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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 4,108.9 254

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								Potential Change in Habitat Suitability			Capability to Cope or Persist			
Ash	2				Model			Scenario	Scenario		Scenario	Scenario		SHIFT	SHIFT
Hickory	5	Abu	ndance		Reliability	Adaptability		RCP45	RCP85		RCP45	RCP85		RCP45	RCP85
Maple	2	Abundant	3	High	13	23	Increase	24	29	Very Good	9	12	Likely	0	0
Oak	15	Common	25	Medium	33	49	No Change	20	21	Good	15	14	Infill	15	19
Pine	5	Rare	36	Low	37	11	Decrease	20	14	Fair	12	14	Migrate	2	4
Other	35	Absent	17	FIA	0		New	11	8	Poor	14	15	•	17	23
-	64		81	•	83	83	Unknown	8	11	Very Poor	12	7			
							-	83	83	FIA Only	0	0			
										Unknown	8	11			
Potentia	Potential Changes in Climate Variables										70	72			

Potential Changes in Climate Variables

		Temperature (°F)											
	Scenario	2009	2039	2069	2099								
Annual	CCSM45	67.3	68.8	70.5	70.7								
Average	CCSM85	67.3	69.1	71.4	73.7								
	GFDL45	67.3	70.3	71.4	72.3								
	GFDL85	67.3	69.7	72.7	75.9								
	HAD45	67.3	69.5	72.1	73.2								
	HAD85	67.3	69.7	73.1	76.7								
Growing	CCSM45	79.1	80.4	81.7	82.1								
Season	CCSM85	79.1	80.6	82.8	85.4								
May—Sep	GFDL45	79.1	82.4	83.3	84.9								
	GFDL85	79.1	81.7	84.8	88.7								
	HAD45	79.1	81.9	84.2	85.1								
	HAD85	79.1	82.0	86.4	89.5								
Coldest	CCSM45	49.1	51.4	52.2	52.1								
Month	CCSM85	49.1	51.8	53.0	54.1								
Average	GFDL45	49.1	52.4	52.6	52.6								
	GFDL85	49.1	50.5	51.4	52.2								
	HAD45	49.1	49.6	51.2	52.0								
	HAD85	49.1	51.0	52.3	54.0								
Warmest	CCSM45	82.2	83.3	83.7	83.9								
Month	CCSM85	82.2	83.5	84.4	85.9								
Average	GFDL45	82.2	85.2	85.3	86.5								
	GFDL85	82.2	84.9	86.2	88.4								
	HAD45	82.2	85.5	86.9	87.1								
	HAD85	82.2	85.8	88.4	89.4								

Precipitation (in)													
	Scenario	2009	2039	2069	2099								
Annual	CCSM45	62.6	65.2	70.8	68.4								
Total	CCSM85	62.6	65.3	67.0	69.9								
	GFDL45	62.6	69.0	74.5	70.2								
	GFDL85	62.6	67.0	68.6	69.1								
	HAD45	62.6	60.2	62.2	65.6								
	HAD85	62.6	66.5	58.8	62.6								
Growing	CCSM45	27.7	29.0	30.2	29.8 • • •								
Season	CCSM85	27.7	27.4	28.8	28.6 ◆◆◆								
May—Sep	GFDL45	27.7	31.9	36.3	31.8								
	GFDL85	27.7	31.5	33.9	35.4								
	HAD45	27.7	27.0	27.4	28.7 ◆◆◆◆								
	HAD85	27.7	27.9	23.2	23.8								

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	64.4	2996.4		No change		Abundant	Good	Good	31111143	31111 103	1 1
water oak	Quercus nigra	WDH	High	71.6	643.0	7.3 Sm. inc.	Sm. inc.		Abundant	Very Good	Very Good			1 2
sweetgum	Liquidambar styraciflua	WDH	High	66.5	613.6		Sm. inc.	Medium		Very Good	Very Good			1 3
bald cypress	Taxodium distichum	NSH	Medium	26.7	462.0		No change	Medium	Common	Fair	Fair			1 4
water tupelo	Nyssa aquatica	NSH	Medium	22	435.0	J	Sm. dec.	Low	Common	Poor	Poor			0 5
red maple	Acer rubrum	WDH	High	64.7	388.1	4.7 Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1 6
blackgum	Nyssa sylvatica	WDL	Medium	62.6	302.7	3.8 No change	No change	High	Common	Good	Good			1 7
laurel oak	Quercus laurifolia	NDH	Medium	36.1	194.0	4.9 Sm. inc.	Sm. inc.	Medium		Good	Good			1 8
green ash	Fraxinus pennsylvanica	WSH	Low	32.8	181.9	4.7 Sm. inc.	Sm. inc.	Medium		Good	Good			1 9
spruce pine	Pinus glabra	NSL	Low	23.6	171.1	6.5 Lg. dec.	Lg. dec.	Medium		Poor	Poor			0 10
yellow-poplar	Liriodendron tulipifera	WDH	High	21.1	157.9	5.6 Sm. dec.	Sm. dec.	High	Common	Fair	Fair			1 11
	uscle\ Carpinus caroliniana	WSL	Low	36.8	139.7	3.3 Sm. inc.	Sm. inc.	Medium		Good	Good			1 12
sugarberry	Celtis laevigata	NDH	Medium	10.6	124.8	7.9 Sm. inc.	Lg. inc.		Common	Good	Very Good	Infill ++	Infill ++	1 13
black willow	Salix nigra	NSH	Low	12.8	123.6	7.4 Sm. inc.	Lg. inc.	Low	Common	Fair	Good			1 14
American elm	Ulmus americana	WDH	Medium	21.5	113.1		Lg. inc.		Common	Good	Very Good			1 15
American beech	Fagus grandifolia	WDH	High	21	111.1	3.8 No change	No change	Medium		Fair	Fair			1 16
slash pine	Pinus elliottii	NDH	High	8	110.2	J	Sm. inc.		Common	Good	Good	Infill ++	Infill ++	1 17
swamp tupelo	Nyssa biflora	NDH	Medium	20	108.7	5.5 Sm. inc.	Sm. inc.	Low	Common	Fair	Fair			1 18
post oak	Quercus stellata	WDH	High	21.3	103.5	4.4 Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1 19
longleaf pine	Pinus palustris	NSH	Medium	10.3	96.0	9.3 Lg. inc.	Lg. inc.	Medium		Very Good	Very Good	Infill ++	Infill ++	1 20
white oak	Quercus alba	WDH	Medium	23.6	96.0	2.9 No change	Sm. inc.	High	Common	Good	Very Good			1 21
southern red oak	Quercus falcata	WDL	Medium	28.6	92.6	2.6 Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1 22
swamp chestnut oak	Quercus michauxii	NSL	Low	23.3	88.7	3.4 No change	No change	Medium		Fair	Fair			1 23
southern magnolia	Magnolia grandiflora	NSL	Low	17.9	88.1	3.8 Sm. inc.	Sm. inc.	Medium		Good	Good			1 24
sweetbay	Magnolia virginiana	NSL	Medium	18	84.2	3.4 Lg. inc.		Medium		Very Good	Very Good			1 25
black cherry	Prunus serotina	WDL	Medium	28.8	77.8	2.1 Sm. inc.	Lg. inc. Sm. inc.	Low	Common	Fair	Fair			1 26
willow oak	Quercus phellos	NSL	Low	18.3	75.8	5.1 Lg. inc.	Lg. inc.	Medium		Very Good	Very Good			1 27
cherrybark oak; swamp r	•	NSL	Medium	17.9	53.8	2.3 Lg. inc.	Lg. inc.	Medium		Very Good	Very Good Very Good			1 28
shortleaf pine	Pinus echinata	WDH	High	10.7	40.6	2.4 Lg. inc.		Medium		Good	Good	Infill ++	Infill ++	1 29
•		NSL	Medium	15.7	35.1		Lg. inc.			Good		1111111 77	1111111 77	1 30
American holly	llex opaca	WDL			33.9	1.3 Lg. inc.	Lg. inc.	Medium			Good			1 30
mockernut hickory	Carya alba		Medium	13.8		1.8 Sm. inc.	Lg. inc.	High	Rare	Good	Good			1 31
flowering dogwood	Cornus florida	WDL	Medium	21.2	33.3	0.9 No change	No change	Medium		Poor	Poor	Indill I	Imfill I	
boxelder	Acer negundo	WSH	Low	2.9	33.1	3.3 No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	2 33
pond cypress	Taxodium ascendens	NSH	Medium	3.3	29.1	7.2 Sm. dec.	No change			Very Poor	Poor		Infill +	2 34
water hickory	Carya aquatica	NSL	Medium	9.8	28.1	2.4 Sm. dec.	No change	Medium		Very Poor	Poor		Infill +	1 35
winged elm	Ulmus alata	WDL	Medium	19.8	27.9	1.1 Lg. inc.	Lg. inc.	Medium		Good	Good	I C:II .	. 6:11	1 36
redbay	Persea borbonia	NSL	Low	8.1	27.2	2.7 No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	1 37
sassafras	Sassafras albidum	WSL	Low	8.4	25.9	2.7 Sm. dec.	Sm. dec.	Medium		Very Poor	Very Poor	. 611	. 6:11	0 38
sycamore .	Platanus occidentalis	NSL	Low	7.4	23.0	1.9 No change	No change	Medium		Poor	Poor	Infill +	Infill +	2 39
sourwood	Oxydendrum arboreum	NDL	High	10.6	21.1	1.4 Sm. dec.	Lg. dec.	High	Rare	Poor	Poor			1 40
pecan	Carya illinoinensis	NSH	Low	4	20.7	3.2 No change	No change	Low	Rare	Very Poor	Very Poor			0 41
live oak	Quercus virginiana	NDH	High	10	19.8	2.8 Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	2 42
nuttall oak	Quercus texana	NSH	Medium	5.8	18.1	1.8 No change	No change	High	Rare	Fair	Fair			0 43
common persimmon	Diospyros virginiana	NSL	Low	21.2	17.4	0.6 Lg. dec.	Lg. dec.	High	Rare	Poor	Poor			1 44
river birch	Betula nigra	NSL	Low	3.7	16.9	4.2 No change	Sm. inc.	Medium	Rare	Poor	Fair	Infill +	Infill +	1 45
blackjack oak	Quercus marilandica	NSL	Medium	6.3	15.3	2.3 No change	Sm. inc.	High	Rare	Fair	Good	Infill +	Infill ++	1 46
eastern hophornbeam; i	ronw Ostrya virginiana	WSL	Low	7.9	15.2	1.0 No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	1 47



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overcup oak	Quercus lyrata	NSL	Medium	3.9	13.0	2.4 No change	Lg. inc.	Low	Rare	Very Poor	Fair		Infill +	2 48
pignut hickory	Carya glabra	WDL	Medium	7.1	12.6	1.1 No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2 49
honeylocust	Gleditsia triacanthos	NSH	Low	3	11.1	2.6 Sm. dec.	No change	High	Rare	Poor	Fair		Infill +	2 50
slippery elm	Ulmus rubra	WSL	Low	8.8	9.8	0.9 No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	1 51
Shumard oak	Quercus shumardii	NSL	Low	0.9	8.5	9.0 Sm. dec.	Sm. dec.	High	Rare	Poor	Poor			0 52
eastern cottonwood	Populus deltoides	NSH	Low	0.6	6.2	1.4 No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2 53
northern red oak	Quercus rubra	WDH	Medium	0.9	4.3	4.6 Sm. dec.	Sm. dec.	High	Rare	Poor	Poor			0 54
black oak	Quercus velutina	WDH	High	3.8	4.3	0.7 No change	No change	Medium	Rare	Poor	Poor	Infill +		2 55
silverbell	Halesia spp.	NSL	Low	2.6	3.8	1.1 Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0 56
red mulberry	Morus rubra	NSL	Low	0.4	2.3	0.3 Sm. dec.	No change	Medium	Rare	Very Poor	Poor			0 57
water elm	Planera aquatica	NSL	Low	1.9	2.2	1.1 Sm. dec.	Sm. inc.	Medium	Rare	Very Poor	Fair		Infill +	2 58
American basswood	Tilia americana	WSL	Medium	2.7	2.1	0.7 Sm. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0 59
bigleaf magnolia	Magnolia macrophylla	NSL	Low	0.9	1.8	1.9 Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0 60
eastern redbud	Cercis canadensis	NSL	Low	0.2	0.9	0.2 Very Lg. dec.	Very Lg. dec.	Medium	Rare	Lost	Lost			0 61
bitternut hickory	Carya cordiformis	WSL	Low	0.9	0.8	0.8 Very Lg. dec.	Very Lg. dec.	High	Rare	Lost	Lost			0 62
pin cherry	Prunus pensylvanica	NSL	Low	0.9	0.7	0.8 Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0 63
white ash	Fraxinus americana	WDL	Medium	0.7	0.3	0.3 Lg. dec.	No change	Low	Rare	Very Poor	Very Poor			2 64
Atlantic white-cedar	Chamaecyparis thyoides	NSH	Low	0	0	0 New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat			3 65
eastern redcedar	Juniperus virginiana	WDH	Medium	0	0	0 New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate ++	3 66
Table Mountain pine	Pinus pungens	NSL	Low	0	0	0 Unknown	Unknown	High	Absent	Unknown	Unknown			0 67
florida maple	Acer barbatum	NSL	Low	0	0	0 Unknown	Unknown	High	Modeled	Unknown	Unknown			0 68
striped maple	Acer pensylvanicum	NSL	Medium	0	0	0 New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3 69
silver maple	Acer saccharinum	NSH	Low	0	0	0 New Habitat	Unknown	High	Absent	New Habitat	Unknown			3 70
mountain maple	Acer spicatum	NSL	Low	0	0	0 Unknown	Unknown	High	Absent	Unknown	Unknown			0 71
serviceberry	Amelanchier spp.	NSL	Low	0	0	0 New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3 72
pawpaw	Asimina triloba	NSL	Low	0	0	0 New Habitat	Unknown	Medium	Absent	New Habitat	Unknown			3 73
cittamwood/gum bumelia	Sideroxylon lanuginosum ssp	p. NSL	Low	0	0	0 New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3 74
shellbark hickory	Carya laciniosa	NSL	Low	0	0	0 Unknown	Unknown	Medium	Absent	Unknown	Unknown			0 75
black hickory	Carya texana	NDL	High	0	0	0 New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3 76
black ash	Fraxinus nigra	WSH	Medium	0	0	0 Unknown	Unknown	Low	Absent	Unknown	Unknown			0 77
scarlet oak	Quercus coccinea	WDL	Medium	0	0	0 Unknown	Unknown	Medium	Absent	Unknown	Unknown			0 78
chinkapin oak	Quercus muehlenbergii	NSL	Medium	0	0	0 New Habitat	Unknown	Medium	Absent	New Habitat	Unknown			3 79
bluejack oak	Quercus incana	NSL	Low	0	0	0 Unknown	Unknown	Medium	Modeled	Unknown	Unknown			0 80
cabbage palmetto	Sabal palmetto	NDH	Medium	0	0	0 New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0 81
American mountain-ash	Sorbus americana	NSL	Low	0	0	0 Unknown	Unknown	Low	Absent	Unknown	Unknown			0 82
cedar elm	Ulmus crassifolia	NDH	Medium	0	0	0 New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat	Migrate ++	Migrate ++	3 83

