

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	9,813.8	3,789.1	223

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	20	23	Increase	23	29	Very Good	11	13	Likely	0	0
Hickory	6			Medium	29	49	No Change	16	12	Good	16	18	Infill	10	12
Maple	4	Abundant	4	Low	33	14	Decrease	27	25	Fair	12	10	Migrate	5	5
Oak	15	Common	36	FIA	6		New	10	12	Poor	14	12			
Pine	5	Rare	32				Unknown	12	10	Very Poor	11	10			
Other	40	Absent	15							FIA Only	4	4			
	72		87		88	86		88	88	Unknown	6	4			
											74	71			

Potential Changes in Climate Variables

Temperature (°F)

	Scenario	2009	2039	2069	2099	
Annual Average	CCSM45	56.5	58.3	60.7	60.9	
	CCSM85	56.5	58.8	61.5	64.7	
	GFDL45	56.5	59.5	61.7	62.5	
	GFDL85	56.5	59.3	62.7	66.4	
	HAD45	56.5	59.1	62.5	63.8	
	HAD85	56.5	59.6	64.2	68.3	
Growing Season (May—Sep)	CCSM45	72.2	74.0	76.0	76.6	
	CCSM85	72.2	74.4	77.4	81.5	
	GFDL45	72.2	75.6	78.2	79.5	
	GFDL85	72.2	75.6	79.7	84.0	
	HAD45	72.2	75.5	78.8	80.5	
	HAD85	72.2	76.0	82.5	86.3	
Coldest Month (Average)	CCSM45	31.9	33.5	35.1	35.6	
	CCSM85	31.9	35.0	36.0	37.7	
	GFDL45	31.9	36.1	36.2	36.5	
	GFDL85	31.9	33.8	35.0	35.6	
	HAD45	31.9	32.9	35.1	35.4	
	HAD85	31.9	34.1	36.0	37.7	
Warmest Month (Average)	CCSM45	77.6	79.3	80.6	81.0	
	CCSM85	77.6	80.0	81.7	83.5	
	GFDL45	77.6	80.7	82.3	83.2	
	GFDL85	77.6	81.1	83.6	86.1	
	HAD45	77.6	81.8	84.5	85.3	
	HAD85	77.6	83.6	88.2	90.0	

Precipitation (in)

	Scenario	2009	2039	2069	2099	
Annual Total	CCSM45	49.0	49.7	55.0	53.7	
	CCSM85	49.0	53.9	54.6	58.4	
	GFDL45	49.0	55.6	58.7	61.6	
	GFDL85	49.0	55.2	59.7	63.6	
	HAD45	49.0	48.6	52.1	51.6	
	HAD85	49.0	49.5	47.2	52.0	
Growing Season (May—Sep)	CCSM45	20.5	19.7	21.4	20.9	
	CCSM85	20.5	21.4	19.8	21.0	
	GFDL45	20.5	23.3	23.1	23.9	
	GFDL85	20.5	22.8	23.3	23.9	
	HAD45	20.5	19.6	18.5	18.4	
	HAD85	20.5	19.6	15.7	16.3	

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	83	1160.5	11.8	Lg. dec.	Lg. dec.	High	Abundant	Good	Good			1	1
eastern redcedar	Juniperus virginiana	WDH	Medium	66.3	746.5	8.9	No change	Sm. inc.	Medium	Abundant	Good	Very Good			1	2
white oak	Quercus alba	WDH	Medium	66.7	620.4	7.1	No change	No change	High	Abundant	Very Good	Very Good			1	3
yellow-poplar	Liriodendron tulipifera	WDH	High	63.7	533.8	7.1	Lg. dec.	Lg. dec.	High	Abundant	Good	Good			1	4
pignut hickory	Carya glabra	WDL	Medium	58.7	425.1	5.1	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor			0	5
sweetgum	Liquidambar styraciflua	WDH	High	39.7	362.3	7.7	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	6
red maple	Acer rubrum	WDH	High	55.5	359.2	4.7	No change	No change	High	Common	Good	Good			1	7
post oak	Quercus stellata	WDH	High	32.6	353.5	9.1	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	8
American beech	Fagus grandifolia	WDH	High	46.9	341.8	6.1	Lg. dec.	Sm. dec.	Medium	Common	Poor	Poor			0	9
black oak	Quercus velutina	WDH	High	47.5	323.4	5.0	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	10
sassafras	Sassafras albidum	WSL	Low	50.8	316.3	5.1	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor			0	11
winged elm	Ulmus alata	WDL	Medium	44.5	300.2	5.8	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	12
Virginia pine	Pinus virginiana	NDH	High	13.2	265.8	11.2	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	13
green ash	Fraxinus pennsylvanica	WSH	Low	51.7	265.3	4.8	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	14
blackgum	Nyssa sylvatica	WDL	Medium	51.5	252.8	3.7	No change	Sm. inc.	High	Common	Good	Very Good			1	15
northern red oak	Quercus rubra	WDH	Medium	47	243.4	4.0	Sm. dec.	Sm. dec.	High	Common	Fair	Fair			1	16
white ash	Fraxinus americana	WDL	Medium	42.4	232.2	4.1	Sm. inc.	Sm. inc.	Low	Common	Fair	Fair			1	17
black cherry	Prunus serotina	WDL	Medium	53.2	227.5	3.7	No change	No change	Low	Common	Poor	Poor			0	18
sycamore	Platanus occidentalis	NSL	Low	32.6	201.0	4.6	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	19
flowering dogwood	Cornus florida	WDL	Medium	58.2	195.7	2.5	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor			0	20
shagbark hickory	Carya ovata	WSL	Medium	33.7	188.4	4.0	No change	No change	Medium	Common	Fair	Fair			1	21
chinkapin oak	Quercus muehlenbergii	NSL	Medium	36.4	185.9	3.6	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor			0	22
black walnut	Juglans nigra	WDH	Low	40.9	162.6	3.1	No change	No change	Medium	Common	Fair	Fair			1	23
mockernut hickory	Carya alba	WDL	Medium	35	150.3	3.6	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	24
American elm	Ulmus americana	WDH	Medium	36.8	148.7	3.1	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	25
southern red oak	Quercus falcata	WDL	Medium	24.9	137.7	3.6	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	26
common persimmon	Diospyros virginiana	NSL	Low	31.9	134.8	3.4	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	27
slippery elm	Ulmus rubra	WSL	Low	42.9	129.8	2.7	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	28
black locust	Robinia pseudoacacia	NDH	Low	8.2	124.9	6.3	No change	No change	Medium	Common	Fair	Fair			1	29
bitternut hickory	Carya cordiformis	WSL	Low	23.9	93.4	2.9	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	30
scarlet oak	Quercus coccinea	WDL	Medium	24.1	85.5	2.5	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	31
boxelder	Acer negundo	WSH	Low	14.6	82.8	4.0	Sm. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	32
silver maple	Acer saccharinum	NSH	Low	10.8	75.6	6.6	Sm. dec.	No change	High	Common	Fair	Good	Infill +	Infill ++	1	33
hackberry	Celtis occidentalis	WDH	Medium	23.9	71.4	2.5	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	34
chestnut oak	Quercus prinus	NDH	High	10.7	66.2	6.6	Lg. dec.	Sm. dec.	High	Common	Fair	Fair	Infill +	Infill +	1	35
shingle oak	Quercus imbricaria	NDH	Medium	15.2	64.2	4.0	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor			0	36
cherrybark oak; swamp red o	Quercus pagoda	NSL	Medium	8.5	61.3	6.6	No change	No change	Medium	Common	Fair	Fair	Infill +	Infill +	1	37
shellbark hickory	Carya laciniosa	NSL	Low	22.5	61.2	1.9	No change	No change	Medium	Common	Fair	Fair			1	38
eastern redbud	Cercis canadensis	NSL	Low	31.9	56.7	1.5	No change	Sm. inc.	Medium	Common	Fair	Good			1	39
ailanthus	Ailanthus altissima	NSL	FIA	3.3	51.1	4.1	Unknown	Unknown	NA	Common	NNIS	NNIS			0	40
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	23.9	49.7	1.7	Lg. inc.	Lg. inc.	High	Rare	Good	Good			1	41
loblolly pine	Pinus taeda	WDH	High	2.1	48.4	14.4	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	2	42
shortleaf pine	Pinus echinata	WDH	High	1.9	36.8	16.6	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	2	43
sourwood	Oxydendrum arboreum	NDL	High	17.4	30.2	1.9	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor			1	44
eastern white pine	Pinus strobus	WDH	High	1	28.8	28.3	Lg. dec.	Very Lg. dec.	Low	Rare	Very Poor	Lost			0	45
pin oak	Quercus palustris	NSH	Low	4.4	21.6	2.2	Sm. dec.	No change	Low	Rare	Very Poor	Very Poor			2	46
American hornbeam; muscle	Carpinus caroliniana	WSL	Low	13	21.0	1.2	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			1	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
Osage-orange	Maclura pomifera	NDH	Medium	2.7	17.5	4.8	No change	Sm. inc.	High	Rare	Fair	Good		Infill ++	2	48
Shumard oak	Quercus shumardii	NSL	Low	5	14.8	2.9	No change	Sm. inc.	High	Rare	Fair	Good		Infill ++	2	49
swamp white oak	Quercus bicolor	NSL	Low	3.6	14.4	4.8	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	50
red mulberry	Morus rubra	NSL	Low	7.4	14.3	0.8	No change	No change	Medium	Rare	Poor	Poor			1	51
pawpaw	Asimina triloba	NSL	Low	9.4	14.3	1.3	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	52
butternut	Juglans cinerea	NSLX	FIA	1	12.0	11.8	Unknown	Unknown	Low	Rare	FIA Only	FIA Only			0	53
yellow buckeye	Aesculus flava	NSL	Low	5.4	10.8	1.0	Lg. dec.	Lg. dec.	Low	Rare	Very Poor	Very Poor			0	54
river birch	Betula nigra	NSL	Low	3.6	10.8	3.7	No change	Sm. inc.	Medium	Rare	Poor	Fair	Infill +	Infill +	1	55
sugarberry	Celtis laevigata	NDH	Medium	4.6	9.4	2.3	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	2	56
black willow	Salix nigra	NSH	Low	2.2	9.3	2.6	Sm. inc.	Lg. inc.	Low	Rare	Poor	Fair	Infill +	Infill +	2	57
honeylocust	Gleditsia triacanthos	NSH	Low	4.1	8.6	2.1	Lg. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	1	58
eastern cottonwood	Populus deltoides	NSH	Low	2	8.4	4.1	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	59
Ohio buckeye	Aesculus glabra	NSL	Low	3.8	7.2	1.7	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	60
pitch pine	Pinus rigida	NSH	High	1	5.3	5.2	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	61
paulownia	Paulownia tomentosa	NSL	FIA	1	4.4	4.3	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	62
American basswood	Tilia americana	WSL	Medium	1	4.1	4.0	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	63
blackjack oak	Quercus marilandica	NSL	Medium	1	4.0	3.9	Lg. inc.	Lg. inc.	High	Rare	Good	Good			2	64
eastern hemlock	Tsuga canadensis	NSH	High	1	2.9	2.8	Very Lg. dec.	Very Lg. dec.	Low	Rare	Lost	Lost			0	65
swamp chestnut oak	Quercus michauxii	NSL	Low	1	2.4	2.4	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	66
serviceberry	Amelanchier spp.	NSL	Low	3.1	1.5	0.5	Very Lg. dec.	Very Lg. dec.	Medium	Rare	Lost	Lost			0	67
bigtooth aspen	Populus grandidentata	NSL	Medium	1	1.4	1.4	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	68
American chestnut	Castanea dentata	NSLX	FIA	1.8	1.3	0.6	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	69
water hickory	Carya aquatica	NSL	Medium	1.5	0.7	1.0	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	70
rock elm	Ulmus thomasii	NSLX	FIA	0.9	0.6	0.5	Unknown	Unknown	Low	Rare	FIA Only	FIA Only			0	71
northern catalpa	Catalpa speciosa	NSHX	FIA	1.3	0.2	0.3	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	72
ashe juniper	Juniperus ashei	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	73
red spruce	Picea rubens	NDH	High	0	0	0	Unknown	Unknown	Low	Absent	Unknown	Unknown			0	74
striped maple	Acer pensylvanicum	NSL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	75
mountain maple	Acer spicatum	NSL	Low	0	0	0	Unknown	Unknown	High	Absent	Unknown	Unknown			0	76
cittamwood/gum bumelia	Sideroxylon lanuginosum ssp.	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			3	77
pecan	Carya illinoensis	NSH	Low	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	78
black hickory	Carya texana	NDL	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	79
black ash	Fraxinus nigra	WSH	Medium	0	0	0	Unknown	New Habitat	Low	Absent	Unknown	New Habitat			3	80
American holly	Ilex opaca	NSL	Medium	0	0	0	Unknown	Unknown	Medium	Modeled	Unknown	Unknown			0	81
southern magnolia	Magnolia grandiflora	NSL	Low	0	0	0	Unknown	New Habitat	Medium	Absent	Unknown	New Habitat			3	82
pin cherry	Prunus pensylvanica	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	83
overcup oak	Quercus lyrata	NSL	Medium	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	84
water oak	Quercus nigra	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	85
willow oak	Quercus phellos	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate ++	Migrate ++	3	86
live oak	Quercus virginiana	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	87
cedar elm	Ulmus crassifolia	NDH	Medium	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat			3	88