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U.S. Census Bureau Urban Areas
Climate Change Atlas Tree Species
Current and Potential Future Habitat, Capability, and Migration

USDA Forest Service
Northern Research Station
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Iverson, Peters, Prasad, Matthews

	sq. km	sq. mi	FIA Plots
Area of Region	9,057.3	3,497.0	177

Species Information

The columns below provide breif 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
Ash	3
Hickory	4
Maple	3
Oak	12
Pine	4
Other	27
	53

Abundance	
Abundant	1
Common	13
Rare	39
Absent	17
	70

	Model Reliability	Adaptability
High	12	17
Medium	31	48
Low	32	10
FIA	1	
	76	**75**

Potential Change in Habitat Suitability	Scenario RCP45	Scenario RCP85
Increase	24	29
No Change	17	14
Decrease	11	9
New	8	6
Unknown	16	18
	76	**76**

Capability to Cope or Persist	Scenario RCP45	Scenario RCP85
Very Good	4	4
Good	16	21
Fair	12	10
Poor	11	9
Very Poor	8	7
FIA Only	1	1
Unknown	15	17
	67	**69**

Migration Potential	SHIFT RCP45	SHIFT RCP85
Likely	3	3
Infill	31	31
Migrate	0	0
	34	**34**

Potential Changes in Climate Variables

Temperature (°F)

	Scenario	2009	2039	2069	2099
Annual Average	CCSM45	68.1	69.6	71.2	71.3
	CCSM85	68.1	69.9	72.2	74.3
	GFDL45	68.1	71.8	72.1	73.2
	GFDL85	68.1	70.5	73.4	76.6
	HAD45	68.1	70.1	72.6	73.6
	HAD85	68.1	70.4	73.5	76.8
Growing Season May—Sep	CCSM45	79.8	81.1	82.2	82.5
	CCSM85	79.8	81.4	83.5	85.9
	GFDL45	79.8	84.2	84.0	86.0
	GFDL85	79.8	82.6	85.7	89.5
	HAD45	79.8	82.2	84.3	84.9
	HAD85	79.8	82.4	85.9	88.6
Coldest Month Average	CCSM45	49.9	52.4	53.3	53.3
	CCSM85	49.9	52.6	53.7	55.1
	GFDL45	49.9	53.2	53.3	53.3
	GFDL85	49.9	51.0	52.1	52.6
	HAD45	49.9	50.9	52.5	53.3
	HAD85	49.9	52.5	53.8	55.6
Warmest Month Average	CCSM45	83.3	84.3	84.7	84.8
	CCSM85	83.3	84.8	85.4	86.6
	GFDL45	83.3	86.6	86.8	88.2
	GFDL85	83.3	86.6	88.0	90.3
	HAD45	83.3	85.9	86.8	86.9
	HAD85	83.3	86.1	88.0	88.9

Precipitation (in)

	Scenario	2009	2039	2069	2099
Annual Total	CCSM45	58.2	60.6	66.6	64.3
	CCSM85	58.2	61.1	64.2	64.0
	GFDL45	58.2	61.6	71.4	60.6
	GFDL85	58.2	60.2	62.4	61.5
	HAD45	58.2	57.2	56.5	62.1
	HAD85	58.2	61.5	54.9	57.3
Growing Season May—Sep	CCSM45	27.1	29.3	31.1	29.2
	CCSM85	27.1	27.9	28.5	26.9
	GFDL45	27.1	30.2	37.4	29.8
	GFDL85	27.1	29.6	31.6	32.2
	HAD45	27.1	26.2	26.0	28.7
	HAD85	27.1	27.0	24.1	24.3

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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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	72.9	2538.9	40.7	No change	No change	Medium	Abundant	Good	Good	Infill ++	Infill ++	2	1
water oak	Quercus nigra	WDH	High	72.9	446.3	8.4	Sm. inc.	Sm. inc.	Medium	Common	Good	Good	Infill ++	Infill ++	2	2
sweetgum	Liquidambar styraciflua	WDH	High	75.1	409.9	7.2	Sm. inc.	Sm. inc.	Medium	Common	Good	Good	Infill ++	Infill ++	2	3
laurel oak	Quercus laurifolia	NDH	Medium	61.8	366.3	7.7	No change	No change	Medium	Common	Fair	Fair	Infill +	Infill +	2	4
blackgum	Nyssa sylvatica	WDL	Medium	55.2	330.2	6.0	No change	No change	High	Common	Good	Good	Infill ++	Infill ++	2	5
slash pine	Pinus elliottii	NDH	High	17.7	252.1	12.3	Sm. inc.	Sm. inc.	Medium	Common	Good	Good	Infill ++	Infill ++	2	6
red maple	Acer rubrum	WDH	High	53	130.8	2.9	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good	Infill ++	Infill ++	2	7
American holly	Ilex opaca	NSL	Medium	38.6	123.7	3.0	No change	No change	Medium	Common	Fair	Fair	Infill +	Infill +	2	8
sweetbay	Magnolia virginiana	NSL	Medium	23.2	101.6	3.8	Sm. inc.	Sm. inc.	Medium	Common	Good	Good	Infill ++	Infill ++	2	9
willow oak	Quercus phellos	NSL	Low	25.4	101.5	4.0	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good	Infill ++	Infill ++	2	10
live oak	Quercus virginiana	NDH	High	6.6	97.1	25.9	No change	Sm. inc.	Medium	Common	Fair	Good	Infill +		2	11
bald cypress	Taxodium distichum	NSH	Medium	13.2	71.9	7.1	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good	Infill ++	Infill ++	2	12
longleaf pine	Pinus palustris	NSH	Medium	8.8	66.9	6.5	Sm. inc.	No change	Medium	Common	Good	Fair	Infill ++		2	13
southern red oak	Quercus falcata	WDL	Medium	21	52.1	2.6	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good	Infill ++	Infill ++	2	14
American hornbeam; muscle	Carpinus caroliniana	WSL	Low	15.5	43.1	2.4	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	2	15
redbay	Persea borbonia	NSL	Low	22.1	41.5	2.0	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	2	16
swamp chestnut oak	Quercus michauxii	NSL	Low	13.2	40.5	2.6	Sm. inc.	Sm. inc.	Medium	Rare	Fair	Fair	Infill +	Infill +	2	17
water tupelo	Nyssa aquatica	NSH	Medium	5.5	38.9	6.1	No change	No change	Low	Rare	Very Poor	Very Poor			2	18
green ash	Fraxinus pennsylvanica	WSH	Low	23.2	36.2	1.7	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	2	19
southern magnolia	Magnolia grandiflora	NSL	Low	15.5	31.5	1.8	Sm. inc.	Sm. inc.	Medium	Rare	Fair	Fair	Infill +	Infill +	2	20
post oak	Quercus stellata	WDH	High	7.7	28.7	3.2	Sm. inc.	Lg. inc.	High	Rare	Good	Good			2	21
American elm	Ulmus americana	WDH	Medium	22.1	26.9	3.0	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	22
white oak	Quercus alba	WDH	Medium	17.7	26.6	1.3	Sm. inc.	Sm. inc.	High	Rare	Good	Good	Infill ++	Infill ++	2	23
sugarberry	Celtis laevigata	NDH	Medium	17.7	24.8	9.7	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	2	24
water hickory	Carya aquatica	NSL	Medium	8.8	19.3	1.9	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	25
shortleaf pine	Pinus echinata	WDH	High	5.5	18.3	2.9	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	26
cherrybark oak; swamp red o	Quercus pagoda	NSL	Medium	19.9	16.7	1.9	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	2	27
black willow	Salix nigra	NSH	Low	15.5	16.6	5.0	Lg. inc.	Lg. inc.	Low	Rare	Fair	Fair	Infill +	Infill +	2	28
overcup oak	Quercus lyrata	NSL	Medium	6.6	16.6	2.2	Sm. inc.	Sm. inc.	Low	Rare	Poor	Poor	Infill +	Infill +	2	29
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	5.5	11.2	1.8	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	2	30
mockernut hickory	Carya alba	WDL	Medium	11	10.3	1.3	No change	Sm. inc.	High	Rare	Fair	Good		Infill ++	2	31
sassafras	Sassafras albidum	WSL	Low	9.9	9.4	0.8	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	32
black hickory	Carya texana	NDL	High	5.5	8.5	1.3	No change	No change	Medium	Rare	Poor	Poor		Infill +	2	33
white ash	Fraxinus americana	WDL	Medium	6.6	7.0	0.9	Sm. dec.	Sm. dec.	Low	Rare	Very Poor	Very Poor			0	34
bluejack oak	Quercus incana	NSL	Low	1.1	6.3	4.9	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	35
winged elm	Ulmus alata	WDL	Medium	4.4	5.6	1.1	Sm. inc.	Lg. inc.	Medium	Rare	Fair	Good	Infill +	Infill ++	2	36
slippery elm	Ulmus rubra	WSL	Low	11	4.2	1.3	No change	Lg. inc.	Medium	Rare	Poor	Good	Infill +		2	37
swamp tupelo	Nyssa biflora	NDH	Medium	1.1	4.2	3.3	No change	No change	Low	Rare	Very Poor	Very Poor			2	38
blackjack oak	Quercus marilandica	NSL	Medium	3.3	4.0	1.1	Lg. dec.	Sm. dec.	High	Rare	Poor	Poor			0	39
American beech	Fagus grandifolia	WDH	High	2.2	3.7	1.4	No change	No change	Medium	Rare	Poor	Poor			0	40
black cherry	Prunus serotina	WDL	Medium	12.1	3.3	1.4	Sm. dec.	Lg. inc.	Low	Rare	Very Poor	Fair		Infill +	2	41
Carolina ash	Fraxinus caroliniana	NSL	FIA	5.5	3.3	4.9	Unknown	Unknown	NA	Rare	FIA Only	FIA Only			0	42
black walnut	Juglans nigra	WDH	Low	1.1	2.1	1.7	Sm. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	43
water elm	Planera aquatica	NSL	Low	3.3	2.1	0.5	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	44
common persimmon	Diospyros virginiana	NSL	Low	2.2	2.0	0.8	Very Lg. dec.	Very Lg. dec.	High	Rare	Lost	Lost			0	45
cedar elm	Ulmus crassifolia	NDH	Medium	5.5	2.0	1.0	Lg. inc.	Lg. inc.	Low	Rare	Fair	Fair	Infill +	Infill +	2	46
flowering dogwood	Cornus florida	WDL	Medium	1.1	1.8	1.4	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	47

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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	1.1	0.4	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	48
bitternut hickory	Carya cordiformis	WSL	Low	4.4	0.7	2.2	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor			0	49
cittamwood/gum bumelia	Sideroxylon lanuginosum ssp.	NSL	Low	1.1	0.4	0.3	No change	Lg. inc.	High	Rare	Fair	Good			2	50
boxelder	Acer negundo	WSH	Low	1.1	0.4	0.3	Lg. dec.	Sm. inc.	High	Rare	Poor	Good			0	51
eastern redcedar	Juniperus virginiana	WDH	Medium	4.4	0.4	1.1	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	52
florida maple	Acer barbatum	NSL	Low	1.1	0.3	0.2	Lg. dec.	Lg. dec.	High	Rare	Poor	Poor			0	53
striped maple	Acer pensylvanicum	NSL	Medium	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	54
serviceberry	Amelanchier spp.	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	55
pawpaw	Asimina triloba	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	56
pecan	Carya illinoinensis	NSH	Low	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat	Likely +	Likely +	3	57
shellbark hickory	Carya laciniosa	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	58
shagbark hickory	Carya ovata	WSL	Medium	0	0	0	Unknown	Unknown	Medium	Modeled	Unknown	Unknown			0	59
eastern redbud	Cercis canadensis	NSL	Low	0	0	0	Unknown	Unknown	Medium	Modeled	Unknown	Unknown			0	60
black ash	Fraxinus nigra	WSH	Medium	0	0	0	Unknown	Unknown	Low	Absent	Unknown	Unknown			0	61
blue ash	Fraxinus quadrangulata	NSL	Low	0	0	0	Unknown	Unknown	Low	Modeled	Unknown	Unknown			0	62
honeylocust	Gleditsia triacanthos	NSH	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Likely +	Likely +	3	63
silverbell	Halesia spp.	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	64
cucumbertree	Magnolia acuminata	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	65
bigleaf magnolia	Magnolia macrophylla	NSL	Low	0	0	0	New Habitat	Unknown	Medium	Absent	New Habitat	Unknown			3	66
red mulberry	Morus rubra	NSL	Low	0	0	0	Unknown	Unknown	Medium	Modeled	Unknown	Unknown			0	67
sourwood	Oxydendrum arboreum	NDL	High	0	0	0	Unknown	Unknown	High	Modeled	Unknown	Unknown			0	68
sycamore	Platanus occidentalis	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Likely +	Likely +	3	69
pin cherry	Prunus pensylvanica	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	70
scarlet oak	Quercus coccinea	WDL	Medium	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	71
chinkapin oak	Quercus muehlenbergii	NSL	Medium	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	72
northern red oak	Quercus rubra	WDH	Medium	0	0	0	Unknown	Unknown	High	Absent	Unknown	Unknown			0	73
black oak	Quercus velutina	WDH	High	0	0	0	Unknown	Unknown	Medium	Modeled	Unknown	Unknown			0	74
cabbage palmetto	Sabal palmetto	NDH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	75
American basswood	Tilia americana	WSL	Medium	0	0	0	New Habitat	Unknown	Medium	Absent	New Habitat	Unknown			3	76