

sq. km     sq. mi     FIA Plots  
 Area of Region   10,306   3,979.1     314

**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	17	21	Increase	35	34	Very Good	17	16	Likely	1	1
Hickory	5		Medium	31	52	No Change	13	15	Good	14	19	Infill	9	10
Maple	3	Abundant	Low	34	10	Decrease	17	16	Fair	13	10	Migrate	5	8
Oak	16	Common	FIA	3		New	13	13	Poor	6	5		<b>15</b>	<b>19</b>
Pine	4	Rare				Unknown	7	7	Very Poor	11	11			
Other	38	Absent							FIA Only	1	1			
	<b>68</b>	<b>84</b>		<b>85</b>	<b>83</b>		<b>85</b>	<b>85</b>	Unknown	4	4			
										<b>66</b>	<b>66</b>			

**Potential Changes in Climate Variables**

**Temperature (°F)**

	Scenario	2009	2039	2069	2099
Annual Average	CCSM45	61.9	63.7	65.8	65.9
	CCSM85	61.9	64.0	66.5	69.1
	GFDL45	61.9	64.6	66.6	67.3
	GFDL85	61.9	64.5	67.7	71.1
	HAD45	61.9	64.2	67.1	68.5
	HAD85	61.9	64.5	68.8	72.6
Growing Season May—Sep	CCSM45	75.6	77.2	79.0	79.5
	CCSM85	75.6	77.4	80.0	83.4
	GFDL45	75.6	78.3	80.4	81.7
	GFDL85	75.6	78.2	81.8	85.7
	HAD45	75.6	78.9	81.5	83.0
	HAD85	75.6	78.9	85.1	88.5
Coldest Month Average	CCSM45	41.5	43.7	44.6	44.5
	CCSM85	41.5	43.9	45.1	46.3
	GFDL45	41.5	45.0	45.1	45.3
	GFDL85	41.5	43.3	44.4	44.8
	HAD45	41.5	41.3	43.2	43.7
	HAD85	41.5	42.6	43.9	45.5
Warmest Month Average	CCSM45	80.2	81.9	82.7	82.8
	CCSM85	80.2	81.9	83.4	85.3
	GFDL45	80.2	82.7	83.7	84.6
	GFDL85	80.2	82.5	84.3	86.3
	HAD45	80.2	84.5	86.5	87.1
	HAD85	80.2	84.9	89.0	90.4

**Precipitation (in)**

	Scenario	2009	2039	2069	2099
Annual Total	CCSM45	54.2	56.0	60.3	59.6
	CCSM85	54.2	56.9	59.1	65.3
	GFDL45	54.2	60.9	64.3	67.6
	GFDL85	54.2	60.8	63.6	65.8
	HAD45	54.2	52.7	59.2	59.3
	HAD85	54.2	57.7	51.7	56.3
Growing Season May—Sep	CCSM45	21.4	21.8	23.1	23.3
	CCSM85	21.4	21.5	21.7	23.8
	GFDL45	21.4	26.1	27.9	28.0
	GFDL85	21.4	26.2	28.2	29.3
	HAD45	21.4	20.5	22.9	21.5
	HAD85	21.4	23.0	16.8	18.5

**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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One x One Degree  
Climate Change Atlas Tree Species

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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
loblolly pine	Pinus taeda	WDH	High	91.6	4023.5	31.0	No change	No change	Medium	Abundant	Good	Good			1	1
sweetgum	Liquidambar styraciflua	WDH	High	90.5	1072.7	8.3	Sm. inc.	Sm. inc.	Medium	Abundant	Very Good	Very Good			1	2
chestnut oak	Quercus prinus	NDH	High	50.9	426.4	6.6	Sm. inc.	No change	High	Common	Very Good	Good			1	3
yellow-poplar	Liriodendron tulipifera	WDH	High	58.5	421.3	4.6	Sm. dec.	Sm. dec.	High	Common	Fair	Fair			1	4
mockernut hickory	Carya alba	WDL	Medium	68	408.0	4.4	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	5
southern red oak	Quercus falcata	WDL	Medium	71.4	393.2	3.5	Sm. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	6
Virginia pine	Pinus virginiana	NDH	High	49.2	374.9	5.4	No change	No change	Medium	Common	Fair	Fair			1	7
water oak	Quercus nigra	WDH	High	66.1	374.7	4.3	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	8
post oak	Quercus stellata	WDH	High	62.2	335.6	4.2	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	9
white oak	Quercus alba	WDH	Medium	71.4	328.5	3.5	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	10
pignut hickory	Carya glabra	WDL	Medium	73.7	324.8	3.1	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor			0	11
red maple	Acer rubrum	WDH	High	65.6	295.9	2.9	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	12
shortleaf pine	Pinus echinata	WDH	High	63.7	283.8	3.2	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	13
longleaf pine	Pinus palustris	NSH	Medium	32.9	267.6	6.4	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	14
blackgum	Nyssa sylvatica	WDL	Medium	75.7	247.0	2.3	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	15
black cherry	Prunus serotina	WDL	Medium	79.7	224.6	2.2	Sm. inc.	Sm. inc.	Low	Common	Fair	Fair			1	16
flowering dogwood	Cornus florida	WDL	Medium	73.1	183.5	1.8	No change	No change	Medium	Common	Fair	Fair			1	17
sourwood	Oxydendrum arboreum	NDL	High	58.1	156.2	1.9	No change	No change	High	Common	Good	Good			1	18
winged elm	Ulmus alata	WDL	Medium	57.6	148.1	1.9	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	19
black oak	Quercus velutina	WDH	High	38.1	121.1	2.1	Sm. inc.	No change	Medium	Common	Good	Fair			1	20
northern red oak	Quercus rubra	WDH	Medium	34.4	107.2	2.0	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	21
green ash	Fraxinus pennsylvanica	WSH	Low	27.9	99.5	2.9	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	22
blackjack oak	Quercus marilandica	NSL	Medium	29.3	91.0	2.5	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	23
American elm	Ulmus americana	WDH	Medium	18.8	73.0	3.4	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	24
scarlet oak	Quercus coccinea	WDL	Medium	18.2	66.6	3.1	No change	No change	Medium	Common	Fair	Fair			1	25
boxelder	Acer negundo	WSH	Low	10.1	62.9	5.7	Sm. dec.	Sm. dec.	High	Common	Fair	Fair			1	26
American hornbeam; muscley	Carpinus caroliniana	WSL	Low	15.6	53.2	2.5	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	27
shagbark hickory	Carya ovata	WSL	Medium	17.8	48.0	1.9	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	28
common persimmon	Diospyros virginiana	NSL	Low	38.6	46.2	0.9	Lg. inc.	Lg. inc.	High	Rare	Good	Good			1	29
sycamore	Platanus occidentalis	NSL	Low	10.1	42.9	4.0	Sm. inc.	Lg. inc.	Medium	Rare	Fair	Good	Infill +	Infill ++	1	30
eastern redcedar	Juniperus virginiana	WDH	Medium	20.2	42.5	1.6	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			1	31
willow oak	Quercus phellos	NSL	Low	11.6	41.2	2.0	Sm. inc.	Lg. inc.	Medium	Rare	Fair	Good	Infill +	Infill ++	1	32
cherrybark oak; swamp red o	Quercus pagoda	NSL	Medium	12.3	37.4	2.4	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			1	33
laurel oak	Quercus laurifolia	NDH	Medium	7.8	36.1	4.0	Sm. inc.	Lg. inc.	Medium	Rare	Fair	Good			1	34
eastern cottonwood	Populus deltoides	NSH	Low	1.9	31.6	16.3	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	35
American beech	Fagus grandifolia	WDH	High	14	31.0	1.2	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	1	36
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	12.8	27.6	1.4	Lg. inc.	Lg. inc.	High	Rare	Good	Good			1	37
red mulberry	Morus rubra	NSL	Low	16	24.5	1.3	Sm. inc.	Lg. inc.	Medium	Rare	Fair	Good			1	38
sugarberry	Celtis laevigata	NDH	Medium	10.6	23.7	2.2	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	1	39
sassafras	Sassafras albidum	WSL	Low	18.2	23.3	0.9	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			1	40
florida maple	Acer barbatum	NSL	Low	14.9	20.8	1.1	Lg. inc.	Lg. inc.	High	Rare	Good	Good			1	41
hackberry	Celtis occidentalis	WDH	Medium	5.8	18.6	3.2	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	1	42
sweetbay	Magnolia virginiana	NSL	Medium	0.7	18.5	2.8	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	2	43
black willow	Salix nigra	NSH	Low	5.7	15.5	2.1	No change	No change	Low	Rare	Very Poor	Very Poor			0	44
white ash	Fraxinus americana	WDL	Medium	9.5	13.0	1.3	No change	No change	Low	Rare	Very Poor	Very Poor			0	45
paulownia	Paulownia tomentosa	NSL	FIA	2.9	11.7	4.0	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	46
eastern redbud	Cercis canadensis	NSL	Low	8.8	10.8	0.7	No change	No change	Medium	Rare	Poor	Poor			1	47



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Common Name	Scientific Name	Range	MR	%Cell	FIAsum	FIAiv	ChngCl45	ChngCl85	Adap	Abund	Capabil45	Capabil85	SHIFT45	SHIFT85	SSO	N
slippery elm	Ulmus rubra	WSL	Low	4.9	10.5	2.2	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	1	48
white mulberry	Morus alba	NSL	FIA	1.5	6.6	2.4	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	49
bigleaf magnolia	Magnolia macrophylla	NSL	Low	1	5.8	0.6	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	50
chinkapin oak	Quercus muehlenbergii	NSL	Medium	3.9	5.3	1.4	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			2	51
overcup oak	Quercus lyrata	NSL	Medium	1	4.2	4.3	No change	No change	Low	Rare	Very Poor	Very Poor			2	52
Shumard oak	Quercus shumardii	NSL	Low	2.9	3.5	1.2	Sm. dec.	No change	High	Rare	Poor	Fair		Infill +	2	53
water tupelo	Nyssa aquatica	NSH	Medium	0.2	3.2	0.6	Sm. dec.	Sm. dec.	Low	Rare	Very Poor	Very Poor			0	54
swamp chestnut oak	Quercus michauxii	NSL	Low	2.9	2.6	0.5	Very Lg. dec.	Very Lg. dec.	Medium	Rare	Lost	Lost			0	55
bitternut hickory	Carya cordiformis	WSL	Low	1.9	2.1	1.1	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor			0	56
American holly	Ilex opaca	NSL	Medium	1.6	2.1	0.3	Sm. inc.	Sm. inc.	Medium	Rare	Fair	Fair	Infill +	Infill +	2	57
American basswood	Tilia americana	WSL	Medium	2.9	1.6	0.6	Very Lg. dec.	Very Lg. dec.	Medium	Rare	Lost	Lost			0	58
honeylocust	Gleditsia triacanthos	NSH	Low	1.9	1.5	0.8	Lg. inc.	Lg. inc.	High	Rare	Good	Good			2	59
serviceberry	Amelanchier spp.	NSL	Low	1.5	1.2	0.5	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	60
wild plum	Prunus americana	NSLX	FIA	1.7	1.1	0.2	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	61
black walnut	Juglans nigra	WDH	Low	1	0.9	1.0	Very Lg. dec.	Very Lg. dec.	Medium	Rare	Lost	Lost			0	62
river birch	Betula nigra	NSL	Low	1	0.9	0.9	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	63
redbay	Persea borbonia	NSL	Low	1	0.8	0.8	No change	Sm. inc.	High	Rare	Fair	Good			0	64
black locust	Robinia pseudoacacia	NDH	Low	0.4	0.5	0.2	Very Lg. dec.	Very Lg. dec.	Medium	Rare	Lost	Lost			0	65
cucumbertree	Magnolia acuminata	NSL	Low	1	0.5	0.5	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	66
pawpaw	Asimina triloba	NSL	Low	1	0.4	0.4	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	67
shellbark hickory	Carya laciniosa	NSL	Low	0.4	0.2	0.1	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	68
ashe juniper	Juniperus ashei	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	69
slash pine	Pinus elliottii	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Likely +	Likely +	3	70
spruce pine	Pinus glabra	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	71
pitch pine	Pinus rigida	NSH	High	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	72
striped maple	Acer pensylvanicum	NSL	Medium	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	73
cittamwood/gum bumelia	Sideroxylon lanuginosum ssp.	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate ++	3	74
water hickory	Carya aquatica	NSL	Medium	0	0	0	Unknown	Unknown	Medium	Modeled	Unknown	Unknown			0	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	Migrate +	Migrate ++	3	77
black ash	Fraxinus nigra	WSH	Medium	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat			0	78
silverbell	Halesia spp.	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	79
southern magnolia	Magnolia grandiflora	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate ++	Migrate +	3	80
mountain or Fraser magnolia	Magnolia fraseri	NSL	Low	0	0	0	Unknown	Unknown	Low	Absent	Unknown	Unknown			0	81
swamp tupelo	Nyssa biflora	NDH	Medium	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat	Migrate ++	Migrate ++	3	82
live oak	Quercus virginiana	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate ++	Migrate ++	3	83
bluejack oak	Quercus incana	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	84
cedar elm	Ulmus crassifolia	NDH	Medium	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat			3	85