

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
 8,985.5 3,469.3 238

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	11	19	Increase	16	12	Very Good	8	7	Likely	1	1
Hickory	2			Medium	22	33	No Change	7	10	Good	9	9	Infill	4	4
Maple	5	Abundant	2	Low	23	9	Decrease	15	16	Fair	8	6	Migrate	5	11
Oak	7	Common	22	FIA	8		New	14	15	Poor	5	8			
Pine	3	Rare	22				Unknown	12	11	Very Poor	6	6			
Other	26	Absent	16							FIA Only	5	5			
	46		62		64	61		64	64	Unknown	4	3			
											45	44			

Potential Changes in Climate Variables

Temperature (°F)

Scenario	2009	2039	2069	2099		
Annual	CCSM45	45.9	48.0	50.9	51.1	
Average	CCSM85	45.9	48.7	51.6	55.1	
	GFDL45	45.9	50.1	51.4	52.8	
	GFDL85	45.9	49.2	52.6	57.4	
	HAD45	45.9	48.9	52.6	54.5	
	HAD85	45.9	49.4	54.0	59.2	
Growing Season	CCSM45	65.6	67.8	70.3	70.7	
	CCSM85	65.6	68.7	71.2	75.5	
May—Sep	GFDL45	65.6	70.6	72.2	74.3	
	GFDL85	65.6	69.7	73.6	79.4	
	HAD45	65.6	68.7	71.8	73.9	
	HAD85	65.6	69.0	73.9	79.0	
Coldest Month	CCSM45	14.2	16.1	18.8	19.1	
	CCSM85	14.2	16.8	18.9	21.1	
Average	GFDL45	14.2	17.8	19.2	19.6	
	GFDL85	14.2	18.0	19.6	21.9	
	HAD45	14.2	15.3	19.6	19.4	
	HAD85	14.2	18.7	22.2	25.5	
Warmest Month	CCSM45	71.9	74.3	75.8	76.5	
	CCSM85	71.9	75.8	77.5	80.0	
Average	GFDL45	71.9	75.3	76.8	78.5	
	GFDL85	71.9	76.3	78.2	82.2	
	HAD45	71.9	75.1	77.0	78.3	
	HAD85	71.9	76.4	79.2	82.7	

Precipitation (in)

Scenario	2009	2039	2069	2099		
Annual	CCSM45	34.3	34.2	34.1	33.7	
Total	CCSM85	34.3	33.3	34.4	34.2	
	GFDL45	34.3	37.2	40.6	38.2	
	GFDL85	34.3	38.1	40.7	39.6	
	HAD45	34.3	36.1	36.7	36.5	
	HAD85	34.3	35.9	35.5	38.0	
Growing Season	CCSM45	21.2	20.6	20.2	20.5	
	CCSM85	21.2	19.9	20.2	18.9	
May—Sep	GFDL45	21.2	22.4	24.3	22.0	
	GFDL85	21.2	23.1	23.5	21.7	
	HAD45	21.2	21.4	20.5	20.6	
	HAD85	21.2	21.0	18.9	19.1	

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	93.9	1194.5	12.7	Sm. dec.	Sm. dec.	Medium	Abundant	Fair	Fair			0	1
northern red oak	Quercus rubra	WDH	Medium	71.1	673.5	9.0	Sm. dec.	Sm. dec.	High	Abundant	Good	Good			1	2
boxelder	Acer negundo	WSH	Low	75.2	486.5	7.7	No change	No change	High	Common	Good	Good			1	3
white oak	Quercus alba	WDH	Medium	65.5	439.2	6.7	Sm. inc.	No change	High	Common	Very Good	Good			1	4
shagbark hickory	Carya ovata	WSL	Medium	61.2	422.2	6.5	No change	Sm. dec.	Medium	Common	Fair	Poor			1	5
bur oak	Quercus macrocarpa	NDH	Medium	49.3	394.7	6.9	Sm. inc.	No change	High	Common	Very Good	Good			1	6
American basswood	Tilia americana	WSL	Medium	74.6	372.1	5.3	No change	Sm. dec.	Medium	Common	Fair	Poor			1	7
black walnut	Juglans nigra	WDH	Low	68.3	326.4	7.4	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	8
silver maple	Acer saccharinum	NSH	Low	13.9	320.2	18.0	No change	No change	High	Common	Good	Good			1	9
bitternut hickory	Carya cordiformis	WSL	Low	60.1	313.7	5.3	No change	No change	High	Common	Good	Good			1	10
slippery elm	Ulmus rubra	WSL	Low	75.5	306.6	4.5	No change	No change	Medium	Common	Fair	Fair			1	11
sugar maple	Acer saccharum	WDH	High	51.3	293.5	5.9	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	12
black cherry	Prunus serotina	WDL	Medium	74.4	292.5	4.8	Sm. inc.	No change	Low	Common	Fair	Poor			1	13
paper birch	Betula papyrifera	WDH	High	37.7	203.2	4.6	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	14
quaking aspen	Populus tremuloides	WDH	High	33.4	195.8	5.1	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor			0	15
eastern redcedar	Juniperus virginiana	WDH	Medium	39.5	171.5	5.5	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	16
white ash	Fraxinus americana	WDL	Medium	34.1	157.1	4.2	Sm. inc.	Sm. inc.	Low	Common	Fair	Fair			1	17
eastern cottonwood	Populus deltoides	NSH	Low	23.1	133.7	8.6	Sm. inc.	Lg. inc.	Medium	Common	Good	Very Good			1	18
black oak	Quercus velutina	WDH	High	36.4	129.3	3.2	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	19
green ash	Fraxinus pennsylvanica	WSH	Low	16.1	124.4	6.3	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	20
hackberry	Celtis occidentalis	WDH	Medium	43.3	118.1	2.8	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	21
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	57.3	114.0	2.6	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	22
bigtooth aspen	Populus grandidentata	NSL	Medium	25.8	103.8	3.9	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	23
black maple	Acer nigrum	NSH	Low	5.3	82.0	13.7	Sm. dec.	Lg. dec.	High	Common	Fair	Fair			0	24
black ash	Fraxinus nigra	WSH	Medium	31.7	47.7	1.5	Lg. dec.	Lg. dec.	Low	Rare	Very Poor	Very Poor			0	25
black willow	Salix nigra	NSH	Low	5.3	39.4	20.5	Sm. dec.	No change	Low	Rare	Very Poor	Very Poor			2	26
peachleaf willow	Salix amygdaloides	NSLX	FIA	1.1	37.1	33.3	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	27
black locust	Robinia pseudoacacia	NDH	Low	6.7	36.6	3.8	Sm. inc.	Sm. inc.	Medium	Rare	Fair	Fair	Infill +	Infill +	1	28
eastern white pine	Pinus strobus	WDH	High	8.6	35.9	4.5	Sm. dec.	Lg. dec.	Low	Rare	Very Poor	Very Poor			0	29
northern pin oak	Quercus ellipsoidalis	NSH	Medium	20.9	32.7	3.8	Lg. dec.	Lg. dec.	High	Rare	Poor	Poor			1	30
red pine	Pinus resinosa	NSH	Medium	4.4	29.8	11.1	Sm. dec.	Sm. dec.	Low	Rare	Very Poor	Very Poor			2	31
butternut	Juglans cinerea	NSLX	FIA	9.9	22.2	1.5	Unknown	Unknown	Low	Rare	FIA Only	FIA Only			0	32
white mulberry	Morus alba	NSL	FIA	4.3	22.1	3.9	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	33
Scots pine	Pinus sylvestris	NSH	FIA	1.9	20.0	7.1	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	34
swamp white oak	Quercus bicolor	NSL	Low	3.2	18.5	5.2	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	35
American hornbeam; musclev	Carpinus caroliniana	WSL	Low	1.5	16.6	3.0	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	36
chokecherry	Prunus virginiana	NSLX	FIA	9.5	16.1	1.3	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	37
red maple	Acer rubrum	WDH	High	0.2	8.0	1.6	Sm. inc.	No change	High	Rare	Good	Fair	Infill ++	Infill +	2	38
river birch	Betula nigra	NSL	Low	1.7	6.3	1.9	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	39
wild plum	Prunus americana	NSLX	FIA	4.9	6.2	1.7	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	40
white spruce	Picea glauca	NSL	Medium	2.8	6.1	2.0	Very Lg. dec.	Very Lg. dec.	Medium	Rare	Lost	Lost			0	41
red mulberry	Morus rubra	NSL	Low	2.2	4.8	2.2	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	1	42
northern white-cedar	Thuja occidentalis	WSH	High	0.7	2.8	1.6	Very Lg. dec.	Very Lg. dec.	Medium	Rare	Lost	Lost			0	43
rock elm	Ulmus thomasii	NSLX	FIA	2.2	2.1	0.9	Unknown	Unknown	Low	Rare	FIA Only	FIA Only			0	44
Siberian elm	Ulmus pumila	NDH	FIA	1.3	1.6	0.2	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	45
chinkapin oak	Quercus muehlenbergii	NSL	Medium	1.1	1.1	1.0	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	46
Ohio buckeye	Aesculus glabra	NSL	Low	0	0	0	Unknown	Unknown	Medium	Modeled	Unknown	Unknown			0	47

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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
serviceberry	Amelanchier spp.	NSL	Low	0	0	0	Unknown	Unknown	Medium	Modeled	Unknown	Unknown				0 48
pignut hickory	Carya glabra	WDL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +		3 49
black hickory	Carya texana	NDL	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat				3 50
mockernut hickory	Carya alba	WDL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate +		3 51
sugarberry	Celtis laevigata	NDH	Medium	0	0	0	Unknown	New Habitat	Medium	Absent	Unknown	New Habitat				3 52
eastern redbud	Cercis canadensis	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +		3 53
common persimmon	Diospyros virginiana	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate +		3 54
American beech	Fagus grandifolia	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +		3 55
blue ash	Fraxinus quadrangulata	NSL	Low	0	0	0	Unknown	Unknown	Low	Absent	Unknown	Unknown				0 56
honeylocust	Gleditsia triacanthos	NSH	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Likely +	Likely +		3 57
yellow-poplar	Liriodendron tulipifera	WDH	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate +		3 58
Osage-orange	Maclura pomifera	NDH	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate ++		3 59
sycamore	Platanus occidentalis	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +		3 60
shingle oak	Quercus imbricaria	NDH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +		3 61
blackjack oak	Quercus marilandica	NSL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat				3 62
post oak	Quercus stellata	WDH	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate ++		3 63
sassafras	Sassafras albidum	WSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +		3 64