

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

	sq. km	sq. mi	FIA Plots
Area of Region	9,941.4	3,838.4	342

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	24	Increase	27	30	Very Good	13	14	Likely	0	0
Hickory	7			Medium	27	55	No Change	7	8	Good	15	18	Infill	5	7
Maple	5	Abundant	6	Low	40	14	Decrease	34	30	Fair	11	9	Migrate	3	10
Oak	11	Common	30	FIA	7		New	12	15	Poor	8	8		8	17
Pine	5	Rare	39				Unknown	17	14	Very Poor	19	17			
Other	44	Absent	20							FIA Only	4	4			
	75		95		97	93		97	97	Unknown	10	7			
											80	77			

Potential Changes in Climate Variables

Temperature (°F)

	Scenario	2009	2039	2069	2099	
Annual Average	CCSM45	55.5	57.4	59.7	59.9	
	CCSM85	55.5	57.8	60.4	63.3	
	GFDL45	55.5	58.2	60.8	61.5	
	GFDL85	55.5	58.4	61.8	65.4	
	HAD45	55.5	57.9	61.1	62.4	
	HAD85	55.5	58.3	62.8	66.7	
Growing Season May—Sep	CCSM45	70.2	72.0	74.1	74.7	
	CCSM85	70.2	72.4	75.1	79.0	
	GFDL45	70.2	73.3	76.4	77.7	
	GFDL85	70.2	73.7	77.9	81.9	
	HAD45	70.2	73.3	76.5	78.0	
	HAD85	70.2	73.6	80.0	83.7	
Coldest Month Average	CCSM45	33.3	35.2	36.4	36.7	
	CCSM85	33.3	36.2	37.0	38.5	
	GFDL45	33.3	36.9	36.8	37.2	
	GFDL85	33.3	35.1	36.2	36.8	
	HAD45	33.3	33.1	35.4	35.7	
	HAD85	33.3	34.6	36.3	38.0	
Warmest Month Average	CCSM45	75.2	77.2	78.4	78.6	
	CCSM85	75.2	77.5	79.3	81.0	
	GFDL45	75.2	78.7	80.4	81.2	
	GFDL85	75.2	79.1	81.8	83.9	
	HAD45	75.2	79.3	81.7	82.5	
	HAD85	75.2	80.5	85.1	86.8	

Precipitation (in)

	Scenario	2009	2039	2069	2099	
Annual Total	CCSM45	53.8	56.6	60.8	59.2	
	CCSM85	53.8	60.2	61.2	65.2	
	GFDL45	53.8	59.9	61.7	65.8	
	GFDL85	53.8	59.5	63.1	65.9	
	HAD45	53.8	52.5	56.1	57.0	
	HAD85	53.8	55.1	51.2	54.8	
Growing Season May—Sep	CCSM45	23.2	23.8	25.3	24.5	
	CCSM85	23.2	25.4	23.9	25.5	
	GFDL45	23.2	26.4	26.1	27.2	
	GFDL85	23.2	25.5	26.5	27.2	
	HAD45	23.2	22.9	22.0	22.7	
	HAD85	23.2	23.9	18.8	20.6	

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	98.4	1412.0	11.0	Lg. dec.	Lg. dec.	High	Abundant	Good	Good			1	1
white oak	Quercus alba	WDH	Medium	93	1271.6	10.7	No change	No change	High	Abundant	Very Good	Very Good			1	2
yellow-poplar	Liriodendron tulipifera	WDH	High	93.9	1095.9	8.0	Lg. dec.	Lg. dec.	High	Abundant	Good	Good			1	3
Virginia pine	Pinus virginiana	NDH	High	73.1	785.5	7.1	Sm. dec.	Lg. dec.	Medium	Abundant	Fair	Fair			0	4
chestnut oak	Quercus prinus	NDH	High	76.2	710.8	7.5	Sm. dec.	Sm. dec.	High	Abundant	Good	Good			1	5
sugar maple	Acer saccharum	WDH	High	71.2	640.3	6.2	Lg. dec.	Lg. dec.	High	Abundant	Good	Good			1	6
pignut hickory	Carya glabra	WDL	Medium	70.6	359.9	3.6	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor			0	7
sourwood	Oxydendrum arboreum	NDL	High	88	357.8	3.0	Sm. dec.	Lg. dec.	High	Common	Fair	Fair			1	8
scarlet oak	Quercus coccinea	WDL	Medium	67.6	356.4	4.3	Sm. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	9
blackgum	Nyssa sylvatica	WDL	Medium	84.1	333.4	2.8	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	10
black oak	Quercus velutina	WDH	High	70.9	327.7	3.7	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	11
American beech	Fagus grandifolia	WDH	High	54.4	321.0	3.9	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor			0	12
mockernut hickory	Carya alba	WDL	Medium	64.5	291.7	3.3	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	13
shortleaf pine	Pinus echinata	WDH	High	53.9	283.2	4.4	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	14
eastern hemlock	Tsuga canadensis	NSH	High	43.2	262.3	5.4	Lg. dec.	Lg. dec.	Low	Common	Very Poor	Very Poor			0	15
eastern redcedar	Juniperus virginiana	WDH	Medium	28.2	214.2	4.3	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	16
sweetgum	Liquidambar styraciflua	WDH	High	34.4	207.7	4.1	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	17
northern red oak	Quercus rubra	WDH	Medium	48.9	189.4	2.7	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	18
black cherry	Prunus serotina	WDL	Medium	51.5	180.3	2.6	Sm. inc.	Lg. inc.	Low	Common	Fair	Good			1	19
eastern white pine	Pinus strobus	WDH	High	30	179.4	5.5	Sm. dec.	Sm. dec.	Low	Common	Poor	Poor			0	20
flowering dogwood	Cornus florida	WDL	Medium	67	152.3	1.4	No change	No change	Medium	Common	Fair	Fair			1	21
white ash	Fraxinus americana	WDL	Medium	30.7	135.8	2.7	Sm. inc.	Sm. inc.	Low	Common	Fair	Fair			1	22
black locust	Robinia pseudoacacia	NDH	Low	30.3	126.0	3.3	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	23
sassafras	Sassafras albidum	WSL	Low	47	118.3	1.6	Sm. dec.	No change	Medium	Common	Poor	Fair			1	24
southern red oak	Quercus falcata	WDL	Medium	27	102.1	2.7	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	25
bitternut hickory	Carya cordiformis	WSL	Low	23.4	91.6	2.2	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	26
shagbark hickory	Carya ovata	WSL	Medium	29.7	89.6	1.8	Sm. inc.	No change	Medium	Common	Good	Fair			1	27
eastern redbud	Cercis canadensis	NSL	Low	28.4	71.2	1.5	No change	No change	Medium	Common	Fair	Fair			1	28
loblolly pine	Pinus taeda	WDH	High	5.9	70.6	9.2	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good	Infill ++	Infill ++	1	29
post oak	Quercus stellata	WDH	High	21.2	68.9	2.7	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good	Infill ++	Infill ++	1	30
green ash	Fraxinus pennsylvanica	WSH	Low	25.4	68.9	1.5	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	31
chinkapin oak	Quercus muehlenbergii	NSL	Medium	14.7	67.5	2.9	No change	Sm. dec.	Medium	Common	Fair	Poor			1	32
black walnut	Juglans nigra	WDH	Low	21.9	65.6	1.9	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	33
American elm	Ulmus americana	WDH	Medium	18.2	64.0	2.2	Sm. inc.	Lg. inc.	Medium	Common	Good	Very Good			1	34
sycamore	Platanus occidentalis	NSL	Low	20.7	57.9	2.0	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	35
sweet birch	Betula lenta	NDH	High	22.4	52.1	1.9	Lg. dec.	Lg. dec.	Low	Common	Very Poor	Very Poor			0	36
American basswood	Tilia americana	WSL	Medium	20.7	45.8	2.2	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	37
paulownia	Paulownia tomentosa	NSL	FIA	4.9	42.9	3.7	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	38
yellow buckeye	Aesculus flava	NSL	Low	15.4	42.9	1.4	Lg. dec.	Lg. dec.	Low	Rare	Very Poor	Very Poor			0	39
cucumbertree	Magnolia acuminata	NSL	Low	25	35.2	1.1	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	40
pitch pine	Pinus rigida	NSH	High	7.1	35.0	4.0	Lg. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	41
winged elm	Ulmus alata	WDL	Medium	23.1	32.1	1.0	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			1	42
serviceberry	Amelanchier spp.	NSL	Low	29.3	29.5	0.9	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	43
ailanthus	Ailanthus altissima	NSL	FIA	5.5	27.5	3.7	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	44
common persimmon	Diospyros virginiana	NSL	Low	9.6	27.5	1.3	No change	Sm. inc.	High	Rare	Fair	Good			1	45
shellbark hickory	Carya laciniosa	NSL	Low	8.9	26.5	1.9	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			2	46
silver maple	Acer saccharinum	NSH	Low	1.4	25.8	12.6	Sm. dec.	Lg. dec.	High	Rare	Poor	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
American holly	Ilex opaca	NSL	Medium	15.8	24.2	1.3	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	48
slippery elm	Ulmus rubra	NSL	Low	21.1	23.6	0.7	Sm. inc.	Lg. inc.	Medium	Rare	Fair	Good			1	49
red mulberry	Morus rubra	NSL	Low	10.9	19.2	1.1	Sm. dec.	Sm. inc.	Medium	Rare	Very Poor	Fair			1	50
American hornbeam; muscle	Carpinus caroliniana	WSL	Low	10.8	16.6	1.2	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			1	51
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	14.4	14.4	0.7	Lg. inc.	Lg. inc.	High	Rare	Good	Good			1	52
bigleaf magnolia	Magnolia macrophylla	NSL	Low	12.6	13.5	1.0	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	53
boxelder	Acer negundo	WSH	Low	4.4	11.3	2.0	No change	Lg. inc.	High	Rare	Fair	Good	Infill +	Infill ++	1	54
black willow	Salix nigra	NSH	Low	2.5	10.7	2.9	Sm. dec.	No change	Low	Rare	Very Poor	Very Poor			2	55
yellow birch	Betula alleghaniensis	NDL	High	5	8.9	1.8	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	56
sand hickory	Carya pallida	NSL	FIA	2.6	7.9	2.2	Unknown	Unknown	NA	Rare	FIA Only	FIA Only			0	57
willow oak	Quercus phellos	NSL	Low	1.1	6.3	1.4	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	58
hackberry	Celtis occidentalis	WDH	Medium	4.3	6.3	1.2	Lg. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	1	59
sugarberry	Celtis laevigata	NDH	Medium	1	5.1	5.1	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	60
striped maple	Acer pensylvanicum	NSL	Medium	6	4.4	0.7	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	61
mountain or Fraser magnolia	Magnolia fraseri	NSL	Low	5	4.2	0.8	Sm. dec.	Sm. dec.	Low	Rare	Very Poor	Very Poor			0	62
Ohio buckeye	Aesculus glabra	NSL	Low	2.7	3.5	1.1	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	63
Shumard oak	Quercus shumardii	NSL	Low	1	3.3	3.3	Sm. dec.	Sm. inc.	High	Rare	Poor	Good			2	64
eastern cottonwood	Populus deltoides	NSH	Low	1	3.0	3.0	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	65
river birch	Betula nigra	NSL	Low	2	3.0	1.5	Sm. dec.	No change	Medium	Rare	Very Poor	Poor		Infill +	2	66
white mulberry	Morus alba	NSL	FIA	0.7	2.2	0.4	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	67
bigtooth aspen	Populus grandidentata	NSL	Medium	1	2.1	2.1	Very Lg. dec.	Very Lg. dec.	Medium	Rare	Lost	Lost			0	68
blue ash	Fraxinus quadrangulata	NSL	Low	1	1.8	1.8	Sm. dec.	Sm. dec.	Low	Rare	Very Poor	Very Poor			0	69
blackjack oak	Quercus marilandica	NSL	Medium	2.4	1.7	0.5	Lg. inc.	Lg. inc.	High	Rare	Good	Good			2	70
pecan	Carya illinoensis	NSH	Low	1	0.9	0.9	Lg. inc.	Lg. inc.	Low	Rare	Fair	Fair		Infill +	2	71
American chestnut	Castanea dentata	NSLX	FIA	2	0.9	0.4	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	72
wild plum	Prunus americana	NSLX	FIA	1	0.7	0.7	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	73
pawpaw	Asimina triloba	NSL	Low	1	0.6	0.6	Very Lg. dec.	Very Lg. dec.	Medium	Rare	Lost	Lost			0	74
Kentucky coffeetree	Gymnocladus dioicus	NSLX	FIA	1	0.5	0.5	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	75
ashe juniper	Juniperus ashei	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	76
red spruce	Picea rubens	NDH	High	0	0	0	Unknown	Unknown	Low	Absent	Unknown	Unknown			0	77
longleaf pine	Pinus palustris	NSH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	78
Table Mountain pine	Pinus pungens	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate +	3	79
northern white-cedar	Thuja occidentalis	WSH	High	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	80
florida maple	Acer barbatum	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	81
mountain maple	Acer spicatum	NSL	Low	0	0	0	Unknown	Unknown	High	Absent	Unknown	Unknown			0	82
cittamwood/gum bumelia	Sideroxylon lanuginosum ssp.	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			3	83
black hickory	Carya texana	NDL	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	84
black ash	Fraxinus nigra	WSH	Medium	0	0	0	Unknown	New Habitat	Low	Absent	Unknown	New Habitat			3	85
honeylocust	Gleditsia triacanthos	NSH	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate ++	3	86
silverbell	Halesia spp.	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	87
southern magnolia	Magnolia grandiflora	NSL	Low	0	0	0	Unknown	New Habitat	Medium	Absent	Unknown	New Habitat		Migrate +	3	88
sweetbay	Magnolia virginiana	NSL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	89
pin cherry	Prunus sylvanica	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	90
swamp white oak	Quercus bicolor	NSL	Low	0	0	0	Unknown	Unknown	Medium	Modeled	Unknown	Unknown			0	91
cherrybark oak; swamp red o.	Quercus pagoda	NSL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	92
water oak	Quercus nigra	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	93
pin oak	Quercus palustris	NSH	Low	0	0	0	Unknown	Unknown	Low	Modeled	Unknown	Unknown			0	94

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live oak	Quercus virginiana	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	95
bluejack oak	Quercus incana	NSL	Low	0	0	0	Unknown	New Habitat	Medium	Absent	Unknown	New Habitat		Migrate +	3	96
cedar elm	Ulmus crassifolia	NDH	Medium	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat			0	97