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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	8,376.8	3,234.3	163

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	1
Maple	1
Oak	8
Pine	5
Other	23
	41

Abundance	
Abundant	5
Common	13
Rare	23
Absent	16
	57

	Model Reliability	Adaptability
High	10	11
Medium	24	39
Low	21	6
FIA	3	
	58	**56**

Potential Change in Habitat Suitability	Scenario RCP45	Scenario RCP85
Increase	16	17
No Change	11	10
Decrease	11	11
New	5	7
Unknown	15	13
	58	**58**

Capability to Cope or Persist	Scenario RCP45	Scenario RCP85
Very Good	5	6
Good	8	6
Fair	9	11
Poor	9	11
Very Poor	7	3
FIA Only	3	3
Unknown	12	10
	53	**50**

Migration Potential	SHIFT RCP45	SHIFT RCP85
Likely	0	0
Infill	25	29
Migrate	2	4
	27	**33**

Potential Changes in Climate Variables

Temperature (°F)

	Scenario	2009	2039	2069	2099
Annual Average	CCSM45	71.4	72.9	74.4	74.3
	CCSM85	71.4	72.9	75.1	77.2
	GFDL45	71.4	74.4	75.6	76.4
	GFDL85	71.4	73.7	76.6	80.0
	HAD45	71.4	73.1	75.4	76.6
	HAD85	71.4	73.7	76.2	79.8
Growing Season May—Sep	CCSM45	80.1	81.4	82.5	82.7
	CCSM85	80.1	81.4	83.5	85.8
	GFDL45	80.1	83.1	84.1	85.2
	GFDL85	80.1	82.5	85.3	88.9
	HAD45	80.1	82.6	84.4	85.6
	HAD85	80.1	82.9	86.1	89.4
Coldest Month Average	CCSM45	57.1	59.4	60.3	60.0
	CCSM85	57.1	58.9	59.9	61.3
	GFDL45	57.1	59.8	60.2	60.8
	GFDL85	57.1	59.5	60.6	61.6
	HAD45	57.1	56.9	58.1	58.8
	HAD85	57.1	57.8	58.4	60.4
Warmest Month Average	CCSM45	82.1	83.4	84.1	84.2
	CCSM85	82.1	83.5	84.7	86.0
	GFDL45	82.1	84.4	85.3	85.9
	GFDL85	82.1	84.5	86.0	87.9
	HAD45	82.1	84.7	85.4	86.0
	HAD85	82.1	84.6	86.5	87.8

Precipitation (in)

	Scenario	2009	2039	2069	2099
Annual Total	CCSM45	51.0	54.9	56.6	57.8
	CCSM85	51.0	53.9	55.4	54.4
	GFDL45	51.0	58.9	60.9	63.0
	GFDL85	51.0	55.4	63.9	60.0
	HAD45	51.0	51.7	52.4	54.8
	HAD85	51.0	49.8	50.4	49.7
Growing Season May—Sep	CCSM45	31.8	34.6	34.6	35.3
	CCSM85	31.8	33.4	34.9	32.9
	GFDL45	31.8	36.8	37.5	38.0
	GFDL85	31.8	35.5	39.8	37.0
	HAD45	31.8	32.3	33.1	31.1
	HAD85	31.8	30.1	27.8	27.1

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	44.7	918.1	23.8	Sm. inc.	Sm. inc.	Medium	Abundant	Very Good	Very Good	Infill ++	Infill ++	1	1
laurel oak	Quercus laurifolia	NDH	Medium	76.1	900.2	14.0	No change	Sm. dec.	Medium	Abundant	Good	Fair	Infill ++	Infill +	1	2
longleaf pine	Pinus palustris	NSH	Medium	43	791.2	21.7	No change	Sm. dec.	Medium	Abundant	Good	Fair	Infill ++	Infill +	1	3
live oak	Quercus virginiana	NDH	High	64.3	766.2	15.0	Sm. inc.	Sm. inc.	Medium	Abundant	Very Good	Very Good	Infill ++	Infill ++	1	4
pond cypress	Taxodium ascendens	NSH	Medium	32.1	751.8	28.6	Sm. inc.	Sm. inc.	Medium	Abundant	Very Good	Very Good	Infill ++	Infill ++	1	5
red maple	Acer rubrum	WDH	High	45.2	295.6	8.8	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good	Infill ++	Infill ++	1	6
turkey oak	Quercus laevis	NSH	Medium	30	291.5	14.1	Sm. dec.	Sm. dec.	High	Common	Fair	Fair	Infill +	Infill +	1	7
bald cypress	Taxodium distichum	NSH	Medium	35.2	276.3	12.3	Sm. inc.	Sm. inc.	Medium	Common	Good	Good	Infill ++	Infill ++	1	8
sweetgum	Liquidambar styraciflua	WDH	High	41.9	275.5	6.9	No change	No change	Medium	Common	Fair	Fair	Infill +	Infill +	1	9
cabbage palmetto	Sabal palmetto	NDH	Medium	29.6	255.0	9.4	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			0	10
water oak	Quercus nigra	WDH	High	34.3	251.6	8.4	Sm. inc.	Sm. inc.	Medium	Common	Good	Good	Infill ++	Infill ++	1	11
sand pine	Pinus clausa	NDH	High	9.5	248.8	24.1	No change	No change	Low	Common	Poor	Poor	Infill +	Infill +	0	12
swamp tupelo	Nyssa biflora	NDH	Medium	41.7	226.8	7.4	Sm. inc.	Sm. inc.	Low	Common	Fair	Fair	Infill +	Infill +	1	13
loblolly pine	Pinus taeda	WDH	High	8.4	111.6	12.4	No change	No change	Medium	Common	Fair	Fair	Infill +	Infill +	1	14
black cherry	Prunus serotina	WDL	Medium	16.7	80.6	6.0	Sm. inc.	Sm. inc.	Low	Common	Fair	Fair	Infill +	Infill +	1	15
eastern cottonwood	Populus deltoides	NSH	Low	1.2	64.5	50.0	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor			0	16
pignut hickory	Carya glabra	WDL	Medium	9.6	54.0	5.2	No change	No change	Medium	Common	Fair	Fair	Infill +	Infill +	1	17
American elm	Ulmus americana	WDH	Medium	29.7	52.9	3.8	Sm. inc.	Lg. inc.	Medium	Common	Good	Very Good	Infill ++	Infill ++	1	18
pumpkin ash	Fraxinus profunda	NSH	FIA	19.2	47.3	4.7	Unknown	Unknown	NA	Rare	FIA Only	FIA Only			0	19
bluejack oak	Quercus incana	NSL	Low	24	46.2	3.0	Sm. dec.	No change	Medium	Rare	Very Poor	Poor		Infill +	1	20
sweetbay	Magnolia virginiana	NSL	Medium	18	43.8	3.4	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	1	21
American hornbeam; muscle	Carpinus caroliniana	WSL	Low	14	42.5	3.3	Sm. dec.	No change	Medium	Rare	Very Poor	Poor		Infill +	1	22
southern magnolia	Magnolia grandiflora	NSL	Low	11.6	36.6	3.6	Sm. inc.	No change	Medium	Rare	Fair	Poor	Infill +	Infill +	2	23
sugarberry	Celtis laevigata	NDH	Medium	7.2	25.0	3.2	No change	Sm. inc.	Medium	Rare	Poor	Fair	Infill +	Infill +	2	24
post oak	Quercus stellata	WDH	High	6.9	20.9	4.2	No change	Sm. inc.	High	Rare	Fair	Good	Infill +	Infill ++	2	25
green ash	Fraxinus pennsylvanica	WSH	Low	6.9	18.3	3.6	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	26
redbay	Persea borbonia	NSL	Low	26.3	15.9	1.2	Lg. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	1	27
loblolly-bay	Gordonia lasianthus	NSH	Medium	2.4	13.7	5.3	Sm. inc.	Sm. inc.	Medium	Rare	Fair	Fair	Infill +	Infill +	2	28
Carolina ash	Fraxinus caroliniana	NSL	FIA	11.6	13.0	2.8	Unknown	Unknown	NA	Rare	FIA Only	FIA Only			0	29
common persimmon	Diospyros virginiana	NSL	Low	9.2	11.4	1.5	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor			0	30
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	3.6	8.2	2.1	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor		Infill +	2	31
blackgum	Nyssa sylvatica	WDL	Medium	2.4	5.4	2.1	Lg. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	2	32
pond pine	Pinus serotina	NSH	Medium	1.2	3.0	2.3	Sm. inc.	Lg. inc.	Low	Rare	Poor	Fair	Infill +	Infill +	2	33
Shumard oak	Quercus shumardii	NSL	Low	1.2	2.7	2.1	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor			0	34
waterlocust	Gleditsia aquatica	NSLX	FIA	5.9	2.7	2.7	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	35
eastern redcedar	Juniperus virginiana	WDH	Medium	4.5	2.5	1.9	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	36
winged elm	Ulmus alata	WDL	Medium	5.7	2.1	0.6	Sm. dec.	No change	Medium	Rare	Very Poor	Poor		Infill +	2	37
water tupelo	Nyssa aquatica	NSH	Medium	1.2	1.4	1.1	No change	Very Lg. dec.	Low	Rare	Very Poor	Lost			0	38
American basswood	Tilia americana	WSL	Medium	1.2	0.4	0.3	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	39
flowering dogwood	Cornus florida	WDL	Medium	1.2	0.3	0.3	No change	No change	Medium	Rare	Poor	Poor			0	40
cherrybark oak; swamp red o	Quercus pagoda	NSL	Medium	3.3	0.1	0.1	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	41
shortleaf pine	Pinus echinata	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	42
spruce pine	Pinus glabra	NSL	Low	0	0	0	Unknown	Unknown	Medium	Modeled	Unknown	Unknown			0	43
serviceberry	Amelanchier spp.	NSL	Low	0	0	0	Unknown	New Habitat	Medium	Absent	Unknown	New Habitat			3	44
river birch	Betula nigra	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	45
cittamwood/gum bumelia	Sideroxylon lanuginosum ssp.	NSL	Low	0	0	0	Unknown	New Habitat	High	Absent	Unknown	New Habitat			0	46
shagbark hickory	Carya ovata	WSL	Medium	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			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
mockernut hickory	Carya alba	WDL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate +	3	48
eastern redbud	Cercis canadensis	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	49
American beech	Fagus grandifolia	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	50
silverbell	Halesia spp.	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	51
cucumbertree	Magnolia acuminata	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	52
bigleaf magnolia	Magnolia macrophylla	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	53
pin cherry	Prunus pensylvanica	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	54
southern red oak	Quercus falcata	WDL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	55
swamp chestnut oak	Quercus michauxii	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	56
black locust	Robinia pseudoacacia	NDH	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	57
American mountain-ash	Sorbus americana	NSL	Low	0	0	0	Unknown	Unknown	Low	Absent	Unknown	Unknown			0	58