

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

	sq. km	sq. mi	FIA Plots
Area of Region	106,914	41,280	1,620

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	4			High	25	29	Increase	22	25	Very Good	4	7
Hickory	5			Medium	33	56	No Change	18	16	Good	20	20
Maple	6	Abundant	1	Low	42	19	Decrease	38	37	Fair	12	9
Oak	15	Common	26	FIA	13		New	12	14	Poor	15	16
Pine	7	Rare	64				Unknown	23	21	Very Poor	26	25
Other	54	Absent	21							FIA Only	6	6
	91		112		113	104		113	113	Unknown	10	8
											93	91

Potential Changes in Climate Variables

Temperature (°F)

	Scenario	2009	2039	2069	2099	
Annual Average	CCSM45	51.1	52.8	55.3	55.5	
	CCSM85	51.1	53.4	56.0	59.1	
	GFDL45	51.1	55.8	56.8	57.7	
	GFDL85	51.1	54.3	57.8	62.0	
	HAD45	51.1	54.0	57.5	59.0	
HAD85	51.1	54.3	58.9	63.7		
Growing Season (May—Sep)	CCSM45	67.7	69.5	71.7	72.2	
	CCSM85	67.7	70.1	72.7	76.6	
	GFDL45	67.7	73.5	74.7	76.0	
	GFDL85	67.7	71.7	76.0	80.9	
	HAD45	67.7	71.1	74.4	76.5	
HAD85	67.7	71.2	77.1	82.1		
Coldest Month Average	CCSM45	25.0	26.5	28.4	28.6	
	CCSM85	25.0	27.7	28.8	30.6	
	GFDL45	25.0	28.4	29.2	29.9	
	GFDL85	25.0	28.1	29.3	30.5	
	HAD45	25.0	26.1	29.0	29.1	
HAD85	25.0	27.4	29.8	32.3		
Warmest Month Average	CCSM45	73.4	75.1	76.5	77.0	
	CCSM85	73.4	76.1	77.8	79.9	
	GFDL45	73.4	76.5	78.6	79.5	
	GFDL85	73.4	77.4	79.8	82.7	
	HAD45	73.4	77.2	79.7	81.1	
HAD85	73.4	78.4	82.6	85.9		

Precipitation (in)

	Scenario	2009	2039	2069	2099	
Annual Total	CCSM45	39.2	40.7	41.3	42.3	
	CCSM85	39.2	41.1	42.0	44.1	
	GFDL45	39.2	43.1	45.6	47.2	
	GFDL85	39.2	41.0	46.4	48.6	
	HAD45	39.2	40.5	41.2	41.0	
HAD85	39.2	41.0	38.2	41.7		
Growing Season (May—Sep)	CCSM45	18.8	19.4	19.2	19.5	
	CCSM85	18.8	18.5	18.7	18.6	
	GFDL45	18.8	20.5	20.5	21.3	
	GFDL85	18.8	19.2	20.3	20.6	
	HAD45	18.8	19.5	17.3	18.3	
HAD85	18.8	18.7	15.5	16.2		

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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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	55.6	586.3	14.2	Lg. dec.	Lg. dec.	High	Abundant	Good	Good			1	1
sugar maple	Acer saccharum	WDH	High	61	492.5	11.8	No change	Sm. dec.	High	Common	Good	Fair			1	2
black cherry	Prunus serotina	WDL	Medium	62.7	383.8	9.6	Sm. dec.	Sm. dec.	Low	Common	Poor	Poor			0	3
white ash	Fraxinus americana	WDL	Medium	66.7	299.2	8.5	No change	No change	Low	Common	Poor	Poor			0	4
yellow-poplar	Liriodendron tulipifera	WDH	High	29.9	292.8	10.3	Sm. dec.	Lg. dec.	High	Common	Fair	Fair			1	5
American elm	Ulmus americana	WDH	Medium	70	267.9	6.9	No change	No change	Medium	Common	Fair	Fair			1	6
white oak	Quercus alba	WDH	Medium	35.4	208.5	7.7	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	7
black locust	Robinia pseudoacacia	NDH	Low	25	169.1	7.7	Sm. dec.	No change	Medium	Common	Poor	Fair			1	8
northern red oak	Quercus rubra	WDH	Medium	43.4	149.9	5.3	No change	No change	High	Common	Good	Good			1	9
shagbark hickory	Carya ovata	WSL	Medium	43.4	137.9	5.8	No change	Sm. dec.	Medium	Common	Fair	Poor			1	10
black walnut	Juglans nigra	WDH	Low	43.7	134.2	6.7	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	11
American beech	Fagus grandifolia	WDH	High	31	113.4	5.2	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor			0	12
slippery elm	Ulmus rubra	WSL	Low	39	103.3	3.5	No change	Sm. inc.	Medium	Common	Fair	Good			1	13
black oak	Quercus velutina	WDH	High	25.5	102.5	5.0	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good	Infill ++	Infill ++	1	14
sassafras	Sassafras albidum	WSL	Low	25.8	101.8	4.6	No change	No change	Medium	Common	Fair	Fair			1	15
green ash	Fraxinus pennsylvanica	WSH	Low	37	97.4	6.2	Sm. inc.	Lg. inc.	Medium	Common	Good	Very Good			1	16
bitternut hickory	Carya cordiformis	WSL	Low	33.8	81.0	4.3	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	17
silver maple	Acer saccharinum	NSH	Low	14.5	79.0	11.5	No change	No change	High	Common	Good	Good	Infill ++	Infill ++	1	18
chestnut oak	Quercus prinus	NDH	High	8.2	75.5	7.1	No change	Sm. dec.	High	Common	Good	Fair	Infill ++	Infill +	2	19
sycamore	Platanus occidentalis	NSL	Low	20	72.0	5.7	Sm. inc.	Lg. inc.	Medium	Common	Good	Very Good	Infill ++	Infill ++	1	20
boxelder	Acer negundo	WSH	Low	25.1	69.0	6.4	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	21
bigtooth aspen	Populus grandidentata	NSL	Medium	13.8	64.3	6.1	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor	Infill +		0	22
blackgum	Nyssa sylvatica	WDL	Medium	19	59.6	3.2	No change	Sm. inc.	High	Common	Good	Very Good	Infill ++	Infill ++	1	23
eastern white pine	Pinus strobus	WDH	High	8	58.6	9.8	Lg. dec.	Lg. dec.	Low	Common	Very Poor	Very Poor			0	24
American basswood	Tilia americana	WSL	Medium	26.3	56.9	5.3	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	25
pignut hickory	Carya glabra	WDL	Medium	23	56.9	3.4	Sm. inc.	Sm. inc.	Medium	Common	Good	Good	Infill ++	Infill ++	1	26
pin oak	Quercus palustris	NSH	Low	13.1	55.6	9.8	Sm. dec.	No change	Low	Common	Poor	Poor	Infill +	Infill +	2	27
mockernut hickory	Carya alba	WDL	Medium	19.1	45.4	3.1	Sm. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	1	28
hackberry	Celtis occidentalis	WDH	Medium	25.9	44.7	5.4	Lg. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	1	29
eastern redcedar	Juniperus virginiana	WDH	Medium	6.2	44.0	9.0	Sm. inc.	Lg. inc.	Medium	Rare	Fair	Good	Infill +	Infill ++	2	30
ailanthus	Ailanthus altissima	NSL	FIA	8.2	43.3	5.4	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	31
black willow	Salix nigra	NSH	Low	7	40.5	12.9	Lg. dec.	No change	Low	Rare	Very Poor	Very Poor			0	32
Virginia pine	Pinus virginiana	NDH	High	5.7	40.2	6.7	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	33
eastern cottonwood	Populus deltoides	NSH	Low	13.2	37.5	8.2	Sm. dec.	No change	Medium	Rare	Very Poor	Poor		Infill +	1	34
scarlet oak	Quercus coccinea	WDL	Medium	11.6	35.8	4.6	No change	Sm. dec.	Medium	Rare	Poor	Very Poor	Infill +		1	35
yellow buckeye	Aesculus flava	NSL	Low	6.7	35.2	4.3	Lg. dec.	Lg. dec.	Low	Rare	Very Poor	Very Poor			0	36
Osage-orange	Maclura pomifera	NDH	Medium	10.5	30.5	8.0	No change	Lg. inc.	High	Rare	Fair	Good	Infill +	Infill ++	2	37
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	22	29.2	2.5	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	1	38
flowering dogwood	Cornus florida	WDL	Medium	16	22.5	1.8	Sm. inc.	Sm. inc.	Medium	Rare	Fair	Fair	Infill +	Infill +	1	39
honeylocust	Gleditsia triacanthos	NSH	Low	12.8	21.8	5.6	Sm. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	1	40
Ohio buckeye	Aesculus glabra	NSL	Low	14.4	20.4	3.8	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	41
swamp white oak	Quercus bicolor	NSL	Low	7.1	17.6	7.5	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			2	42
eastern redbud	Cercis canadensis	NSL	Low	11.7	17.5	1.8	Sm. inc.	Lg. inc.	Medium	Rare	Fair	Good			0	43
quaking aspen	Populus tremuloides	WDH	High	4	16.7	5.0	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	44
sourwood	Oxydendrum arboreum	NDL	High	4.9	16.6	2.7	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor	Infill +	Infill +	2	45
chinkapin oak	Quercus muehlenbergii	NSL	Medium	6.6	14.9	3.4	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	46
shingle oak	Quercus imbricaria	NDH	Medium	5.3	14.4	3.8	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	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	
American hornbeam; muscle	Carpinus caroliniana	WSL	Low	11.9	14.3	1.4	Lg. dec.	No change	Medium	Rare	Very Poor	Poor		Infill +		1	48
bur oak	Quercus macrocarpa	NDH	Medium	8.9	11.7	6.1	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +		2	49
Norway spruce	Picea abies	NSH	FIA	2.4	10.7	8.9	Unknown	Unknown	NA	Rare	NNIS	NNIS				0	50
pawpaw	Asimina triloba	NSL	Low	4.6	10.3	1.9	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor				0	51
white mulberry	Morus alba	NSL	FIA	9.6	9.6	5.3	Unknown	Unknown	NA	Rare	NNIS	NNIS				0	52
loblolly pine	Pinus taeda	WDH	High	0.5	8.9	15.0	Sm. inc.	Lg. inc.	Medium	Rare	Fair	Good	Infill +			2	53
black maple	Acer nigrum	NSH	Low	3	8.1	3.3	Lg. dec.	Lg. dec.	High	Rare	Poor	Poor				0	54
red pine	Pinus resinosa	NSH	Medium	2.8	8.1	6.2	Lg. dec.	Lg. dec.	Low	Rare	Very Poor	Very Poor				0	55
river birch	Betula nigra	NSL	Low	0.7	7.9	10.5	Lg. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor				2	56
blue ash	Fraxinus quadrangulata	NSL	Low	4.9	7.5	3.3	Sm. dec.	Sm. dec.	Low	Rare	Very Poor	Very Poor				0	57
black ash	Fraxinus nigra	WSH	Medium	3.7	6.9	4.4	Lg. dec.	Lg. dec.	Low	Rare	Very Poor	Very Poor				0	58
Scots pine	Pinus sylvestris	NSH	FIA	2.7	6.8	7.5	Unknown	Unknown	NA	Rare	NNIS	NNIS				0	59
cucumbertree	Magnolia acuminata	NSL	Low	2.7	6.4	2.5	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor				0	60
eastern hemlock	Tsuga canadensis	NSH	High	1.3	6.4	6.5	Lg. dec.	Lg. dec.	Low	Rare	Very Poor	Very Poor				0	61
pitch pine	Pinus rigida	NSH	High	1.6	5.7	3.5	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor				0	62
serviceberry	Amelanchier spp.	NSL	Low	3.3	5.1	1.6	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor				0	63
sweetgum	Liquidambar styraciflua	WDH	High	1.6	4.9	5.6	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good				2	64
common persimmon	Diospyros virginiana	NSL	Low	1.7	4.6	1.7	Sm. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++		2	65
Siberian elm	Ulmus pumila	NDH	FIA	0.1	4.0	43.0	Unknown	Unknown	NA	Rare	NNIS	NNIS				0	66
gray birch	Betula populifolia	NSL	Low	0.1	4.0	42.5	Very Lg. dec.	Very Lg. dec.	Medium	Rare	Lost	Lost				0	67
sweet birch	Betula lenta	NDH	High	1.2	3.4	3.5	Lg. dec.	Lg. dec.	Low	Rare	Very Poor	Very Poor				2	68
wild plum	Prunus americana	NSLX	FIA	0.2	3.3	17.7	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only				0	69
red mulberry	Morus rubra	NSL	Low	1.5	2.7	5.1	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +		2	70
shellbark hickory	Carya laciniosa	NSL	Low	1.1	2.4	2.0	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor				2	71
post oak	Quercus stellata	WDH	High	1.5	2.1	2.5	Lg. inc.	Lg. inc.	High	Rare	Good	Good				2	72
chokecherry	Prunus virginiana	NSLX	FIA	1.6	1.5	3.0	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only				0	73
yellow birch	Betula alleghaniensis	NDL	High	0.7	1.2	2.4	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor				0	74
northern catalpa	Catalpa speciosa	NSHX	FIA	0.3	1.1	3.8	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only				0	75
shortleaf pine	Pinus echinata	WDH	High	0.2	1.1	1.9	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good				2	76
pin cherry	Prunus pennsylvanica	NSL	Low	0.2	0.9	3.0	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor				0	77
winged elm	Ulmus alata	WDL	Medium	0.1	0.8	8.8	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good				2	78
Kentucky coffeetree	Gymnocladus dioicus	NSLX	FIA	0.1	0.8	2.0	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only				0	79
butternut	Juglans cinerea	NSLX	FIA	0.8	0.6	1.5	Unknown	Unknown	Low	Rare	FIA Only	FIA Only				0	80
Shumard oak	Quercus shumardii	NSL	Low	0.1	0.6	0.5	Sm. inc.	Lg. inc.	High	Rare	Good	Good				2	81
northern pin oak	Quercus ellipsoidalis	NSH	Medium	0.4	0.5	1.9	Lg. dec.	Lg. dec.	High	Rare	Poor	Poor				0	82
balsam fir	Abies balsamea	NDH	High	0.1	0.5	5.1	Lg. dec.	Lg. dec.	Low	Rare	Very Poor	Very Poor				0	83
rock elm	Ulmus thomasii	NSLX	FIA	0.6	0.5	2.3	Unknown	Unknown	Low	Rare	FIA Only	FIA Only				0	84
Norway maple	Acer platanoides	NSL	FIA	0.4	0.3	1.3	Unknown	Unknown	NA	Rare	NNIS	NNIS				0	85
paulownia	Paulownia tomentosa	NSL	FIA	0.3	0.2	0.8	Unknown	Unknown	NA	Rare	NNIS	NNIS				0	86
swamp chestnut oak	Quercus michauxii	NSL	Low	0.1	0.2	1.6	Sm. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor				0	87
bald cypress	Taxodium distichum	NSH	Medium	0.1	0.1	1.0	Sm. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor				0	88
sugarberry	Celtis laevigata	NDH	Medium	0	0.1	0.2	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good				2	89
red spruce	Picea rubens	NDH	High	0.1	0.1	0.9	Sm. dec.	Sm. dec.	Low	Rare	Very Poor	Very Poor				0	90
overcup oak	Quercus lyrata	NSL	Medium	0.4	0.0	1.6	Lg. dec.	Lg. dec.	Low	Rare	Very Poor	Very Poor				0	91
Atlantic white-cedar	Chamaecyparis thyoides	NSH	Low	0	0	0	Unknown	Unknown	Low	Absent	Unknown	Unknown				0	92
ashe juniper	Juniperus ashei	NDH	High	0	0	0	New Habitat	New Habitat	NA	Absent	New Habitat	New Habitat				0	93
jack pine	Pinus banksiana	NSH	Medium	0	0	0	Unknown	Unknown	High	Absent	Unknown	Unknown				0	94

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Common Name	Scientific Name	Range	MR	%Cell	FIAsum	FIAiv	ChngCl45	ChngCl85	Adap	Abund	Capabil45	Capabil85	SHIFT45	SHIFT85	SSO	N
slash pine	<i>Pinus elliottii</i>	NDH	High	0	0	0	Unknown	New Habitat	Medium	Absent	Unknown	New Habitat			3	95
florida maple	<i>Acer barbatum</i>	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	96
mountain maple	<i>Acer spicatum</i>	NSL	Low	0	0	0	Unknown	Unknown	High	Absent	Unknown	Unknown			0	97
cittamwood/gum bumelia	<i>Sideroxylon lanuginosum ssp.</i>	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			2	98
pecan	<i>Carya illinoensis</i>	NSH	Low	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat			3	99
black hickory	<i>Carya texana</i>	NDL	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	100
loblolly-bay	<i>Gordonia lasianthus</i>	NSH	Medium	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	101
American holly	<i>Ilex opaca</i>	NSL	Medium	0	0	0	Unknown	Unknown	Medium	Modeled	Unknown	Unknown			0	102
southern magnolia	<i>Magnolia grandiflora</i>	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	103
bigleaf magnolia	<i>Magnolia macrophylla</i>	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	104
mountain or Fraser magnolia	<i>Magnolia fraseri</i>	NSL	Low	0	0	0	Unknown	Unknown	NA	Absent	Unknown	Unknown			0	105
redbay	<i>Persea borbonia</i>	NSL	Low	0	0	0	Unknown	New Habitat	High	Absent	Unknown	New Habitat			3	106
southern red oak	<i>Quercus falcata</i>	WDL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate ++	Migrate ++	3	107
cherrybark oak; swamp red o	<i>Quercus pagoda</i>	NSL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	108
blackjack oak	<i>Quercus marilandica</i>	NSL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate ++	Migrate ++	3	109
water oak	<i>Quercus nigra</i>	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate ++	3	110
live oak	<i>Quercus virginiana</i>	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			2	111
bluejack oak	<i>Quercus incana</i>	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	112
cedar elm	<i>Ulmus crassifolia</i>	NDH	Medium	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat			0	113