#### **HUC 6 Watershed**

# 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 23,848 9,207.8 665

### **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	4				Model			Scenario	Scenario		Scenario	Scenario		SHIFT	SHIFT	
Hickory	7	Abu	ndance		Reliability	Adaptability		RCP45	RCP85		RCP45	RCP85		RCP45	RCP85	
Maple	5	Abundant	4	High	21	25	Increase	28	37	Very Good	13	17	Likely	0	1	
Oak	19	Common	33	Medium	38	57	No Change	22	15	Good	18	18	Infill	22	26	
Pine	7	Rare	51	Low	35	15	Decrease	31	29	Fair	12	12	Migrate	0	0	
Other	46	Absent	12	FIA	7		New	6	7	Poor	15	15	•	22	27	
-	88	_	100	-	101	97	Unknown	14	13	Very Poor	22	18				
							-	101	101	FIA Only	5	5				
										Unknown	7	6				
Potentia	I Change	es in Climate Vai	iables							•	02	01				

#### Potential Changes in Climate variables

Temperatu	ıre (°F)				
	Scenario	2009	2039	2069	2099
Annual	CCSM45	55.8	57.2	58.8	58.9
Average	CCSM85	55.8	57.4	59.3	61.6
	GFDL45	55.8	57.9	59.8	60.5
	GFDL85	55.8	58.1	60.7	63.7
	HAD45	55.8	57.5	59.8	60.9
	HAD85	55.8	57.7	60.6	64.0
Growing	CCSM45	67.2	68.5	69.9	70.3
Season	CCSM85	67.2	68.6	70.6	73.4
May—Sep		67.2	69.5	71.5	72.6
ividy Scp	GFDL85	67.2	69.8	72.6	76.0
	HAD45	67.2	69.3	71.4	72.8
	HAD85	67.2	69.3	73.1	76.7
	TIADOS	07.2	09.5	73.1	70.7
Coldest	CCSM45	38.7	40.6	41.3	41.3
Month	CCSM85	38.7	40.6	41.4	42.4
Average	GFDL45	38.7	41.4	41.7	42.3
	GFDL85	38.7	40.5	41.3	42.1
	HAD45	38.7	39.1	40.6	40.9
	HAD85	38.7	39.6	40.5	41.8
Warmest	CCSM45	71.3	72.9	73.6	73.7
Month	CCSM85	71.3	73.0	74.3	75.5
Average	GFDL45	71.3	73.5	74.3	75.1
Average	GFDL85	71.3	73.9	75.3	77.3
	HAD45	71.3	73.8	75.1	75.6
	נדטחו	, 1.5	, 5.0	, ,.1	75.0

78.6

Precipitati	on (in)				
	Scenario	2009	2039	2069	2099
Annual	CCSM45	39.2	43.6	44.8	46.2
Total	CCSM85	39.2	43.8	45.8	50.9
	GFDL45	39.2	43.0	46.2	48.8
	GFDL85	39.2	42.5	47.8	48.0
	HAD45	39.2	41.5	42.6	41.9
	HAD85	39.2	43.8	40.6	40.6
Growing	CCSM45	19.3	23.3	24.0	24.9
Season	CCSM85	19.3	22.1	23.6	26.3
May—Sep	GFDL45	19.3	22.1	24.2	25.6
	GFDL85	19.3	21.4	25.7	26.0
	HAD45	19.3	20.1	20.2	20.0 • • •
	HAD85	19.3	21.9	19.3	17.8

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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HAD85

71.3

74.2

76.5

# **HUC 030300 Cape Fear**

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## Current and Potential Future Habitat, Capability, and Migration

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Common Name	Scientific Name	Range				FIAiv ChngCl45	ChngCl85	Adap	Abund	Capabil45	Capabil85	SHIF145	SHIFT85	
loblolly pine	Pinus taeda	WDH	High	81.9	3270.3	- C	No change	Medium		Good	Good			1 1
sweetgum	Liquidambar styraciflua	WDH	High	81.1	1056.8		Sm. inc.	Medium	Abundant	Good	Very Good			1 2
red maple	Acer rubrum	WDH	High	85.7	978.3	8.7 Sm. dec.	Sm. dec.	High	Abundant	Good	Good			1 3
yellow-poplar	Liriodendron tulipifera	WDH	High	56.7	640.1	8.0 Lg. dec.	Lg. dec.	High	Abundant	Good	Good			1 4
longleaf pine	Pinus palustris	NSH	Medium	24	459.0		Sm. inc.	Medium	Common	Good	Good			1 5
pond pine	Pinus serotina	NSH	Medium	22.7	428.8	14.8 Sm. dec.	Sm. dec.	Low	Common	Poor	Poor			0 6
white oak	Quercus alba	WDH	Medium	49	366.6	5.8 No change	No change	High	Common	Good	Good			1 7
water oak	Quercus nigra	WDH	High	48.5	340.6	5.2 Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1 8
swamp tupelo	Nyssa biflora	NDH	Medium	33.4	241.2	5.7 Lg. inc.	Lg. inc.	Low	Common	Good	Good			1 9
Virginia pine	Pinus virginiana	NDH	High	19.7	230.1	7.7 Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor	Infill +	Infill +	0 10
southern red oak	Quercus falcata	WDL	Medium	40.2	173.4	3.3 Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1 11
shortleaf pine	Pinus echinata	WDH	High	24.8	124.3	4.3 Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1 12
American holly	llex opaca	NSL	Medium	42.5	121.5	2.2 No change	Sm. inc.	Medium	Common	Fair	Good			1 13
blackgum	Nyssa sylvatica	WDL	Medium	44.2	118.8	2.0 Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1 14
pignut hickory	Carya glabra	WDL	Medium	31.8	116.9	3.0 Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor			0 15
black cherry	Prunus serotina	WDL	Medium	36.3	114.1	2.5 Sm. inc.	Lg. inc.	Low	Common	Fair	Good			1 16
eastern redcedar	Juniperus virginiana	WDH	Medium	27.7	113.2	3.5 Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1 17
slash pine	Pinus elliottii	NDH	High	5.4	111.5		Lg. inc.	Medium		Very Good	Very Good	Infill ++	Infill ++	2 18
post oak	Quercus stellata	WDH	High	36.5	105.2	2.4 Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1 19
sourwood	Oxydendrum arboreum	NDL	High	30.4	103.9	2.5 Lg. dec.	Lg. dec.	High	Common	Fair	Fair			1 20
loblolly-bay	Gordonia lasianthus	NSH	Medium	13.9	100.1	5.1 No change	No change	_	Common	Fair	Fair	Infill +	Infill +	1 21
mockernut hickory	Carya alba	WDL	Medium	31.4	96.9	2.2 Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1 22
sweetbay	Magnolia virginiana	NSL	Medium	28.5	94.8	2.6 Lg. inc.	Lg. inc.	_	Common	Very Good	Very Good			1 23
redbay	Persea borbonia	NSL	Low	22.3	77.8	2.5 Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1 24
	uscle\ Carpinus caroliniana	WSL	Low	24	77.2	2.5 Sm. inc.	Lg. inc.	Medium		Good	Very Good			1 25
flowering dogwood	Cornus florida	WDL	Medium	34.1	72.1	1.6 No change	No change		Common	Fair	Fair			1 26
northern red oak	Quercus rubra	WDL	Medium	21.7	68.8	2.3 Sm. dec.	Sm. dec.	High	Common	Fair	Fair	Infill +	Infill +	1 27
turkey oak	Quercus laevis	NSH	Medium	12.1	66.8	4.1 No change	No change	High	Common	Good	Good			1 28
willow oak	Quercus phellos	NSL	Low	18.7	64.6	3.0 Sm. inc.	Lg. inc.	_	Common	Good	Very Good			1 29
laurel oak	Quercus laurifolia	NDH	Medium	15.4	60.1				Common	Very Good	Very Good			1 30
		WDH		20.4		3.0 Lg. inc.	Lg. inc.			,		Infill ++	Indill	1 30
American elm	Ulmus americana		Medium		57.6	2.4 Sm. inc.	Lg. inc.	Medium		Good	Very Good	INTIII ++	INTIII ++	
winged elm	Ulmus alata	WDL	Medium	20.7	57.3	2.5 Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good	. (1)		1 32
American beech	Fagus grandifolia	WDH	High	12.9	55.9	2.6 Sm. inc.	Sm. inc.	Medium	Common	Good	Good	Infill ++	INTIII ++	1 33
black oak	Quercus velutina	WDH	High	18.7	55.6	2.4 Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1 34
green ash	Fraxinus pennsylvanica	WSH	Low	16.7	55.0	2.3 Lg. inc.	Lg. inc.		Common	Very Good	Very Good			1 35
white ash	Fraxinus americana	WDL	Medium	19.2	54.8	2.4 No change	No change	Low	Common	Poor	Poor	Infill +	Infill +	0 36
blackjack oak	Quercus marilandica	NSL	Medium	8.5	53.8	4.8 No change	No change	High	Common	Good	Good	Infill ++	Infill ++	1 37
scarlet oak	Quercus coccinea	WDL	Medium	15.5	41.6	1.8 Lg. dec.	Lg. dec.	Medium		Very Poor	Very Poor			0 38
hackberry	Celtis occidentalis	WDH	Medium	5.5	35.8	5.5 Sm. dec.	Sm. dec.	High	Rare	Poor	Poor	Infill +	Infill +	1 39
bald cypress	Taxodium distichum	NSH	Medium	8.3	30.4	3.0 Sm. inc.	Sm. inc.	Medium	Rare	Fair	Fair	Infill +	Infill +	1 40
sycamore	Platanus occidentalis	NSL	Low	5.4	27.8	3.7 No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	1 41
boxelder	Acer negundo	WSH	Low	5.2	27.4	4.1 Sm. dec.	No change	High	Rare	Poor	Fair	Infill +	Infill +	1 42
pond cypress	Taxodium ascendens	NSH	Medium	2.7	26.7	7.1 Sm. inc.	Sm. inc.	Medium	Rare	Fair	Fair	Infill +	Infill +	2 43
common persimmon	Diospyros virginiana	NSL	Low	11.6	24.9	1.2 Lg. dec.	Lg. dec.	High	Rare	Poor	Poor			1 44
river birch	Betula nigra	NSL	Low	6.4	21.7	3.0 No change	Sm. inc.	Medium	Rare	Poor	Fair	Infill +	Infill +	1 45
pumpkin ash	Fraxinus profunda	NSH	FIA	2.5	21.4	8.5 Unknown	Unknown	NA	Rare	FIA Only	FIA Only			0 46
slippery elm	Ulmus rubra	WSL	Low	8.6	20.4	2.0 Sm. dec.	No change	Medium	Rare	Very Poor	Poor		Infill +	1 47
										,				



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## Current and Potential Future Habitat, Capability, and Migration

Common Name	Scientific Name	Range	MP	%Call	EIAcum	FIAiv ChngCl45	ChngCl85	Adap	Abund	Capabil45	Capabil85	CHIETAE	SHIFT85		
black willow	Salix nigra	NSH	Low	4.9		3.4 No change	Sm. inc.	Low	Rare	Very Poor	Poor	3011143	Infill +		48
swamp chestnut oak	Quercus michauxii	NSL	Low	5.6		1.9 No change	No change	Medium		Poor	Poor	Infill +	Infill +		49
shagbark hickory	Carya ovata	WSL	Medium	5.2		2.2 No change	Sm. dec.	Medium		Poor	Very Poor	Infill +	111111111111111111111111111111111111111		50
eastern redbud	Cercis canadensis	NSL	Low	8.8		1.2 Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor	111111111111111111111111111111111111111			51
black walnut	Juglans nigra	WDH	Low	3.9		1.7 Lg. dec.	Lg. dec.	Medium		Very Poor	Very Poor				52
water tupelo	Nyssa aquatica	NSH	Medium	1.4		6.4 No change	No change	Low	Rare	Very Poor	Very Poor				53
florida maple	Acer barbatum	NSL	Low	3.8		2.2 No change	No change	High	Rare	Fair	Fair	Infill +	Infill +		54
pecan	Carya illinoinensis	NSH	Low	1.5		4.8 No change	Sm. inc.	Low	Rare	Very Poor	Poor	111111111111111111111111111111111111111	Infill +		55
Atlantic white-cedar	Chamaecyparis thyoides	NSH	Low	2.7		2.7 Sm. dec.	Sm. dec.	Low	Rare	Very Poor	Very Poor		11111111 +		56
cherrybark oak; swamp red		NSL	Medium	2.9		1.9 Sm. inc.	Sm. inc.	Medium		Fair	Fair	Infill +	Infill +		57
sassafras	Sassafras albidum	WSL	Low	6.6		1.0 No change	Sm. inc.	Medium		Poor	Fair	Infill +	Infill +		58
ailanthus	Ailanthus altissima	NSL	FIA	1.6		2.1 Unknown	Unknown	NA	Rare	NNIS	NNIS	111111111111111111111111111111111111111	111111111111111111111111111111111111111		59
butternut	Juglans cinerea	NSLX	FIA	0.4		1.7 Unknown	Unknown	Low	Rare	FIA Only	FIA Only				60
sugarberry	Celtis laevigata	NDH	Medium	1.8		3.0 Lg. inc.	Lg. inc.	Medium		Good	Good	Infill ++	Infill ++		61
bitternut hickory	Carya cordiformis	WSL	Low	2.5		2.0 Lg. dec.	Sm. dec.	High	Rare	Poor	Poor	111111111111111111111111111111111111111	11111111111111111		62
chestnut oak	Quercus prinus	NDH	High	1.5		2.4 No change	No change	High	Rare	Fair	Fair	Infill +	Infill +		63
black locust	Robinia pseudoacacia	NDH	Low	1.3		1.4 Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor	11111111 +	11111111 +		64
eastern white pine	Pinus strobus	WDH	High	0.8		5.7 Lg. dec.	Lg. dec.	Low	Rare	Very Poor	Very Poor				65
eastern hophornbeam; iro		WSL	Low	1.7		2.8 Lg. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++		66
sugar maple	Acer saccharum	WDH	High	3.2		1.3 Very Lg. dec.		High	Rare	Lost	Lost	11111111 77	11111111 77		67
red mulberry	Morus rubra	NSL	Low	3.3		0.8 Sm. dec.	No change	Medium		Very Poor	Poor		Infill +		68
sweet birch	Betula lenta	NDH	High	0.8		3.9 Sm. dec.	Sm. dec.	Low	Rare	Very Poor	Very Poor		11111111 +		69
overcup oak	Quercus lyrata	NSL	Medium	2.5		1.3 No change	Sm. inc.	Low	Rare	Very Poor	Poor		Infill +		70
water hickory	Carya aquatica	NSL	Medium	0.8		2.7 Sm. dec.	Sm. dec.	Medium		Very Poor	Very Poor		11111111 +		71
white mulberry	Morus alba	NSL	FIA	0.8		1.6 Unknown	Unknown	NA	Rare	NNIS	NNIS				72
Carolina ash	Fraxinus caroliniana	NSL	FIA	1.3		1.5 Unknown	Unknown	NA	Rare	FIA Only	FIA Only				73
bluejack oak	Quercus incana	NSL	Low	1.6		0.9 No change	Lg. inc.	Medium		Poor	Good				74
live oak	Quercus virginiana	NDH	High	0.8		0.5 Lg. inc.	Lg. inc.	Medium		Good	Good				75
cucumbertree	Magnolia acuminata	NSL	Low	0.6		0.5 Lg. IIIC. 0.7 Sm. dec.	Sm. dec.	Medium		Very Poor	Very Poor				76
		NSL	Low	0.8							•				77
serviceberry northern white-cedar	Amelanchier spp. Thuja occidentalis	WSH	High	0.8		1.2 Lg. dec. 2.1 Sm. dec.	Lg. dec. Sm. dec.	Medium Medium		Very Poor Very Poor	Very Poor Very Poor				78
southern magnolia	•	NSL	Low	0.4				Medium		Good	Good				79
chinkapin oak	Magnolia grandiflora Quercus muehlenbergii	NSL	Medium	0.8		1.0 Lg. inc. 0.9 Sm. dec.	Lg. inc. Sm. dec.	Medium		Very Poor	Very Poor				80
honeylocust	Gleditsia triacanthos	NSH	Low	0.8		0.7 No change	Lg. inc.	High	Rare	Fair	Good				81
striped maple		NSL	Medium	0.8		0.7 Lg. dec.		Medium		Very Poor					82
shellbark hickory	Acer pensylvanicum  Carya laciniosa	NSL	Low	0.4		0.7 Lg. dec. 0.6 Lg. dec.	Lg. dec.	Medium		Very Poor	Very Poor Very Poor				83
yellow birch	Betula alleghaniensis	NDL	High	0.4		0.6 Lg. dec. 0.4 Sm. dec.	Sm. dec. Sm. dec.	Medium		Very Poor	Very Poor				84
pawpaw	Asimina triloba	NSL	Low	0.4		0.4 Sill. dec.	Lg. dec.	Medium		Very Poor	Very Poor				85
wild plum	Prunus americana	NSLX	FIA	0.4		0.1 Unknown	Unknown	Medium	Rare	FIA Only	FIA Only				86
bear oak; scrub oak	Quercus ilicifolia	NSLX	FIA	0.1											87
•						0.2 Unknown	Unknown	Medium		FIA Only	FIA Only Poor				
Osage-orange	Maclura pomifera	NDH	Medium	0.3		0.2 Lg. dec.	Lg. dec.	High	Rare	Poor					88 89
sand pine	Pinus clausa	NDH	High			0 New Habitat		Low	Absent	New Habitat	New Habitat				
mountain maple	Acer spicatum	NSL	Low	0		0 Unknown	Unknown	High	Absent	Unknown	Unknown Now Habitat				90
cittamwood/gum bumelia	Sideroxylon lanuginosum ssp		Low	0		0 New Habitat		J	Absent		New Habitat				91
black hickory	Carya texana	NDL	High	0		0 New Habitat		Medium			New Habitat				92
black ash	Fraxinus nigra	WSH	Medium	0		0 New Habitat		Low	Absent		New Habitat				93
silverbell	Halesia spp.	NSL	Low	0	0	0 Unknown	Unknown	Medium	Absent	Unknown	Unknown			U	94



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## Current and Potential Future Habitat, Capability, and Migration

Common Name	Scientific Name	Range	MR	%Cell	FIAsum	FIAi	/ ChngCl45	ChngCl85	Adap	Abund	Capabil45	Capabil85	SHIFT45 S	HIFT85	SSO I	N
bigleaf magnolia	Magnolia macrophylla	NSL	Low	0	0	)	0 Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	95
eastern cottonwood	Populus deltoides	NSH	Low	0	0	)	0 Unknown	Unknown	Medium	Modeled	Unknown	Unknown			0	96
pin cherry	Prunus pensylvanica	NSL	Low	0	0	)	0 Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	97
Shumard oak	Quercus shumardii	NSL	Low	0	0	)	0 Unknown	New Habitat	High	Absent	Unknown	New Habitat	L	ikely +	3	98
cabbage palmetto	Sabal palmetto	NDH	Medium	0	0	)	0 New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	99
American basswood	Tilia americana	WSL	Medium	0	0	)	0 Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	100
cedar elm	Ulmus crassifolia	NDH	Medium	0	0	)	0 New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat			0	101

