

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	365

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	16	22	Increase	26	31	Very Good	11	11	Likely	1	1
Hickory	5			Medium	27	42	No Change	8	6	Good	16	19	Infill	3	6
Maple	4	Abundant	5	Low	29	10	Decrease	18	15	Fair	7	9	Migrate	5	9
Oak	12	Common	19	FIA	3		New	15	17	Poor	6	3		9	16
Pine	1	Rare	31				Unknown	8	6	Very Poor	11	9			
Other	30	Absent	19					75	75	FIA Only	2	2			
	55		74		75	74				Unknown	5	3			
											58	56			

Potential Changes in Climate Variables

Temperature (°F)

	Scenario	2009	2039	2069	2099	
Annual Average	CCSM45	55.4	57.3	59.4	59.7	
	CCSM85	55.4	57.7	60.2	63.4	
	GFDL45	55.4	58.2	60.6	61.5	
	GFDL85	55.4	58.3	61.3	65.1	
	HAD45	55.4	58.1	61.1	62.6	
	HAD85	55.4	58.3	63.1	66.9	
Growing Season (May—Sep)	CCSM45	71.4	73.4	75.1	75.8	
	CCSM85	71.4	74.0	76.5	80.5	
	GFDL45	71.4	74.5	77.6	79.2	
	GFDL85	71.4	75.0	78.6	83.3	
	HAD45	71.4	74.5	77.2	78.9	
	HAD85	71.4	74.8	80.8	84.3	
Coldest Month (Average)	CCSM45	30.1	32.2	33.7	34.1	
	CCSM85	30.1	33.0	34.1	35.8	
	GFDL45	30.1	34.6	34.8	35.2	
	GFDL85	30.1	32.5	33.8	34.5	
	HAD45	30.1	31.3	33.7	33.9	
	HAD85	30.1	32.8	35.1	37.0	
Warmest Month (Average)	CCSM45	77.5	79.7	80.8	81.1	
	CCSM85	77.5	80.2	81.6	83.5	
	GFDL45	77.5	81.7	83.1	84.2	
	GFDL85	77.5	81.7	83.4	86.6	
	HAD45	77.5	81.2	83.0	83.9	
	HAD85	77.5	82.6	86.0	87.6	

Precipitation (in)

	Scenario	2009	2039	2069	2099	
Annual Total	CCSM45	45.5	44.6	49.9	47.8	
	CCSM85	45.5	47.5	48.2	49.5	
	GFDL45	45.5	51.2	52.8	52.7	
	GFDL85	45.5	50.8	57.5	57.9	
	HAD45	45.5	44.8	48.2	48.1	
	HAD85	45.5	47.9	44.4	47.2	
Growing Season (May—Sep)	CCSM45	20.5	19.3	21.6	20.1	
	CCSM85	20.5	21.0	19.5	20.4	
	GFDL45	20.5	23.1	22.5	23.5	
	GFDL85	20.5	23.2	24.8	25.0	
	HAD45	20.5	19.4	19.6	19.2	
	HAD85	20.5	20.2	16.7	17.0	

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-DGP30 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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Common Name	Scientific Name	Range	MR	%Cell	FIAsum	FIAiv	ChngCl45	ChngCl85	Adap	Abund	Capabil45	Capabil85	SHIFT45	SHIFT85	SSO	N
white oak	Quercus alba	WDH	Medium	95.8	3027.7	22.4	Lg. dec.	Lg. dec.	High	Abundant	Good	Good			1	1
black oak	Quercus velutina	WDH	High	97.9	2213.0	15.9	Sm. dec.	Sm. dec.	Medium	Abundant	Fair	Fair			0	2
post oak	Quercus stellata	WDH	High	86.4	1359.1	10.4	Sm. inc.	Sm. inc.	High	Abundant	Very Good	Very Good			1	3
shortleaf pine	Pinus echinata	WDH	High	55.6	856.3	10.9	Sm. inc.	Sm. inc.	Medium	Abundant	Very Good	Very Good			1	4
scarlet oak	Quercus coccinea	WDL	Medium	50.7	678.8	9.1	Lg. dec.	Lg. dec.	Medium	Abundant	Fair	Fair			0	5
black hickory	Carya texana	NDL	High	77.9	422.1	3.5	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	6
mockernut hickory	Carya alba	WDL	Medium	76.5	401.6	3.9	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	7
eastern redcedar	Juniperus virginiana	WDH	Medium	51.2	387.7	5.2	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	8
blackjack oak	Quercus marilandica	NSL	Medium	43.5	254.9	3.7	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	9
blackgum	Nyssa sylvatica	WDL	Medium	66.1	232.7	2.4	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	10
flowering dogwood	Cornus florida	WDL	Medium	76.8	192.4	1.8	No change	No change	Medium	Common	Fair	Fair			1	11
northern red oak	Quercus rubra	WDH	Medium	38.5	190.1	3.3	Lg. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	12
pignut hickory	Carya glabra	WDL	Medium	39.4	173.8	3.1	No change	No change	Medium	Common	Fair	Fair			1	13
black walnut	Juglans nigra	WDH	Low	44.5	163.1	2.6	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	14
American elm	Ulmus americana	WDH	Medium	37.1	129.9	1.9	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	15
chinkapin oak	Quercus muehlenbergii	NSL	Medium	28.1	121.0	2.8	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	16
slippery elm	Ulmus rubra	WSL	Low	38	118.9	2.0	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	17
sugar maple	Acer saccharum	WDH	High	26.3	114.5	3.2	No change	No change	High	Common	Good	Good			1	18
sycamore	Platanus occidentalis	NSL	Low	16.6	114.4	4.1	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	19
red maple	Acer rubrum	WDH	High	47.2	109.6	1.6	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	20
black cherry	Prunus serotina	WDL	Medium	43	100.1	1.6	Lg. inc.	Lg. inc.	Low	Common	Good	Good			1	21
sassafras	Sassafras albidum	WSL	Low	55.8	91.1	1.2	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	22
bitternut hickory	Carya cordiformis	WSL	Low	29.2	78.3	1.6	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	23
white ash	Fraxinus americana	WDL	Medium	28.9	51.8	1.3	Lg. inc.	Lg. inc.	Low	Common	Good	Good			1	24
boxelder	Acer negundo	WSH	Low	7.6	43.0	3.0	Sm. dec.	No change	High	Rare	Poor	Fair			1	25
hackberry	Celtis occidentalis	WDH	Medium	14.1	41.8	1.1	Lg. inc.	Lg. inc.	High	Rare	Good	Good			1	26
Shumard oak	Quercus shumardii	NSL	Low	11	36.0	1.9	No change	Lg. inc.	High	Rare	Fair	Good			1	27
red mulberry	Morus rubra	NSL	Low	19	33.2	1.2	Sm. dec.	Sm. inc.	Medium	Rare	Very Poor	Fair			1	28
eastern redbud	Cercis canadensis	NSL	Low	22.7	32.8	0.9	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			1	29
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	11.8	26.1	1.5	Lg. inc.	Lg. inc.	High	Rare	Good	Good			1	30
shingle oak	Quercus imbricaria	NDH	Medium	5.5	25.8	2.3	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	31
shagbark hickory	Carya ovata	WSL	Medium	9.9	22.9	1.2	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	1	32
common persimmon	Diospyros virginiana	NSL	Low	20.3	22.7	0.8	Lg. inc.	Lg. inc.	High	Rare	Good	Good			1	33
American basswood	Tilia americana	WSL	Medium	2.1	19.7	3.4	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	34
green ash	Fraxinus pennsylvanica	WSH	Low	9.6	19.0	1.0	Sm. inc.	Lg. inc.	Medium	Rare	Fair	Good	Infill +	Infill ++	1	35
winged elm	Ulmus alata	WDL	Medium	10.6	18.8	1.0	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	1	36
river birch	Betula nigra	NSL	Low	1.2	11.4	4.2	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			2	37
honeylocust	Gleditsia triacanthos	NSH	Low	6.4	10.8	0.7	Sm. inc.	Lg. inc.	High	Rare	Good	Good			1	38
serviceberry	Amelanchier spp.	NSL	Low	9	8.8	0.5	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	39
Ohio buckeye	Aesculus glabra	NSL	Low	1.2	7.4	2.5	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	40
American hornbeam; muscle	Carpinus caroliniana	WSL	Low	6.8	6.0	0.4	No change	Sm. inc.	Medium	Rare	Poor	Fair		Infill +	1	41
swamp white oak	Quercus bicolor	NSL	Low	0.3	4.9	1.3	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	42
Osage-orange	Maclura pomifera	NDH	Medium	1	4.4	4.3	No change	Lg. inc.	High	Rare	Fair	Good			2	43
bur oak	Quercus macrocarpa	NDH	Medium	0.6	4.2	0.3	Lg. dec.	Sm. dec.	High	Rare	Poor	Poor			0	44
cittamwood/gum bumelia	Sideroxylon lanuginosum ssp.	NSL	Low	2.4	3.8	1.1	Lg. inc.	Lg. inc.	High	Rare	Good	Good		Infill ++	2	45
blue ash	Fraxinus quadrangulata	NSL	Low	2	3.4	1.7	Sm. dec.	Sm. dec.	Low	Rare	Very Poor	Very Poor			0	46
pawpaw	Asimina triloba	NSL	Low	5.1	3.2	0.6	Very Lg. dec.	Very Lg. dec.	Medium	Rare	Lost	Lost			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
butternut	Juglans cinerea	NSLX	FIA	1.7	3.0	1.2	Unknown	Unknown	Low	Rare	FIA Only	FIA Only			0	48
black willow	Salix nigra	NSH	Low	1.2	2.8	0.7	No change	Lg. inc.	Low	Rare	Very Poor	Fair	Infill +		2	49
eastern cottonwood	Populus deltoides	NSH	Low	1	2.8	2.7	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	50
ailanthus	Ailanthus altissima	NSL	FIA	1	2.2	2.2	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	51
southern red oak	Quercus falcata	WDL	Medium	0.7	1.6	1.1	Lg. inc.	Lg. inc.	High	Rare	Good	Good			2	52
wild plum	Prunus americana	NSLX	FIA	1.6	1.3	0.5	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	53
silver maple	Acer saccharinum	NSH	Low	1	0.4	0.4	Lg. dec.	No change	High	Rare	Poor	Fair			0	54
water tupelo	Nyssa aquatica	NSH	Medium	1	0.4	0.4	Lg. dec.	Lg. dec.	Low	Rare	Very Poor	Very Poor			0	55
ashe juniper	Juniperus ashei	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	56
longleaf pine	Pinus palustris	NSH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	57
loblolly pine	Pinus taeda	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate ++	Migrate ++	3	58
Virginia pine	Pinus virginiana	NDH	High	0	0	0	Unknown	New Habitat	Medium	Absent	Unknown	New Habitat		Migrate +	3	59
yellow birch	Betula alleghaniensis	NDL	High	0	0	0	Unknown	Unknown	Medium	Modeled	Unknown	Unknown			0	60
pecan	Carya illinoensis	NSH	Low	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	61
shellbark hickory	Carya laciniosa	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	62
sugarberry	Celtis laevigata	NDH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Likely +	Likely +	3	63
American beech	Fagus grandifolia	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	64
black ash	Fraxinus nigra	WSH	Medium	0	0	0	Unknown	New Habitat	Low	Absent	Unknown	New Habitat			3	65
sweetgum	Liquidambar styraciflua	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate ++	Migrate ++	3	66
yellow-poplar	Liriodendron tulipifera	WDH	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +		3	67
bigleaf magnolia	Magnolia macrophylla	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	68
cherrybark oak; swamp red o.	Quercus pagoda	NSL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	69
water oak	Quercus nigra	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate ++	3	70
pin oak	Quercus palustris	NSH	Low	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat		Migrate +	3	71
chestnut oak	Quercus prinus	NDH	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			3	72
live oak	Quercus virginiana	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	73
black locust	Robinia pseudoacacia	NDH	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	74
cedar elm	Ulmus crassifolia	NDH	Medium	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat		Migrate ++	3	75