

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	9,412.7	3,634.3	52

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	4			High	8	19	Increase	12	15	Very Good	0	0
Hickory	5			Medium	24	31	No Change	11	8	Good	11	12
Maple	4	Abundant	0	Low	28	12	Decrease	26	26	Fair	7	7
Oak	10	Common	8	FIA	5		New	9	9	Poor	13	11
Pine	3	Rare	46				Unknown	7	7	Very Poor	17	16
Other	28	Absent	10							FIA Only	2	2
	54		64		65	62		65	65	Unknown	2	2
											31	28

Potential Changes in Climate Variables

Temperature (°F)

	Scenario	2009	2039	2069	2099	
Annual Average	CCSM45	50.8	52.4	54.9	55.0	
	CCSM85	50.8	53.1	55.7	58.8	
	GFDL45	50.8	57.1	56.5	57.4	
	GFDL85	50.8	53.9	57.5	61.7	
	HAD45	50.8	53.7	57.3	58.8	
	HAD85	50.8	54.1	58.7	63.5	
Growing Season (May—Sep)	CCSM45	68.0	69.6	71.9	72.3	
	CCSM85	68.0	70.4	73.0	76.7	
	GFDL45	68.0	75.8	74.8	76.1	
	GFDL85	68.0	71.9	76.1	81.1	
	HAD45	68.0	71.3	74.6	76.7	
	HAD85	68.0	71.4	77.3	82.4	
Coldest Month Average	CCSM45	23.8	25.3	27.2	27.3	
	CCSM85	23.8	26.5	27.7	29.4	
	GFDL45	23.8	27.2	28.0	28.7	
	GFDL85	23.8	26.8	28.1	29.2	
	HAD45	23.8	25.1	28.1	28.2	
	HAD85	23.8	26.6	29.1	31.7	
Warmest Month Average	CCSM45	73.7	75.4	76.9	77.3	
	CCSM85	73.7	76.5	78.3	80.3	
	GFDL45	73.7	76.6	78.7	79.6	
	GFDL85	73.7	77.6	79.8	82.9	
	HAD45	73.7	77.4	80.0	81.3	
	HAD85	73.7	78.7	82.9	86.4	

Precipitation (in)

	Scenario	2009	2039	2069	2099	
Annual Total	CCSM45	37.9	39.0	39.6	40.6	
	CCSM85	37.9	39.7	40.2	42.1	
	GFDL45	37.9	41.5	44.5	46.0	
	GFDL85	37.9	39.7	45.3	47.7	
	HAD45	37.9	39.1	39.8	40.0	
	HAD85	37.9	39.6	37.1	40.7	
Growing Season (May—Sep)	CCSM45	18.8	19.4	19.0	19.3	
	CCSM85	18.8	18.4	18.6	18.2	
	GFDL45	18.8	20.3	20.6	21.4	
	GFDL85	18.8	19.3	20.6	20.9	
	HAD45	18.8	19.5	17.4	18.5	
	HAD85	18.8	18.5	15.5	16.1	

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
white ash	Fraxinus americana	WDL	Medium	75.1	183.9	10.3	Sm. dec.	Sm. dec.	Low	Common	Poor	Poor	Infill +	Infill +	0	1
sugar maple	Acer saccharum	WDH	High	57.4	179.2	12.6	Sm. dec.	Sm. dec.	High	Common	Fair	Fair	Infill +	Infill +	1	2
black locust	Robinia pseudoacacia	NDH	Low	9.6	153.0	28.1	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor	Infill +	Infill +	2	3
black walnut	Juglans nigra	WDH	Low	57.9	110.9	10.8	No change	No change	Medium	Common	Fair	Fair	Infill +	Infill +	1	4
black cherry	Prunus serotina	WDL	Medium	47.7	106.2	6.6	Sm. dec.	Lg. dec.	Low	Common	Poor	Very Poor	Infill +		0	5
American elm	Ulmus americana	WDH	Medium	70.2	105.0	8.2	Sm. inc.	Sm. inc.	Medium	Common	Good	Good	Infill ++	Infill ++	1	6
hackberry	Celtis occidentalis	WDH	Medium	42.9	74.2	6.4	No change	No change	High	Common	Good	Good	Infill ++	Infill ++	2	7
northern red oak	Quercus rubra	WDH	Medium	24.1	54.6	12.2	No change	Sm. dec.	High	Common	Good	Fair	Infill ++	Infill +	2	8
eastern cottonwood	Populus deltoides	NSH	Low	16.5	44.8	11.2	No change	Sm. inc.	Medium	Rare	Poor	Fair	Infill +	Infill +	2	9
silver maple	Acer saccharinum	NSH	Low	19.8	41.9	7.2	No change	Sm. dec.	High	Rare	Fair	Poor	Infill +	Infill +	2	10
red maple	Acer rubrum	WDH	High	37.4	40.9	7.9	Lg. dec.	Lg. dec.	High	Rare	Poor	Poor	Infill +		2	11
slippery elm	Ulmus rubra	WSL	Low	35.5	40.2	3.8	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	1	12
shagbark hickory	Carya ovata	WSL	Medium	40.6	37.7	7.5	Sm. inc.	No change	Medium	Rare	Fair	Poor	Infill +	Infill +	1	13
American basswood	Tilia americana	WSL	Medium	34.2	34.4	7.2	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	14
green ash	Fraxinus pennsylvanica	WDH	Low	35.3	29.1	5.2	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	1	15
American beech	Fagus grandifolia	WDH	High	17.3	23.3	6.0	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			2	16
boxelder	Acer negundo	WSH	Low	26.7	22.2	5.7	Lg. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	2	17
honeylocust	Gleditsia triacanthos	NSH	Low	11.4	21.3	9.7	Sm. inc.	Sm. inc.	High	Rare	Good	Good	Infill ++	Infill ++	2	18
bitternut hickory	Carya cordiformis	WSL	Low	32.8	21.1	3.7	Lg. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	2	19
bur oak	Quercus macrocarpa	NDH	Medium	16.9	18.8	5.6	Sm. dec.	Sm. inc.	High	Rare	Poor	Good	Infill +		2	20
eastern white pine	Pinus strobus	WDH	High	4.6	17.7	6.3	Lg. dec.	Very Lg. dec.	Low	Rare	Very Poor	Lost			0	21
Osage-orange	Maclura pomifera	NDH	Medium	19	16.0	8.0	Lg. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	2	22
black oak	Quercus velutina	WDH	High	8.1	14.1	5.0	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	23
yellow-poplar	Liriodendron tulipifera	WDH	High	4.7	11.9	4.1	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	2	24
pignut hickory	Carya glabra	WDL	Medium	12.8	11.4	2.7	Sm. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			2	25
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	28.2	11.0	2.4	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor	Infill +	Infill +	2	26
pin oak	Quercus palustris	NSH	Low	17.9	10.7	6.9	No change	Sm. inc.	Low	Rare	Very Poor	Poor		Infill +	2	27
white oak	Quercus alba	WDH	Medium	12.6	9.8	1.9	Lg. inc.	Lg. inc.	High	Rare	Good	Good			2	28
shingle oak	Quercus imbricaria	NDH	Medium	11.4	8.6	4.4	Sm. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			2	29
black willow	Salix nigra	NSH	Low	7.7	8.6	13.3	Sm. dec.	No change	Low	Rare	Very Poor	Very Poor			2	30
white mulberry	Morus alba	NSL	FIA	16	8.5	2.8	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	31
Ohio buckeye	Aesculus glabra	NSL	Low	17.3	6.9	3.5	Sm. inc.	Sm. inc.	Medium	Rare	Fair	Fair	Infill +	Infill +	2	32
sycamore	Platanus occidentalis	NSL	Low	12.1	6.3	3.0	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	33
scarlet oak	Quercus coccinea	WDL	Medium	3.4	5.6	4.3	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	34
mockernut hickory	Carya alba	WDL	Medium	20.5	5.4	1.5	Sm. dec.	Lg. inc.	High	Rare	Poor	Good	Infill +		2	35
yellow buckeye	Aesculus flava	NSL	Low	2.8	4.0	2.0	Sm. dec.	Sm. dec.	Low	Rare	Very Poor	Very Poor			0	36
swamp white oak	Quercus bicolor	NSL	Low	5	3.4	2.2	No change	Sm. dec.	Medium	Rare	Poor	Very Poor	Infill +		2	37
bigtooth aspen	Populus grandidentata	NSL	Medium	5.9	3.2	4.3	Lg. dec.	Very Lg. dec.	Medium	Rare	Very Poor	Lost			0	38
red pine	Pinus resinosa	NSH	Medium	1.7	3.0	4.6	Lg. dec.	Lg. dec.	Low	Rare	Very Poor	Very Poor			0	39
Scots pine	Pinus sylvestris	NSH	FIA	1.7	1.9	3.0	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	40
blue ash	Fraxinus quadrangulata	NSL	Low	8.5	1.6	3.0	Sm. dec.	Sm. dec.	Low	Rare	Very Poor	Very Poor			0	41
flowering dogwood	Cornus florida	WDL	Medium	9	1.5	1.5	Sm. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	42
black ash	Fraxinus nigra	WSH	Medium	9.3	1.5	1.1	Very Lg. dec.	Very Lg. dec.	Low	Rare	Lost	Lost			0	43
American hornbeam; muscle	Carpinus caroliniana	WSL	Low	3.9	1.3	0.2	Sm. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	44
chinkapin oak	Quercus muehlenbergii	NSL	Medium	0.7	1.3	0.8	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	45
eastern redbud	Cercis canadensis	NSL	Low	5.3	1.2	0.9	Sm. inc.	Sm. inc.	Medium	Rare	Fair	Fair	Infill +	Infill +	2	46
butternut	Juglans cinerea	NSLX	FIA	4.2	0.9	3.5	Unknown	Unknown	Low	Rare	FIA Only	FIA Only			0	47

One x One Degree
Climate Change Atlas Tree Species

USDA Forest Service
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
sassafras	Sassafras albidum	WSL	Low	1.7	0.9	1.3	No change	No change	Medium	Rare	Poor	Poor	Infill +		2	48
shellbark hickory	Carya laciniosa	NSL	Low	4.2	0.7	2.7	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor				49
rock elm	Ulmus thomasii	NSLX	FIA	3.6	0.7	2.1	Unknown	Unknown	Low	Rare	FIA Only	FIA Only				50
northern pin oak	Quercus ellipsoidalis	NSH	Medium	4.2	0.6	2.1	Lg. dec.	Lg. dec.	High	Rare	Poor	Poor				51
ailanthus	Ailanthus altissima	NSL	FIA	3.7	0.5	1.7	Unknown	Unknown	NA	Rare	NNIS	NNIS				52
serviceberry	Amelanchier spp.	NSL	Low	1.8	0.4	0.6	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor				53
pawpaw	Asimina triloba	NSL	Low	3.4	0.3	0.8	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor				54
eastern redcedar	Juniperus virginiana	WDH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate ++	Migrate ++		55
pecan	Carya illinoensis	NSH	Low	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat				56
black hickory	Carya texana	NDL	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat				57
sugarberry	Celtis laevigata	NDH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +		58
common persimmon	Diospyros virginiana	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate +		59
cucumbertree	Magnolia acuminata	NSL	Low	0	0	0	Unknown	Unknown	Medium	Modeled	Unknown	Unknown				60
blackjack oak	Quercus marilandica	NSL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat				61
Shumard oak	Quercus shumardii	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate +		62
post oak	Quercus stellata	WDH	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate ++	Migrate ++		63
bluejack oak	Quercus incana	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown				64
winged elm	Ulmus alata	WDL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate ++		65