

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	9,683.1	3,738.7	242

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	19	26	Increase	25	28	Very Good	9	11	Likely	0	0
Hickory	5			Medium	29	49	No Change	15	12	Good	18	18	Infill	10	10
Maple	6	Abundant	3	Low	35	12	Decrease	25	25	Fair	11	11	Migrate	8	8
Oak	15	Common	29	FIA	7		New	13	15	Poor	15	12		18	18
Pine	3	Rare	40				Unknown	12	10	Very Poor	9	11			
Other	40	Absent	17					90	90	FIA Only	4	4			
	72		89		90	87				Unknown	5	3			
											71	70			

Potential Changes in Climate Variables

Temperature (°F)

	Scenario	2009	2039	2069	2099	
Annual Average	CCSM45	54.8	56.5	58.9	59.2	
	CCSM85	54.8	57.1	59.8	62.9	
	GFDL45	54.8	58.2	60.2	61.0	
	GFDL85	54.8	57.8	61.2	65.1	
	HAD45	54.8	57.5	61.0	62.4	
HAD85	54.8	58.0	62.6	67.0		
Growing Season (May—Sep)	CCSM45	70.9	72.7	74.7	75.4	
	CCSM85	70.9	73.2	76.1	80.0	
	GFDL45	70.9	75.0	77.4	78.7	
	GFDL85	70.9	74.7	78.8	83.3	
	HAD45	70.9	74.2	77.5	79.4	
HAD85	70.9	74.7	81.0	85.3		
Coldest Month (Average)	CCSM45	29.5	30.8	32.5	33.0	
	CCSM85	29.5	32.3	33.3	35.0	
	GFDL45	29.5	33.6	33.9	34.3	
	GFDL85	29.5	32.0	33.1	33.7	
	HAD45	29.5	30.8	33.3	33.4	
HAD85	29.5	32.1	34.2	36.1		
Warmest Month (Average)	CCSM45	76.4	78.0	79.3	79.9	
	CCSM85	76.4	78.8	80.6	82.5	
	GFDL45	76.4	79.7	81.5	82.5	
	GFDL85	76.4	80.2	82.8	85.4	
	HAD45	76.4	80.3	83.1	84.0	
HAD85	76.4	82.2	86.6	89.0		

Precipitation (in)

	Scenario	2009	2039	2069	2099	
Annual Total	CCSM45	46.1	46.5	50.8	49.4	
	CCSM85	46.1	48.6	49.7	53.2	
	GFDL45	46.1	52.1	54.5	57.3	
	GFDL85	46.1	49.9	55.3	58.6	
	HAD45	46.1	47.9	50.0	49.1	
HAD85	46.1	47.6	45.3	49.5		
Growing Season (May—Sep)	CCSM45	20.4	19.8	21.5	20.6	
	CCSM85	20.4	20.1	19.5	20.4	
	GFDL45	20.4	23.1	22.2	23.0	
	GFDL85	20.4	21.5	22.1	22.7	
	HAD45	20.4	20.5	18.8	19.0	
HAD85	20.4	20.1	16.2	16.6		

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
sugar maple	Acer saccharum	WDH	High	80.4	1195.6	11.9	Sm. dec.	Sm. dec.	High	Abundant	Good	Good			1	1
eastern redcedar	Juniperus virginiana	WDH	Medium	60.9	940.8	11.9	No change	Sm. inc.	Medium	Abundant	Good	Very Good			1	2
white ash	Fraxinus americana	WDL	Medium	68.8	687.8	8.3	Sm. dec.	Sm. dec.	Low	Abundant	Fair	Fair			0	3
yellow-poplar	Liriodendron tulipifera	WDH	High	51.5	479.7	8.3	Sm. dec.	Lg. dec.	High	Common	Fair	Fair			1	4
red maple	Acer rubrum	WDH	High	48.6	437.8	7.9	Sm. dec.	Sm. dec.	High	Common	Fair	Fair			1	5
black walnut	Juglans nigra	WDH	Low	62.5	367.9	4.9	No change	No change	Medium	Common	Fair	Fair			1	6
white oak	Quercus alba	WDH	Medium	34.6	328.8	5.9	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	7
American elm	Ulmus americana	WDH	Medium	58.7	298.2	3.7	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	8
sassafras	Sassafras albidum	WSL	Low	46.3	282.5	4.6	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor			0	9
black locust	Robinia pseudoacacia	NDH	Low	36	273.2	6.4	No change	Sm. inc.	Medium	Common	Fair	Good			1	10
chinkapin oak	Quercus muehlenbergii	NSL	Medium	43.7	270.3	5.1	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor			0	11
shagbark hickory	Carya ovata	WSL	Medium	45.5	235.1	3.6	No change	No change	Medium	Common	Fair	Fair			1	12
American beech	Fagus grandifolia	WDH	High	47	230.0	4.0	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor			0	13
green ash	Fraxinus pennsylvanica	WSH	Low	40.3	227.1	5.1	Sm. inc.	Lg. inc.	Medium	Common	Good	Very Good			1	14
black cherry	Prunus serotina	WDL	Medium	52.1	215.2	3.2	No change	No change	Low	Common	Poor	Poor			0	15
sweetgum	Liquidambar styraciflua	WDH	High	32.8	199.9	6.3	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	16
hackberry	Celtis occidentalis	WDH	Medium	45.5	185.2	3.4	Sm. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	17
pignut hickory	Carya glabra	WDL	Medium	32.3	181.9	4.2	No change	No change	Medium	Common	Fair	Fair			1	18
slippery elm	Ulmus rubra	WSL	Low	52.7	179.8	2.6	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	19
Virginia pine	Pinus virginiana	NDH	High	20.1	177.9	7.5	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	20
bitternut hickory	Carya cordiformis	WSL	Low	47	177.6	3.4	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	21
northern red oak	Quercus rubra	WDH	Medium	46.5	174.7	3.9	Sm. inc.	No change	High	Common	Very Good	Good			1	22
sycamore	Platanus occidentalis	NSL	Low	36.3	171.4	4.8	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	23
boxelder	Acer negundo	WSH	Low	43.8	166.9	3.5	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	24
chestnut oak	Quercus prinus	NDH	High	15	163.5	8.6	Lg. dec.	Lg. dec.	High	Common	Fair	Fair	Infill +	Infill +	1	25
black oak	Quercus velutina	WDH	High	17.1	128.7	3.7	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	26
pin oak	Quercus palustris	NSH	Low	16.3	125.2	8.5	Sm. dec.	Sm. dec.	Low	Common	Poor	Poor			0	27
Shumard oak	Quercus shumardii	NSL	Low	15	111.6	5.0	No change	Sm. inc.	High	Common	Good	Very Good			1	28
blackgum	Nyssa sylvatica	WDL	Medium	30.7	103.3	3.1	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	29
eastern redbud	Cercis canadensis	NSL	Low	32.9	85.2	1.7	No change	No change	Medium	Common	Fair	Fair			1	30
honeylocust	Gleditsia triacanthos	NSH	Low	15.5	70.9	2.1	Sm. inc.	Lg. inc.	High	Common	Very Good	Very Good	Infill ++	Infill ++	1	31
silver maple	Acer saccharinum	NSH	Low	3.8	69.1	7.5	No change	No change	High	Common	Good	Good	Infill ++	Infill ++	1	32
Ohio buckeye	Aesculus glabra	NSL	Low	18.7	48.8	1.6	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	33
scarlet oak	Quercus coccinea	WDL	Medium	7.2	43.0	3.1	No change	Sm. dec.	Medium	Rare	Poor	Very Poor	Infill +		1	34
common persimmon	Diospyros virginiana	NSL	Low	15.5	41.4	2.3	Lg. inc.	Lg. inc.	High	Rare	Good	Good			1	35
Osage-orange	Maclura pomifera	NDH	Medium	17.8	41.0	3.5	Lg. inc.	Lg. inc.	High	Rare	Good	Good			1	36
flowering dogwood	Cornus florida	WDL	Medium	27.3	34.2	0.8	Sm. inc.	Sm. inc.	Medium	Rare	Fair	Fair			1	37
eastern white pine	Pinus strobus	WDH	High	1.9	31.1	9.4	Lg. dec.	Lg. dec.	Low	Rare	Very Poor	Very Poor			0	38
ailanthus	Ailanthus altissima	NSL	FIA	7.9	29.2	2.1	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	39
American basswood	Tilia americana	WSL	Medium	8.4	24.1	2.5	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	40
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	20.1	23.8	1.0	Lg. inc.	Lg. inc.	High	Rare	Good	Good			1	41
blue ash	Fraxinus quadrangulata	NSL	Low	12.3	21.5	1.4	Sm. dec.	No change	Low	Rare	Very Poor	Very Poor			0	42
shellbark hickory	Carya laciniosa	NSL	Low	5.7	20.7	1.9	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	43
pawpaw	Asimina triloba	NSL	Low	11.3	19.4	1.2	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	44
swamp chestnut oak	Quercus michauxii	NSL	Low	1.8	18.1	8.2	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	45
red mulberry	Morus rubra	NSL	Low	11.7	16.4	1.2	No change	Lg. inc.	Medium	Rare	Poor	Good			1	46
mockernut hickory	Carya alba	WDL	Medium	6.4	16.2	1.2	Lg. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	1	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	19.6	15.6	0.7	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			1	48
bigtooth aspen	Populus grandidentata	NSL	Medium	3.3	12.7	2.8	Very Lg. dec.	Very Lg. dec.	Medium	Rare	Lost	Lost			0	49
Siberian elm	Ulmus pumila	NDH	FIA	1	12.7	12.3	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	50
northern pin oak	Quercus ellipsoidalis	NSH	Medium	0.5	10.6	4.7	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor			0	51
northern catalpa	Catalpa speciosa	NSHX	FIA	1	9.8	9.5	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	52
eastern cottonwood	Populus deltoides	NSH	Low	1.5	9.3	3.0	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	53
black maple	Acer nigrum	NSH	Low	2.1	8.4	4.1	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor			0	54
river birch	Betula nigra	NSL	Low	3.1	7.9	2.6	No change	No change	Medium	Rare	Poor	Poor			2	55
sourwood	Oxydendrum arboreum	NDL	High	1.5	7.4	1.9	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	2	56
southern red oak	Quercus falcata	WDL	Medium	1.6	7.0	2.8	Lg. inc.	Lg. inc.	High	Rare	Good	Good			2	57
bur oak	Quercus macrocarpa	NDH	Medium	3.1	7.0	2.3	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor			0	58
black willow	Salix nigra	NSH	Low	1	5.8	5.6	Sm. inc.	Lg. inc.	Low	Rare	Poor	Fair	Infill +	Infill +	2	59
yellow buckeye	Aesculus flava	NSL	Low	5.3	4.5	1.2	Sm. dec.	Sm. dec.	Low	Rare	Very Poor	Very Poor			0	60
winged elm	Ulmus alata	WDL	Medium	2.5	4.5	0.6	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	2	61
swamp white oak	Quercus bicolor	NSL	Low	3.1	3.3	1.1	Very Lg. dec.	Lg. dec.	Medium	Rare	Lost	Very Poor			0	62
red pine	Pinus resinosa	NSH	Medium	0.4	2.9	1.1	Very Lg. dec.	Very Lg. dec.	Low	Rare	Lost	Lost			0	63
Kentucky coffeetree	Gymnocladus dioicus	NSLX	FIA	1.1	2.9	1.1	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	64
shingle oak	Quercus imbricaria	NDH	Medium	0.3	2.0	0.1	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	65
post oak	Quercus stellata	WDH	High	1	2.0	1.9	Lg. inc.	Lg. inc.	High	Rare	Good	Good			2	66
wild plum	Prunus americana	NSLX	FIA	1	1.7	1.7	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	67
sugarberry	Celtis laevigata	NDH	Medium	0.6	1.3	0.7	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	68
striped maple	Acer pensylvanicum	NSL	Medium	1	0.5	0.5	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	69
yellow birch	Betula alleghaniensis	NDL	High	0.1	0.4	0.0	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	70
white mulberry	Morus alba	NSL	FIA	1	0.4	0.4	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	71
rock elm	Ulmus thomasii	NSLX	FIA	1	0.3	0.3	Unknown	Unknown	Low	Rare	FIA Only	FIA Only			0	72
ashe juniper	Juniperus ashei	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	73
shortleaf pine	Pinus echinata	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate ++	Migrate ++	3	74
slash pine	Pinus elliotii	NDH	High	0	0	0	Unknown	New Habitat	Medium	Absent	Unknown	New Habitat			3	75
loblolly pine	Pinus taeda	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate ++	Migrate ++	3	76
mountain maple	Acer spicatum	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			3	77
serviceberry	Amelanchier spp.	NSL	Low	0	0	0	Unknown	Unknown	Medium	Modeled	Unknown	Unknown			0	78
cittamwood/gum bumelia	Sideroxylon lanuginosum ssp.	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			3	79
pecan	Carya illinoensis	NSH	Low	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	80
black hickory	Carya texana	NDL	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	81
black ash	Fraxinus nigra	WSH	Medium	0	0	0	Unknown	New Habitat	Low	Absent	Unknown	New Habitat			3	82
cucumbertree	Magnolia acuminata	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	83
pin cherry	Prunus pensylvanica	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	84
cherrybark oak; swamp red o.	Quercus pagoda	NSL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	85
blackjack oak	Quercus marilandica	NSL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	86
water oak	Quercus nigra	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	87
willow oak	Quercus phellos	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	88
live oak	Quercus virginiana	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	89
cedar elm	Ulmus crassifolia	NDH	Medium	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat			3	90