

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

Area of Region sq. km sq. mi FIA Plots
 9,549.4 3,687.0 99

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	8	21	Increase	20	21	Very Good	8	7	Likely	1	1
Hickory	7			Medium	22	33	No Change	7	9	Good	8	11	Infill	14	14
Maple	4	Abundant	0	Low	30	7	Decrease	20	17	Fair	9	10	Migrate	4	8
Oak	11	Common	20	FIA	2		New	10	11	Poor	12	10			
Pine	0	Rare	29				Unknown	5	4	Very Poor	9	8			
Other	24	Absent	12							FIA Only	1	1			
	49		61		62	61		62	62	Unknown	3	2			
											50	49			

Potential Changes in Climate Variables

Temperature (°F)

	Scenario	2009	2039	2069	2099	
Annual Average	CCSM45	53.5	55.5	57.4	57.9	
	CCSM85	53.5	56.2	58.6	61.6	
	GFDL45	53.5	58.9	58.8	59.8	
	GFDL85	53.5	56.4	59.6	63.6	
	HAD45	53.5	56.2	59.4	61.1	
	HAD85	53.5	56.6	61.4	65.3	
Growing Season (May—Sep)	CCSM45	71.2	73.4	74.8	75.7	
	CCSM85	71.2	74.4	76.8	80.4	
	GFDL45	71.2	77.9	77.5	79.2	
	GFDL85	71.2	74.8	78.5	83.6	
	HAD45	71.2	74.0	76.7	78.7	
	HAD85	71.2	74.5	80.1	83.7	
Coldest Month (Average)	CCSM45	25.3	27.4	29.2	29.6	
	CCSM85	25.3	28.4	29.5	31.3	
	GFDL45	25.3	29.5	30.1	30.5	
	GFDL85	25.3	28.3	29.8	30.9	
	HAD45	25.3	26.7	29.6	29.8	
	HAD85	25.3	28.9	31.7	33.9	
Warmest Month (Average)	CCSM45	77.5	79.9	81.1	81.7	
	CCSM85	77.5	81.2	82.8	84.4	
	GFDL45	77.5	81.1	82.8	83.9	
	GFDL85	77.5	81.6	83.1	86.7	
	HAD45	77.5	80.4	82.3	83.3	
	HAD85	77.5	82.1	85.3	87.2	

Precipitation (in)

	Scenario	2009	2039	2069	2099	
Annual Total	CCSM45	41.4	39.1	42.9	40.4	
	CCSM85	41.4	40.1	42.4	41.3	
	GFDL45	41.4	45.0	46.6	46.5	
	GFDL85	41.4	45.0	50.6	50.1	
	HAD45	41.4	43.1	44.4	43.7	
	HAD85	41.4	43.2	41.6	44.9	
Growing Season (May—Sep)	CCSM45	23.0	21.8	23.7	21.4	
	CCSM85	23.0	21.8	22.7	21.5	
	GFDL45	23.0	24.7	24.1	24.4	
	GFDL85	23.0	25.0	26.6	25.6	
	HAD45	23.0	23.0	22.8	22.7	
	HAD85	23.0	23.0	20.4	21.0	

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
American elm	Ulmus americana	WDH	Medium	89.1	398.9	9.7	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor			0	1
shagbark hickory	Carya ovata	WSL	Medium	81.1	302.4	8.2	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	2
white oak	Quercus alba	WDH	Medium	53.5	290.2	13.7	Lg. dec.	Lg. dec.	High	Common	Fair	Fair			1	3
shingle oak	Quercus imbricaria	NDH	Medium	67.3	193.9	7.1	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	4
pin oak	Quercus palustris	NSH	Low	44.6	183.5	9.8	Sm. dec.	Sm. dec.	Low	Common	Poor	Poor			0	5
hackberry	Celtis occidentalis	WDH	Medium	68.4	168.4	6.5	Sm. inc.	No change	High	Common	Very Good	Good			1	6
black walnut	Juglans nigra	WDH	Low	60.5	148.7	6.9	No change	No change	Medium	Common	Fair	Fair			1	7
Osage-orange	Maclura pomifera	NDH	Medium	14.8	135.2	9.7	Sm. dec.	Sm. inc.	High	Common	Fair	Very Good	Infill +	Infill ++	1	8
slippery elm	Ulmus rubra	WSL	Low	48.7	104.4	4.8	Sm. dec.	No change	Medium	Common	Poor	Fair			1	9
black oak	Quercus velutina	WDH	High	36.9	97.5	5.0	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	10
black locust	Robinia pseudoacacia	NDH	Low	26.2	94.6	10.6	Sm. dec.	No change	Medium	Common	Poor	Fair			1	11
river birch	Betula nigra	NSL	Low	25.7	81.6	8.0	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	12
silver maple	Acer saccharinum	NSH	Low	28.8	72.3	10.5	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good	Infill ++	Infill ++	1	13
white ash	Fraxinus americana	WDL	Medium	41	71.1	3.8	Sm. inc.	Sm. inc.	Low	Common	Fair	Fair			1	14
honeylocust	Gleditsia triacanthos	NSH	Low	54.5	68.3	5.1	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	15
post oak	Quercus stellata	WDH	High	12.2	68.3	10.9	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good	Infill ++	Infill ++	1	16
bitternut hickory	Carya cordiformis	WSL	Low	59	65.2	3.6	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	17
green ash	Fraxinus pennsylvanica	WSH	Low	35.4	64.8	4.8	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	18
eastern redcedar	Juniperus virginiana	WDH	Medium	36.9	59.4	4.9	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	19
northern red oak	Quercus rubra	WDH	Medium	41.6	53.0	4.4	Sm. inc.	No change	High	Common	Very Good	Good			1	20
bur oak	Quercus macrocarpa	NDH	Medium	23.5	42.3	6.0	Lg. dec.	Lg. dec.	High	Rare	Poor	Poor	Infill +	Infill +	1	21
swamp white oak	Quercus bicolor	NSL	Low	30.9	41.6	3.6	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	22
sycamore	Platanus occidentalis	NSL	Low	19.8	37.5	5.4	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	1	23
black willow	Salix nigra	NSH	Low	18.1	34.5	10.3	No change	Lg. inc.	Low	Rare	Very Poor	Fair			1	24
chinkapin oak	Quercus muehlenbergii	NSL	Medium	20.5	34.5	3.4	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	25
sugar maple	Acer saccharum	WDH	High	4.2	29.0	3.8	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	2	26
red mulberry	Morus rubra	NSL	Low	28.6	26.6	1.4	Sm. inc.	Sm. inc.	Medium	Rare	Fair	Fair			1	27
black cherry	Prunus serotina	WDL	Medium	31.8	26.5	1.6	Lg. inc.	Lg. inc.	Low	Rare	Fair	Fair			1	28
white mulberry	Morus alba	NSL	FIA	7.2	23.1	3.6	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	29
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	14	18.8	2.2	Lg. dec.	Sm. dec.	High	Rare	Poor	Poor		Infill +	1	30
blue ash	Fraxinus quadrangulata	NSL	Low	3	17.3	8.7	Lg. dec.	Lg. dec.	Low	Rare	Very Poor	Very Poor			0	31
Ohio buckeye	Aesculus glabra	NSL	Low	19.2	16.5	1.6	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	32
pecan	Carya illinoensis	NSH	Low	6.5	15.0	3.8	Lg. inc.	Lg. inc.	Low	Rare	Fair	Fair	Infill +	Infill +	2	33
common persimmon	Diospyros virginiana	NSL	Low	5.9	12.8	3.3	Sm. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	1	34
boxelder	Acer negundo	WSH	Low	17.7	12.4	4.7	Lg. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	1	35
eastern redbud	Cercis canadensis	NSL	Low	9.2	12.0	2.4	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	1	36
flowering dogwood	Cornus florida	WDL	Medium	2.9	6.8	1.3	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			2	37
mockernut hickory	Carya alba	WDL	Medium	19	6.4	2.4	Lg. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	1	38
eastern cottonwood	Populus deltoides	NSH	Low	7.8	6.2	6.1	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	39
shellbark hickory	Carya laciniosa	NSL	Low	6.3	6.0	2.8	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			2	40
blackjack oak	Quercus marilandica	NSL	Medium	1	4.7	4.5	Lg. inc.	Lg. inc.	High	Rare	Good	Good			2	41
pawpaw	Asimina triloba	NSL	Low	0.8	4.2	3.1	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	42
black hickory	Carya texana	NDL	High	12.6	3.5	4.4	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	2	43
pignut hickory	Carya glabra	WDL	Medium	6.4	2.8	1.2	No change	No change	Medium	Rare	Poor	Poor	Infill +		2	44
American basswood	Tilia americana	WSL	Medium	0.6	1.7	0.9	Very Lg. dec.	Very Lg. dec.	Medium	Rare	Lost	Lost			0	45
Shumard oak	Quercus shumardii	NSL	Low	4.2	1.3	4.8	No change	Lg. inc.	High	Rare	Fair	Good			2	46
Kentucky coffeetree	Gymnocladus dioicus	NSLX	FIA	0.6	0.8	0.4	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	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	
red maple	Acer rubrum	WDH	High	4.2	0.7	2.8	Lg. inc.	Lg. inc.	High	Rare	Good	Good				2	48
serviceberry	Amelanchier spp.	NSL	Low	4.2	0.1	0.4	Lg. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor				0	49
loblolly pine	Pinus taeda	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate ++		3	50
black maple	Acer nigrum	NSH	Low	0	0	0	Unknown	Unknown	High	Modeled	Unknown	Unknown				0	51
cittamwood/gum bumelia	Sideroxylon lanuginosum ssp.	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate +		3	52
sugarberry	Celtis laevigata	NDH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate ++		3	53
sweetgum	Liquidambar styraciflua	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +		3	54
bigleaf magnolia	Magnolia macrophylla	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown				0	55
blackgum	Nyssa sylvatica	WDL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate +		3	56
pin cherry	Prunus pensylvanica	NSL	Low	0	0	0	Unknown	New Habitat	Medium	Absent	Unknown	New Habitat				3	57
southern red oak	Quercus falcata	WDL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate +		3	58
water oak	Quercus nigra	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +		3	59
sassafras	Sassafras albidum	WSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Likely +	Likely +		3	60
winged elm	Ulmus alata	WDL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate ++		3	61
cedar elm	Ulmus crassifolia	NDH	Medium	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat				3	62