

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	356

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	23	24	Increase	25	29	Very Good	10	12	Likely	0	0
Hickory	5		Medium	27	51	No Change	10	13	Good	17	19	Infill	6	11
Maple	7	Abundant	Low	37	16	Decrease	30	23	Fair	11	12	Migrate	3	8
Oak	10	Common	FIA	7		New	13	17	Poor	13	12		9	19
Pine	5	Rare				Unknown	16	12	Very Poor	12	9			
Other	43	Absent					94	94	FIA Only	4	4			
	72	92							Unknown	9	5			
										76	73			

Potential Changes in Climate Variables

Temperature (°F)

	Scenario	2009	2039	2069	2099	
Annual Average	CCSM45	55.0	56.9	59.2	59.4	
	CCSM85	55.0	57.3	59.8	62.8	
	GFDL45	55.0	57.7	60.5	61.3	
	GFDL85	55.0	58.1	61.6	65.3	
	HAD45	55.0	57.4	60.8	62.1	
Growing Season (May-Sep)	CCSM45	69.8	71.7	73.9	74.4	
	CCSM85	69.8	72.1	74.7	78.7	
	GFDL45	69.8	73.0	76.5	77.7	
	GFDL85	69.8	73.7	77.9	82.1	
	HAD45	69.8	72.9	76.2	77.9	
Coldest Month (Average)	CCSM45	32.3	34.1	35.4	35.7	
	CCSM85	32.3	35.0	35.9	37.2	
	GFDL45	32.3	36.1	36.2	36.8	
	GFDL85	32.3	34.4	35.5	36.5	
	HAD45	32.3	32.7	34.8	35.2	
Warmest Month (Average)	CCSM45	74.9	77.1	78.3	78.6	
	CCSM85	74.9	77.3	79.0	80.8	
	GFDL45	74.9	78.6	80.6	81.5	
	GFDL85	74.9	79.8	82.5	84.8	
	HAD45	74.9	78.7	81.3	82.3	
HAD85	74.9	80.1	84.3	86.7		

Precipitation (in)

	Scenario	2009	2039	2069	2099	
Annual Total	CCSM45	44.7	47.3	50.3	50.7	
	CCSM85	44.7	50.1	51.2	55.3	
	GFDL45	44.7	49.2	50.3	53.9	
	GFDL85	44.7	47.6	52.1	53.9	
	HAD45	44.7	44.8	46.1	46.2	
Growing Season (May-Sep)	CCSM45	20.9	22.3	23.3	23.2	
	CCSM85	20.9	23.2	22.2	24.1	
	GFDL45	20.9	23.2	22.5	23.8	
	GFDL85	20.9	21.6	22.8	23.3	
	HAD45	20.9	21.2	19.7	20.0	
HAD85	20.9	21.1	18.6	19.3		

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
yellow-poplar	Liriodendron tulipifera	WDH	High	97.1	1865.7	12.6	Lg. dec.	Lg. dec.	High	Abundant	Good	Good			1	1
red maple	Acer rubrum	WDH	High	90.9	1008.7	6.7	Sm. dec.	Sm. dec.	High	Abundant	Good	Good			1	2
chestnut oak	Quercus prinus	NDH	High	79.3	889.4	8.0	No change	No change	High	Abundant	Very Good	Very Good			1	3
American beech	Fagus grandifolia	WDH	High	85	844.1	6.9	Sm. dec.	Sm. dec.	Medium	Abundant	Fair	Fair			0	4
sugar maple	Acer saccharum	WDH	High	87.4	680.4	5.1	Sm. dec.	Lg. dec.	High	Abundant	Good	Good			1	5
white oak	Quercus alba	WDH	Medium	77.5	595.1	5.5	Sm. inc.	Sm. inc.	High	Abundant	Very Good	Very Good			1	6
black locust	Robinia pseudoacacia	NDH	Low	72.8	527.5	4.7	Sm. dec.	No change	Medium	Abundant	Fair	Good			1	7
northern red oak	Quercus rubra	WDH	Medium	76.1	419.2	3.4	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	8
black oak	Quercus velutina	WDH	High	71.8	340.9	3.5	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	9
pignut hickory	Carya glabra	WDL	Medium	72.4	324.5	3.0	No change	No change	Medium	Common	Fair	Fair			1	10
sassafras	Sassafras albidum	WSL	Low	76.1	309.7	2.9	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor			0	11
scarlet oak	Quercus coccinea	WDL	Medium	60.9	293.2	3.6	No change	No change	Medium	Common	Fair	Fair			1	12
mockernut hickory	Carya alba	WDL	Medium	61.2	292.5	3.1	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	13
sourwood	Oxydendrum arboreum	NDL	High	82.4	280.3	2.3	No change	Sm. dec.	High	Common	Good	Fair			1	14
sweet birch	Betula lenta	NDH	High	64.9	277.3	2.5	Sm. dec.	Sm. dec.	Low	Common	Poor	Poor			0	15
American basswood	Tilia americana	WSL	Medium	53.3	257.2	2.9	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor			0	16
blackgum	Nyssa sylvatica	WDL	Medium	71.2	220.7	2.2	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	17
white ash	Fraxinus americana	WDL	Medium	63.8	216.9	2.4	Sm. inc.	Sm. inc.	Low	Common	Fair	Fair			1	18
eastern hemlock	Tsuga canadensis	NSH	High	31.3	207.1	4.1	Sm. dec.	Sm. dec.	Low	Common	Poor	Poor			0	19
sycamore	Platanus occidentalis	NSL	Low	34.6	203.4	4.7	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	20
Virginia pine	Pinus virginiana	NDH	High	28.9	162.7	5.0	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	21
pitch pine	Pinus rigida	NSH	High	18.6	157.4	5.0	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	22
shagbark hickory	Carya ovata	WSL	Medium	55.3	135.1	1.7	No change	No change	Medium	Common	Fair	Fair			1	23
eastern redbud	Cercis canadensis	NSL	Low	49.3	135.0	1.9	No change	No change	Medium	Common	Fair	Fair			1	24
yellow buckeye	Aesculus flava	NSL	Low	24.6	132.7	3.4	Lg. dec.	Lg. dec.	Low	Common	Very Poor	Very Poor			0	25
eastern white pine	Pinus strobus	WDH	High	8.9	126.9	7.9	No change	No change	Low	Common	Poor	Poor			0	26
cucumbertree	Magnolia acuminata	NSL	Low	45.6	118.2	1.7	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor			0	27
flowering dogwood	Cornus florida	WDL	Medium	58.7	106.5	1.4	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	28
American elm	Ulmus americana	WDH	Medium	37.4	106.1	2.0	Sm. inc.	Lg. inc.	Medium	Common	Good	Very Good			1	29
bitternut hickory	Carya cordiformis	WSL	Low	37.7	86.7	1.8	Sm. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	30
black cherry	Prunus serotina	WDL	Medium	21.6	69.5	1.6	Lg. inc.	Lg. inc.	Low	Common	Good	Good			1	31
sweetgum	Liquidambar styraciflua	WDH	High	14.9	59.4	3.9	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	32
shortleaf pine	Pinus echinata	WDH	High	15.4	54.0	2.6	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	33
boxelder	Acer negundo	WSH	Low	11.3	53.1	4.2	Sm. dec.	No change	High	Common	Fair	Good			1	34
slippery elm	Ulmus rubra	WSL	Low	28.8	51.4	1.4	Sm. dec.	Sm. inc.	Medium	Common	Poor	Good			1	35
American hornbeam; muscley	Carpinus caroliniana	WSL	Low	27.2	50.2	1.2	Sm. inc.	Lg. inc.	Medium	Common	Good	Very Good			1	36
ailanthus	Ailanthus altissima	NSL	FIA	18.4	50.2	1.9	Unknown	Unknown	NA	Common	NNIS	NNIS			0	37
paulownia	Paulownia tomentosa	NSL	FIA	10.1	46.0	2.8	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	38
black walnut	Juglans nigra	WDH	Low	21.6	45.0	1.6	Sm. inc.	Lg. inc.	Medium	Rare	Fair	Good			1	39
mountain or Fraser magnolia	Magnolia fraseri	NSL	Low	11.9	40.4	1.7	Sm. dec.	Sm. dec.	Low	Rare	Very Poor	Very Poor			0	40
eastern redcedar	Juniperus virginiana	WDH	Medium	3.9	39.4	4.1	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	1	41
yellow birch	Betula alleghaniensis	NDL	High	5.9	35.0	2.7	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	42
black willow	Salix nigra	NSH	Low	4.3	29.0	3.0	No change	Sm. inc.	Low	Rare	Very Poor	Poor		Infill +	1	43
chinkapin oak	Quercus muehlenbergii	NSL	Medium	9.8	25.4	1.6	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	1	44
serviceberry	Amelanchier spp.	NSL	Low	21.4	22.6	0.7	Lg. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	45
American chestnut	Castanea dentata	NSLX	FIA	4.4	21.8	3.4	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	46
green ash	Fraxinus pennsylvanica	WSH	Low	16	21.2	0.8	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			1	47

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USDA Forest Service
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
loblolly pine	Pinus taeda	WDH	High	1	20.9	20.6	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	48
southern red oak	Quercus falcata	WDL	Medium	9.2	17.8	1.5	Lg. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	1	49
post oak	Quercus stellata	WDH	High	7.7	15.6	1.8	Lg. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	2	50
red mulberry	Morus rubra	NSL	Low	10.6	15.3	0.9	Sm. dec.	Sm. inc.	Medium	Rare	Very Poor	Fair			1	51
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	13	13.2	0.5	Lg. inc.	Lg. inc.	High	Rare	Good	Good			1	52
striped maple	Acer pensylvanicum	NSL	Medium	3.8	10.5	1.2	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	53
black maple	Acer nigrum	NSH	Low	1.5	9.7	0.8	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor			0	54
pawpaw	Asimina triloba	NSL	Low	7.3	8.5	0.5	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	55
silver maple	Acer saccharinum	NSH	Low	1	7.4	7.3	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor			0	56
bigleaf magnolia	Magnolia macrophylla	NSL	Low	5.2	5.0	0.6	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	57
hackberry	Celtis occidentalis	WDH	Medium	4.1	4.4	1.1	Sm. dec.	No change	High	Rare	Poor	Fair		Infill +	2	58
American holly	Ilex opaca	NSL	Medium	4.1	4.2	1.0	Sm. dec.	No change	Medium	Rare	Very Poor	Poor		Infill +	1	59
northern catalpa	Catalpa speciosa	NSHX	FIA	1	3.6	3.5	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	60
Ohio buckeye	Aesculus glabra	NSL	Low	1.1	3.4	0.8	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	61
common persimmon	Diospyros virginiana	NSL	Low	3	2.9	0.9	No change	Lg. inc.	High	Rare	Fair	Good	Infill +	Infill ++	1	62
rock elm	Ulmus thomasii	NSLX	FIA	1	2.3	2.3	Unknown	Unknown	Low	Rare	FIA Only	FIA Only			0	63
Shumard oak	Quercus shumardii	NSL	Low	1	2.0	1.9	Lg. dec.	No change	High	Rare	Poor	Fair		Infill +	2	64
shellbark hickory	Carya laciniosa	NSL	Low	1.3	1.9	0.7	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	65
butternut	Juglans cinerea	NSLX	FIA	2.6	1.9	0.6	Unknown	Unknown	Low	Rare	FIA Only	FIA Only			0	66
honeylocust	Gleditsia triacanthos	NSH	Low	2	1.4	0.7	Very Lg. dec.	No change	High	Rare	Lost	Fair		Infill +	2	67
eastern cottonwood	Populus deltoides	NSH	Low	1	1.1	1.1	Very Lg. dec.	Very Lg. dec.	Medium	Rare	Lost	Lost			0	68
winged elm	Ulmus alata	WDL	Medium	1.5	0.9	0.4	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	69
blackjack oak	Quercus marilandica	NSL	Medium	0.5	0.8	0.4	Lg. inc.	Lg. inc.	High	Rare	Good	Good			2	70
river birch	Betula nigra	NSL	Low	1	0.6	0.6	Sm. inc.	Sm. inc.	Medium	Rare	Fair	Fair	Infill +	Infill +	2	71
Norway maple	Acer platanoides	NSL	FIA	1	0.3	0.3	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	72
ashe juniper	Juniperus ashei	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	73
slash pine	Pinus elliotii	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	74
longleaf pine	Pinus palustris	NSH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	75
northern white-cedar	Thuja occidentalis	WSH	High	0	0	0	Unknown	New Habitat	Medium	Absent	Unknown	New Habitat			3	76
florida maple	Acer barbatum	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	77
mountain maple	Acer spicatum	NSL	Low	0	0	0	Unknown	Unknown	High	Absent	Unknown	Unknown			0	78
cittamwood/gum bumelia	Sideroxylon lanuginosum ssp.	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			3	79
pecan	Carya illinoensis	NSH	Low	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat		Migrate +	3	80
black hickory	Carya texana	NDL	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	81
sugarberry	Celtis laevigata	NDH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	82
black ash	Fraxinus nigra	WSH	Medium	0	0	0	Unknown	Unknown	Low	Absent	Unknown	Unknown			0	83
blue ash	Fraxinus quadrangulata	NSL	Low	0	0	0	Unknown	Unknown	Low	Modeled	Unknown	Unknown			0	84
silverbell	Halesia spp.	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	85
southern magnolia	Magnolia grandiflora	NSL	Low	0	0	0	Unknown	New Habitat	Medium	Absent	Unknown	New Habitat			3	86
swamp tupelo	Nyssa biflora	NDH	Medium	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat			3	87
bigtooth aspen	Populus grandidentata	NSL	Medium	0	0	0	Unknown	Unknown	Medium	Modeled	Unknown	Unknown			0	88
overcup oak	Quercus lyrata	NSL	Medium	0	0	0	Unknown	New Habitat	Low	Absent	Unknown	New Habitat			3	89
water oak	Quercus nigra	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	90
willow oak	Quercus phellos	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	91
live oak	Quercus virginiana	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	92
bluejack oak	Quercus incana	NSL	Low	0	0	0	Unknown	New Habitat	Medium	Absent	Unknown	New Habitat		Migrate +	3	93
cedar elm	Ulmus crassifolia	NDH	Medium	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat			0	94

