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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	9,900.0	3,822.4	59

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	6
Pine	0
Other	18
	29

Abundance	
Abundant	0
Common	6
Rare	23
Absent	3
	32

	Model Reliability	Adaptability
High	4	11
Medium	14	17
Low	13	4
FIA	2	
	33	**32**

Potential Change in Habitat Suitability	Scenario RCP45	Scenario RCP85
Increase	5	6
No Change	13	12
Decrease	9	9
New	2	2
Unknown	4	4
	33	**33**

Capability to Cope or Persist	Scenario RCP45	Scenario RCP85
Very Good	0	0
Good	3	5
Fair	12	9
Poor	5	6
Very Poor	7	7
FIA Only	2	2
Unknown	2	2
	31	**31**

Migration Potential	SHIFT RCP45	SHIFT RCP85
Likely	1	1
Infill	18	17
Migrate	1	1
	20	**19**

Potential Changes in Climate Variables

Temperature (°F)

	Scenario	2009	2039	2069	2099
Annual Average	CCSM45	65.0	66.4	67.9	68.5
	CCSM85	65.0	67.1	69.2	71.6
	GFDL45	65.0	70.7	69.3	70.8
	GFDL85	65.0	67.8	70.7	74.5
	HAD45	65.0	67.1	69.7	70.7
	HAD85	65.0	67.4	71.4	74.7
Growing Season May—Sep	CCSM45	79.6	80.9	82.3	83.1
	CCSM85	79.6	81.9	83.8	86.8
	GFDL45	79.6	87.3	84.7	87.4
	GFDL85	79.6	83.5	86.9	91.6
	HAD45	79.6	81.8	84.1	84.7
	HAD85	79.6	82.3	86.8	89.7
Coldest Month Average	CCSM45	43.1	45.3	46.1	46.5
	CCSM85	43.1	45.3	46.4	47.6
	GFDL45	43.1	46.7	46.7	46.9
	GFDL85	43.1	44.2	45.6	45.9
	HAD45	43.1	43.6	45.7	46.0
	HAD85	43.1	46.0	47.7	49.4
Warmest Month Average	CCSM45	85.4	86.4	87.2	87.5
	CCSM85	85.4	87.5	88.0	89.8
	GFDL45	85.4	90.6	90.8	92.8
	GFDL85	85.4	90.5	92.2	96.1
	HAD45	85.4	87.7	88.9	89.1
	HAD85	85.4	88.5	90.7	91.7

Precipitation (in)

	Scenario	2009	2039	2069	2099
Annual Total	CCSM45	38.5	39.4	39.6	38.5
	CCSM85	38.5	37.5	40.8	40.4
	GFDL45	38.5	39.7	45.6	38.0
	GFDL85	38.5	39.2	42.3	41.5
	HAD45	38.5	38.8	38.0	40.4
	HAD85	38.5	40.0	35.3	38.3
Growing Season May—Sep	CCSM45	16.7	18.2	16.3	16.9
	CCSM85	16.7	16.6	16.4	16.0
	GFDL45	16.7	17.8	21.1	17.2
	GFDL85	16.7	18.0	19.5	18.5
	HAD45	16.7	16.3	15.7	16.7
	HAD85	16.7	16.6	13.3	14.6

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
cedar elm	Ulmus crassifolia	NDH	Medium	62.6	155.8	23.2	No change	No change	Low	Common	Poor	Poor	Infill +	Infill +	0	1
sugarberry	Celtis laevigata	NDH	Medium	66.7	98.8	13.1	No change	No change	Medium	Common	Fair	Fair	Infill +	Infill +	1	2
live oak	Quercus virginiana	NDH	High	9.1	88.2	38.8	No change	No change	Medium	Common	Fair	Fair	Infill +	Infill +	2	3
ashe juniper	Juniperus ashei	NDH	High	6.1	70.1	24.6	No change	No change	Medium	Common	Fair	Fair			0	4
Osage-orange	Maclura pomifera	NDH	Medium	53.5	66.8	15.0	No change	No change	High	Common	Good	Good	Infill ++	Infill ++	1	5
eastern redcedar	Juniperus virginiana	WDH	Medium	37.4	62.0	13.6	No change	Sm. inc.	Medium	Common	Fair	Good	Infill +	Infill ++	1	6
post oak	Quercus stellata	WDH	High	24.2	43.5	25.2	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	1	7
winged elm	Ulmus alata	WDL	Medium	36.4	39.9	15.4	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	1	8
honeylocust	Gleditsia triacanthos	NSH	Low	38.4	30.8	8.8	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	1	9
green ash	Fraxinus pennsylvanica	WSH	Low	29.3	30.3	11.1	Sm. inc.	Sm. inc.	Medium	Rare	Fair	Fair	Infill +	Infill +	1	10
eastern cottonwood	Populus deltoides	NSH	Low	24.2	28.5	16.5	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			2	11
black walnut	Juglans nigra	WDH	Low	12.1	24.5	28.4	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	12
Shumard oak	Quercus shumardii	NSL	Low	9.1	19.8	9.3	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor	Infill +	Infill +	2	13
American elm	Ulmus americana	WDH	Medium	36.4	16.6	6.4	Sm. inc.	Lg. inc.	Medium	Rare	Fair	Good	Infill +	Infill ++	1	14
pecan	Carya illinoinensis	NSH	Low	28.3	16.5	8.2	Lg. inc.	Lg. inc.	Low	Rare	Fair	Fair	Infill +	Infill +	2	15
boxelder	Acer negundo	WSH	Low	12.1	13.1	15.2	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	2	16
blackjack oak	Quercus marilandica	NSL	Medium	16.2	12.0	10.4	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	2	17
hackberry	Celtis occidentalis	WDH	Medium	12.1	10.1	11.8	Lg. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	2	18
black willow	Salix nigra	NSH	Low	20.2	9.5	6.6	Sm. dec.	No change	Low	Rare	Very Poor	Very Poor			2	19
slippery elm	Ulmus rubra	WSL	Low	8.1	7.4	12.9	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	20
waterlocust	Gleditsia aquatica	NSLX	FIA	4	7.2	25.0	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	21
cittamwood/gum bumelia	Sideroxylon lanuginosum ssp.	NSL	Low	13.1	6.2	3.4	Lg. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	2	22
Texas ash	Fraxinus texensis	NDH	FIA	12.1	5.6	6.5	Unknown	Unknown	NA	Rare	FIA Only	FIA Only			0	23
red mulberry	Morus rubra	NSL	Low	13.1	4.3	2.3	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	24
white ash	Fraxinus americana	WDL	Medium	4	2.8	9.7	Sm. dec.	Sm. dec.	Low	Rare	Very Poor	Very Poor			0	25
eastern redbud	Cercis canadensis	NSL	Low	8.1	1.7	2.9	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	26
common persimmon	Diospyros virginiana	NSL	Low	4	1.1	3.8	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor			0	27
chinkapin oak	Quercus muehlenbergii	NSL	Medium	4	1.0	3.5	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	28
bur oak	Quercus macrocarpa	NDH	Medium	4	1.0	3.5	No change	Sm. dec.	High	Rare	Fair	Poor	Infill +		2	29
mockernut hickory	Carya alba	WDL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Likely +	Likely +	3	30
flowering dogwood	Cornus florida	WDL	Medium	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	31
water oak	Quercus nigra	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate ++	Migrate ++	3	32
American basswood	Tilia americana	WSL	Medium	0	0	0	Unknown	Unknown	Medium	Modeled	Unknown	Unknown			0	33