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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 10,642 4,108.9 326

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	al Change	in Habitat Suitability	Capability	Migration Potential				
Ash	2		Model						Scenario		Scenario	Scenario Scenario		SHIFT	SHIFT
Hickory	7	Abu	ndance		Reliability	Adaptability		RCP45	RCP85		RCP45	RCP85		RCP45	RCP85
Maple	3	Abundant	4	High	12	20	Increase	20	21	Very Good	7	7	Likely	0	0
Oak	15	Common	16	Medium	31	47	No Change	19	23	Good	12	15	Infill	19	20
Pine	4	Rare	46	Low	33	9	Decrease	26	21	Fair	9	7	Migrate	1	1
Other	35	Absent	10	FIA	1		New	1	1	Poor	17	20	•	20	21
•	66	_	76	-	77	76	Unknown	11	11	Very Poor	20	15			
							•	77	77	FIA Only	0	0			
										Unknown	10	10			
Potential Changes in Climate Variables										•	75	74			

Temperature (°F)											
	Scenario	2009	2039	2069	2099						
Annual	CCSM45	67.7	69.4	70.6	71.0						
Average	CCSM85	67.7	69.8	72.1	74.2						
	GFDL45	67.7	70.6	71.7	73.0						
	GFDL85	67.7	70.2	73.2	76.5						
	HAD45	67.7	69.8	72.4	73.3						
	HAD85	67.7	70.1	73.5	76.9						
Growing	CCSM45	80.0	81.5	82.3	82.8						
Season	CCSM85	80.0	82.0	84.1	86.6						
May—Sep	GFDL45	80.0	83.3	84.4	86.8						
	GFDL85	80.0	83.1	86.4	90.5						
	HAD45	80.0	82.4	84.7	85.2						
	HAD85	80.0	82.8	86.6	89.3						
Coldest	CCSM45	48.6	51.2	51.9	52.0						
Month	CCSM85	48.6	51.3	52.4	53.7						
Average	GFDL45	48.6	52.2	52.3	52.3						
	GFDL85	48.6	49.7	50.8	51.3						
	HAD45	48.6	49.2	50.9	51.6						
	HAD85	48.6	51.1	52.5	54.3						
Warmest	CCSM45	84.0	85.1	85.5	85.7						
Month	CCSM85	84.0	85.8	86.5	87.8						
Average	GFDL45	84.0	87.9	88.1	89.6						
	GFDL85	84.0	87.9	89.4	92.0						
	HAD45	84.0	86.7	87.7	87.9						
	HAD85	84.0	87.1	89.1	90.0						

Precipitation (in)												
	Scenario	2009	2039	2069	2099							
Annual	CCSM45	48.0	47.6	54.3	51.4							
Total	CCSM85	48.0	49.1	52.7	52.1							
	GFDL45	48.0	49.1	57.3	47.6							
	GFDL85	48.0	48.0	50.5	49.0							
	HAD45	48.0	49.1	46.3	50.0							
	HAD85	48.0	50.7	44.2	46.7							
					a. =							
Growing	CCSM45	20.3	21.3	23.7	21.5							
Season	CCSM85	20.3	20.5	21.3	19.5 ◆◆◆◆							
May—Sep	GFDL45	20.3	22.0	28.1	21.3							
	GFDL85	20.3	21.9	23.4	23.4							
	HAD45	20.3	19.9	19.1	21.0							
	HAD85	20.3	20.6	17.7	17.9							

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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			Cu		ana i o	teritiar rature	riabitat, ca	•	Ū	ation				Peters, Prasa
Common Name	Scientific Name	Range				FIAiv ChngCl45	ChngCl85	Adap	Abund	Capabil45	Capabil85	SHIFT45	SHIFT85	SSO N
loblolly pine	Pinus taeda	WDH	High	92.3	4538.7	41.7 Sm. dec.	Sm. dec.	Medium		Fair	Fair			0 1
water oak	Quercus nigra	WDH	High	85.2	873.8	8.4 Sm. inc.	Sm. inc.	Medium		Very Good	Very Good			1 2
sweetgum	Liquidambar styraciflua	WDH	High	69.4	799.2	9.8 No change	No change	Medium		Good	Good			1 3
post oak	Quercus stellata	WDH	High	60	628.9	8.8 Sm. inc.	Sm. inc.	High	Abundant	Very Good	Very Good			1 4
winged elm	Ulmus alata	WDL	Medium	71.3	454.0	5.5 No change	No change	Medium	Common	Fair	Fair			1 5
southern red oak	Quercus falcata	WDL	Medium	66.1	306.2	4.2 Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1 6
sugarberry	Celtis laevigata	NDH	Medium	33.8	241.2	4.4 Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1 7
shortleaf pine	Pinus echinata	WDH	High	37	237.0	5.7 Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1 8
pecan	Carya illinoinensis	NSH	Low	9.7	162.4	12.7 No change	No change	Low	Common	Poor	Poor	Infill +	Infill +	0 9
white oak	Quercus alba	WDH	Medium	27.2	132.0	4.2 No change	No change	High	Common	Good	Good	Infill ++	Infill ++	1 10
cherrybark oak; swamp red	o Quercus pagoda	NSL	Medium	26.9	112.6	3.3 No change	Sm. inc.	Medium	Common	Fair	Good			1 11
blackgum	Nyssa sylvatica	WDL	Medium	39.1	98.6	2.3 Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1 12
willow oak	Quercus phellos	NSL	Low	18.6	88.5	3.8 Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1 13
American hornbeam; muscle	e\ Carpinus caroliniana	WSL	Low	22.9	80.8	3.0 Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1 14
American elm	Ulmus americana	WDH	Medium	31.8	80.0	2.3 Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1 15
white ash	Fraxinus americana	WDL	Medium	24.7	58.4	2.3 No change	No change	Low	Common	Poor	Poor			0 16
cedar elm	Ulmus crassifolia	NDH	Medium	6.1	57.1	5.1 Sm. inc.	Lg. inc.	Low	Common	Fair	Good	Infill +	Infill ++	1 17
green ash	Fraxinus pennsylvanica	WSH	Low	23	56.1	2.0 Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1 18
American holly	llex opaca	NSL	Medium	25.9	54.1	1.9 No change	No change	Medium		Fair	Fair			1 19
eastern hophornbeam; iron	·	WSL	Low	25.4	51.6	1.8 Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1 20
red maple	Acer rubrum	WDH	High	19.9	42.0	1.6 Lg. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	1 21
laurel oak	Quercus laurifolia	NDH	Medium	11.7	40.6	2.5 Sm. inc.	Sm. inc.	Medium		Fair	Fair	Infill +	Infill +	1 22
eastern redcedar	Juniperus virginiana	WDH	Medium	14.7	36.3	2.1 Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			1 23
black willow	Salix nigra	NSH	Low	5.8	28.7	7.8 No change	No change	Low	Rare	Very Poor	Very Poor			2 24
Osage-orange	Maclura pomifera	NDH	Medium	9.7	28.2	2.3 No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	1 25
cittamwood/gum bumelia	Sideroxylon lanuginosum ssp		Low	6.7	25.5	2.9 No change	Sm. inc.	High	Rare	Fair	Good	Infill +	Infill ++	1 26
southern magnolia	Magnolia grandiflora	NSL	Low	8	24.7	2.3 No change	No change	Medium		Poor	Poor	Infill +	Infill +	1 27
sycamore	Platanus occidentalis	NSL	Low	4.5	22.6	4.3 Sm. dec.	No change	Medium	Rare	Very Poor	Poor		Infill +	2 28
black hickory	Carya texana	NDL	High	17.9	22.4	1.3 Sm. inc.	Lg. inc.	Medium		Fair	Good	Infill +	Infill ++	1 29
mockernut hickory	Carya alba	WDL	Medium	13.6	20.2	1.6 Lg. inc.	Lg. inc.	High	Rare	Good	Good			1 30
,	Gleditsia triacanthos	NSH	Low	5.3	19.3	2.1 Sm. dec.		_	Rare	Poor	Poor	Infill +	Infill +	1 31
honeylocust	Ulmus rubra	WSL	Low	10.2			Sm. dec.	High Medium			Very Poor	11111111 +	11111111 +	0 32
slippery elm					18.5	1.9 Lg. dec.	Sm. dec.		Rare	Very Poor	- ,	Indill	Indill I	
redbay	Persea borbonia	NSL WSL	Low	10.5	18.2	2.4 Sm. inc.	No change	High	Rare	Good	Fair	Infill ++	Infill +	1 33 1 34
sassafras	Sassafras albidum		Low	12.3	17.7	1.0 Sm. dec.	No change	Medium		Very Poor	Poor			
nuttall oak	Quercus texana	NSH	Medium	2	17.6	1.7 Sm. dec.	Sm. dec.	High	Rare	Poor	Poor	ı Cili		0 35
river birch	Betula nigra	NSL	Low	2	16.8	5.6 No change	No change	Medium		Poor	Poor	Infill +	Infill +	2 36
blackjack oak	Quercus marilandica	NSL	Medium	4.7	16.6	3.5 Sm. inc.	Sm. inc.	High	Rare	Good	Good	Infill ++	Infill ++	1 37
black cherry	Prunus serotina	WDL	Medium	15.5	16.3	0.9 No change	No change	Low	Rare	Very Poor	Very Poor	. 6.11		0 38
slash pine	Pinus elliottii	NDH	High	5.8	14.7	1.6 No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2 39
water hickory	Carya aquatica	NSL	Medium	2.9	14.4	1.4 Sm. dec.	Sm. dec.	Medium		Very Poor	Very Poor			2 40
overcup oak	Quercus lyrata	NSL	Medium	1	14.0	4.0 Sm. dec.	Sm. dec.	Low	Rare	Very Poor	Very Poor			0 41
sweetbay	Magnolia virginiana	NSL	Medium	1.9	13.9	7.4 No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2 42
boxelder	Acer negundo	WSH	Low	5.8	12.9	2.3 Sm. dec.	Sm. dec.	High	Rare	Poor	Poor			0 43
pignut hickory	Carya glabra	WDL	Medium	2	10.5	3.2 Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			2 44
common persimmon	Diospyros virginiana	NSL	Low	9.2	10.5	0.8 Sm. dec.	Sm. dec.	High	Rare	Poor	Poor			1 45
American beech	Fagus grandifolia	WDH	High	0.5	8.5	4.8 No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2 46
red mulberry	Morus rubra	NSL	Low	6.7	8.2	1.1 Sm. dec.	No change	Medium	Rare	Very Poor	Poor		Infill +	1 47



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Common Name	Scientific Name	Range	MR	%Cell	FIAsum	FIAiv Ch	ngCl45	ChngCl85	Adap	Abund	Capabil45	Capabil85	SHIFT45	SHIFT85	SSO N
swamp chestnut oak	Quercus michauxii	NSL	Low	4.3	8.0	1.3 No	change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2 48
flowering dogwood	Cornus florida	WDL	Medium	9	7.6	0.6 No	change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	1 49
American basswood	Tilia americana	WSL	Medium	4.7	6.6	1.4 Sm	n. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0 50
longleaf pine	Pinus palustris	NSH	Medium	2.8	6.0	2.1 Sm	n. dec.	No change	Medium	Rare	Very Poor	Poor			2 51
water elm	Planera aquatica	NSL	Low	1.9	5.8	3.1 Sm	n. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0 52
bitternut hickory	Carya cordiformis	WSL	Low	3.8	4.4	1.2 Sm	n. dec.	Sm. dec.	High	Rare	Poor	Poor			0 53
black walnut	Juglans nigra	WDH	Low	2.9	4.1	0.9 Lg.	dec.	Very Lg. dec.	Medium	Rare	Very Poor	Lost			0 54
eastern redbud	Cercis canadensis	NSL	Low	4.7	3.1	0.7 Lg.	dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0 55
bald cypress	Taxodium distichum	NSH	Medium	0.9	2.4	2.5 No	change	No change	Medium	Rare	Poor	Poor	Infill +		2 56
Shumard oak	Quercus shumardii	NSL	Low	1.9	2.3	1.2 Sm	n. dec.	Lg. dec.	High	Rare	Poor	Poor			0 57
bluejack oak	Quercus incana	NSL	Low	0.9	2.3	2.4 Sm	n. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0 58
eastern cottonwood	Populus deltoides	NSH	Low	1.3	2.1	3.0 Sm	n. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0 59
black oak	Quercus velutina	WDH	High	0.9	1.4	1.5 Sm	n. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0 60
shagbark hickory	Carya ovata	WSL	Medium	4.9	1.1	0.8 Sm	n. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0 61
white mulberry	Morus alba	NSL	FIA	0.2	0.7	0.2 Un	known	Unknown	NA	Rare	NNIS	NNIS			0 62
pawpaw	Asimina triloba	NSL	Low	0.9	0.5	0.5 Lg.	dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0 63
live oak	Quercus virginiana	NDH	High	1.9	0.3	0.7 Lg.	inc.	Lg. inc.	Medium	Rare	Good	Good			2 64
florida maple	Acer barbatum	NSL	Low	0.9	0.2	0.2 Lg.	dec.	No change	High	Rare	Poor	Fair			0 65
water tupelo	Nyssa aquatica	NSH	Medium	0.1	0.1	0.0 Lg.	dec.	Lg. dec.	Low	Rare	Very Poor	Very Poor			0 66
serviceberry	Amelanchier spp.	NSL	Low	0	0	0 Un	known	Unknown	Medium	Absent	Unknown	Unknown			0 67
shellbark hickory	Carya laciniosa	NSL	Low	0	0	0 Un	known	Unknown	Medium	Absent	Unknown	Unknown			0 68
black ash	Fraxinus nigra	WSH	Medium	0	0	0 Un	known	Unknown	Low	Absent	Unknown	Unknown			0 69
cucumbertree	Magnolia acuminata	NSL	Low	0	0	0 Un	known	Unknown	Medium	Absent	Unknown	Unknown			0 70
bigleaf magnolia	Magnolia macrophylla	NSL	Low	0	0	0 Un	known	Unknown	Medium	Absent	Unknown	Unknown			0 71
swamp tupelo	Nyssa biflora	NDH	Medium	0	0	0 Ne	w Habitat	New Habitat	Low	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3 72
sourwood	Oxydendrum arboreum	NDL	High	0	0	0 Un	known	Unknown	High	Modeled	Unknown	Unknown			0 73
pin cherry	Prunus pensylvanica	NSL	Low	0	0	0 Un	known	Unknown	Medium	Absent	Unknown	Unknown			0 74
chinkapin oak	Quercus muehlenbergii	NSL	Medium	0	0	0 Un	known	Unknown	Medium	Absent	Unknown	Unknown			0 75
northern red oak	Quercus rubra	WDH	Medium	0	0	0 Un	known	Unknown	High	Absent	Unknown	Unknown			0 76
black locust	Robinia pseudoacacia	NDH	Low	0	0	0 Un	ıknown	Unknown	Medium	Absent	Unknown	Unknown			0 77

