

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	9,683.1	3,738.7	267

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	Scenario	Scenario	Scenario	SHIFT	SHIFT		
				High	20	27	Increase	25	29	Very Good	8	11	
Ash	3			Medium	27	46	No Change	10	8	Good	22	21	
Hickory	5			Low	37	14	Decrease	28	26	Fair	8	6	
Maple	6	Abundant	6	FIA	6		New	16	18	Poor	8	10	
Oak	11	Common	28					Unknown	11	9	Very Poor	15	13
Pine	5	Rare	35							FIA Only	3	3	
Other	39	Absent	21							Unknown	5	3	
				90	87	90	90	90	90	69	67	8	20

Potential Changes in Climate Variables

Temperature (°F)

	Scenario	2009	2039	2069	2099	
Annual Average	CCSM45	53.8	55.8	58.1	58.3	
	CCSM85	53.8	56.3	58.7	61.9	
	GFDL45	53.8	56.6	59.6	60.4	
	GFDL85	53.8	57.2	60.7	64.7	
	HAD45	53.8	56.5	59.9	61.2	
Growing Season (May—Sep)	CCSM45	69.1	71.1	73.3	73.9	
	CCSM85	69.1	71.5	74.1	78.2	
	GFDL45	69.1	72.3	76.0	77.3	
	GFDL85	69.1	73.2	77.5	82.0	
	HAD45	69.1	72.3	75.7	77.4	
Coldest Month (Average)	CCSM45	30.4	32.3	33.6	34.1	
	CCSM85	30.4	33.3	34.3	35.7	
	GFDL45	30.4	34.1	34.6	35.3	
	GFDL85	30.4	33.1	34.0	35.2	
	HAD45	30.4	31.0	33.3	33.5	
Warmest Month (Average)	CCSM45	74.5	76.6	77.8	78.2	
	CCSM85	74.5	76.9	78.6	80.6	
	GFDL45	74.5	78.0	80.2	81.2	
	GFDL85	74.5	79.4	82.0	84.6	
	HAD45	74.5	78.3	80.9	82.1	
HAD85	74.5	79.7	83.8	86.6		

Precipitation (in)

	Scenario	2009	2039	2069	2099	
Annual Total	CCSM45	44.9	48.0	49.5	50.5	
	CCSM85	44.9	49.2	50.5	54.7	
	GFDL45	44.9	48.8	49.8	52.8	
	GFDL85	44.9	46.5	51.3	52.9	
	HAD45	44.9	46.0	46.4	45.7	
Growing Season (May—Sep)	CCSM45	21.2	22.8	23.2	23.5	
	CCSM85	21.2	22.7	22.1	23.9	
	GFDL45	21.2	22.9	22.1	23.4	
	GFDL85	21.2	21.0	21.8	22.3	
	HAD45	21.2	22.2	19.9	20.5	
HAD85	21.2	21.5	18.7	19.7		

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	83.3	1268.8	10.8	Lg. dec.	Lg. dec.	High	Abundant	Good	Good			1	1
red maple	Acer rubrum	WDH	High	90.9	1151.8	9.1	Sm. dec.	Sm. dec.	High	Abundant	Good	Good			1	2
white oak	Quercus alba	WDH	Medium	76	1060.1	10.8	No change	No change	High	Abundant	Very Good	Very Good			1	3
sugar maple	Acer saccharum	WDH	High	80.4	915.1	8.6	Sm. dec.	Sm. dec.	High	Abundant	Good	Good			1	4
chestnut oak	Quercus prinus	NDH	High	68.4	647.1	6.9	No change	Sm. dec.	High	Abundant	Very Good	Good			1	5
American beech	Fagus grandifolia	WDH	High	70.7	531.4	5.3	Sm. dec.	Sm. dec.	Medium	Abundant	Fair	Fair			0	6
black oak	Quercus velutina	WDH	High	70.8	432.3	4.7	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	7
northern red oak	Quercus rubra	WDH	Medium	63	367.4	4.7	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	8
white ash	Fraxinus americana	WDL	Medium	65.9	358.2	4.2	No change	No change	Low	Common	Poor	Poor			0	9
Virginia pine	Pinus virginiana	NDH	High	36.4	355.4	7.7	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor			0	10
pignut hickory	Carya glabra	WDL	Medium	70	347.1	3.9	No change	No change	Medium	Common	Fair	Fair			1	11
mockernut hickory	Carya alba	WDL	Medium	66.4	294.4	3.7	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	12
scarlet oak	Quercus coccinea	WDL	Medium	43.5	292.4	5.0	No change	Sm. dec.	Medium	Common	Fair	Poor			1	13
black locust	Robinia pseudoacacia	NDH	Low	41.1	244.9	4.0	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	14
blackgum	Nyssa sylvatica	WDL	Medium	57.1	215.4	2.8	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	15
sourwood	Oxydendrum arboreum	NDL	High	48.7	195.0	2.6	Sm. dec.	Sm. dec.	High	Common	Fair	Fair			1	16
American basswood	Tilia americana	WSL	Medium	29	186.9	4.7	Sm. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	17
sassafras	Sassafras albidum	WSL	Low	47	186.9	2.8	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	18
sycamore	Platanus occidentalis	NSL	Low	28.4	185.8	4.9	Sm. inc.	Lg. inc.	Medium	Common	Good	Very Good			1	19
black cherry	Prunus serotina	WDL	Medium	27.3	182.9	4.0	Sm. inc.	Sm. inc.	Low	Common	Fair	Fair			1	20
sweet birch	Betula lenta	NDH	High	30	170.0	3.3	Sm. dec.	Lg. dec.	Low	Common	Poor	Very Poor			0	21
eastern hemlock	Tsuga canadensis	NSH	High	15.1	163.5	4.1	Lg. dec.	Lg. dec.	Low	Common	Very Poor	Very Poor			0	22
shagbark hickory	Carya ovata	WSL	Medium	47.2	157.2	2.9	No change	No change	Medium	Common	Fair	Fair			1	23
slippery elm	Ulmus rubra	WSL	Low	38.7	137.3	3.3	No change	Sm. inc.	Medium	Common	Fair	Good			1	24
yellow buckeye	Aesculus flava	NSL	Low	28.9	131.4	3.5	Lg. dec.	Lg. dec.	Low	Common	Very Poor	Very Poor			0	25
black walnut	Juglans nigra	WDH	Low	22.2	125.6	5.1	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	26
cucumbertree	Magnolia acuminata	NSL	Low	26.1	107.8	2.9	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor			0	27
boxelder	Acer negundo	WSH	Low	14.9	101.4	6.4	No change	Sm. inc.	High	Common	Good	Very Good			1	28
American elm	Ulmus americana	WDH	Medium	24.7	81.0	2.7	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	29
pitch pine	Pinus rigida	NSH	High	14.5	69.6	4.4	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	30
eastern redbud	Cercis canadensis	NSL	Low	32.6	64.1	1.7	Sm. inc.	Lg. inc.	Medium	Common	Good	Very Good			1	31
bitternut hickory	Carya cordiformis	WSL	Low	22.9	59.4	2.3	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	32
ailanthus	Ailanthus altissima	NSL	FIA	15.7	54.1	3.0	Unknown	Unknown	NA	Common	NNIS	NNIS			0	33
American hornbeam; muscle	Carpinus caroliniana	WSL	Low	19	53.7	1.4	No change	Lg. inc.	Medium	Common	Fair	Very Good			1	34
flowering dogwood	Cornus florida	WDL	Medium	29.4	47.2	1.1	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			1	35
paulownia	Paulownia tomentosa	NSL	FIA	9.1	44.5	2.8	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	36
eastern white pine	Pinus strobus	WDH	High	3.9	41.9	7.4	No change	No change	Low	Rare	Very Poor	Very Poor			0	37
loblolly pine	Pinus taeda	WDH	High	2.1	37.4	18.1	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	2	38
pawpaw	Asimina triloba	NSL	Low	18.3	29.4	1.5	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	39
post oak	Quercus stellata	WDH	High	5.9	29.2	4.7	Lg. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	2	40
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	19.3	26.9	0.9	Lg. inc.	Lg. inc.	High	Rare	Good	Good			1	41
silver maple	Acer saccharinum	NSH	Low	2.1	24.0	11.6	Sm. dec.	No change	High	Rare	Poor	Fair		Infill +	2	42
eastern redcedar	Juniperus virginiana	WDH	Medium	6.3	17.3	2.2	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	1	43
mountain or Fraser magnolia	Magnolia fraseri	NSL	Low	0.4	15.4	0.3	Sm. dec.	Sm. dec.	Low	Rare	Very Poor	Very Poor			0	44
bigtooth aspen	Populus grandidentata	NSL	Medium	7.2	15.3	2.1	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	45
yellow birch	Betula alleghaniensis	NDL	High	3.4	15.1	1.8	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	46
common persimmon	Diospyros virginiana	NSL	Low	7.2	14.6	2.0	Sm. inc.	Lg. inc.	High	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
river birch	Betula nigra	NSL	Low	2.2	13.4	2.2	Sm. dec.	No change	Medium	Rare	Very Poor	Poor		Infill +	2	48
black willow	Salix nigra	NSH	Low	2.1	9.8	2.0	Sm. dec.	Sm. inc.	Low	Rare	Very Poor	Poor		Infill +	2	49
serviceberry	Amelanchier spp.	NSL	Low	6	9.2	0.8	Sm. dec.	No change	Medium	Rare	Very Poor	Poor			1	50
hackberry	Celtis occidentalis	WDH	Medium	2.1	7.7	3.7	Lg. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	2	51
butternut	Juglans cinerea	NSLX	FIA	3.2	4.7	0.9	Unknown	Unknown	Low	Rare	FIA Only	FIA Only			0	52
pin cherry	Prunus pensylvanica	NSL	Low	2.1	4.1	0.7	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	53
shortleaf pine	Pinus echinata	WDH	High	2.1	3.8	1.9	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	54
southern red oak	Quercus falcata	WDL	Medium	2.1	3.3	1.6	Lg. inc.	Lg. inc.	High	Rare	Good	Good			2	55
swamp white oak	Quercus bicolor	NSL	Low	1	2.5	2.4	Very Lg. dec.	Very Lg. dec.	Medium	Rare	Lost	Lost			0	56
striped maple	Acer pensylvanicum	NSL	Medium	1.1	2.4	1.0	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	57
green ash	Fraxinus pennsylvanica	WSH	Low	3.1	2.2	0.7	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	2	58
shellbark hickory	Carya laciniosa	NSL	Low	1	2.0	2.0	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	59
black maple	Acer nigrum	NSH	Low	1	1.9	1.9	Lg. dec.	Lg. dec.	High	Rare	Poor	Poor			0	60
chinkapin oak	Quercus muehlenbergii	NSL	Medium	0.1	1.8	0.1	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	61
shingle oak	Quercus imbricaria	NDH	Medium	0.7	1.4	0.9	Very Lg. dec.	Very Lg. dec.	Medium	Rare	Lost	Lost			0	62
chokecherry	Prunus virginiana	NSLX	FIA	1	1.3	1.3	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	63
white mulberry	Morus alba	NSL	FIA	1	1.2	1.2	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	64
blackjack oak	Quercus marilandica	NSL	Medium	1	0.9	0.9	Lg. inc.	Lg. inc.	High	Rare	Good	Good			2	65
black ash	Fraxinus nigra	WSH	Medium	1	0.7	0.7	Lg. dec.	Sm. dec.	Low	Rare	Very Poor	Very Poor			0	66
sweetgum	Liquidambar styraciflua	WDH	High	1	0.7	0.7	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	67
American chestnut	Castanea dentata	NSLX	FIA	1	0.6	0.6	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	68
American holly	Ilex opaca	NSL	Medium	0.1	0.4	0.0	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	69
Atlantic white-cedar	Chamaecyparis thyoides	NSH	Low	0	0	0	New Habitat	Unknown	Low	Absent	New Habitat	Unknown			3	70
longleaf pine	Pinus palustris	NSH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	71
Table Mountain pine	Pinus pungens	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate ++	3	72
florida maple	Acer barbatum	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	73
mountain maple	Acer spicatum	NSL	Low	0	0	0	Unknown	New Habitat	High	Absent	Unknown	New Habitat			3	74
cittamwood/gum bumelia	Sideroxylon lanuginosum ssp.	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			3	75
pecan	Carya illinoensis	NSH	Low	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat		Migrate +	3	76
black hickory	Carya texana	NDL	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	77
sugarberry	Celtis laevigata	NDH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	78
honeylocust	Gleditsia triacanthos	NSH	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate ++	3	79
Osage-orange	Maclura pomifera	NDH	Medium	0	0	0	Unknown	New Habitat	High	Absent	Unknown	New Habitat		Likely +	3	80
bigleaf magnolia	Magnolia macrophylla	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	81
red mulberry	Morus rubra	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate ++	3	82
redbay	Persea borbonia	NSL	Low	0	0	0	Unknown	Unknown	High	Absent	Unknown	Unknown			0	83
water oak	Quercus nigra	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	84
pin oak	Quercus palustris	NSH	Low	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat		Migrate +	3	85
Shumard oak	Quercus shumardii	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate +	3	86
live oak	Quercus virginiana	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	87
bluejack oak	Quercus incana	NSL	Low	0	0	0	Unknown	New Habitat	Medium	Absent	Unknown	New Habitat			3	88
winged elm	Ulmus alata	WDL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	89
cedar elm	Ulmus crassifolia	NDH	Medium	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat			0	90