

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	9,549.4	3,687.0	158

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	15	23	Increase	23	24	Very Good	6	6	Likely	3	3
Hickory	3			Medium	27	40	No Change	9	10	Good	13	18	Infill	33	36
Maple	4	Abundant	1	Low	29	11	Decrease	19	17	Fair	13	11	Migrate	7	11
Oak	9	Common	25	FIA	6		New	17	17	Poor	9	7			
Pine	4	Rare	31				Unknown	9	9	Very Poor	9	6			
Other	34	Absent	20							FIA Only	3	3			
	57		77		77	74		77	77	Unknown	3	3			
											56	54			

Potential Changes in Climate Variables

Temperature (°F)

	Scenario	2009	2039	2069	2099	
Annual Average	CCSM45	52.1	53.7	56.0	56.3	
	CCSM85	52.1	54.4	56.9	59.9	
	GFDL45	52.1	57.3	57.6	58.4	
	GFDL85	52.1	55.1	58.6	62.6	
	HAD45	52.1	54.8	58.4	59.8	
HAD85	52.1	55.3	59.9	64.5		
Growing Season (May—Sep)	CCSM45	69.0	70.6	72.7	73.3	
	CCSM85	69.0	71.4	73.9	77.7	
	GFDL45	69.0	75.4	75.5	76.9	
	GFDL85	69.0	72.8	76.9	81.6	
	HAD45	69.0	72.2	75.6	77.5	
HAD85	69.0	72.6	78.7	83.3		
Coldest Month (Average)	CCSM45	25.2	26.7	28.4	28.9	
	CCSM85	25.2	28.2	29.1	30.8	
	GFDL45	25.2	29.2	29.6	30.2	
	GFDL85	25.2	28.3	29.4	30.2	
	HAD45	25.2	26.5	29.1	29.2	
HAD85	25.2	27.9	30.2	32.4		
Warmest Month (Average)	CCSM45	74.5	76.1	77.4	78.1	
	CCSM85	74.5	77.3	79.0	80.9	
	GFDL45	74.5	77.8	79.6	80.6	
	GFDL85	74.5	78.4	80.9	83.7	
	HAD45	74.5	78.2	81.0	82.0	
HAD85	74.5	79.9	84.1	87.0		

Precipitation (in)

	Scenario	2009	2039	2069	2099	
Annual Total	CCSM45	43.4	43.6	46.1	45.4	
	CCSM85	43.4	44.5	45.4	47.7	
	GFDL45	43.4	48.4	51.3	53.2	
	GFDL85	43.4	46.3	52.1	54.7	
	HAD45	43.4	45.6	47.2	46.5	
HAD85	43.4	45.7	43.3	46.9		
Growing Season (May—Sep)	CCSM45	20.2	20.1	20.7	19.9	
	CCSM85	20.2	19.1	19.1	19.2	
	GFDL45	20.2	22.3	21.8	22.6	
	GFDL85	20.2	21.0	21.9	22.1	
	HAD45	20.2	20.7	18.7	19.5	
HAD85	20.2	20.1	16.7	16.8		

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	71.7	556.2	10.3	Sm. dec.	Sm. dec.	High	Abundant	Good	Good	Infill ++	Infill ++	1	1
white ash	Fraxinus americana	WDL	Medium	76.9	432.6	8.4	Sm. dec.	Sm. dec.	Low	Common	Poor	Poor			0	2
red maple	Acer rubrum	WDL	High	40.4	331.6	6.6	Lg. dec.	Lg. dec.	High	Common	Fair	Fair	Infill +	Infill +	1	3
yellow-poplar	Liriodendron tulipifera	WDH	High	46.3	299.0	7.5	Sm. dec.	Lg. dec.	High	Common	Fair	Fair	Infill +	Infill +	1	4
black cherry	Prunus serotina	WDL	Medium	74.6	217.4	5.9	No change	Sm. dec.	Low	Common	Poor	Poor			0	5
eastern redcedar	Juniperus virginiana	WDH	Medium	25.5	200.7	4.7	Sm. inc.	Lg. inc.	Medium	Common	Good	Very Good	Infill ++	Infill ++	1	6
shagbark hickory	Carya ovata	WSL	Medium	48.6	198.2	4.5	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor	Infill +	Infill +	0	7
American elm	Ulmus americana	WDH	Medium	76.3	194.5	4.0	Sm. inc.	Sm. inc.	Medium	Common	Good	Good	Infill ++	Infill ++	1	8
black walnut	Juglans nigra	WDH	Low	72.5	181.3	5.2	No change	No change	Medium	Common	Fair	Fair			1	9
white oak	Quercus alba	WDH	Medium	38.5	164.4	4.6	Sm. inc.	No change	High	Common	Very Good	Good	Infill ++	Infill ++	1	10
sassafras	Sassafras albidum	WSL	Low	33.8	164.2	4.4	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor	Infill +	Infill +	0	11
American beech	Fagus grandifolia	WDH	High	45.3	164.0	3.6	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor	Infill +	Infill +	0	12
sweetgum	Liquidambar styraciflua	WDH	High	19.7	149.0	5.4	Sm. inc.	Sm. inc.	Medium	Common	Good	Good	Infill ++	Infill ++	1	13
black locust	Robinia pseudoacacia	NDH	Low	23.7	140.9	6.3	No change	Sm. inc.	Medium	Common	Fair	Good	Infill +	Infill ++	1	14
sycamore	Platanus occidentalis	NSL	Low	45.9	126.3	5.2	Sm. inc.	Sm. inc.	Medium	Common	Good	Good	Infill ++	Infill ++	1	15
Osage-orange	Maclura pomifera	NDH	Medium	28.7	115.3	8.4	Sm. dec.	Sm. inc.	High	Common	Fair	Very Good	Infill +	Infill ++	1	16
hackberry	Celtis occidentalis	WDH	Medium	61.4	111.6	4.4	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good	Infill ++	Infill ++	1	17
bitternut hickory	Carya cordiformis	WSL	Low	48.8	97.7	3.1	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good	Infill ++	Infill ++	1	18
green ash	Fraxinus pennsylvanica	WSH	Low	52.4	97.3	6.9	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	19
black oak	Quercus velutina	WDH	High	17.7	94.2	3.6	Sm. inc.	Sm. inc.	Medium	Common	Good	Good	Infill ++	Infill ++	1	20
boxelder	Acer negundo	WSH	Low	49.1	89.3	4.5	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good	Infill ++	Infill ++	1	21
northern red oak	Quercus rubra	WDH	Medium	38.1	82.0	3.2	Sm. inc.	No change	High	Common	Very Good	Good	Infill ++	Infill ++	1	22
slippery elm	Ulmus rubra	WSL	Low	35.9	71.6	2.3	Sm. inc.	Sm. inc.	Medium	Common	Good	Good	Infill ++	Infill ++	1	23
honeylocust	Gleditsia triacanthos	NSH	Low	27.1	70.4	3.5	Sm. dec.	No change	High	Common	Fair	Good	Infill +	Infill ++	1	24
pignut hickory	Carya glabra	WDL	Medium	26.4	63.0	2.7	Sm. inc.	No change	Medium	Common	Good	Fair	Infill ++	Infill +	1	25
pin oak	Quercus palustris	NSH	Low	17.7	59.8	4.0	No change	No change	Low	Common	Poor	Poor	Infill +	Infill +	0	26
eastern white pine	Pinus strobus	WDH	High	2.2	41.4	7.3	Lg. dec.	Very Lg. dec.	Low	Rare	Very Poor	Lost			0	27
Virginia pine	Pinus virginiana	NDH	High	5.3	39.6	4.2	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			2	28
Ohio buckeye	Aesculus glabra	NSL	Low	24.7	36.8	2.1	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	29
chinkapin oak	Quercus muehlenbergii	NSL	Medium	28.4	33.9	1.6	Sm. inc.	Sm. inc.	Medium	Rare	Fair	Fair	Infill +	Infill +	1	30
blackgum	Nyssa sylvatica	WDL	Medium	16.3	33.4	1.5	Sm. inc.	Sm. inc.	High	Rare	Good	Good	Infill ++	Infill ++	1	31
eastern cottonwood	Populus deltoides	NSH	Low	15.1	20.8	2.7	Sm. inc.	Lg. inc.	Medium	Rare	Fair	Good	Infill +	Infill ++	2	32
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	11.5	17.6	1.0	Sm. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	1	33
flowering dogwood	Cornus florida	WDL	Medium	23.5	15.6	0.6	Sm. inc.	Sm. inc.	Medium	Rare	Fair	Fair	Infill +	Infill +	1	34
eastern redbud	Cercis canadensis	NSL	Low	16.6	14.7	0.8	Sm. inc.	Lg. inc.	Medium	Rare	Fair	Good	Infill +	Infill ++	1	35
black willow	Salix nigra	NSH	Low	10.3	13.1	6.2	Lg. dec.	Lg. inc.	Low	Rare	Very Poor	Fair		Infill +	2	36
northern catalpa	Catalpa speciosa	NSHX	FIA	9.8	11.7	6.1	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	37
red pine	Pinus resinosa	NSH	Medium	1.6	11.4	5.2	Lg. dec.	Lg. dec.	Low	Rare	Very Poor	Very Poor			0	38
bigtooth aspen	Populus grandidentata	NSL	Medium	15.8	10.7	1.1	Very Lg. dec.	Very Lg. dec.	Medium	Rare	Lost	Lost			0	39
American basswood	Tilia americana	WSL	Medium	20.8	10.2	3.1	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	40
red mulberry	Morus rubra	NSL	Low	23.6	9.8	2.1	No change	Sm. inc.	Medium	Rare	Poor	Fair	Infill +	Infill +	1	41
American hornbeam; musclev	Carpinus caroliniana	WSL	Low	19.4	9.0	0.8	Sm. inc.	Lg. inc.	Medium	Rare	Fair	Good		Infill ++	1	42
common persimmon	Diospyros virginiana	NSL	Low	1.5	7.7	1.7	Sm. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	2	43
silver maple	Acer saccharinum	NSH	Low	17.9	7.7	2.0	Lg. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	2	44
scarlet oak	Quercus coccinea	WDL	Medium	1.8	7.1	1.1	No change	Sm. dec.	Medium	Rare	Poor	Very Poor	Infill +		2	45
rock elm	Ulmus thomasii	NSLX	FIA	13.1	7.0	2.8	Unknown	Unknown	Low	Rare	FIA Only	FIA Only			0	46
blue ash	Fraxinus quadrangulata	NSL	Low	5.8	6.9	1.1	No change	Sm. dec.	Low	Rare	Very Poor	Very Poor			0	47

One x One Degree
Climate Change Atlas Tree Species

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Northern Research Station
Landscape Change Research Group
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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
bur oak	Quercus macrocarpa	NDH	Medium	4.5	5.1	3.0	Sm. dec.	No change	High	Rare	Poor	Fair		Infill +	2	48
pawpaw	Asimina triloba	NSL	Low	7.7	4.8	0.9	Lg. dec.	Very Lg. dec.	Medium	Rare	Very Poor	Lost			0	49
Siberian elm	Ulmus pumila	NDH	FIA	5.2	2.7	1.4	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	50
chestnut oak	Quercus prinus	NDH	High	0.2	1.6	0.3	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	2	51
river birch	Betula nigra	NSL	Low	1	1.3	1.2	Sm. dec.	No change	Medium	Rare	Very Poor	Poor		Infill +	2	52
Scots pine	Pinus sylvestris	NSH	FIA	1	1.1	1.1	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	53
sourwood	Oxydendrum arboreum	NDL	High	0.4	0.6	0.2	No change	No change	High	Rare	Fair	Fair			0	54
post oak	Quercus stellata	WDH	High	1	0.4	0.4	Lg. inc.	Lg. inc.	High	Rare	Good	Good			2	55
white mulberry	Morus alba	NSL	FIA	4.2	0.1	0.5	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	56
Kentucky coffeetree	Gymnocladus dioicus	NSLX	FIA	4.2	0.1	0.3	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	57
shortleaf pine	Pinus echinata	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate ++	3	58
loblolly pine	Pinus taeda	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	59
serviceberry	Amelanchier spp.	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	60
cittamwood/gum bumelia	Sideroxylon lanuginosum ssp.	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			3	61
pecan	Carya illinoensis	NSH	Low	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat		Migrate ++	3	62
shellbark hickory	Carya laciniosa	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Likely +	Likely +	3	63
black hickory	Carya texana	NDL	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	64
mockernut hickory	Carya alba	WDL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Likely +	Likely +	3	65
sugarberry	Celtis laevigata	NDH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	66
black ash	Fraxinus nigra	WSH	Medium	0	0	0	Unknown	Unknown	Low	Absent	Unknown	Unknown			0	67
swamp white oak	Quercus bicolor	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	68
southern red oak	Quercus falcata	WDL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	69
cherrybark oak; swamp red o.	Quercus pagoda	NSL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	70
shingle oak	Quercus imbricaria	NDH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	71
blackjack oak	Quercus marilandica	NSL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	72
water oak	Quercus nigra	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate ++	3	73
Shumard oak	Quercus shumardii	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Likely +	Likely +	3	74
bluejack oak	Quercus incana	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	75
winged elm	Ulmus alata	WDL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	76
cedar elm	Ulmus crassifolia	NDH	Medium	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat			0	77