

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

	sq. km	sq. mi	FIA Plots
Area of Region	11,477	4,431.3	347

### Species Information

The columns below provide brief 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	Abundance		Model		Potential Change in Habitat Suitability		Capability to Cope or Persist		Migration Potential					
				Reliability	Adaptability	Scenario	Scenario	Scenario	Scenario	SHIFT	SHIFT				
				High	26	Increase	RCP45	RCP85	Very Good	13	16	Likely	1	0	
Ash	2			Medium	36	52	No Change	21	19	Good	18	17	Infill	17	20
Hickory	7			Low	37	12	Decrease	27	24	Fair	8	12	Migrate	1	1
Maple	3	Abundant	2	FIA	3		New	5	4	Poor	22	16			
Oak	20	Common	29				Unknown	7	8	Very Poor	15	15			
Pine	5	Rare	50							FIA Only	3	3			
Other	44	Absent	7							Unknown	4	5			
	<b>81</b>		<b>88</b>		<b>90</b>	<b>90</b>		<b>90</b>	<b>90</b>		<b>83</b>	<b>84</b>			

### Potential Changes in Climate Variables

#### Temperature (°F)

	Scenario	2009	2039	2069	2099	
Annual Average	CCSM45	56.3	57.6	58.8	59.0	
	CCSM85	56.3	57.8	59.5	61.3	
	GFDL45	56.3	58.4	59.4	60.1	
	GFDL85	56.3	58.2	60.4	62.8	
	HAD45	56.3	58.1	60.2	60.9	
HAD85	56.3	58.3	61.2	63.9		
Growing Season (May—Sep)	CCSM45	65.9	67.0	68.0	68.3	
	CCSM85	65.9	67.1	68.8	70.9	
	GFDL45	65.9	68.2	69.1	70.6	
	GFDL85	65.9	68.1	70.4	73.4	
	HAD45	65.9	68.1	70.1	70.5	
HAD85	65.9	68.3	72.1	74.4		
Coldest Month (Average)	CCSM45	42.1	43.9	44.5	44.6	
	CCSM85	42.1	44.0	44.9	45.8	
	GFDL45	42.1	44.6	44.7	44.6	
	GFDL85	42.1	42.9	43.6	44.0	
	HAD45	42.1	42.7	43.9	44.5	
HAD85	42.1	43.5	44.6	45.9		
Warmest Month (Average)	CCSM45	68.9	69.8	70.1	70.3	
	CCSM85	68.9	70.0	70.6	71.8	
	GFDL45	68.9	71.8	71.6	72.8	
	GFDL85	68.9	71.4	72.4	74.4	
	HAD45	68.9	71.7	72.8	72.8	
HAD85	68.9	72.1	74.3	74.9		

#### Precipitation (in)

	Scenario	2009	2039	2069	2099	
Annual Total	CCSM45	42.0	43.3	47.9	46.1	
	CCSM85	42.0	44.0	46.7	48.0	
	GFDL45	42.0	45.5	52.1	47.5	
	GFDL85	42.0	45.2	46.7	47.9	
	HAD45	42.0	41.2	41.8	44.6	
HAD85	42.0	43.1	38.1	41.4		
Growing Season (May—Sep)	CCSM45	15.3	15.4	16.4	15.6	
	CCSM85	15.3	14.4	15.0	14.6	
	GFDL45	15.3	17.3	21.4	18.1	
	GFDL85	15.3	17.8	19.1	20.0	
	HAD45	15.3	14.8	15.0	14.8	
HAD85	15.3	14.7	11.9	12.3		

**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	68	3936.3	40.9	No change	Sm. dec.	Medium	Abundant	Good	Fair			1	1
sweetgum	Liquidambar styraciflua	WDH	High	80.2	828.5	7.4	Sm. inc.	Sm. inc.	Medium	Abundant	Very Good	Very Good			1	2
sugarberry	Celtis laevigata	NDH	Medium	24.6	438.8	9.9	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	3
water oak	Quercus nigra	WDH	High	65.8	376.3	4.0	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	4
southern red oak	Quercus falcata	WDL	Medium	56.1	338.9	3.9	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	5
white oak	Quercus alba	WDH	Medium	51.9	311.7	3.7	Sm. dec.	Sm. dec.	High	Common	Fair	Fair			1	6
overcup oak	Quercus lyrata	NSL	Medium	33.6	285.1	7.8	No change	No change	Low	Common	Poor	Poor			0	7
bald cypress	Taxodium distichum	NSH	Medium	22.4	267.4	8.8	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	8
willow oak	Quercus phellos	NSL	Low	41.5	252.0	5.3	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	9
water hickory	Carya aquatica	NSL	Medium	27.1	249.4	8.3	No change	No change	Medium	Common	Fair	Fair			1	10
green ash	Fraxinus pennsylvanica	WSH	Low	47.5	203.3	3.1	Sm. inc.	Lg. inc.	Medium	Common	Good	Very Good			1	11
shortleaf pine	Pinus echinata	WDH	High	31.2	193.1	3.2	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	12
red maple	Acer rubrum	WDH	High	58.7	189.9	2.1	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	13
American beech	Fagus grandifolia	WDH	High	28.7	187.6	3.6	No change	No change	Medium	Common	Fair	Fair			1	14
blackgum	Nyssa sylvatica	WDL	Medium	57.3	165.0	2.0	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	15
Nuttall oak	Quercus texana	NSH	Medium	21.9	157.5	7.8	Sm. dec.	No change	High	Common	Fair	Good			0	16
black willow	Salix nigra	NSH	Low	11.1	144.2	13.7	Lg. inc.	Lg. inc.	Low	Common	Good	Good	Infill ++	Infill ++	1	17
sycamore	Platanus occidentalis	NSL	Low	14.7	136.5	4.2	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor	Infill +	Infill +	0	18
post oak	Quercus stellata	WDH	High	38.7	127.7	2.5	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	19
longleaf pine	Pinus palustris	NSH	Medium	10.8	120.2	6.1	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good	Infill ++	Infill ++	1	20
American hornbeam; muscle	Carpinus caroliniana	WSL	Low	39.8	116.5	2.2	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	21
cherrybark oak; swamp red o	Quercus pagoda	NSL	Medium	26.9	99.6	2.1	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	22
mockernut hickory	Carya alba	WDL	Medium	35.8	92.7	1.8	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	23
honeylocust	Gleditsia triacanthos	NSH	Low	23.2	89.7	3.1	No change	Sm. inc.	High	Common	Good	Very Good			1	24
pecan	Carya illinoensis	NSH	Low	9.2	81.1	3.8	No change	No change	Low	Common	Poor	Poor	Infill +	Infill +	2	25
winged elm	Ulmus alata	WDL	Medium	45.3	79.6	1.1	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	26
boxelder	Acer negundo	WSH	Low	9.5	72.7	3.4	No change	No change	High	Common	Good	Good	Infill ++	Infill ++	2	27
flowering dogwood	Cornus florida	WDL	Medium	39	72.1	1.1	No change	No change	Medium	Common	Fair	Fair			1	28
eastern hophornbeam; ironw	Ostrya virginiana	WDL	Low	32.8	65.1	1.2	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	29
American elm	Ulmus americana	WDH	Medium	30.7	55.2	1.1	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	30
common persimmon	Diospyros virginiana	NSL	Low	28.4	51.6	1.5	No change	Sm. inc.	High	Common	Good	Very Good			1	31
slippery elm	Ulmus rubra	WSL	Low	12.2	49.5	1.9	Sm. inc.	Lg. inc.	Medium	Rare	Fair	Good			1	32
water tupelo	Nyssa aquatica	NSH	Medium	6.5	45.2	5.2	No change	No change	Low	Rare	Very Poor	Very Poor			2	33
American holly	Ilex opaca	NSL	Medium	28.8	42.5	1.0	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			1	34
eastern cottonwood	Populus deltoides	NSH	Low	3.1	37.1	3.9	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	35
water elm	Planera aquatica	NSL	Low	7.9	36.2	3.7	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	1	36
swamp chestnut oak	Quercus michauxii	NSL	Low	18.4	34.4	1.8	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			1	37
sweetbay	Magnolia virginiana	NSL	Medium	14.3	31.9	1.4	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	1	38
black cherry	Prunus serotina	WDL	Medium	24.4	30.6	0.6	Sm. inc.	Lg. inc.	Low	Rare	Poor	Fair			1	39
yellow-poplar	Liriodendron tulipifera	WDH	High	8.1	29.7	2.3	Sm. dec.	No change	High	Rare	Poor	Fair	Infill +	Infill +	1	40
bitternut hickory	Carya cordiformis	WSL	Low	9.8	28.2	1.8	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor			1	41
pignut hickory	Carya glabra	WDL	Medium	12.5	27.8	1.2	Sm. dec.	No change	Medium	Rare	Very Poor	Poor		Infill +	1	42
sassafras	Sassafras albidum	WSL	Low	20.4	27.1	0.7	No change	Sm. inc.	Medium	Rare	Poor	Fair			1	43
cedar elm	Ulmus crassifolia	NDH	Medium	5.7	24.4	1.7	Lg. inc.	Lg. inc.	Low	Rare	Fair	Fair	Infill +	Infill +	2	44
swamp tupelo	Nyssa biflora	NDH	Medium	6.4	23.3	1.5	No change	No change	Low	Rare	Very Poor	Very Poor			2	45
laurel oak	Quercus laurifolia	NDH	Medium	11.7	22.2	1.5	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			1	46
slash pine	Pinus elliotii	NDH	High	3.8	22.1	5.0	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	2	47

# HUC 080403 Lower Red

## HUC 6 Watershed Climate Change Atlas Tree Species

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Northern Research Station  
Landscape Change Research Group  
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Common Name	Scientific Name	Range	MR	%Cell	FIAsum	FIAiv	ChngCl45	ChngCl85	Adap	Abund	Capabil45	Capabil85	SHIFT45	SHIFT85	SSO	N
southern magnolia	Magnolia grandiflora	NSL	Low	7.1	16.7	1.1	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	1	48
eastern redcedar	Juniperus virginiana	WDH	Medium	8	15.8	0.7	No change	Sm. inc.	Medium	Rare	Poor	Fair	Infill +	Infill +	2	49
blackjack oak	Quercus marilandica	NSL	Medium	7.2	15.6	1.4	Sm. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	1	50
black oak	Quercus velutina	WDH	High	10.9	14.6	0.9	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	51
white ash	Fraxinus americana	WDL	Medium	9	14.2	0.7	No change	No change	Low	Rare	Very Poor	Very Poor			0	52
eastern redbud	Cercis canadensis	NSL	Low	2.1	11.6	2.1	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	53
Shumard oak	Quercus shumardii	NSL	Low	2.9	11.3	1.1	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor	Infill +	Infill +	2	54
sourwood	Oxydendrum arboreum	NDL	High	8.2	11.0	0.9	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor			1	55
waterlocust	Gleditsia aquatica	NSLX	FIA	5.3	10.0	1.6	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	56
chestnut oak	Quercus prinus	NDH	High	0.9	5.6	6.4	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor			0	57
river birch	Betula nigra	NSL	Low	0.1	5.2	0.6	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	58
black locust	Robinia pseudoacacia	NDH	Low	1	4.6	0.5	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	59
red mulberry	Morus rubra	NSL	Low	4.6	3.6	0.4	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	60
ogeechee tupelo	Nyssa ogeche	NSLX	FIA	1.7	3.5	2.0	Unknown	Unknown	Low	Rare	FIA Only	FIA Only			0	61
pin cherry	Prunus pensylvanica	NSL	Low	3.7	3.5	0.2	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	62
Osage-orange	Maclura pomifera	NDH	Medium	0.9	2.9	3.3	Sm. dec.	No change	High	Rare	Poor	Fair		Infill +	2	63
cittamwood/gum bumelia	Sideroxylon lanuginosum ssp.	NSL	Low	1.1	2.2	1.2	Lg. inc.	Lg. inc.	High	Rare	Good	Good			2	64
hackberry	Celtis occidentalis	WDH	Medium	4.4	2.1	1.4	Sm. dec.	No change	High	Rare	Poor	Fair		Infill +	2	65
bigleaf magnolia	Magnolia macrophylla	NSL	Low	2.4	1.7	0.6	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	66
American basswood	Tilia americana	WSL	Medium	1.3	1.5	0.6	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	67
northern red oak	Quercus rubra	WDH	Medium	0.8	1.4	1.5	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor			0	68
swamp white oak	Quercus bicolor	NSL	Low	1.9	1.3	0.2	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	69
florida maple	Acer barbatum	NSL	Low	2	1.2	0.4	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor	Infill +	Infill +	2	70
pond pine	Pinus serotina	NSH	Medium	0.9	1.2	1.3	Sm. dec.	Sm. dec.	Low	Rare	Very Poor	Very Poor			0	71
black walnut	Juglans nigra	WDH	Low	0.9	0.9	1.1	Very Lg. dec.	Very Lg. dec.	Medium	Rare	Lost	Lost			0	72
redbay	Persea borbonia	NSL	Low	1.3	0.7	0.1	No change	Sm. inc.	High	Rare	Fair	Good			0	73
scarlet oak	Quercus coccinea	WDL	Medium	0.8	0.7	0.2	No change	Sm. dec.	Medium	Rare	Poor	Very Poor			0	74
chinkapin oak	Quercus muehlenbergii	NSL	Medium	0.1	0.6	0.1	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	75
wild plum	Prunus americana	NSLX	FIA	1.7	0.6	0.3	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	76
bluejack oak	Quercus incana	NSL	Low	0.2	0.5	0.1	Very Lg. dec.	Very Lg. dec.	Medium	Rare	Lost	Lost			0	77
black hickory	Carya texana	NDL	High	0.9	0.5	0.6	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	78
serviceberry	Amelanchier spp.	NSL	Low	0.6	0.5	0.4	No change	No change	Medium	Rare	Poor	Poor			0	79
bur oak	Quercus macrocarpa	NDH	Medium	0.9	0.2	0.3	Lg. dec.	Lg. dec.	High	Rare	Poor	Poor			0	80
shagbark hickory	Carya ovata	WSL	Medium	0.3	0.1	0.0	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	81
Atlantic white-cedar	Chamaecyparis thyoides	NSH	Low	0	0	0	Unknown	Unknown	Low	Modeled	Unknown	Unknown			0	82
striped maple	Acer pensylvanicum	NSL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	83
silver maple	Acer saccharinum	NSH	Low	0	0	0	Unknown	Unknown	High	Modeled	Unknown	Unknown			0	84
mountain maple	Acer spicatum	NSL	Low	0	0	0	Unknown	Unknown	High	Absent	Unknown	Unknown			0	85
pawpaw	Asimina triloba	NSL	Low	0	0	0	New Habitat	Unknown	Medium	Absent	New Habitat	Unknown	Likely +		3	86
black ash	Fraxinus nigra	WSH	Medium	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat			3	87
silverbell	Halesia spp.	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	88
cucumbertree	Magnolia acuminata	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	89
live oak	Quercus virginiana	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate ++	Migrate ++	3	90