

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
 9,412.7 3,634.3 40

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	2			High	4	15	Increase	14	13	Very Good	0	0	Likely	1	1
Hickory	2			Medium	21	28	No Change	6	7	Good	7	7	Infill	21	22
Maple	1	Abundant	0	Low	23	7	Decrease	9	9	Fair	11	10	Migrate	4	11
Oak	6	Common	5	FIA	4		New	15	15	Poor	4	6		26	34
Pine	2	Rare	28				Unknown	8	8	Very Poor	7	6			
Other	20	Absent	18							FIA Only	2	2			
	33		51		52	50		52	52	Unknown	4	4			
											35	35			

Potential Changes in Climate Variables

Temperature (°F)

	Scenario	2009	2039	2069	2099	
Annual Average	CCSM45	51.7	53.5	55.6	56.3	
	CCSM85	51.7	54.2	56.7	59.5	
	GFDL45	51.7	57.8	56.6	57.9	
	GFDL85	51.7	54.5	57.7	61.9	
	HAD45	51.7	54.1	57.1	58.6	
	HAD85	51.7	54.7	59.3	63.0	
Growing Season (May—Sep)	CCSM45	70.4	72.6	74.6	75.6	
	CCSM85	70.4	73.4	76.0	79.1	
	GFDL45	70.4	78.5	76.4	78.5	
	GFDL85	70.4	74.1	77.6	83.1	
	HAD45	70.4	72.5	74.7	76.4	
	HAD85	70.4	73.2	78.1	81.5	
Coldest Month Average	CCSM45	22.0	23.9	25.4	26.1	
	CCSM85	22.0	24.4	25.6	27.4	
	GFDL45	22.0	25.5	26.0	26.4	
	GFDL85	22.0	24.6	26.1	27.5	
	HAD45	22.0	24.0	27.1	26.9	
	HAD85	22.0	26.6	29.8	32.0	
Warmest Month Average	CCSM45	76.7	79.1	80.7	81.5	
	CCSM85	76.7	80.9	82.5	84.3	
	GFDL45	76.7	80.4	81.7	83.3	
	GFDL85	76.7	81.0	82.4	86.4	
	HAD45	76.7	78.6	80.4	81.2	
	HAD85	76.7	80.4	83.3	85.2	

Precipitation (in)

	Scenario	2009	2039	2069	2099	
Annual Total	CCSM45	34.0	34.2	34.7	33.0	
	CCSM85	34.0	34.0	34.1	34.9	
	GFDL45	34.0	38.4	40.1	39.1	
	GFDL85	34.0	37.9	41.9	40.1	
	HAD45	34.0	37.6	38.7	38.1	
	HAD85	34.0	36.2	34.7	38.2	
Growing Season (May—Sep)	CCSM45	21.3	20.9	20.9	19.7	
	CCSM85	21.3	20.3	19.8	20.3	
	GFDL45	21.3	24.3	24.3	23.3	
	GFDL85	21.3	23.8	25.4	23.4	
	HAD45	21.3	22.2	23.1	22.8	
	HAD85	21.3	21.5	19.7	19.8	

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
hackberry	Celtis occidentalis	WDH	Medium	56.4	111.4	9.8	No change	No change	High	Common	Good	Good	Infill ++	Infill ++	2	1
black walnut	Juglans nigra	WDH	Low	59.9	103.1	8.8	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor	Infill +	Infill +	2	2
American elm	Ulmus americana	WDH	Medium	58.9	71.9	8.6	Sm. inc.	Sm. inc.	Medium	Common	Good	Good	Infill ++	Infill ++	2	3
honeylocust	Gleditsia triacanthos	NSH	Low	51.9	64.5	12.6	No change	No change	High	Common	Good	Good	Infill ++	Infill ++	2	4
bur oak	Quercus macrocarpa	NDH	Medium	41.8	63.0	9.2	No change	No change	High	Common	Good	Good	Infill ++	Infill ++	2	5
Osage-orange	Maclura pomifera	NDH	Medium	32.3	47.6	6.5	Sm. inc.	Sm. inc.	High	Rare	Good	Good	Infill ++	Infill ++	2	6
eastern redcedar	Juniperus virginiana	WDH	Medium	34	42.2	9.2	Sm. inc.	Sm. inc.	Medium	Rare	Fair	Fair	Infill +	Infill +	2	7
eastern cottonwood	Populus deltoides	NSH	Low	21.4	41.7	11.9	Sm. inc.	Sm. inc.	Medium	Rare	Fair	Fair	Infill +	Infill +	2	8
red mulberry	Morus rubra	NSL	Low	57.9	39.8	4.2	Sm. inc.	Sm. inc.	Medium	Rare	Fair	Fair	Infill +	Infill +	2	9
bitternut hickory	Carya cordiformis	WSL	Low	21.6	34.9	10.0	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor	Infill +	Infill +	2	10
northern red oak	Quercus rubra	WDH	Medium	9.7	24.5	6.4	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	2	11
green ash	Fraxinus pennsylvanica	WSH	Low	36	22.8	3.0	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	2	12
black cherry	Prunus serotina	WDL	Medium	15.8	22.1	3.1	Sm. dec.	Lg. dec.	Low	Rare	Very Poor	Very Poor			2	13
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	27.9	21.4	4.1	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor	Infill +	Infill +	2	14
American basswood	Tilia americana	WSL	Medium	21.9	17.5	5.5	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			2	15
black willow	Salix nigra	NSH	Low	15.5	15.3	5.1	Sm. inc.	Lg. inc.	Low	Rare	Poor	Fair	Infill +	Infill +	2	16
slippery elm	Ulmus rubra	WSL	Low	41.9	14.0	3.5	Sm. inc.	Sm. inc.	Medium	Rare	Fair	Fair	Infill +	Infill +	2	17
black oak	Quercus velutina	WDH	High	21.8	13.5	7.5	Sm. inc.	Sm. inc.	Medium	Rare	Fair	Fair	Infill +	Infill +	2	18
Siberian elm	Ulmus pumila	NDH	FIA	6.4	12.7	7.3	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	19
white ash	Fraxinus americana	WDL	Medium	11.2	12.0	4.2	No change	Sm. inc.	Low	Rare	Very Poor	Poor		Infill +	2	20
sycamore	Platanus occidentalis	NSL	Low	11.2	11.9	14.2	Sm. inc.	Sm. inc.	Medium	Rare	Fair	Fair	Infill +	Infill +	2	21
chinkapin oak	Quercus muehlenbergii	NSL	Medium	14.1	10.3	4.3	Sm. inc.	No change	Medium	Rare	Fair	Poor	Infill +	Infill +	2	22
shagbark hickory	Carya ovata	WSL	Medium	12.5	9.5	3.4	Sm. inc.	No change	Medium	Rare	Fair	Poor	Infill +	Infill +	2	23
boxelder	Acer negundo	WSH	Low	4.3	7.7	6.5	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	2	24
Kentucky coffeetree	Gymnocladus dioicus	NSLX	FIA	12.7	4.6	2.3	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	25
peachleaf willow	Salix amygdaloides	NSLX	FIA	1.4	2.4	3.0	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	26
eastern redbud	Cercis canadensis	NSL	Low	6.3	2.0	2.2	Sm. inc.	Sm. inc.	Medium	Rare	Fair	Fair	Infill +	Infill +	2	27
pin oak	Quercus palustris	NSH	Low	7.7	1.9	3.2	Sm. dec.	Sm. dec.	Low	Rare	Very Poor	Very Poor			0	28
pawpaw	Asimina triloba	NSL	Low	4.2	1.4	5.1	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	29
red pine	Pinus resinosa	NSH	Medium	2.7	1.0	2.4	Sm. dec.	Sm. dec.	Low	Rare	Very Poor	Very Poor			0	30
Scots pine	Pinus sylvestris	NSH	FIA	4.2	0.6	2.4	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	31
black locust	Robinia pseudoacacia	NDH	Low	1.2	0.3	0.4	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	32
swamp white oak	Quercus bicolor	NSL	Low	4.2	0.2	0.9	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	33
striped maple	Acer pensylvanicum	NSL	Medium	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	34
silver maple	Acer saccharinum	NSH	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate ++	Migrate ++	3	35
sugar maple	Acer saccharum	WDH	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Likely +	Likely +	3	36
Ohio buckeye	Aesculus glabra	NSL	Low	0	0	0	Unknown	Unknown	Medium	Modeled	Unknown	Unknown			0	37
serviceberry	Amelanchier spp.	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	38
cittamwood/gum bumelia	Sideroxylon lanuginosum ssp.	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate +	3	39
pignut hickory	Carya glabra	WDL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	40
pecan	Carya illinoensis	NSH	Low	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	41
black hickory	Carya texana	NDL	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	42
mockernut hickory	Carya alba	WDL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate +	3	43
sugarberry	Celtis laevigata	NDH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	44
flowering dogwood	Cornus florida	WDL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	45
pin cherry	Prunus pensylvanica	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	46
shingle oak	Quercus imbricaria	NDH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	47

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Northern Research Station
Landscape Change Research Group
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Common Name	Scientific Name	Range	MR	%Cell	FIAsum	FIaiv	ChngCl45	ChngCl85	Adap	Abund	Capabil45	Capabil85	SHIFT45	SHIFT85	SSO	N
blackjack oak	Quercus marilandica	NSL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate +	3	48
Shumard oak	Quercus shumardii	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate +	3	49
post oak	Quercus stellata	WDH	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	50
winged elm	Ulmus alata	WDL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	51
cedar elm	Ulmus crassifolia	NDH	Medium	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat			3	52