

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	204

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				
		Abundant	Common	High	Medium	Reliability	Adaptability	Scenario RCP45	Scenario RCP85	Scenario RCP45	Scenario RCP85	SHIFT RCP45	SHIFT RCP85	
Ash	3													
Hickory	6													
Maple	5	4		15	23	Increase	23	29	Very Good	10	14	Likely	0	0
Oak	12	27		26	41	No Change	10	11	Good	15	17	Infill	6	10
Pine	3	29		31	9	Decrease	24	17	Fair	11	8	Migrate	4	6
Other	31	14		3		New	10	11	Poor	5	6			
	60	74		75	73	Unknown	8	7	Very Poor	12	7		10	16
							75	75	FIA Only	1	1			
									Unknown	5	4			
										59	57			

Potential Changes in Climate Variables

Temperature (°F)

	Scenario	2009	2039	2069	2099	
Annual Average	CCSM45	54.6	56.5	58.5	58.9	
	CCSM85	54.6	57.1	59.6	62.8	
	GFDL45	54.6	58.1	59.9	60.8	
	GFDL85	54.6	57.5	60.6	64.6	
	HAD45	54.6	57.4	60.5	62.1	
	HAD85	54.6	57.6	62.4	66.3	
Growing Season (May—Sep)	CCSM45	71.3	73.4	75.0	75.7	
	CCSM85	71.3	74.1	76.7	80.7	
	GFDL45	71.3	75.3	77.6	79.1	
	GFDL85	71.3	74.9	78.6	83.5	
	HAD45	71.3	74.4	77.1	79.1	
	HAD85	71.3	74.8	80.7	84.2	
Coldest Month (Average)	CCSM45	28.2	30.4	32.0	32.4	
	CCSM85	28.2	31.2	32.3	34.1	
	GFDL45	28.2	32.8	33.1	33.5	
	GFDL85	28.2	31.2	32.5	33.4	
	HAD45	28.2	29.6	32.2	32.4	
	HAD85	28.2	31.2	33.8	35.7	
Warmest Month (Average)	CCSM45	77.7	80.0	81.0	81.6	
	CCSM85	77.7	80.8	82.3	84.1	
	GFDL45	77.7	81.4	83.0	83.9	
	GFDL85	77.7	81.7	83.4	86.6	
	HAD45	77.7	81.1	83.0	83.9	
	HAD85	77.7	82.6	86.0	87.8	

Precipitation (in)

	Scenario	2009	2039	2069	2099	
Annual Total	CCSM45	43.5	42.3	47.2	45.3	
	CCSM85	43.5	44.7	46.2	46.4	
	GFDL45	43.5	48.4	49.5	50.4	
	GFDL85	43.5	47.8	53.8	54.6	
	HAD45	43.5	43.9	45.6	45.6	
	HAD85	43.5	45.5	43.1	46.1	
Growing Season (May—Sep)	CCSM45	21.2	20.3	22.9	21.1	
	CCSM85	21.2	21.4	21.4	20.9	
	GFDL45	21.2	23.4	22.7	23.6	
	GFDL85	21.2	23.6	25.0	25.0	
	HAD45	21.2	20.8	20.1	20.3	
	HAD85	21.2	21.0	17.8	18.6	

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
white oak	Quercus alba	WDH	Medium	80.8	1751.4	20.3	Lg. dec.	Lg. dec.	High	Abundant	Good	Good			1	1
eastern redcedar	Juniperus virginiana	WDH	Medium	79.5	1131.3	13.5	No change	No change	Medium	Abundant	Good	Good			1	2
post oak	Quercus stellata	WDH	High	62.4	1039.0	14.6	Sm. inc.	Sm. inc.	High	Abundant	Very Good	Very Good			1	3
black oak	Quercus velutina	WDH	High	68	736.8	10.3	No change	No change	Medium	Abundant	Good	Good			1	4
northern red oak	Quercus rubra	WDH	Medium	50.3	445.0	7.9	Sm. dec.	Sm. dec.	High	Common	Fair	Fair			1	5
shagbark hickory	Carya ovata	WSL	Medium	65.8	389.1	5.3	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	6
sugar maple	Acer saccharum	WDH	High	36.7	356.3	7.6	No change	No change	High	Common	Good	Good			1	7
white ash	Fraxinus americana	WDL	Medium	55.1	263.2	4.7	Sm. inc.	Sm. inc.	Low	Common	Fair	Fair			1	8
shingle oak	Quercus imbricaria	NDH	Medium	26.3	256.6	6.9	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	9
American elm	Ulmus americana	WDH	Medium	63.2	240.1	4.1	Sm. inc.	Lg. inc.	Medium	Common	Good	Very Good			1	10
black walnut	Juglans nigra	WDH	Low	40.9	223.8	5.6	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	11
chinkapin oak	Quercus muehlenbergii	NSL	Medium	32.2	197.7	5.0	No change	No change	Medium	Common	Fair	Fair			1	12
hackberry	Celtis occidentalis	WDH	Medium	40.5	170.7	4.4	Sm. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	13
bitternut hickory	Carya cordiformis	WSL	Low	34.9	168.5	3.3	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	14
black hickory	Carya texana	NDL	High	38.6	160.9	3.2	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	15
silver maple	Acer saccharinum	NSH	Low	6	111.0	17.9	Sm. dec.	No change	High	Common	Fair	Good			1	16
green ash	Fraxinus pennsylvanica	WSH	Low	23.5	99.8	4.4	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	17
sycamore	Platanus occidentalis	NSL	Low	16.5	99.4	6.7	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	18
slippery elm	Ulmus rubra	WSL	Low	39.8	97.7	2.3	Sm. inc.	Lg. inc.	Medium	Common	Good	Very Good			1	19
Shumard oak	Quercus shumardii	NSL	Low	21	95.2	4.8	Sm. dec.	Sm. inc.	High	Common	Fair	Very Good			1	20
black cherry	Prunus serotina	WDL	Medium	33.3	87.2	2.6	Sm. inc.	Sm. inc.	Low	Common	Fair	Fair			1	21
eastern hophornbeam; ironw	Ostrya virginiana	WDL	Low	25.3	85.6	3.1	Sm. dec.	No change	High	Common	Fair	Good			1	22
mockernut hickory	Carya alba	WSL	Medium	35.8	79.4	2.2	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	23
blackjack oak	Quercus marilandica	NSL	Medium	12.2	75.8	3.2	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	24
sassafras	Sassafras albidum	WSL	Low	21.9	67.7	2.5	No change	Sm. dec.	Medium	Common	Fair	Poor			1	25
red mulberry	Morus rubra	NSL	Low	26.6	67.6	2.7	Sm. dec.	No change	Medium	Common	Poor	Fair			1	26
honeylocust	Gleditsia triacanthos	NSH	Low	26.7	65.5	2.1	Sm. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	27
eastern cottonwood	Populus deltoides	NSH	Low	2.9	61.2	19.6	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor	Infill +		0	28
boxelder	Acer negundo	WSH	Low	11.6	60.2	4.8	No change	Lg. inc.	High	Common	Good	Very Good			1	29
flowering dogwood	Cornus florida	WDL	Medium	46.9	59.1	1.4	No change	No change	Medium	Common	Fair	Fair			1	30
common persimmon	Diospyros virginiana	NSL	Low	23	55.3	2.8	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	31
American basswood	Tilia americana	WSL	Medium	4.2	32.1	4.0	Lg. dec.	Very Lg. dec.	Medium	Rare	Very Poor	Lost			0	32
Osage-orange	Maclura pomifera	NDH	Medium	7.7	28.3	3.6	No change	Sm. inc.	High	Rare	Fair	Good	Infill ++		1	33
Ohio buckeye	Aesculus glabra	NSL	Low	10	25.2	2.6	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	34
scarlet oak	Quercus coccinea	WDL	Medium	15.7	23.7	1.7	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	35
eastern white pine	Pinus strobus	WDH	High	1	21.8	21.1	Lg. dec.	Lg. dec.	Low	Rare	Very Poor	Very Poor			0	36
red maple	Acer rubrum	WDH	High	13.2	21.6	2.2	Sm. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	1	37
black locust	Robinia pseudoacacia	NDH	Low	2.5	21.3	4.9	No change	Sm. inc.	Medium	Rare	Poor	Fair	Infill +	Infill +	1	38
black willow	Salix nigra	NSH	Low	12.6	19.5	1.9	Sm. dec.	Lg. inc.	Low	Rare	Very Poor	Fair			1	39
eastern redbud	Cercis canadensis	NSL	Low	19.2	19.5	1.2	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			1	40
pin oak	Quercus palustris	NSH	Low	3.8	17.7	1.0	No change	No change	Low	Rare	Very Poor	Very Poor			2	41
serviceberry	Amelanchier spp.	NSL	Low	13.1	17.5	1.5	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	42
shortleaf pine	Pinus echinata	WDH	High	5.6	15.2	3.8	Sm. inc.	Lg. inc.	Medium	Rare	Fair	Good	Infill +	Infill ++	1	43
white mulberry	Morus alba	NSL	FIA	2.1	13.9	6.8	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	44
blue ash	Fraxinus quadrangulata	NSL	Low	5.7	13.3	1.5	Sm. dec.	Sm. dec.	Low	Rare	Very Poor	Very Poor			0	45
winged elm	Ulmus alata	WDL	Medium	4.1	12.2	2.9	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	1	46
blackgum	Nyssa sylvatica	WDL	Medium	7.4	10.5	1.6	Sm. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	1	47

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Northern Research Station
Landscape Change Research Group
Iverson, Peters, Prasad, Matthews

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Common Name	Scientific Name	Range	MR	%Cell	FIAsum	FIAiv	ChngCl45	ChngCl85	Adap	Abund	Capabil45	Capabil85	SHIFT45	SHIFT85	SSO	N
pignut hickory	<i>Carya glabra</i>	WDL	Medium	10.6	8.7	1.0	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	1	48
American hornbeam; muscle	<i>Carpinus caroliniana</i>	WSL	Low	2.9	7.6	2.2	Sm. dec.	No change	Medium	Rare	Very Poor	Poor			0	49
Kentucky coffeetree	<i>Gymnocladus dioicus</i>	NSLX	FIA	2.1	7.1	3.5	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	50
river birch	<i>Betula nigra</i>	NSL	Low	2.1	5.7	2.7	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	51
shellbark hickory	<i>Carya laciniosa</i>	NSL	Low	2.3	5.3	2.6	Sm. dec.	No change	Medium	Rare	Very Poor	Poor		Infill +	2	52
swamp white oak	<i>Quercus bicolor</i>	NSL	Low	3.1	5.0	1.7	Very Lg. dec.	Very Lg. dec.	Medium	Rare	Lost	Lost			0	53
cittamwood/gum bumelia	<i>Sideroxylon lanuginosum</i> ssp.	NSL	Low	4.6	4.3	0.8	Lg. inc.	Lg. inc.	High	Rare	Good	Good		Infill ++	2	54
bur oak	<i>Quercus macrocarpa</i>	NDH	Medium	6	2.7	1.0	Very Lg. dec.	Very Lg. dec.	High	Rare	Lost	Lost			0	55
ailanthus	<i>Ailanthus altissima</i>	NSL	FIA	1	2.4	2.3	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	56
pawpaw	<i>Asimina triloba</i>	NSL	Low	0.9	1.3	1.1	Very Lg. dec.	Very Lg. dec.	Medium	Rare	Lost	Lost			0	57
black maple	<i>Acer nigrum</i>	NSH	Low	0.3	1.0	0.2	Very Lg. dec.	Very Lg. dec.	High	Rare	Lost	Lost			0	58
sugarberry	<i>Celtis laevigata</i>	NDH	Medium	1	0.7	0.7	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	59
Virginia pine	<i>Pinus virginiana</i>	NDH	High	4.1	0.1	0.3	Lg. dec.	Lg. inc.	Medium	Rare	Very Poor	Good			0	60
ashe juniper	<i>Juniperus ashei</i>	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	61
loblolly pine	<i>Pinus taeda</i>	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate ++	3	62
striped maple	<i>Acer pensylvanicum</i>	NSL	Medium	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	63
pecan	<i>Carya illinoensis</i>	NSH	Low	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	64
black ash	<i>Fraxinus nigra</i>	WSH	Medium	0	0	0	Unknown	New Habitat	Low	Absent	Unknown	New Habitat			3	65
sweetgum	<i>Liquidambar styraciflua</i>	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	66
yellow-poplar	<i>Liriodendron tulipifera</i>	WDH	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +		3	67
bigleaf magnolia	<i>Magnolia macrophylla</i>	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	68
sourwood	<i>Oxydendrum arboreum</i>	NDL	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			3	69
bigtooth aspen	<i>Populus grandidentata</i>	NSL	Medium	0	0	0	Unknown	Unknown	Medium	Modeled	Unknown	Unknown			0	70
pin cherry	<i>Prunus pensylvanica</i>	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	71
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	72
water oak	<i>Quercus nigra</i>	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	73
live oak	<i>Quercus virginiana</i>	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	74
cedar elm	<i>Ulmus crassifolia</i>	NDH	Medium	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat		Migrate ++	3	75