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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
Landscape Change Research Group
Iverson, Peters, Prasad, Matthews

	sq. km	sq. mi	FIA Plots
Area of Region	8,189.8	3,162.1	132

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	1
Hickory	1
Maple	1
Oak	3
Pine	2
Other	11
	19

Abundance	
Abundant	2
Common	6
Rare	11
Absent	9
	28

	Model Reliability	Adaptability
High	5	9
Medium	18	22
Low	10	2
FIA	1	
	34	**33**

Potential Change in Habitat Suitability	Scenario RCP45	Scenario RCP85
Increase	8	9
No Change	4	2
Decrease	6	7
New	4	4
Unknown	12	12
	34	**34**

Capability to Cope or Persist	Scenario RCP45	Scenario RCP85
Very Good	4	5
Good	4	3
Fair	2	2
Poor	3	4
Very Poor	4	3
FIA Only	1	1
Unknown	11	11
	29	**29**

Migration Potential	SHIFT RCP45	SHIFT RCP85
Likely	1	1
Infill	10	10
Migrate	0	0
	11	**11**

Potential Changes in Climate Variables

Temperature (°F)

	Scenario	2009	2039	2069	2099
Annual Average	CCSM45	73.9	75.2	76.6	76.5
	CCSM85	73.9	75.2	77.3	79.5
	GFDL45	73.9	77.4	77.8	78.7
	GFDL85	73.9	76.0	78.8	82.0
	HAD45	73.9	75.2	77.2	78.3
	HAD85	73.9	75.8	77.9	81.1
Growing Season May—Sep	CCSM45	81.0	82.2	83.3	83.4
	CCSM85	81.0	82.2	84.3	86.6
	GFDL45	81.0	84.6	84.9	86.0
	GFDL85	81.0	83.2	86.0	89.3
	HAD45	81.0	82.8	84.3	85.4
	HAD85	81.0	83.1	85.6	88.4
Coldest Month Average	CCSM45	62.0	63.8	64.6	64.4
	CCSM85	62.0	63.1	64.0	65.6
	GFDL45	62.0	64.4	64.8	65.4
	GFDL85	62.0	64.3	65.3	66.5
	HAD45	62.0	62.3	63.4	64.0
	HAD85	62.0	62.9	63.6	65.5
Warmest Month Average	CCSM45	82.7	83.9	84.6	84.6
	CCSM85	82.7	84.0	85.2	86.6
	GFDL45	82.7	84.8	85.8	86.4
	GFDL85	82.7	85.0	86.6	88.4
	HAD45	82.7	84.5	85.2	85.7
	HAD85	82.7	84.5	85.8	87.2

Precipitation (in)

	Scenario	2009	2039	2069	2099
Annual Total	CCSM45	52.7	54.2	52.8	57.2
	CCSM85	52.7	54.4	52.9	49.5
	GFDL45	52.7	59.9	60.9	62.0
	GFDL85	52.7	56.9	64.4	57.7
	HAD45	52.7	55.7	55.4	55.1
	HAD85	52.7	50.3	53.1	50.5
Growing Season May—Sep	CCSM45	36.8	38.1	36.7	39.7
	CCSM85	36.8	38.0	37.6	33.7
	GFDL45	36.8	40.2	39.9	38.5
	GFDL85	36.8	38.8	41.2	36.0
	HAD45	36.8	37.9	38.0	35.2
	HAD85	36.8	34.7	33.9	31.6

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
slash pine	Pinus elliottii	NDH	High	92.8	2491.6	49.9	No change	Sm. dec.	Medium	Abundant	Good	Fair	Infill ++	Infill +	1	1
cabbage palmetto	Sabal palmetto	NDH	Medium	57.8	766.0	24.2	Sm. inc.	Sm. inc.	Medium	Abundant	Very Good	Very Good			0	2
pond cypress	Taxodium ascendens	NSH	Medium	32.3	445.8	22.5	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good	Infill ++	Infill ++	1	3
live oak	Quercus virginiana	NDH	High	43.7	382.5	21.7	Sm. inc.	Lg. inc.	Medium	Common	Good	Very Good	Infill ++	Infill ++	1	4
bald cypress	Taxodium distichum	NSH	Medium	13.4	86.6	9.4	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good	Infill ++	Infill ++	1	5
longleaf pine	Pinus palustris	NSH	Medium	3.7	84.0	22.4	No change	Sm. dec.	Medium	Common	Fair	Poor	Infill +	Infill +	2	6
laurel oak	Quercus laurifolia	NDH	Medium	38.6	83.2	5.4	Sm. inc.	Sm. inc.	Medium	Common	Good	Good	Infill ++	Infill ++	1	7
red maple	Acer rubrum	WDH	High	14.6	51.3	9.5	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good	Infill ++	Infill ++	1	8
loblolly-bay	Gordonia lasianthus	NSH	Medium	1.2	26.9	21.6	Sm. inc.	Sm. inc.	Medium	Rare	Fair	Fair	Infill +	Infill +	2	9
Carolina ash	Fraxinus caroliniana	NSL	FIA	8.5	18.6	7.5	Unknown	Unknown	NA	Rare	FIA Only	FIA Only			0	10
swamp tupelo	Nyssa biflora	NDH	Medium	1.2	15.5	12.4	Sm. dec.	Sm. dec.	Low	Rare	Very Poor	Very Poor			0	11
redbay	Persea borbonia	NSL	Low	13.4	11.6	1.3	Lg. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	1	12
American elm	Ulmus americana	WDH	Medium	1.2	9.5	7.6	No change	No change	Medium	Rare	Poor	Poor			2	13
sweetbay	Magnolia virginiana	NSL	Medium	9.8	4.8	7.7	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	14
water oak	Quercus nigra	WDH	High	8.3	4.8	7.4	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	15
water hickory	Carya aquatica	NSL	Medium	1.2	4.0	3.2	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	16
hackberry	Celtis occidentalis	WDH	Medium	1.2	3.4	2.7	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor			0	17
red mulberry	Morus rubra	NSL	Low	1.2	3.2	2.6	Very Lg. dec.	Very Lg. dec.	Medium	Rare	Lost	Lost			0	18
sugarberry	Celtis laevigata	NDH	Medium	4.9	0.4	1.3	Sm. dec.	Lg. inc.	Medium	Rare	Very Poor	Good			2	19
sand pine	Pinus clausa	NDH	High	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat			3	20
pawpaw	Asimina triloba	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	21
eastern redbud	Cercis canadensis	NSL	Low	0	0	0	Unknown	Unknown	Medium	Modeled	Unknown	Unknown			0	22
flowering dogwood	Cornus florida	WDL	Medium	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	23
green ash	Fraxinus pennsylvanica	WSH	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Likely +	Likely +	3	24
American holly	Ilex opaca	NSL	Medium	0	0	0	Unknown	Unknown	Medium	Modeled	Unknown	Unknown			0	25
blackgum	Nyssa sylvatica	WDL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			3	26
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	0	0	0	Unknown	Unknown	High	Modeled	Unknown	Unknown			0	27
pin cherry	Prunus pensylvanica	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	28
turkey oak	Quercus laevis	NSH	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			3	29
bur oak	Quercus macrocarpa	NDH	Medium	0	0	0	Unknown	Unknown	High	Absent	Unknown	Unknown			0	30
Nuttall oak	Quercus texana	NSH	Medium	0	0	0	Unknown	Unknown	High	Absent	Unknown	Unknown			0	31
willow oak	Quercus phellos	NSL	Low	0	0	0	Unknown	Unknown	Medium	Modeled	Unknown	Unknown			0	32
Shumard oak	Quercus shumardii	NSL	Low	0	0	0	Unknown	Unknown	High	Modeled	Unknown	Unknown			0	33
slippery elm	Ulmus rubra	WSL	Low	0	0	0	Unknown	Unknown	Medium	Modeled	Unknown	Unknown			0	34