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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	8,014.7	3,094.5	140

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	2
Hickory	0
Maple	1
Oak	3
Pine	1
Other	9
	16

Abundance	
Abundant	3
Common	6
Rare	7
Absent	11
	27

	Model Reliability	Adaptability
High	5	9
Medium	15	19
Low	11	3
FIA	1	
	32	**31**

Potential Change in Habitat Suitability	Scenario RCP45	Scenario RCP85
Increase	6	6
No Change	4	5
Decrease	5	4
New	4	4
Unknown	13	13
	32	**32**

Capability to Cope or Persist	Scenario RCP45	Scenario RCP85
Very Good	4	4
Good	4	4
Fair	0	1
Poor	3	3
Very Poor	1	0
FIA Only	1	1
Unknown	12	12
	25	**25**

Migration Potential	SHIFT RCP45	SHIFT RCP85
Likely	0	0
Infill	9	9
Migrate	1	2
	10	**11**

Potential Changes in Climate Variables

Temperature (°F)

	Scenario	2009	2039	2069	2099
Annual Average	CCSM45	74.4	75.6	76.9	76.9
	CCSM85	74.4	75.6	77.7	79.8
	GFDL45	74.4	77.7	78.3	79.2
	GFDL85	74.4	76.5	79.3	82.3
	HAD45	74.4	75.7	77.6	78.7
	HAD85	74.4	76.2	78.3	81.4
Growing Season May—Sep	CCSM45	81.2	82.3	83.4	83.6
	CCSM85	81.2	82.4	84.5	86.7
	GFDL45	81.2	84.6	85.1	86.2
	GFDL85	81.2	83.4	86.2	89.4
	HAD45	81.2	82.9	84.5	85.6
	HAD85	81.2	83.2	85.7	88.4
Coldest Month Average	CCSM45	62.9	64.5	65.3	65.2
	CCSM85	62.9	63.9	64.8	66.4
	GFDL45	62.9	65.2	65.6	66.1
	GFDL85	62.9	65.1	66.2	67.4
	HAD45	62.9	63.2	64.4	64.9
	HAD85	62.9	63.8	64.5	66.4
Warmest Month Average	CCSM45	82.9	84.1	84.7	84.7
	CCSM85	82.9	84.2	85.3	86.7
	GFDL45	82.9	85.1	86.1	86.7
	GFDL85	82.9	85.2	86.8	88.6
	HAD45	82.9	84.7	85.4	85.9
	HAD85	82.9	84.8	86.0	87.4

Precipitation (in)

	Scenario	2009	2039	2069	2099
Annual Total	CCSM45	54.1	55.2	53.6	58.3
	CCSM85	54.1	55.7	53.6	49.7
	GFDL45	54.1	61.0	61.6	62.4
	GFDL85	54.1	58.1	65.0	58.0
	HAD45	54.1	57.1	56.8	56.0
	HAD85	54.1	51.8	54.2	51.2
Growing Season May—Sep	CCSM45	38.4	39.3	37.9	41.1
	CCSM85	38.4	39.5	38.7	34.4
	GFDL45	38.4	41.6	40.9	39.2
	GFDL85	38.4	40.2	42.1	36.6
	HAD45	38.4	39.5	39.5	36.2
	HAD85	38.4	36.2	35.4	32.6

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	79.4	1901.2	37.1	No change	No change	Medium	Abundant	Good	Good	Infill ++	Infill ++	1	1
cabbage palmetto	Sabal palmetto	NDH	Medium	60.5	1332.4	27.7	No change	No change	Medium	Abundant	Good	Good			0	2
pond cypress	Taxodium ascendens	NSH	Medium	53.9	1143.2	29.5	Sm. inc.	Sm. inc.	Medium	Abundant	Very Good	Very Good	Infill ++	Infill ++	1	3
bald cypress	Taxodium distichum	NSH	Medium	21.2	252.8	13.4	Sm. inc.	No change	Medium	Common	Good	Fair	Infill ++	Infill +	2	4
live oak	Quercus virginiana	NDH	High	38.6	177.7	10.1	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good	Infill ++	Infill ++	2	5
red maple	Acer rubrum	WDH	High	19.9	129.1	7.2	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good	Infill ++	Infill ++	1	6
laurel oak	Quercus laurifolia	NDH	Medium	41.9	104.4	4.4	Sm. inc.	Sm. inc.	Medium	Common	Good	Good	Infill ++	Infill ++	1	7
Carolina ash	Fraxinus caroliniana	NSL	FIA	14.9	71.5	7.4	Unknown	Unknown	NA	Common	FIA Only	FIA Only			0	8
redbay	Persea borbonia	NSL	Low	26.2	59.3	2.4	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good	Infill ++	Infill ++	1	9
sweetbay	Magnolia virginiana	NSL	Medium	8.7	16.4	3.1	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	10
green ash	Fraxinus pennsylvanica	WSH	Low	2.5	12.4	4.5	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	11
hackberry	Celtis occidentalis	WDH	Medium	1.2	3.8	2.7	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor			0	12
red mulberry	Morus rubra	NSL	Low	1.2	3.6	2.6	Very Lg. dec.	Very Lg. dec.	Medium	Rare	Lost	Lost			0	13
swamp tupelo	Nyssa biflora	NDH	Medium	1.2	2.3	1.6	Very Lg. dec.	Very Lg. dec.	Low	Rare	Lost	Lost			0	14
water oak	Quercus nigra	WDH	High	4.8	1.5	1.0	Very Lg. dec.	Very Lg. dec.	Medium	Rare	Lost	Lost			0	15
sugarberry	Celtis laevigata	NDH	Medium	5	0.4	1.3	Sm. dec.	Lg. inc.	Medium	Rare	Very Poor	Good			2	16
sand pine	Pinus clausa	NDH	High	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat			3	17
pawpaw	Asimina triloba	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	18
eastern redbud	Cercis canadensis	NSL	Low	0	0	0	Unknown	Unknown	Medium	Modeled	Unknown	Unknown			0	19
flowering dogwood	Cornus florida	WDL	Medium	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	20
loblolly-bay	Gordonia lasianthus	NSH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	21
cucumbertree	Magnolia acuminata	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	22
mountain or Fraser magnolia	Magnolia fraseri	NSL	Low	0	0	0	Unknown	Unknown	Low	Absent	Unknown	Unknown			0	23
blackgum	Nyssa sylvatica	WDL	Medium	0	0	0	Unknown	Unknown	High	Modeled	Unknown	Unknown			0	24
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	0	0	0	Unknown	Unknown	High	Modeled	Unknown	Unknown			0	25
pin cherry	Prunus pensylvanica	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	26
turkey oak	Quercus laevis	NSH	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			3	27
bur oak	Quercus macrocarpa	NDH	Medium	0	0	0	Unknown	Unknown	High	Absent	Unknown	Unknown			0	28
Nuttall oak	Quercus texana	NSH	Medium	0	0	0	Unknown	Unknown	High	Absent	Unknown	Unknown			0	29
Shumard oak	Quercus shumardii	NSL	Low	0	0	0	Unknown	Unknown	High	Modeled	Unknown	Unknown			0	30
American elm	Ulmus americana	WDH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	31
slippery elm	Ulmus rubra	WSL	Low	0	0	0	Unknown	Unknown	Medium	Modeled	Unknown	Unknown			0	32