dec.	High	Abundant	Good	Good			1	2
eastern white pine	Pinus strobus	WDH	High	69.1	1081.0	15.6	Sm. dec.	Lg. dec.	Low	Abundant	Fair	Poor			0	3
American beech	Fagus grandifolia	WDH	High	63	618.9	9.8	Sm. dec.	Sm. dec.	Medium	Abundant	Fair	Fair			0	4
northern red oak	Quercus rubra	WDH	Medium	58	603.9	10.4	Sm. inc.	Sm. inc.	High	Abundant	Very Good	Very Good			1	5
eastern hemlock	Tsuga canadensis	NSH	High	53.1	542.4	10.2	Sm. dec.	Sm. dec.	Low	Abundant	Fair	Fair			0	6
white ash	Fraxinus americana	WDL	Medium	67.9	522.9	7.7	No change	No change	Low	Abundant	Fair	Fair			0	7
black cherry	Prunus serotina	WDL	Medium	63	401.7	6.4	Sm. inc.	No change	Low	Common	Fair	Poor			1	8
American elm	Ulmus americana	WDH	Medium	45.7	322.4	7.1	No change	No change	Medium	Common	Fair	Fair			1	9
yellow birch	Betula alleghaniensis	NDL	High	40.7	269.4	6.6	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor			0	10
sweet birch	Betula lenta	NDH	High	46.9	215.7	4.6	Sm. inc.	No change	Low	Common	Fair	Poor			1	11
bitternut hickory	Carya cordiformis	WSL	Low	32.1	213.8	6.7	Sm. dec.	No change	High	Common	Fair	Good			1	12
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	48.1	191.9	4.0	Sm. dec.	Sm. dec.	High	Common	Fair	Fair			1	13
shagbark hickory	Carya ovata	WSL	Medium	27.2	181.7	6.7	No change	No change	Medium	Common	Fair	Fair			1	14
white oak	Quercus alba	WDH	Medium	23.5	150.1	6.4	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	15
quaking aspen	Populus tremuloides	WDH	High	29.6	139.9	4.7	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	16
American basswood	Tilia americana	WSL	Medium	40.7	133.8	3.3	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	17
black oak	Quercus velutina	WDH	High	16	131.3	8.2	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	18
chestnut oak	Quercus prinus	NDH	High	17.3	106.1	6.1	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	19
paper birch	Betula papyrifera	WDH	High	39.5	105.2	2.7	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor			0	20
red spruce	Picea rubens	NDH	High	17.3	98.9	5.7	Lg. dec.	Lg. dec.	Low	Common	Very Poor	Very Poor			0	21
tamarack (native)	Larix laricina	NSH	High	4.9	77.4	15.7	Lg. dec.	Lg. dec.	Low	Common	Very Poor	Very Poor			0	22
black locust	Robinia pseudoacacia	NDH	Low	7.4	74.9	10.1	No change	Sm. inc.	Medium	Common	Fair	Good			1	23
pitch pine	Pinus rigida	NSH	High	4.9	74.3	15.1	No change	No change	Medium	Common	Fair	Fair			1	24
eastern cottonwood	Populus deltoides	NSH	Low	3.7	73.1	19.7	No change	No change	Medium	Common	Fair	Fair	Infill +	Infill +	1	25
bigtooth aspen	Populus grandidentata	NSL	Medium	18.5	71.7	3.9	No change	No change	Medium	Common	Fair	Fair			1	26
boxelder	Acer negundo	WSH	Low	4.9	51.2	10.4	No change	No change	High	Common	Good	Good	Infill ++	Infill ++	1	27
Norway maple	Acer platanoides	NSL	FIA	3.7	44.6	12.0	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	28
striped maple	Acer pensylvanicum	NSL	Medium	29.6	42.4	1.4	Sm. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	29
bur oak	Quercus macrocarpa	NDH	Medium	2.5	35.7	14.5	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor			0	30
balsam fir	Abies balsamea	NDH	High	11.1	34.5	3.1	Lg. dec.	Lg. dec.	Low	Rare	Very Poor	Very Poor			0	31
red pine	Pinus resinosa	NSH	Medium	3.7	29.2	7.9	Lg. dec.	Very Lg. dec.	Low	Rare	Very Poor	Lost			0	32
serviceberry	Amelanchier spp.	NSL	Low	19.8	28.2	1.4	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	33
pin cherry	Prunus pensylvanica	NSL	Low	7.4	27.0	3.6	Lg. dec.	Very Lg. dec.	Medium	Rare	Very Poor	Lost			0	34
Scots pine	Pinus sylvestris	NSH	FIA	3.7	26.8	7.2	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	35
gray birch	Betula populifolia	NSL	Low	9.9	24.3	2.5	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	36
black ash	Fraxinus nigra	WSH	Medium	8.6	24.0	2.8	Lg. dec.	Lg. dec.	Low	Rare	Very Poor	Very Poor			0	37
pignut hickory	Carya glabra	WDL	Medium	8.6	20.4	2.4	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	1	38
green ash	Fraxinus pennsylvanica	WSH	Low	4.9	19.7	4.0	Sm. inc.	Lg. inc.	Medium	Rare	Fair	Good	Infill +	Infill ++	1	39
Norway spruce	Picea abies	NSH	FIA	2.5	18.5	7.5	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	40
eastern redcedar	Juniperus virginiana	WDH	Medium	2.5	16.7	6.8	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	2	41
American hornbeam; musclev	Carpinus caroliniana	WSL	Low	18.5	16.1	0.9	Lg. dec.	Sm. inc.	Medium	Rare	Very Poor	Fair			1	42
swamp white oak	Quercus bicolor	NSL	Low	2.5	9.9	4.0	No change	Sm. inc.	Medium	Rare	Poor	Fair	Infill +	Infill +	2	43
yellow-poplar	Liriodendron tulipifera	WDH	High	1.2	8.1	6.5	Lg. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	2	44
scarlet oak	Quercus coccinea	WDL	Medium	3.7	6.7	1.8	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	2	45
sycamore	Platanus occidentalis	NSL	Low	1.2	6.5	5.3	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	46
butternut	Juglans cinerea	NSLX	FIA	4.9	6.1	1.2	Unknown	Unknown	Low	Rare	FIA Only	FIA Only			0	47

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
bear oak; scrub oak	Quercus ilicifolia	NSLX	FIA	1.2	5.7	4.6	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only				0 48
sassafras	Sassafras albidum	WSL	Low	1.2	5.1	4.1	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++		2 49
black walnut	Juglans nigra	WDH	Low	1.2	3.9	3.2	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good				2 50
slippery elm	Ulmus rubra	WSL	Low	2.5	2.1	0.9	Sm. inc.	Lg. inc.	Medium	Rare	Fair	Good	Infill +	Infill ++		2 51
mockernut hickory	Carya alba	WDL	Medium	2.5	1.8	0.7	Lg. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++		2 52
chokecherry	Prunus virginiana	NSLX	FIA	1.2	1.7	1.4	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only				0 53
black willow	Salix nigra	NSH	Low	1.2	1.5	1.2	Very Lg. dec.	No change	Low	Rare	Lost	Very Poor				2 54
mountain maple	Acer spicatum	NSL	Low	3.7	1.4	0.4	Lg. dec.	Lg. dec.	High	Rare	Poor	Poor				1 55
flowering dogwood	Cornus florida	WDL	Medium	1.2	0.9	0.8	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good		Infill ++		2 56
wild plum	Prunus americana	NSLX	FIA	1.2	0.8	0.7	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only				0 57
shortleaf pine	Pinus echinata	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +		3 58
loblolly pine	Pinus taeda	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat				3 59
Virginia pine	Pinus virginiana	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +		3 60
silver maple	Acer saccharinum	NSH	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate +		3 61
yellow buckeye	Aesculus flava	NSL	Low	0	0	0	Unknown	Unknown	Low	Absent	Unknown	Unknown				0 62
cittamwood/gum bumelia	Sideroxylon lanuginosum ssp.	NSL	Low	0	0	0	Unknown	New Habitat	High	Absent	Unknown	New Habitat				0 63
pecan	Carya illinoensis	NSH	Low	0	0	0	Unknown	New Habitat	Low	Absent	Unknown	New Habitat				0 64
shellbark hickory	Carya laciniosa	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown				0 65
black hickory	Carya texana	NDL	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat				0 66
sugarberry	Celtis laevigata	NDH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat				0 67
hackberry	Celtis occidentalis	WDH	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate +		3 68
eastern redbud	Cercis canadensis	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +		3 69
common persimmon	Diospyros virginiana	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate +		3 70
sweetgum	Liquidambar styraciflua	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate ++		3 71
cucumbertree	Magnolia acuminata	NSL	Low	0	0	0	Unknown	New Habitat	Medium	Absent	Unknown	New Habitat		Migrate +		3 72
southern magnolia	Magnolia grandiflora	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown				0 73
bigleaf magnolia	Magnolia macrophylla	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown				0 74
mountain or Fraser magnolia	Magnolia fraseri	NSL	Low	0	0	0	Unknown	Unknown	Low	Absent	Unknown	Unknown				0 75
blackgum	Nyssa sylvatica	WDL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate +		3 76
sourwood	Oxydendrum arboreum	NDL	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat				3 77
cherrybark oak; swamp red o.	Quercus pagoda	NSL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat				3 78
blackjack oak	Quercus marilandica	NSL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat				3 79
chinkapin oak	Quercus muehlenbergii	NSL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +		3 80
pin oak	Quercus palustris	NSH	Low	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat	Migrate +	Migrate ++		3 81
willow oak	Quercus phellos	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat				3 82
Shumard oak	Quercus shumardii	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat				0 83
post oak	Quercus stellata	WDH	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat				3 84
American mountain-ash	Sorbus americana	NSL	Low	0	0	0	Unknown	Unknown	Low	Absent	Unknown	Unknown				0 85
winged elm	Ulmus alata	WDL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat				0 86