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 8,100.0 3,127.4 185

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						Potentia	Potential Change in Habitat Suitability			Capability to Cope or Persist				Migration Potential		
Ash	2		Model						Scenario		Scenario	Scenario		SHIFT	SHIFT		
Hickory	7	Abu	ndance		Reliability	Adaptability		RCP45	RCP85		RCP45	RCP85		RCP45	RCP85		
Maple	3	Abundant	6	High	12	18	Increase	26	29	Very Good	9	9	Likely	1	1		
Oak	11	Common	18	Medium	27	39	No Change	10	9	Good	15	17	Infill	4	4		
Pine	3	Rare	32	Low	24	8	Decrease	18	16	Fair	7	8	Migrate	3	3		
Other	30	Absent	8	FIA	2		New	4	4	Poor	12	9		8	8		
•	56	_	64	•	65	65	Unknown	7	7	Very Poor	10	9					
							-	65	65	FIA Only	2	2					
										Unknown	5	5					
Potentia	I Change	es in Climate Var	iables							•	60	E0					

Potentiai Changes in Climate variables

Temperature (°F)											
	Scenario	2009	2039	2069	2099						
Annual	CCSM45	65.2	66.7	68.2	68.6						
Average	CCSM85	65.2	67.4	69.6	72.0						
	GFDL45	65.2	68.4	69.3	70.7						
	GFDL85	65.2	67.9	70.7	74.2						
	HAD45	65.2	67.4	70.1	71.1						
	HAD85	65.2	67.7	71.6	75.1						
Growing	CCSM45	78.8	80.2	81.3	81.8						
Season	CCSM85	78.8	81.2	83.1	86.1						
May—Sep	GFDL45	78.8	82.7	83.4	86.0						
, .	GFDL85	78.8	82.3	85.5	89.8						
	HAD45	78.8	81.4	84.0	84.5						
	HAD85	78.8	81.9	86.6	89.5						
6 11 1	0000 445	44.7	47.0	47.0	40.0						
Coldest	CCSM45	44.7	47.0	47.9	48.0						
Month	CCSM85	44.7	47.3	48.3	49.5						
Average	GFDL45	44.7	48.4	48.5	48.5						
	GFDL85	44.7	45.7	47.0	47.5						
	HAD45	44.7	45.0	46.8	47.3						
	HAD85	44.7	46.9	48.5	50.3						
Warmest	CCSM45	83.8	84.7	85.2	85.4						
Month	CCSM85	83.8	85.7	86.3	88.0						
Average	GFDL45	83.8	88.5	88.5	90.3						
	GFDL85	83.8	88.2	89.7	93.0						
	HAD45	83.8	86.8	88.0	88.1						
	HAD85	83.8	87.5	89.8	90.8						

Precipitati	on (in)				
	Scenario	2009	2039	2069	2099
Annual	CCSM45	44.7	44.3	48.4	46.8
Total	CCSM85	44.7	44.9	48.9	48.2
	GFDL45	44.7	46.2	53.1	45.7
	GFDL85	44.7	45.7	48.6	48.5
	HAD45	44.7	45.1	44.5	48.0
	HAD85	44.7	47.4	41.2	44.1
Growing	CCSM45	16.9	17.9	17.9	17.9
Season	CCSM85	16.9	16.3	16.8	16.2 ◆◆◆◆
May—Sep	GFDL45	16.9	18.4	22.3	18.1
	GFDL85	16.9	18.8	20.0	19.7
	HAD45	16.9	16.1	15.4	16.6 ◆◆◆◆
	HAD85	16.9	16.7	13.1	13.9

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	66.7	1634.5	25.2 Sm. inc.	Sm. inc.	Medium	Abundant	Very Good	Very Good			1 1
sweetgum	Liquidambar styraciflua	WDH	High	84	1286.9	16.8 No change	No change	Medium	Abundant	Good	Good			1 2
winged elm	Ulmus alata	WDL	Medium	88.9	752.2	9.5 No change	No change	Medium	Abundant	Good	Good			1 3
water oak	Quercus nigra	WDH	High	76.5	701.3	9.9 Sm. inc.	Sm. inc.	Medium	Abundant	Very Good	Very Good			1 4
shortleaf pine	Pinus echinata	WDH	High	60.5	691.0	12.7 No change	No change	Medium	Abundant	Good	Good			1 5
post oak	Quercus stellata	WDH	High	64.2	513.4	10.6 Lg. inc.	Lg. inc.	High	Abundant	Very Good	Very Good			1 6
southern red oak	Quercus falcata	WDL	Medium	67.9	474.6	7.8 Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1 7
eastern redcedar	Juniperus virginiana	WDH	Medium	64.2	307.4	5.9 Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1 8
sugarberry	Celtis laevigata	NDH	Medium	44.4	258.0	6.1 No change	Sm. inc.	Medium	Common	Fair	Good			1 9
American elm	Ulmus americana	WDH	Medium	32.1	131.3	3.9 Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1 10
river birch	Betula nigra	NSL	Low	22.2	130.0	5.6 No change	No change	Medium	Common	Fair	Fair			1 11
green ash	Fraxinus pennsylvanica	WSH	Low	17.3	129.5	7.2 Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1 12
red maple	Acer rubrum	WDH	High	35.8	94.3	2.9 Sm. inc.	Lg. inc.	High	Common	Very Good	Very Good			1 13
blackgum	Nyssa sylvatica	WDL	Medium	35.8	88.5	3.3 Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1 14
willow oak	Quercus phellos	NSL	Low	23.5	83.2	4.3 Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1 15
blackjack oak	Quercus marilandica	NSL	Medium	30.9	80.9	4.4 Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1 16
Osage-orange	Maclura pomifera	NDH	Medium	9.9	80.0	12.6 Sm. dec.	Sm. dec.	High	Common	Fair	Fair			1 17
overcup oak	Quercus lyrata	NSL	Medium	13.6	75.3	7.6 Sm. dec.	Sm. dec.	Low	Common	Poor	Poor			0 18
black hickory	Carya texana	NDL	High	33.3	63.2	3.5 Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1 19
mockernut hickory	Carya alba	WDL	Medium	29.6	61.9	2.8 Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1 20
black oak	Quercus velutina	WDH	High	7.4	54.6	7.1 Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor			0 21
black willow	Salix nigra	NSH	Low	22.2	53.1	2.8 Lg. inc.	Lg. inc.	Low	Common	Good	Good			1 22
cedar elm	Ulmus crassifolia	NDH	Medium	13.6	52.6	5.9 Lg. inc.	Lg. inc.	Low	Common	Good	Good			1 23
black cherry	Prunus serotina	WDL	Medium	28.4	50.0	2.0 Sm. inc.	Sm. inc.	Low	Common	Fair	Fair			1 24
flowering dogwood	Cornus florida	WDL	Medium	24.7	47.2	2.2 No change	Sm. inc.	Medium	Rare	Poor	Fair			1 25
cherrybark oak; swamp red	Quercus pagoda	NSL	Medium	11.1	46.2	4.0 Sm. inc.	Sm. inc.	Medium	Rare	Fair	Fair			1 26
common persimmon	Diospyros virginiana	NSL	Low	18.5	46.1	2.4 Sm. dec.	No change	High	Rare	Poor	Fair			1 27
American hornbeam; muscle	e Carpinus caroliniana	WSL	Low	18.5	44.0	2.3 Sm. inc.	Lg. inc.	Medium	Rare	Fair	Good			1 28
white ash	Fraxinus americana	WDL	Medium	8.6	43.2	4.8 No change	No change	Low	Rare	Very Poor	Very Poor			0 29
white oak	Quercus alba	WDH	Medium	13.6	42.3	3.0 Lg. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	1 30
sassafras	Sassafras albidum	WSL	Low	22.2	40.4	2.4 Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			1 31
American holly	llex opaca	NSL	Medium	17.3	34.3	2.5 No change	Sm. inc.	Medium	Rare	Poor	Fair			1 32
eastern hophornbeam; ironv	w Ostrya virginiana	WSL	Low	11.1	29.5	2.6 Sm. inc.	Sm. inc.	High	Rare	Good	Good			1 33
bluejack oak	Quercus incana	NSL	Low	19.8	27.0	2.9 Sm. inc.	Sm. inc.	Medium	Rare	Fair	Fair			1 34
boxelder	Acer negundo	WSH	Low	6.2	25.3	4.0 Sm. dec.	Sm. dec.	High	Rare	Poor	Poor			1 35
red mulberry	Morus rubra	NSL	Low	13.6	19.9	2.6 No change	No change	Medium	Rare	Poor	Poor			1 36
bitternut hickory	Carya cordiformis	WSL	Low	3.7	18.7	4.9 Sm. dec.	Sm. dec.	High	Rare	Poor	Poor			0 37
pecan	Carya illinoinensis	NSH	Low	12.3	18.2	2.3 Sm. dec.	No change	Low	Rare	Very Poor	Very Poor			0 38
honeylocust	Gleditsia triacanthos	NSH	Low	12.3	17.4	2.0 Lg. dec.	Sm. dec.	High	Rare	Poor	Poor			1 39
eastern redbud	Cercis canadensis	NSL	Low	9.9	17.2	1.7 No change	No change	Medium	Rare	Poor	Poor			1 40
sycamore	Platanus occidentalis	NSL	Low	3.7	16.8	4.4 Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			2 41
florida maple	Acer barbatum	NSL	Low	6.2	15.7	2.4 Sm. dec.	Sm. dec.	High	Rare	Poor	Poor			1 42
slippery elm	Ulmus rubra	WSL	Low	3.7	14.0	3.6 Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0 43
black walnut	Juglans nigra	WDH	Low	2.5	13.7	5.3 Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0 44
American basswood	Tilia americana	WSL	Medium	2.5	7.8	3.0 Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			2 45
wild plum	Prunus americana	NSLX	FIA	2.5	7.7	3.0 Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0 46
slash pine	Pinus elliottii	NDH	High	7.4	7.1	2.1 Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	2 47



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water elm	Planera aquatica	NSL	Low	2.5	5.6	2.2	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0 48
cittamwood/gum bumelia	Sideroxylon lanuginosum ssp	. NSL	Low	6.2	5.2	2.5	Lg. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	2 49
eastern cottonwood	Populus deltoides	NSH	Low	1.2	4.9	3.9	Sm. dec.	Very Lg. dec.	Medium	Rare	Very Poor	Lost			0 50
water hickory	Carya aquatica	NSL	Medium	3.7	4.9	1.3	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0 51
swamp tupelo	Nyssa biflora	NDH	Medium	1.2	4.2	3.3	Sm. inc.	Sm. inc.	Low	Rare	Poor	Poor	Infill +	Infill +	2 52
peachleaf willow	Salix amygdaloides	NSLX	FIA	1.2	2.7	2.1	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0 53
shagbark hickory	Carya ovata	WSL	Medium	1.2	1.2	0.9	Very Lg. dec.	Very Lg. dec.	Medium	Rare	Lost	Lost			0 54
live oak	Quercus virginiana	NDH	High	1.2	1.1	. 0.9	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2 55
pignut hickory	Carya glabra	WDL	Medium	4.9	0.9	2.7	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0 56
longleaf pine	Pinus palustris	NSH	Medium	0	C) (New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3 57
serviceberry	Amelanchier spp.	NSL	Low	0	C) (Unknown	Unknown	Medium	Absent	Unknown	Unknown			0 58
shellbark hickory	Carya laciniosa	NSL	Low	0	C) (New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Likely +	Likely +	3 59
black ash	Fraxinus nigra	WSH	Medium	0	C) (Unknown	Unknown	Low	Absent	Unknown	Unknown			0 60
sweetbay	Magnolia virginiana	NSL	Medium	0	C) (New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3 61
sourwood	Oxydendrum arboreum	NDL	High	0	C) (Unknown	Unknown	High	Absent	Unknown	Unknown			0 62
laurel oak	Quercus laurifolia	NDH	Medium	0	C) (New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3 63
chestnut oak	Quercus prinus	NDH	High	0	C) (Unknown	Unknown	High	Absent	Unknown	Unknown			0 64
northern red oak	Quercus rubra	WDH	Medium	0	C) (Unknown	Unknown	High	Modeled	Unknown	Unknown			0 65

