S32 E93

One x One Degree

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 10,421 4,023.6 309

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
Hickory	7	Abu	ndance		Reliability	Adaptability		RCP45	RCP85		RCP45	RCP85		RCP45	RCP85
Maple	4	Abundant	3	High	13	21	Increase	29	37	Very Good	10	12	Likely	0	0
Oak	17	Common	23	Medium	33	53	No Change	18	12	Good	18	19	Infill	14	16
Pine	4	Rare	48	Low	35	9	Decrease	25	23	Fair	8	11	Migrate	0	0
Other	40	Absent	9	FIA	2		New	4	5	Poor	22	16		14	16
-	74	_	83	-	83	83	Unknown	7	6	Very Poor	13	13			
							-	83	83	FIA Only	2	2			

Potential Changes in Climate Variables

Temperatu	ıre (°F)				
	Scenario	2009	2039	2069	2099
Annual	CCSM45	64.5	66.2	68.0	68.2
Average	CCSM85	64.5	66.5	68.9	71.5
	GFDL45	64.5	67.4	68.7	69.9
	GFDL85	64.5	67.2	70.0	73.4
	HAD45	64.5	66.9	69.8	70.8
	HAD85	64.5	67.2	71.3	75.0
Growing	CCSM45	78.3	79.9	81.3	81.7
Season	CCSM85	78.3	80.3	82.5	85.8
May—Sep	GFDL45	78.3	81.8	82.8	85.2
	GFDL85	78.3	81.7	84.7	89.0
	HAD45	78.3	81.4	84.2	84.6
	HAD85	78.3	81.7	87.0	90.1
Coldest	CCSM45	44.1	46.8	47.7	47.8
Month	CCSM85	44.1	46.7	47.9	49.3
Average	GFDL45	44.1	47.8	47.9	47.8
	GFDL85	44.1	45.1	46.3	46.8 🛶 🔶
	HAD45	44.1	45.1	46.8	47.5
	HAD85	44.1	46.3	47.9	49.8
Warmest	CCSM45	83.1	84.5	84.9	85.0
Month	CCSM85	83.1	84.9	85.6	87.3
Average	GFDL45	83.1	87.7	87.5	89.2
	GFDL85	83.1	87.1	88.4	91.4
	HAD45	83.1	87.0	88.3	88.3
	HAD85	83.1	87.7	90.5	91.4

Precipitati	ion (in)				
	Scenario	2009	2039	2069	2099
Annual	CCSM45	53.0	53.1	58.7	57.4 🛶 🚧
Total	CCSM85	53.0	55.0	59.0	60.0
	GFDL45	53.0	56.3	65.6	57.9
	GFDL85	53.0	55.9	59.3	60.3
	HAD45	53.0	52.3	53.1	57.4 🛶 🔶
	HAD85	53.0	55.1	48.4	52.0 +++++
Growing	CCSM45	19.3	19.5	20.4	20.2 + + + +
Season	CCSM85	19.3	18.7	18.7	18.9 + + + +
May—Sep	GFDL45	19.3	21.5	27.0	22.1 +++++
	GFDL85	19.3	21.8	23.6	24.2 ++++
	HAD45	19.3	18.6	18.5	18.7 🔶 🔶 🔶
	HAD85	19.3	19.3	14.7	15.0 +++++

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.

Unknown

5

78

4

77

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Common Name	Scientific Name	Range	MR	%Cell	FIAsum	FIAiv ChngCl45	ChngCl85	Adap	Abund	Capabil45	Capabil85	SHIFT45	SHIFT85 SS	
loblolly pine	Pinus taeda	WDH	High	89.2			Sm. dec.		Abundant	Good	Fair			1 1
sweetgum	Liquidambar styraciflua	WDH	High	89.2	1267.8	10.1 No change	No change	Medium	Abundant	Good	Good			1 2
water oak	Quercus nigra	WDH	High	78.9	648.1	6.2 Lg. inc.	Lg. inc.	Medium	Abundant	Very Good	Very Good			1 3
shortleaf pine	Pinus echinata	WDH	High	55.2	492.6	6.8 No change	Sm. inc.	Medium	Common	Fair	Good			1 4
southern red oak	Quercus falcata	WDL	Medium	71.5	406.9	4.3 Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1 5
willow oak	Quercus phellos	NSL	Low	41.5	382.0	7.7 No change	Sm. inc.	Medium	Common	Fair	Good			1 6
winged elm	Ulmus alata	WDL	Medium	72.1	328.5	3.5 Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1 7
post oak	Quercus stellata	WDH	High	56.8	326.4	5.0 Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1 8
cherrybark oak; swamp r	ed o: Quercus pagoda	NSL	Medium	53.8	219.3	3.3 Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1 9
white oak	Quercus alba	WDH	Medium	51.2	215.1	3.2 Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1 10
red maple	Acer rubrum	WDH	High	55.3	212.2	2.8 No change	Sm. inc.	High	Common	Good	Very Good			1 11
blackgum	Nyssa sylvatica	WDL	Medium	51	187.1	2.7 Sm. inc.	Lg. inc.	High	Common	Very Good	Very Good			1 12
sugarberry	Celtis laevigata	NDH	Medium	22.5	175.2	8.5 Lg. inc.	Lg. inc.	-	Common	, Very Good	, Very Good			1 13
bald cypress	Taxodium distichum	NSH	Medium	9.5	149.5		No change	Medium	Common	Fair	Fair			1 14
green ash	Fraxinus pennsylvanica	WSH	Low	44.2	147.0	3.1 Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1 15
black willow	Salix nigra	NSH	Low	6.6	123.9		No change	Low	Common	Poor	Poor			0 16
honeylocust	Gleditsia triacanthos	NSH	Low	14.9	117.9	6.8 No change	Sm. inc.	High	Common	Good	Very Good			1 17
American hornbeam; mu	scle ¹ Carpinus caroliniana	WSL	Low	34.4	95.4	1.9 Lg. inc.	Lg. inc.	_	Common	Very Good	Very Good			1 18
pecan	Carya illinoinensis	NSH	Low	9.6	91.5	9.5 No change	No change	Low	Common	Poor	Poor			0 19
American elm	Ulmus americana	WDH	Medium	23	85.9	3.3 Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1 20
Osage-orange	Maclura pomifera	NDH	Medium	6.7	78.4	20.9 No change	No change	High	Common	Good	Good	Infill ++	Infill ++	1 21
mockernut hickory	Carya alba	WDL	Medium	29.6	72.7		Lg. inc.	High	Common	Very Good	Very Good			1 22
overcup oak	Quercus lyrata	NSL	Medium	16.8	57.7	3.1 Sm. inc.	Lg. inc.	Low	Common	Fair	Good			1 23
eastern cottonwood	Populus deltoides	NSH	Low	3.1	56.7	14.7 Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor			0 24
flowering dogwood	Cornus florida	WDL	Medium	30	53.6	1.3 Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1 25
nuttall oak	Quercus texana	NSH	Medium	11	53.0	5.4 Lg. dec.	Lg. dec.	High	Common	Fair	Fair			0 26
eastern hophornbeam; ir	onw Ostrya virginiana	WSL	Low	29	49.7	1.3 Lg. inc.	Lg. inc.	High	Rare	Good	Good			1 27
boxelder	Acer negundo	WSH	Low	6.6	45.0	11.1 Lg. dec.	Sm. dec.	High	Rare	Poor	Poor		Infill +	1 28
water hickory	Carya aquatica	NSL	Medium	15.1	40.2	2.9 Sm. inc.	Sm. inc.	Medium	Rare	Fair	Fair	Infill +	Infill +	1 29
water elm	Planera aquatica	NSL	Low	1.9	40.2	20.9 Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0 30
sweetbay	Magnolia virginiana	NSL	Medium	6.5	37.4	2.3 No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	1 31
American beech	Fagus grandifolia	WDH	High	11.2	37.1	1.5 Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	1 32
waterlocust	Gleditsia aquatica	NSLX	FIA	4.8	34.8	7.3 Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0 33
white ash	Fraxinus americana	WDL	Medium	26.8	30.7	1.0 Sm. inc.	Sm. inc.	Low	Rare	Poor	Poor			1 34
sycamore	Platanus occidentalis	NSL	Low	7.8	29.2	4.9 No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	1 35
florida maple	Acer barbatum	NSL	Low	9.8	28.2	2.1 Sm. dec.	Sm. dec.	High	Rare	Poor	Poor			1 36
Shumard oak	Quercus shumardii	NSL	Low	5.8	27.9	4.9 Sm. dec.	Sm. dec.	High	Rare	Poor	Poor	Infill +	Infill +	1 37
American holly	llex opaca	NSL	Medium	15.4	27.2	0.8 Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			1 38
black cherry	Prunus serotina	WDL	Medium	30.4	26.9	0.7 Sm. inc.	Lg. inc.	Low	Rare	Poor	Fair			1 39
sassafras	Sassafras albidum	WSL	Low	18.1	25.1	1.0 Sm. inc.	Sm. inc.	Medium	Rare	Fair	Fair			1 40
eastern redcedar	Juniperus virginiana	WDH	Medium	11.1	23.0	1.7 Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	1 41
cedar elm	Ulmus crassifolia	NDH	Medium	7.8	21.4	-	Lg. inc.	Low	Rare	Fair	Fair	Infill +	Infill +	2 42
common persimmon	Diospyros virginiana	NSL	Low	15.3	20.5		Lg. inc.	High	Rare	Poor	Good			1 43
swamp tupelo	Nyssa biflora	NDH	Medium	1.2	19.8	1.5 Sm. dec.	No change	Low	Rare	Very Poor	Very Poor			2 44
shagbark hickory	Carya ovata	WSL	Medium	12.6	19.8		Lg. dec.	Medium		Very Poor	Very Poor			0 45
swamp chestnut oak	Quercus michauxii	NSL	Low	8.5	19.3	1.8 No change	No change	Medium		Poor	Poor	Infill +	Infill +	1 46
laurel oak	Quercus laurifolia	NDH	Medium	6.7	16.6	•	Sm. inc.	Medium		Poor	Fair	Infill +	Infill +	1 47



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Common Name	Scientific Name	Range	MR	%Cell	FIAsum	FIAiv ChngCl	45 ChngCl8	35 Adap	Abund	Capabil45	Capabil85	SHIFT45	SHIFT85	SSO N
pignut hickory	Carya glabra	WDL	Medium	12.8	16.5	0.9 Lg. dec	. Lg. dec.	Medium	Rare	Very Poor	Very Poor			0 48
slippery elm	Ulmus rubra	WSL	Low	8.1	14.6	1.3 No cha	nge Sm. inc.	. Medium	Rare	Poor	Fair	Infill +	Infill +	1 49
black locust	Robinia pseudoacacia	NDH	Low	2.3	14.4	3.3 Sm. de	c. Sm. dec	. <mark>Medium</mark>	Rare	Very Poor	Very Poor			0 50
blackjack oak	Quercus marilandica	NSL	Medium	7.9	11.6	1.1 Lg. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	1 51
black oak	Quercus velutina	WDH	High	7.4	10.4	1.3 Lg. dec	. Lg. dec.	Medium	Rare	Very Poor	Very Poor			0 52
southern magnolia	Magnolia grandiflora	NSL	Low	2.7	9.1	1.1 <mark>No cha</mark>	nge Sm. inc.	. Medium	Rare	Poor	Fair	Infill +	Infill +	2 53
river birch	Betula nigra	NSL	Low	2.1	8.8	2.5 No cha	nge No char	nge Medium	Rare	Poor	Poor	Infill +	Infill +	2 54
eastern redbud	Cercis canadensis	NSL	Low	2.9	6.6	2.3 Sm. de	c. Sm. dec	. <mark>Medium</mark>	Rare	Very Poor	Very Poor			0 55
bitternut hickory	Carya cordiformis	WSL	Low	1.9	5.8	3.0 Sm. de	c. Sm. dec	. High	Rare	Poor	Poor			0 56
red mulberry	Morus rubra	NSL	Low	6	5.6	0.8 Sm. de	c. Sm. dec	. <mark>Medium</mark>	Rare	Very Poor	Very Poor			0 57
slash pine	Pinus elliottii	NDH	High	2.1	5.5	1.6 Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2 58
pin cherry	Prunus pensylvanica	NSL	Low	4	4.6	0.9 Sm. de	c. Sm. dec	<mark>Medium</mark>	Rare	Very Poor	Very Poor			0 59
water tupelo	Nyssa aquatica	NSH	Medium	1.9	4.2	2.2 Sm. de	c. Sm. dec	. Low	Rare	Very Poor	Very Poor			0 60
black walnut	Juglans nigra	WDH	Low	1.9	4.2	2.2 Sm. de	c. Sm. dec	<mark>Medium</mark>	Rare	Very Poor	Very Poor			0 61
redbay	Persea borbonia	NSL	Low	2.9	3.5	1.2 Sm. de	c. No char	nge High	Rare	Poor	Fair			0 62
swamp white oak	Quercus bicolor	NSL	Low	1	3.3	3.5 Sm. de	c. Sm. dec	<mark>Medium</mark>	Rare	Very Poor	Very Poor			0 63
cittamwood/gum bumelia	Sideroxylon lanuginosum	ssp. NSL	Low	1.2	2.4	1.1 Lg. inc.	Lg. inc.	High	Rare	Good	Good			2 64
sugar maple	Acer saccharum	WDH	High	1.9	1.6	0.8 Sm. de	c. Sm. dec	High	Rare	Poor	Poor			0 65
northern red oak	Quercus rubra	WDH	Medium	2.4	. 1.5	0.4 Lg. dec	. Lg. dec.	High	Rare	Poor	Poor			0 66
sourwood	Oxydendrum arboreum	NDL	High	1	1.5	1.6 Sm. de	c. Sm. dec	. High	Rare	Poor	Poor			0 67
black hickory	Carya texana	NDL	High	0.2	1.0	0.3 Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2 68
wild plum	Prunus americana	NSLX	FIA	1	. 1.0	0.2 Unknov	wn Unknow	vn Medium	Rare	FIA Only	FIA Only			0 69
American basswood	Tilia americana	WSL	Medium	1.9	0.9	0.5 Very Lg	. dec. Very Lg.	dec. Medium	Rare	Lost	Lost			0 70
live oak	Quercus virginiana	NDH	High	0.7	0.5	0.4 Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2 71
bluejack oak	Quercus incana	NSL	Low	1	0.3	0.3 No cha	nge No char	nge Medium	Rare	Poor	Poor		Infill +	2 72
pawpaw	Asimina triloba	NSL	Low	1	0.3	0.3 Lg. dec	. Lg. dec.	Medium	Rare	Very Poor	Very Poor			0 73
longleaf pine	Pinus palustris	NSH	Medium	0.1	0.3	0.0 Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2 74
striped maple	Acer pensylvanicum	NSL	Medium	0	0	0 Unkno	wn New Ha	ibitat <mark>Medium</mark>	Absent	Unknown	New Habitat			3 75
serviceberry	Amelanchier spp.	NSL	Low	0	0	0 New H	abitat New Ha	ıbitat <mark>Medium</mark>	Absent	New Habitat	New Habitat			3 76
shellbark hickory	Carya laciniosa	NSL	Low	0	0	0 Unkno	wn Unknow	vn Medium	Absent	Unknown	Unknown			0 77
black ash	Fraxinus nigra	WSH	Medium	0	0	0 New H	abitat New Ha	bitat Low	Absent	New Habitat	New Habitat			3 78
silverbell	Halesia spp.	NSL	Low	0	0	0 New H	abitat New Ha	ıbitat <mark>Medium</mark>	Absent	New Habitat	New Habitat			3 79
cucumbertree	Magnolia acuminata	NSL	Low	0	0	0 Unkno	wn Unknow	vn Medium	Absent	Unknown	Unknown			0 80
bigleaf magnolia	Magnolia macrophylla	NSL	Low	0	0	0 Unkno	wn Unknow	vn Medium	Absent	Unknown	Unknown			0 81
scarlet oak	Quercus coccinea	WDL	Medium	0	0	0 New H	abitat New Ha	ibitat <mark>Medium</mark>	Absent	New Habitat	New Habitat			3 82
chinkapin oak	Quercus muehlenbergii	NSL	Medium	0	0	0 Unkno	wn Unknow	vn Medium	Absent	Unknown	Unknown			0 83

