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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
 391

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	6	Abu	ndance		Reliability	Adaptability		RCP45	RCP85		RCP45	RCP85		RCP45	RCP85
Maple	3	Abundant	4	High	13	19	Increase	25	31	Very Good	12	15	Likely	0	0
Oak	12	Common	22	Medium	30	50	No Change	16	16	Good	13	12	Infill	13	15
Pine	4	Rare	35	Low	32	8	Decrease	18	12	Fair	6	10	Migrate	3	2
Other	34	Absent	14	FIA	2		New	7	7	Poor	15	14	•	16	17
•	61	_	75		77	77	Unknown	11	11	Very Poor	11	6			
							-	77	77	FIA Only	2	2			
										Unknown	9	9			
Potentia	Potential Changes in Climate Variables										60	60			

Potential Changes in Climate Variables

Temperature (°F)											
	Scenario	2009	2039	2069	2099						
Annual	CCSM45	65.7	67.4	68.9	69.2						
Average	CCSM85	65.7	67.9	70.3	72.6						
	GFDL45	65.7	68.5	69.8	71.1						
	GFDL85	65.7	68.3	71.2	74.6						
	HAD45	65.7	68.0	70.9	71.8						
	HAD85	65.7	68.4	72.1	75.7						
Growing	CCSM45	78.8	80.3	81.4	81.9						
Season	CCSM85	78.8	81.0	83.1	86.0						
May—Sep	GFDL45	78.8	82.0	83.2	85.6						
, .	GFDL85	78.8	82.0	85.2	89.3						
	HAD45	78.8	81.6	84.2	84.6						
	HAD85	78.8	82.0	86.4	89.4						
Coldest	CCSM45	46.1	48.8	49.7	49.7						
Month	CCSM85	46.1	48.8	50.0	51.3						
Average	GFDL45	46.1	49.7	49.8	49.6						
	GFDL85	46.1	47.1	48.1	48.7						
	HAD45	46.1	46.8	48.6	49.3						
	HAD85	46.1	48.5	50.1	51.9						
Warmest	CCSM45	83.2	84.3	84.6	84.8						
Month	CCSM85	83.2	85.1	85.8	87.3						
Average	GFDL45	83.2	87.5	87.3	89.1						
	GFDL85	83.2	87.1	88.5	91.4						
	HAD45	83.2	86.5	87.6	87.6						
	HAD85	83.2	87.0	89.3	90.2						

Precipitati	on (in)				
	Scenario	2009	2039	2069	2099
Annual	CCSM45	51.8	51.4	58.3	56.3
Total	CCSM85	51.8	53.5	57.5	57.7
	GFDL45	51.8	53.8	62.8	54.1
	GFDL85	51.8	53.7	56.5	56.3
	HAD45	51.8	51.5	50.4	54.4
	HAD85	51.8	54.0	47.0	50.0
Growing	CCSM45	19.9	20.4	22.4	21.3
Season	CCSM85	19.9	19.5	20.2	19.2 ◆◆◆◆
May—Sep	GFDL45	19.9	22.0	27.6	22.1
	GFDL85	19.9	22.3	24.2	24.5
	HAD45	19.9	19.1	18.7	19.8 ◆◆◆◆
	HAD85	19.9	19.4	15.9	16.4

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	الم	FIAsum	FIAiv ChngCl45	ChngCl85	Adap	Abund	Capabil45	Capabil85	SHIFT45	SHIFT85	SSO N
loblolly pine	Pinus taeda	WDH	High	96.8	5391.3		Sm. dec.		Abundant	Good	Fair	31111143	31111103	1 1
sweetgum	Liquidambar styraciflua	WDH	High	95.9	1399.3	10.4 No change	No change	Medium		Good	Good			1 2
shortleaf pine	Pinus echinata	WDH	High	68.7	656.6	6.5 No change	No change	Medium		Good	Good			1 3
water oak	Quercus nigra	WDH	High	79.5	562.9	4.9 Lg. inc.	Lg. inc.	Medium		Very Good	Very Good			1 4
post oak	Quercus stellata	WDH	High	64.9	433.3	5.0 Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1 5
winged elm	Ulmus alata	WDL	Medium	79.4	326.7	2.7 Sm. inc.	Lg. inc.	Medium		Good	Very Good			1 6
white oak	Quercus alba	WDH	Medium	51.9	245.3	2.8 No change	No change	High	Common	Good	Good			1 7
southern red oak	Quercus falcata	WDL	Medium	71.8	217.8	2.2 Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1 8
cherrybark oak; swamp re		NSL	Medium	59.4	210.4	2.6 Sm. inc.	Sm. inc.	Medium		Good	Good			1 9
red maple	Acer rubrum	WDH	High	59	174.8	2.2 Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1 10
blackgum	Nyssa sylvatica	WDL	Medium	53.8	172.7	2.1 Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1 11
green ash	Fraxinus pennsylvanica	WSH	Low	23.5	149.6	4.1 Sm. inc.	Lg. inc.	Medium		Good	Very Good			1 12
American hornbeam; mus	' '	WSL	Low	43.2	133.2		Lg. inc.	Medium		Very Good	Very Good			1 13
longleaf pine	Pinus palustris	NSH	Medium	14.9	132.6	7.6 No change	Sm. inc.	Medium		Fair	Good	Infill +	Infill ++	1 14
willow oak	Quercus phellos	NSL	Low	36.8	127.0	2.3 Sm. inc.	Lg. inc.	Medium		Good	Very Good			1 15
American elm	Ulmus americana	WDH	Medium	36.2	111.4	2.1 Lg. inc.	Lg. inc.		Common	Very Good	Very Good			1 16
overcup oak	Quercus lyrata	NSL	Medium	14.2	105.8	4.4 Sm. dec.	Sm. dec.	Low	Common	Poor	Poor			0 17
eastern redcedar	Juniperus virginiana	WDH	Medium	22.8	93.4	2.4 Lg. inc.	Lg. inc.	Medium		Very Good	Very Good			1 18
mockernut hickory	Carya alba	WDL	Medium	44.4	91.3	1.7 Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1 19
eastern hophornbeam; in		WSL	Low	38.4	81.7	1.3 Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1 20
black willow	Salix nigra	NSH	Low	8.2	77.0	3.8 No change	No change	Low	Common	Poor	Poor			0 21
white ash	Fraxinus americana	WDL	Medium	35	71.6	1.6 Sm. inc.	Sm. inc.	Low	Common	Fair	Fair			1 22
sugarberry	Celtis laevigata	NDH	Medium	25.7	66.3	1.9 Lg. inc.	Lg. inc.	Medium		Very Good	Very Good			1 23
American holly	Ilex opaca	NSL	Medium	32.3	54.3	1.1 Lg. inc.	Lg. inc.	Medium		Very Good	Very Good			1 24
water elm	Planera aquatica	NSL	Low	5.7	53.7	5.0 Sm. dec.	No change	Medium		Poor	Fair			1 25
slash pine	Pinus elliottii	NDH	High	8.2	51.0	5.0 No change	Sm. inc.	Medium		Fair	Good	Infill +	Infill ++	1 26
black hickory	Carya texana	NDL	High	22.1	43.9	1.5 Lg. inc.	Lg. inc.	Medium		Good	Good			1 27
florida maple	Acer barbatum	NSL	Low	23.1	42.5	1.3 Lg. dec.	Lg. dec.	High	Rare	Poor	Poor			1 28
sassafras	Sassafras albidum	WSL	Low	24.1	41.9	1.1 Sm. inc.	Sm. inc.	Medium		Fair	Fair			1 29
American beech	Fagus grandifolia	WDH	High	11	30.9	1.2 Lg. inc.	Lg. inc.	Medium		Good	Good	Infill ++	Infill ++	2 30
black cherry	Prunus serotina	WDL	Medium	26.3	29.3	0.8 No change	Sm. inc.	Low	Rare	Very Poor	Poor			1 31
flowering dogwood	Cornus florida	WDL	Medium	26.3	26.9	0.6 Sm. inc.	Lg. inc.	Medium		Fair	Good			1 32
sycamore	Platanus occidentalis	NSL	Low	4.4	22.4	4.5 Sm. dec.	Sm. dec.	Medium		Very Poor	Very Poor			2 33
river birch	Betula nigra	NSL	Low	5.5	22.4	3.9 No change	No change	Medium		Poor	Poor			1 34
swamp chestnut oak	Quercus michauxii	NSL	Low	8.3	20.6	1.7 No change	No change	Medium		Poor	Poor	Infill +	Infill +	1 35
sweetbay	Magnolia virginiana	NSL	Medium	5.4	16.7	1.7 No change	Sm. inc.	Medium		Poor	Fair	Infill +	Infill +	1 36
common persimmon	Diospyros virginiana	NSL	Low	8.7	16.2		No change	High	Rare	Poor	Fair			1 37
cedar elm	Ulmus crassifolia	NDH	Medium	4.6	15.5	2.1 Lg. inc.	Lg. inc.	Low	Rare	Fair	Fair	Infill +	Infill +	2 38
Shumard oak	Quercus shumardii	NSL	Low	4	14.8	2.4 Sm. dec.	Sm. dec.	High	Rare	Poor	Poor			0 39
laurel oak	Quercus laurifolia	NDH	Medium	4.1	14.7	1.3 No change	Sm. inc.	Medium		Poor	Fair	Infill +		2 40
water hickory	Carya aquatica	NSL	Medium	6.4	14.5	1.7 Sm. dec.	No change	Medium		Very Poor	Poor		Infill +	2 41
red mulberry	Morus rubra	NSL	Low	12.1	12.9	0.8 Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0 42
bluejack oak	Quercus incana	NSL	Low	6.7	12.3	1.4 No change	No change	Medium	Rare	Poor	Poor		Infill +	1 43
bald cypress	Taxodium distichum	NSH	Medium	3.1	12.3	1.7 No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2 44
honeylocust	Gleditsia triacanthos	NSH	Low	7.4	10.3	1.1 Sm. dec.	No change	High	Rare	Poor	Fair		Infill +	1 45
blackjack oak	Quercus marilandica	NSL	Medium	8.4	9.0	0.6 Lg. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	1 46
eastern cottonwood	Populus deltoides	NSH	Low	0.9	8.6	_	Sm. dec.	Medium		Very Poor	Very Poor			0 47
castern cottonwood	i opulus deltoldes	NOIT	LOW	0.5	0.0	J.1 Jill. UCC.	Jiii. ucc.	MEGIGITI	Marc	VETY FOOT	VETYTOOL			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
swamp tupelo	Nyssa biflora	NDH	Medium	1.9	8.6	4.5 No change	No change	Low	Rare	Very Poor	Very Poor			2 48
eastern redbud	Cercis canadensis	NSL	Low	7.1	8.5	1.1 Sm. dec.	No change	Medium	Rare	Very Poor	Poor			1 49
pecan	Carya illinoinensis	NSH	Low	4.1	8.1	0.8 No change	Sm. inc.	Low	Rare	Very Poor	Poor		Infill +	2 50
shagbark hickory	Carya ovata	WSL	Medium	3.2	7.3	0.9 Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0 51
black walnut	Juglans nigra	WDH	Low	2.6	6.4	1.7 Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0 52
slippery elm	Ulmus rubra	WSL	Low	3.3	5.7	1.3 Sm. dec.	No change	Medium	Rare	Very Poor	Poor		Infill +	2 53
waterlocust	Gleditsia aquatica	NSLX	FIA	0.1	3.9	0.4 Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0 54
boxelder	Acer negundo	WSH	Low	1.5	3.0	1.5 Sm. dec.	Sm. dec.	High	Rare	Poor	Poor	Infill +		2 55
southern magnolia	Magnolia grandiflora	NSL	Low	2.3	2.2	0.3 Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	2 56
wild plum	Prunus americana	NSLX	FIA	0.8	1.5	0.4 Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0 57
redbay	Persea borbonia	NSL	Low	0.4	1.4	0.2 Sm. dec.	No change	High	Rare	Poor	Fair	Infill +		2 58
bitternut hickory	Carya cordiformis	WSL	Low	2.2	1.2	0.3 Very Lg. dec.	Very Lg. dec.	High	Rare	Lost	Lost			0 59
cittamwood/gum bumelia	Sideroxylon lanuginosum ssp	. NSL	Low	2.4	0.9	0.3 Lg. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	1 60
American basswood	Tilia americana	WSL	Medium	0.9	0.7	0.8 Very Lg. dec.	Very Lg. dec.	Medium	Rare	Lost	Lost			0 61
Virginia pine	Pinus virginiana	NDH	High	0	0	0 Unknown	Unknown	Medium	Absent	Unknown	Unknown			0 62
striped maple	Acer pensylvanicum	NSL	Medium	0	0	0 Unknown	Unknown	Medium	Absent	Unknown	Unknown			0 63
serviceberry	Amelanchier spp.	NSL	Low	0	0	0 New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3 64
pignut hickory	Carya glabra	WDL	Medium	0	0	0 New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3 65
shellbark hickory	Carya laciniosa	NSL	Low	0	0	0 New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3 66
black ash	Fraxinus nigra	WSH	Medium	0	0	0 New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat			3 67
silverbell	Halesia spp.	NSL	Low	0	0	0 Unknown	Unknown	Medium	Absent	Unknown	Unknown			0 68
yellow-poplar	Liriodendron tulipifera	WDH	High	0	0	0 New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +		3 69
cucumbertree	Magnolia acuminata	NSL	Low	0	0	0 Unknown	Unknown	Medium	Absent	Unknown	Unknown			0 70
bigleaf magnolia	Magnolia macrophylla	NSL	Low	0	0	0 Unknown	Unknown	Medium	Absent	Unknown	Unknown			0 71
pin cherry	Prunus pensylvanica	NSL	Low	0	0	0 New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3 72
scarlet oak	Quercus coccinea	WDL	Medium	0	0	0 Unknown	Unknown	Medium	Absent	Unknown	Unknown			0 73
nuttall oak	Quercus texana	NSH	Medium	0	0	0 Unknown	Unknown	High	Modeled	Unknown	Unknown			0 74
northern red oak	Quercus rubra	WDH	Medium	0	0	0 Unknown	Unknown	High	Absent	Unknown	Unknown			0 75
black oak	Quercus velutina	WDH	High	0	0	0 Unknown	Unknown	Medium	Modeled	Unknown	Unknown			0 76
live oak	Quercus virginiana	NDH	High	0	0	0 New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate ++	Migrate +	+ 3 77

