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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 10,533 4,066.9 354

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	to Cope or	Persist	Migratio	n Potent	tial
Ash	2				Model			Scenario	Scenario		Scenario	Scenario		SHIFT	SHIFT
Hickory	8	Abu	ndance		Reliability	Adaptability		RCP45	RCP85		RCP45	RCP85		RCP45	RCP85
Maple	3	Abundant	3	High	15	24	Increase	33	37	Very Good	14	15	Likely	1	1
Oak	18	Common	20	Medium	33	52	No Change	11	10	Good	17	18	Infill	9	12
Pine	5	Rare	50	Low	36	9	Decrease	27	24	Fair	5	5	Migrate	0	3
Other	37	Absent	13	FIA	2		New	7	8	Poor	18	20	•	10	16
•	73	_	86	•	86	85	Unknown	8	7	Very Poor	14	10			
							-	86	86	FIA Only	1	1			
										Unknown	6	5			
Potentia	al Change	es in Climate Var	riahles							•	75	74			

Potential Changes in Climate variables

Temperature (°F)											
	Scenario	2009	2039	2069	2099						
Annual	CCSM45	65.1	66.8	68.6	68.7						
Average	CCSM85	65.1	67.0	69.5	71.9						
	GFDL45	65.1	67.8	69.4	70.3						
	GFDL85	65.1	67.6	70.6	73.9						
	HAD45	65.1	67.5	70.3	71.5						
	HAD85	65.1	67.7	71.6	75.4						
Growing	CCSM45	77.7	79.2	80.6	81.1						
Season	CCSM85	77.7	79.3	81.8	84.7						
May—Sep	GFDL45	77.7	80.6	82.1	83.7						
	GFDL85	77.7	80.4	83.5	87.5						
	HAD45	77.7	80.9	83.5	84.5						
	HAD85	77.7	81.0	86.3	89.7						
Coldest	CCSM45	46.0	48.3	49.1	49.0						
Month	CCSM85	46.0	48.5	49.8	50.9						
Average	GFDL45	46.0	49.6	49.7	49.8						
	GFDL85	46.0	47.6	48.5	49.1						
	HAD45	46.0	46.3	48.0	48.8						
	HAD85	46.0	47.6	49.0	50.7						
Marmaat	CCCNAAF	01.4	02.7	02.2	02.4						
Warmest		81.4	82.7	83.2	83.4						
Month	CCSM85	81.4	82.8	83.9	85.6						
Average	GFDL45	81.4	84.6	84.8	85.9						
	GFDL85	81.4	83.9	85.3	87.5						
	HAD45	81.4	85.4	87.1	87.4						
	HAD85	81.4	85.9	89.1	90.3						

Precipitation (in)													
	Scenario	2009	2039	2069	2099								
Annual	CCSM45	58.7	61.7	66.6	64.7								
Total	CCSM85	58.7	62.3	63.0	68.3								
	GFDL45	58.7	65.3	70.5	68.6								
	GFDL85	58.7	64.4	66.4	68.0								
	HAD45	58.7	57.4	61.3	63.0								
	HAD85	58.7	62.4	55.7	59.4								
Growing	CCSM45	23.1	24.1	25.3	25.0 + + +								
Season	CCSM85	23.1	22.5	23.3	24.4								
May—Sep	GFDL45	23.1	27.2	30.8	28.1								
	GFDL85	23.1	27.9	29.9	31.3								
	HAD45	23.1	22.0	23.7	23.6								
	HAD85	23.1	23.8	19.1	19.6								

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
loblolly pine	Pinus taeda	WDH	High	99.9	4902.5	35.0	No change	No change	Medium	Abundant	Good	Good		1 1
water oak	Quercus nigra	WDH	High	89	1115.5	8.6	Sm. inc.	Sm. inc.	Medium	Abundant	Very Good	Very Good		1 2
sweetgum	Liquidambar styraciflua	WDH	High	88	924.0	7.0	Sm. inc.	Sm. inc.	Medium	Abundant	Very Good	Very Good		1 3
longleaf pine	Pinus palustris	NSH	Medium	36.1	460.5	8.9	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good		1 4
slash pine	Pinus elliottii	NDH	High	26.9	410.7	10.8	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good		1 5
blackgum	Nyssa sylvatica	WDL	Medium	82.8	368.5	3.1	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good		1 6
yellow-poplar	Liriodendron tulipifera	WDH	High	60.8	328.8	3.9	Sm. dec.	Sm. dec.	High	Common	Fair	Fair		1 7
sweetbay	Magnolia virginiana	NSL	Medium	53.2	318.0	4.7	Sm. inc.	Sm. inc.	Medium	Common	Good	Good		1 8
shortleaf pine	Pinus echinata	WDH	High	51.8	289.6	4.2	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good		1 9
southern red oak	Quercus falcata	WDL	Medium	68.7	281.3	3.1	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good		1 10
red maple	Acer rubrum	WDH	High	78.9	262.0	2.2	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good		1 11
white oak	Quercus alba	WDH	Medium	50.6	242.9	3.6	No change	Sm. inc.	High	Common	Good	Very Good		1 12
black cherry	Prunus serotina	WDL	Medium	78.8	242.4	2.3	Sm. inc.	Sm. inc.	Low	Common	Fair	Fair		1 13
post oak	Quercus stellata	WDH	High	44.6	173.2	2.6	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good		1 14
swamp tupelo	Nyssa biflora	NDH	Medium	20.7	133.1	4.6	Sm. inc.	Sm. inc.	Low	Common	Fair	Fair		1 15
American hornbeam; musc	le Carpinus caroliniana	WSL	Low	31.9	113.2	1.9	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good		1 16
mockernut hickory	Carya alba	WDL	Medium	43.9	104.7	1.9	Sm. inc.	Lg. inc.	High	Common	Very Good	Very Good		1 17
laurel oak	Quercus laurifolia	NDH	Medium	32.2	92.3	2.1	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good		1 18
flowering dogwood	Cornus florida	WDL	Medium	54.7	82.9	1.0	Sm. inc.	Sm. inc.	Medium	Common	Good	Good		1 19
spruce pine	Pinus glabra	NSL	Low	22.5	74.2	2.4	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor		0 20
sugarberry	Celtis laevigata	NDH	Medium	11.4	57.0	3.8	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good		1 21
American holly	Ilex opaca	NSL	Medium	26.9	52.0		Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good		1 22
pignut hickory	Carya glabra	WDL	Medium	22.6	50.1		Lg. dec.	Sm. dec.	Medium	Common	Poor	Poor		0 23
common persimmon	Diospyros virginiana	NSL	Low	34.9	49.4		Sm. dec.	Sm. dec.	High	Rare	Poor	Poor		1 24
willow oak	Quercus phellos	NSL	Low	15.5	43.0	1.7	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good		1 25
sourwood	Oxydendrum arboreum	NDL	High	27.4	41.3		Sm. dec.	Sm. dec.	High	Rare	Poor	Poor		1 26
blackjack oak	Quercus marilandica	NSL	Medium	17.4	40.9	1.8	Lg. inc.	Lg. inc.	High	Rare	Good	Good		1 27
American beech	Fagus grandifolia	WDH	High	16	38.3	2.0	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++ Infill ++	1 28
cherrybark oak; swamp red	l o Quercus pagoda	NSL	Medium	14.3	37.6		Lg. inc.	Lg. inc.	Medium	Rare	Good	Good		1 29
winged elm	Ulmus alata	WDL	Medium	19	35.0		Lg. inc.	Lg. inc.	Medium	Rare	Good	Good		1 30
sassafras	Sassafras albidum	WSL	Low	32	34.0	0.8	Sm. inc.	Lg. inc.	Medium	Rare	Fair	Good		1 31
water tupelo	Nyssa aquatica	NSH	Medium	1.2	34.0	9.3	Sm. dec.	Sm. dec.	Low	Rare	Very Poor	Very Poor		2 32
American elm	Ulmus americana	WDH	Medium	11.5	30.5	1.6	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++ Infill ++	1 33
green ash	Fraxinus pennsylvanica	WSH	Low	12.9	29.3	1.2	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good		1 34
redbay	Persea borbonia	NSL	Low	13.2	25.1		Sm. inc.	Sm. inc.	High	Rare	Good	Good		1 35
swamp chestnut oak	Quercus michauxii	NSL	Low	6.3	24.1	2.3	No change	No change	Medium	Rare	Poor	Poor	Infill + Infill +	1 36
southern magnolia	Magnolia grandiflora	NSL	Low	17.3	23.2	1.0	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good		1 37
sycamore	Platanus occidentalis	NSL	Low	5	22.1	2.3	No change	No change	Medium	Rare	Poor	Poor	Infill + Infill +	2 38
red mulberry	Morus rubra	NSL	Low	5.9	18.4	2.0	No change	No change	Medium	Rare	Poor	Poor		1 39
pecan	Carya illinoinensis	NSH	Low	3.8	17.9	4.7	Sm. dec.	No change	Low	Rare	Very Poor	Very Poor		2 40
eastern redcedar	Juniperus virginiana	WDH	Medium	7.8	16.9		No change	Lg. inc.	Medium	Rare	Poor	Good	Infill + Infill ++	1 41
eastern hophornbeam; iron	, ,	WSL	Low	5.7	12.8		Lg. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++ Infill ++	1 42
turkey oak	Quercus laevis	NSH	Medium	2.8	11.5		Sm. dec.	Sm. dec.	High	Rare	Poor	Poor		0 43
black oak	Quercus velutina	WDH	High	9.1	10.6		Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor		0 44
bald cypress	Taxodium distichum	NSH	Medium	1.9	8.9		No change	No change	Medium	Rare	Poor	Poor	Infill + Infill +	2 45
overcup oak	Quercus lyrata	NSL	Medium	2.5	8.8		No change	Lg. inc.	Low	Rare	Very Poor	Fair	Infill +	2 46
bitternut hickory	Carya cordiformis	WSL	Low	3.6	8.7		Sm. dec.	Sm. dec.	High	Rare	Poor	Poor		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
nuttall oak	Quercus texana	NSH	Medium	1.9	8.7	4.6	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor			0 48
scarlet oak	Quercus coccinea	WDL	Medium	6.1	8.1	1.0	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0 49
Shumard oak	Quercus shumardii	NSL	Low	2	7.9	1.8	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor			0 50
black willow	Salix nigra	NSH	Low	6.4	7.9	0.8	Lg. inc.	Lg. inc.	Low	Rare	Fair	Fair	Infill +	Infill +	1 51
eastern redbud	Cercis canadensis	NSL	Low	4.2	6.8	0.9	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0 52
slippery elm	Ulmus rubra	WSL	Low	3.7	5.4	1.0	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0 53
river birch	Betula nigra	NSL	Low	1.7	4.1	0.8	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	2 54
water elm	Planera aquatica	NSL	Low	0.9	4.0	4.2	Sm. dec.	No change	Medium	Rare	Very Poor	Poor			0 55
white ash	Fraxinus americana	WDL	Medium	3.8	3.1	0.4	No change	Sm. inc.	Low	Rare	Very Poor	Poor		Infill +	2 56
boxelder	Acer negundo	WSH	Low	1.3	2.8	0.5	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor			0 57
black walnut	Juglans nigra	WDH	Low	0.9	2.6	2.8	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0 58
bigleaf magnolia	Magnolia macrophylla	NSL	Low	1.9	2.0	1.0	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0 59
water hickory	Carya aquatica	NSL	Medium	1.7	1.9	0.4	Very Lg. dec.	Very Lg. dec.	Medium	Rare	Lost	Lost			0 60
florida maple	Acer barbatum	NSL	Low	1	1.3	0.6	Sm. dec.	Lg. dec.	High	Rare	Poor	Poor			0 61
waterlocust	Gleditsia aquatica	NSLX	FIA	0.9	0.9	0.9	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0 62
northern red oak	Quercus rubra	WDH	Medium	0.2	0.9	0.2	Lg. dec.	Lg. dec.	High	Rare	Poor	Poor			0 63
live oak	Quercus virginiana	NDH	High	0.3	0.9	0.3	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2 64
bluejack oak	Quercus incana	NSL	Low	1.6	0.8	0.4	No change	No change	Medium	Rare	Poor	Poor		Infill +	2 65
pond cypress	Taxodium ascendens	NSH	Medium	0.9	0.7	0.7	Very Lg. dec.	Very Lg. dec.	Medium	Rare	Lost	Lost			0 66
shagbark hickory	Carya ovata	WSL	Medium	0.4	0.5	0.2	Very Lg. dec.	Very Lg. dec.	Medium	Rare	Lost	Lost			0 67
shellbark hickory	Carya laciniosa	NSL	Low	0.2	0.5	0.1	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0 68
paulownia	Paulownia tomentosa	NSL	FIA	0.9	0.4	0.4	Unknown	Unknown	NA	Rare	NNIS	NNIS			0 69
black hickory	Carya texana	NDL	High	0.9	0.3	0.4	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2 70
serviceberry	Amelanchier spp.	NSL	Low	0.9	0.3	0.3	No change	No change	Medium	Rare	Poor	Poor			0 71
pawpaw	Asimina triloba	NSL	Low	0.5	0.3	0.1	Sm. dec.	No change	Medium	Rare	Very Poor	Poor			0 72
black locust	Robinia pseudoacacia	NDH	Low	0.5	0.2	0.1	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0 73
Table Mountain pine	Pinus pungens	NSL	Low	0	0	0	Unknown	Unknown	High	Absent	Unknown	Unknown			0 74
Virginia pine	Pinus virginiana	NDH	High	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0 75
striped maple	Acer pensylvanicum	NSL	Medium	0	0	0	Unknown	New Habitat	Medium	Absent	Unknown	New Habitat			3 76
silver maple	Acer saccharinum	NSH	Low	0	0	0	New Habitat	Unknown	High	Absent	New Habitat	Unknown			3 77
cittamwood/gum bumelia	Sideroxylon lanuginosum s	sp. NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate +	3 78
black ash	Fraxinus nigra	WSH	Medium	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat			3 79
honeylocust	Gleditsia triacanthos	NSH	Low	0	0	0	Unknown	New Habitat	High	Absent	Unknown	New Habitat		Migrate +	3 80
silverbell	Halesia spp.	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3 81
cucumbertree	Magnolia acuminata	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0 82
pin cherry	Prunus pensylvanica	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Likely +	Likely +	3 83
chinkapin oak	Quercus muehlenbergii	NSL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3 84
chestnut oak	Quercus prinus	NDH	High	0	0	0	Unknown	Unknown	High	Absent	Unknown	Unknown			0 85
cedar elm	Ulmus crassifolia	NDH	Medium	0	0	0	New Habitat	New Habitat		Absent	New Habitat	New Habitat		Migrate ++	3 86

