

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

Area of Region sq. km sq. mi FIA Plots
93,717 36,184 1,782

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	5			High	22	29	Increase	27	31	Very Good	6	7	Likely	1	1
Hickory	8			Medium	38	60	No Change	19	18	Good	22	25	Infill	35	38
Maple	5	Abundant	1	Low	39	16	Decrease	30	27	Fair	12	7	Migrate	4	5
Oak	16	Common	25	FIA	13		New	15	16	Poor	14	21			
Pine	6	Rare	63				Unknown	21	20	Very Poor	21	15			
Other	49	Absent	22							FIA Only	8	8			
										Unknown	8	7			
	89		111		112	105		112	112		91	90		40	44

Potential Changes in Climate Variables

Temperature (°F)

Scenario	2009	2039	2069	2099		
Annual	CCSM45	52.1	53.9	56.2	56.5	
Average	CCSM85	52.1	54.5	57.1	60.1	
	GFDL45	52.1	56.9	57.6	58.5	
	GFDL85	52.1	55.1	58.6	62.6	
	HAD45	52.1	54.9	58.4	60.0	
	HAD85	52.1	55.3	60.0	64.6	
Growing Season	CCSM45	69.2	71.0	73.0	73.7	
	CCSM85	69.2	71.8	74.3	78.0	
May—Sep	GFDL45	69.2	75.0	75.7	77.1	
	GFDL85	69.2	72.9	77.0	81.9	
	HAD45	69.2	72.5	75.7	77.7	
	HAD85	69.2	72.7	78.7	83.4	
Coldest Month	CCSM45	24.9	26.3	28.2	28.5	
Average	CCSM85	24.9	27.7	28.9	30.6	
	GFDL45	24.9	28.9	29.4	30.0	
	GFDL85	24.9	28.0	29.2	30.2	
	HAD45	24.9	26.3	29.2	29.3	
	HAD85	24.9	27.9	30.4	32.7	
Warmest Month	CCSM45	74.8	76.6	77.9	78.6	
Average	CCSM85	74.8	77.9	79.6	81.4	
	GFDL45	74.8	78.0	79.7	80.7	
	GFDL85	74.8	78.8	81.0	83.9	
	HAD45	74.8	78.6	81.1	82.1	
	HAD85	74.8	80.1	84.1	87.0	

Precipitation (in)

Scenario	2009	2039	2069	2099		
Annual	CCSM45	42.1	41.6	43.7	43.1	
Total	CCSM85	42.1	43.1	43.3	45.3	
	GFDL45	42.1	46.6	49.9	51.5	
	GFDL85	42.1	45.6	51.1	53.3	
	HAD45	42.1	43.6	45.7	45.2	
	HAD85	42.1	44.5	42.2	45.7	
Growing Season	CCSM45	19.9	19.6	20.0	19.1	
	CCSM85	19.9	19.0	18.8	18.8	
May—Sep	GFDL45	19.9	21.7	22.0	22.7	
	GFDL85	19.9	21.2	22.3	22.3	
	HAD45	19.9	20.1	18.6	19.2	
	HAD85	19.9	19.7	16.4	16.7	

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
sugar maple	Acer saccharum	WDH	High	64.9	517.7	14.1	Sm. dec.	Sm. dec.	High	Abundant	Good	Good			1	1
yellow-poplar	Liriodendron tulipifera	WDH	High	38.1	273.4	10.1	Lg. dec.	Lg. dec.	High	Common	Fair	Fair	Infill +	Infill +	1	2
white ash	Fraxinus americana	WDL	Medium	64.7	260.9	7.7	No change	No change	Low	Common	Poor	Poor			0	3
black cherry	Prunus serotina	WDL	Medium	70.5	242.9	8.4	Sm. dec.	Sm. dec.	Low	Common	Poor	Poor			0	4
red maple	Acer rubrum	WDH	High	39.4	211.2	7.8	Sm. dec.	Sm. dec.	High	Common	Fair	Fair	Infill +	Infill +	1	5
white oak	Quercus alba	WDH	Medium	41.8	199.6	7.7	No change	No change	High	Common	Good	Good	Infill ++	Infill ++	1	6
sassafras	Sassafras albidum	WSL	Low	42.6	198.6	6.1	Sm. dec.	Lg. dec.	Medium	Common	Poor	Poor	Infill +	Infill +	0	7
American elm	Ulmus americana	WDH	Medium	70.9	195.8	5.4	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	8
black walnut	Juglans nigra	WDH	Low	56.5	168.9	6.8	No change	No change	Medium	Common	Fair	Fair			1	9
black oak	Quercus velutina	WDH	High	32.1	161.7	7.4	Sm. inc.	Sm. inc.	Medium	Common	Good	Good	Infill ++	Infill ++	1	10
shagbark hickory	Carya ovata	WSL	Medium	46.4	131.3	5.2	No change	Sm. dec.	Medium	Common	Fair	Poor	Infill +	Infill +	1	11
silver maple	Acer saccharinum	NSH	Low	19.2	128.9	13.6	No change	No change	High	Common	Good	Good	Infill ++	Infill ++	1	12
eastern redcedar	Juniperus virginiana	WDH	Medium	17.4	114.1	6.8	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good	Infill ++	Infill ++	1	13
American beech	Fagus grandifolia	WDH	High	33.2	113.8	4.9	Sm. dec.	Lg. dec.	Medium	Common	Poor	Poor	Infill +	Infill +	0	14
pignut hickory	Carya glabra	WDL	Medium	32	107.5	5.0	No change	Sm. dec.	Medium	Common	Fair	Poor	Infill +	Infill +	1	15
northern red oak	Quercus rubra	WDH	Medium	45.6	102.9	4.5	No change	No change	High	Common	Good	Good	Infill ++	Infill ++	1	16
sycamore	Platanus occidentalis	NSL	Low	30.3	100.6	5.3	Sm. inc.	Sm. inc.	Medium	Common	Good	Good	Infill ++	Infill ++	1	17
hackberry	Celtis occidentalis	WDH	Medium	46.7	98.1	5.1	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	18
sweetgum	Liquidambar styraciflua	WDH	High	12.3	91.0	7.9	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good	Infill ++	Infill ++	2	19
green ash	Fraxinus pennsylvanica	WSH	Low	37.1	88.0	6.9	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	20
bitternut hickory	Carya cordiformis	WSL	Low	38	81.1	4.4	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good	Infill ++	Infill ++	1	21
boxelder	Acer negundo	WSH	Low	33	70.9	4.9	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good	Infill ++	Infill ++	1	22
black locust	Robinia pseudoacacia	NDH	Low	15.7	69.4	6.5	Sm. inc.	Sm. inc.	Medium	Common	Good	Good	Infill ++	Infill ++	1	23
slippery elm	Ulmus rubra	WSL	Low	41.7	65.6	3.0	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	24
pin oak	Quercus palustris	NSH	Low	19.9	57.6	7.2	No change	No change	Low	Common	Poor	Poor	Infill +	Infill +	0	25
blackgum	Nyssa sylvatica	WDL	Medium	21.2	54.3	3.2	No change	Sm. inc.	High	Common	Good	Very Good	Infill ++	Infill ++	1	26
eastern white pine	Pinus strobus	WDH	High	7.5	49.2	10.7	Lg. dec.	Lg. dec.	Low	Rare	Very Poor	Very Poor			2	27
honeylocust	Gleditsia triacanthos	NSH	Low	18.6	43.1	6.2	No change	Sm. inc.	High	Rare	Fair	Good	Infill +	Infill ++	1	28
Osage-orange	Maclura pomifera	NDH	Medium	12.9	42.4	7.7	No change	Lg. inc.	High	Rare	Fair	Good	Infill +	Infill ++	2	29
chinkapin oak	Quercus muehlenbergii	NSL	Medium	19.7	41.1	2.9	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	1	30
American basswood	Tilia americana	WSL	Medium	23.2	39.8	5.4	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	31
eastern cottonwood	Populus deltoides	NSH	Low	16.4	39.6	5.9	Sm. inc.	Sm. inc.	Medium	Rare	Fair	Fair	Infill +	Infill +	2	32
Virginia pine	Pinus virginiana	NDH	High	6.3	36.8	7.0	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			2	33
chestnut oak	Quercus prinus	NDH	High	3.3	32.9	8.3	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor	Infill +	Infill +	2	34
black willow	Salix nigra	NSH	Low	10.2	31.0	9.5	No change	Lg. inc.	Low	Rare	Very Poor	Fair			2	35
shingle oak	Quercus imbricaria	NDH	Medium	8.5	27.9	6.1	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	36
flowering dogwood	Cornus florida	WDL	Medium	21.7	25.4	1.5	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	1	37
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	20.4	21.0	2.1	Sm. inc.	Sm. inc.	High	Rare	Good	Good	Infill ++	Infill ++	1	38
eastern redbud	Cercis canadensis	NSL	Low	15.7	20.6	1.6	Sm. dec.	No change	Medium	Rare	Very Poor	Poor			0	39
common persimmon	Diospyros virginiana	NSL	Low	9.3	18.1	2.3	Sm. inc.	Sm. inc.	High	Rare	Good	Good	Infill ++	Infill ++	1	40
Siberian elm	Ulmus pumila	NDH	FIA	3.7	17.8	10.9	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	41
red mulberry	Morus rubra	NSL	Low	19.3	17.0	3.8	Sm. dec.	No change	Medium	Rare	Very Poor	Poor		Infill +	1	42
red pine	Pinus resinosa	NSH	Medium	2	15.0	10.9	Lg. dec.	Lg. dec.	Low	Rare	Very Poor	Very Poor			2	43
Ohio buckeye	Aesculus glabra	NSL	Low	16.5	14.5	2.3	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			2	44
American hornbeam; muscle	Carpinus caroliniana	WSL	Low	17.8	13.1	1.4	Sm. inc.	Lg. inc.	Medium	Rare	Fair	Good	Infill +	Infill ++	1	45
scarlet oak	Quercus coccinea	WDL	Medium	4.1	12.0	2.4	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	46
bigtooth aspen	Populus grandidentata	NSL	Medium	7.3	11.6	2.3	Lg. dec.	Lg. dec.	Medium	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
river birch	Betula nigra	NSL	Low	4.2	11.5	4.6	Sm. dec.	No change	Medium	Rare	Very Poor	Poor		Infill +	2	48
pawpaw	Asimina triloba	NSL	Low	8.8	11.4	1.7	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	49
swamp white oak	Quercus bicolor	NSL	Low	5.7	9.7	3.9	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	50
shortleaf pine	Pinus echinata	WDH	High	1.8	9.6	5.2	Sm. inc.	Lg. inc.	Medium	Rare	Fair	Good	Infill +		2	51
mockernut hickory	Carya alba	WDL	Medium	5.4	7.8	2.4	Sm. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	2	52
ailanthus	Ailanthus altissima	NSL	FIA	2.4	7.6	2.5	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	53
bur oak	Quercus macrocarpa	NDH	Medium	10.2	6.5	3.1	Lg. inc.	Lg. inc.	High	Rare	Good	Good			2	54
post oak	Quercus stellata	WDH	High	1.6	6.3	2.1	Lg. inc.	Lg. inc.	High	Rare	Good	Good			2	55
Scots pine	Pinus sylvestris	NSH	FIA	2.1	5.6	5.1	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	56
northern catalpa	Catalpa speciosa	NSHX	FIA	4.5	5.4	4.3	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	57
winged elm	Ulmus alata	WDL	Medium	2	5.4	2.0	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	58
blue ash	Fraxinus quadrangulata	NSL	Low	5.1	5.0	2.0	Sm. dec.	Sm. dec.	Low	Rare	Very Poor	Very Poor			2	59
white mulberry	Morus alba	NSL	FIA	4.2	4.1	2.2	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	60
shellbark hickory	Carya laciniosa	NSL	Low	1.4	4.0	3.0	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	61
swamp chestnut oak	Quercus michauxii	NSL	Low	0.7	3.6	4.7	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	62
Kentucky coffeetree	Gymnocladus dioicus	NSLX	FIA	2.1	2.8	3.2	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	63
black ash	Fraxinus nigra	WSH	Medium	2.6	2.7	2.7	Sm. dec.	Sm. dec.	Low	Rare	Very Poor	Very Poor			0	64
northern pin oak	Quercus ellipsoidalis	NSH	Medium	3	2.7	4.3	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor	Infill +	Infill +	2	65
black maple	Acer nigrum	NSH	Low	0.9	2.6	2.8	Lg. dec.	Lg. dec.	High	Rare	Poor	Poor			0	66
pecan	Carya illinoensis	NSH	Low	0.6	2.3	2.4	Lg. inc.	Lg. inc.	Low	Rare	Fair	Fair	Infill +	Infill +	2	67
yellow birch	Betula alleghaniensis	NDL	High	0.1	1.4	0.7	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	68
Shumard oak	Quercus shumardii	NSL	Low	0.3	1.2	2.0	Sm. inc.	Lg. inc.	High	Rare	Good	Good			2	69
rock elm	Ulmus thomasii	NSLX	FIA	2.1	1.1	2.3	Unknown	Unknown	Low	Rare	FIA Only	FIA Only			0	70
cherrybark oak; swamp red o.	Quercus pagoda	NSL	Medium	0.7	0.9	2.8	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	71
Norway spruce	Picea abies	NSH	FIA	0.2	0.8	3.6	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	72
sugarberry	Celtis laevigata	NDH	Medium	0.1	0.7	0.5	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	73
tamarack (native)	Larix laricina	NSH	High	0.1	0.6	5.4	Sm. dec.	Sm. dec.	Low	Rare	Very Poor	Very Poor			0	74
chokecherry	Prunus virginiana	NSLX	FIA	0.5	0.6	2.7	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	75
jack pine	Pinus banksiana	NSH	Medium	1.1	0.5	5.1	No change	No change	High	Rare	Fair	Fair		Infill +	2	76
serviceberry	Amelanchier spp.	NSL	Low	1.6	0.5	1.1	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	77
waterlocust	Gleditsia aquatica	NSLX	FIA	0.1	0.3	2.9	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	78
pumpkin ash	Fraxinus profunda	NSH	FIA	0.1	0.3	2.7	Unknown	Unknown	NA	Rare	FIA Only	FIA Only			0	79
quaking aspen	Populus tremuloides	WDH	High	0.8	0.3	2.0	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	80
wild plum	Prunus americana	NSLX	FIA	0.1	0.2	1.7	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	81
butternut	Juglans cinerea	NSLX	FIA	0.6	0.2	1.3	Unknown	Unknown	Low	Rare	FIA Only	FIA Only			0	82
balsam poplar	Populus balsamifera	NSH	Medium	0.2	0.1	1.8	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	83
yellow buckeye	Aesculus flava	NSL	Low	0	0.1	0.1	Very Lg. dec.	Very Lg. dec.	Low	Rare	Lost	Lost			0	84
water hickory	Carya aquatica	NSL	Medium	0	0.1	0.1	Sm. dec.	No change	Medium	Rare	Very Poor	Poor			0	85
black hickory	Carya texana	NDL	High	0.1	0.1	0.6	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	86
sourwood	Oxydendrum arboreum	NDL	High	0.1	0.1	0.5	Lg. inc.	Lg. inc.	High	Rare	Good	Good			2	87
blackjack oak	Quercus marilandica	NSL	Medium	0.1	0.1	0.5	Lg. inc.	Lg. inc.	High	Rare	Good	Good			2	88
bald cypress	Taxodium distichum	NSH	Medium	0.4	0.0	1.1	Lg. dec.	No change	Medium	Rare	Very Poor	Poor			0	89
ashe juniper	Juniperus ashei	NDH	High	0	0	0	New Habitat	New Habitat	NA	Absent	New Habitat	New Habitat			0	90
red spruce	Picea rubens	NDH	High	0	0	0	Unknown	Unknown	Low	Absent	Unknown	Unknown			0	91
slash pine	Pinus elliottii	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	92
longleaf pine	Pinus palustris	NSH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	93
loblolly pine	Pinus taeda	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate ++	Migrate ++	3	94

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Common Name	Scientific Name	Range	MR	%Cell	FIAsum	FIaiv	ChngCl45	ChngCl85	Adap	Abund	Capabil45	Capabil85	SHIFT45	SHIFT85	SSO	N
striped maple	<i>Acer pensylvanicum</i>	NSL	Medium	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	95
mountain maple	<i>Acer spicatum</i>	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			3	96
cittamwood/gum bumelia	<i>Sideroxylon lanuginosum ssp.</i>	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			3	97
American holly	<i>Ilex opaca</i>	NSL	Medium	0	0	0	Unknown	Unknown	Medium	Modeled	Unknown	Unknown			0	98
cucumbertree	<i>Magnolia acuminata</i>	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	99
bigleaf magnolia	<i>Magnolia macrophylla</i>	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	100
redbay	<i>Persea borbonia</i>	NSL	Low	0	0	0	Unknown	Unknown	High	Absent	Unknown	Unknown			0	101
water elm	<i>Planera aquatica</i>	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +		3	102
pin cherry	<i>Prunus pensylvanica</i>	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	103
southern red oak	<i>Quercus falcata</i>	WDL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Likely +	Likely +	3	104
laurel oak	<i>Quercus laurifolia</i>	NDH	Medium	0	0	0	Unknown	New Habitat	Medium	Absent	Unknown	New Habitat			3	105
overcup oak	<i>Quercus lyrata</i>	NSL	Medium	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	106
water oak	<i>Quercus nigra</i>	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	107
Nuttall oak	<i>Quercus texana</i>	NSH	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			0	108
willow oak	<i>Quercus phellos</i>	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	109
live oak	<i>Quercus virginiana</i>	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	110
bluejack oak	<i>Quercus incana</i>	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	111
cedar elm	<i>Ulmus crassifolia</i>	NDH	Medium	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat			3	112