

HUC 051302 Lower Cumberland

HUC 6 Watershed Climate Change Atlas Tree Species

USDA Forest Service
Northern Research Station
Landscape Change Research Group
Iverson, Peters, Prasad, Matthews

Current and Potential Future Habitat, Capability, and Migration

	sq. km	sq. mi	FIA Plots
Area of Region	18,709	7,223.5	368

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					
		High	Low	Reliability	Adaptability	Scenario RCP45	Scenario RCP85	Scenario RCP45	Scenario RCP85	SHIFT RCP45	SHIFT RCP85				
Ash	3					Increase	26	31	Very Good	16	20	Likely	2	2	
Hickory	6					No Change	15	14	Good	14	11	Infill	12	13	
Maple	4	Abundant	4	High	19	24	Decrease	25	21	Fair	7	11	Migrate	3	6
Oak	17	Common	37	Medium	32	56	New	17	17	Poor	17	14			
Pine	2	Rare	31	Low	38	12	Unknown	12	12	Very Poor	12	10			
Other	40	Absent	20	FIA	6					FIA Only	3	3			
	72		92		95	92		95	95	Unknown	6	6		17	21
											75	75			

Potential Changes in Climate Variables

Temperature (°F)

Scenario	2009	2039	2069	2099		
Annual	CCSM45	52.2	53.6	55.4	55.6	
Average	CCSM85	52.2	53.9	56.1	58.4	
	GFDL45	52.2	54.4	56.1	56.7	
	GFDL85	52.2	54.3	56.9	59.6	
	HAD45	52.2	54.2	56.7	57.7	
	HAD85	52.2	54.6	58.1	61.1	
Growing Season	CCSM45	64.1	65.4	67.0	67.4	
	CCSM85	64.1	65.7	68.0	71.0	
May—Sep	GFDL45	64.1	66.5	68.5	69.5	
	GFDL85	64.1	66.5	69.7	72.9	
	HAD45	64.1	66.7	69.1	70.3	
	HAD85	64.1	67.0	72.1	74.9	
Coldest Month	CCSM45	34.0	35.4	36.6	36.9	
	CCSM85	34.0	36.5	37.3	38.6	
Average	GFDL45	34.0	36.9	36.9	37.1	
	GFDL85	34.0	35.2	36.1	36.5	
	HAD45	34.0	34.4	36.2	36.4	
	HAD85	34.0	35.5	36.9	38.2	
Warmest Month	CCSM45	68.2	69.4	70.3	70.5	
	CCSM85	68.2	69.8	71.1	72.5	
Average	GFDL45	68.2	70.6	71.7	72.3	
	GFDL85	68.2	70.7	72.5	74.3	
	HAD45	68.2	71.6	73.6	74.1	
	HAD85	68.2	72.8	76.4	77.5	

Precipitation (in)

Scenario	2009	2039	2069	2099		
Annual	CCSM45	39.3	40.1	44.4	43.0	
Total	CCSM85	39.3	43.7	43.8	46.8	
	GFDL45	39.3	44.8	47.2	49.3	
	GFDL85	39.3	44.9	47.8	50.5	
	HAD45	39.3	37.7	40.9	41.1	
	HAD85	39.3	39.3	36.7	40.6	
Growing Season	CCSM45	16.0	15.3	16.3	16.0	
	CCSM85	16.0	16.8	14.9	16.2	
May—Sep	GFDL45	16.0	18.4	18.7	19.4	
	GFDL85	16.0	18.5	19.1	19.7	
	HAD45	16.0	14.9	14.5	14.4	
	HAD85	16.0	15.4	11.9	12.8	

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
eastern redcedar	Juniperus virginiana	WDH	Medium	58.2	868.6	13.1	No change	No change	Medium	Abundant	Good	Good			1	1
sugar maple	Acer saccharum	WDH	High	66.1	668.6	8.8	Lg. dec.	Lg. dec.	High	Abundant	Good	Good			1	2
white oak	Quercus alba	WDH	Medium	47.7	587.9	9.0	No change	No change	High	Abundant	Very Good	Very Good			1	3
yellow-poplar	Liriodendron tulipifera	WDH	High	46.4	526.1	8.6	Lg. dec.	Lg. dec.	High	Abundant	Good	Good			1	4
hackberry	Celtis occidentalis	WDH	Medium	43.4	389.5	8.4	No change	No change	High	Common	Good	Good			1	5
pignut hickory	Carya glabra	WDL	Medium	47.7	372.0	5.9	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	6
sassafras	Sassafras albidum	WSL	Low	48.9	334.8	5.5	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	7
winged elm	Ulmus alata	WDL	Medium	65.5	300.4	4.2	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	8
white ash	Fraxinus americana	WDL	Medium	46.1	248.4	4.8	No change	No change	Low	Common	Poor	Poor			0	9
black oak	Quercus velutina	WDH	High	40.3	248.2	4.6	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	10
shagbark hickory	Carya ovata	WSL	Medium	47.4	239.6	4.4	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor			0	11
black cherry	Prunus serotina	WDL	Medium	38.2	214.6	5.5	No change	No change	Low	Common	Poor	Poor			0	12
post oak	Quercus stellata	WDH	High	32.1	212.9	6.4	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	13
sweetgum	Liquidambar styraciflua	WDH	High	27.3	208.5	5.9	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	14
blackgum	Nyssa sylvatica	WDL	Medium	45.3	190.6	3.2	No change	Sm. inc.	High	Common	Good	Very Good			1	15
red maple	Acer rubrum	WDH	High	21.9	185.9	6.5	No change	Sm. inc.	High	Common	Good	Very Good			1	16
American elm	Ulmus americana	WDH	Medium	46	177.9	3.6	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	17
boxelder	Acer negundo	WSH	Low	21.9	174.3	6.8	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	18
American beech	Fagus grandifolia	WDH	High	35.6	168.6	4.1	Sm. dec.	No change	Medium	Common	Poor	Fair			1	19
mockernut hickory	Carya alba	WDL	Medium	38.9	168.2	3.9	Sm. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	20
black walnut	Juglans nigra	WDH	Low	40	166.3	3.7	Sm. dec.	No change	Medium	Common	Poor	Fair			1	21
green ash	Fraxinus pennsylvanica	WSH	Low	40.1	165.6	3.9	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	22
southern red oak	Quercus falcata	WDL	Medium	27.3	158.8	5.5	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	23
chinkapin oak	Quercus muehlenbergii	NSL	Medium	41.7	155.2	3.6	No change	No change	Medium	Common	Fair	Fair			1	24
northern red oak	Quercus rubra	WDH	Medium	30.3	154.6	3.9	No change	Sm. inc.	High	Common	Good	Very Good			1	25
loblolly pine	Pinus taeda	WDH	High	7.3	148.9	12.9	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good	Infill ++	Infill ++	1	26
scarlet oak	Quercus coccinea	WDL	Medium	31.7	142.7	4.1	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	27
black locust	Robinia pseudoacacia	NDH	Low	22.8	134.5	5.2	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	28
sugarberry	Celtis laevigata	NDH	Medium	27	121.4	4.3	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	29
sycamore	Platanus occidentalis	NSL	Low	28.2	114.7	3.9	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	30
chestnut oak	Quercus prinus	NDH	High	10.6	113.7	8.0	Sm. dec.	Sm. dec.	High	Common	Fair	Fair	Infill +	Infill +	1	31
flowering dogwood	Cornus florida	WDL	Medium	35.5	100.2	2.2	No change	No change	Medium	Common	Fair	Fair			1	32
slippery elm	Ulmus rubra	WSL	Low	28.5	97.3	3.0	Sm. inc.	Lg. inc.	Medium	Common	Good	Very Good			1	33
common persimmon	Diospyros virginiana	NSL	Low	31.6	91.4	2.9	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	34
Osage-orange	Maclura pomifera	NDH	Medium	16.1	91.3	5.6	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good	Infill ++	Infill ++	1	35
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	37.2	84.6	1.9	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	36
bitternut hickory	Carya cordiformis	WSL	Low	26.1	74.1	3.0	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	37
sourwood	Oxydendrum arboreum	NDL	High	16	69.2	2.7	Sm. dec.	Sm. dec.	High	Common	Fair	Fair			1	38
blue ash	Fraxinus quadrangulata	NSL	Low	18.4	63.5	4.4	Sm. dec.	Sm. dec.	Low	Common	Poor	Poor	Infill +	Infill +	0	39
honeylocust	Gleditsia triacanthos	NSH	Low	18.1	61.7	2.9	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	40
ailanthus	Ailanthus altissima	NSL	FIA	12.7	60.2	3.1	Unknown	Unknown	NA	Common	NNIS	NNIS			0	41
eastern redbud	Cercis canadensis	NSL	Low	26.5	41.2	1.1	No change	Sm. inc.	Medium	Rare	Poor	Fair			1	42
red mulberry	Morus rubra	NSL	Low	20.2	36.6	1.8	Sm. dec.	No change	Medium	Rare	Very Poor	Poor			1	43
silver maple	Acer saccharinum	NSH	Low	4	34.6	8.0	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor	Infill +		2	44
Virginia pine	Pinus virginiana	NDH	High	3.2	33.8	3.0	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	45
shingle oak	Quercus imbricaria	NDH	Medium	7.2	28.5	3.1	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			2	46
shellbark hickory	Carya laciniosa	NSL	Low	7.3	27.8	4.1	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	47



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Shumard oak	Quercus shumardii	NSL	Low	3.8	26.9	3.8	No change	Sm. inc.	High	Rare	Fair	Good	Infill +	Infill ++	1	48
American hornbeam; musclev	Carpinus caroliniana	WSL	Low	15.7	22.2	1.3	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			1	49
cherrybark oak; swamp red o.	Quercus pagoda	NSL	Medium	4.3	19.6	2.7	Sm. inc.	Sm. inc.	Medium	Rare	Fair	Fair	Infill +	Infill +	2	50
yellow buckeye	Aesculus flava	NSL	Low	2.5	16.1	2.0	Lg. dec.	Lg. dec.	Low	Rare	Very Poor	Very Poor			0	51
pawpaw	Asimina triloba	NSL	Low	6	10.4	1.5	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	52
black willow	Salix nigra	NSH	Low	1.8	9.9	3.7	Sm. inc.	Lg. inc.	Low	Rare	Poor	Fair		Infill +	2	53
serviceberry	Amelanchier spp.	NSL	Low	4.6	9.2	1.3	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	54
American basswood	Tilia americana	WSL	Medium	2	6.5	1.6	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	55
blackjack oak	Quercus marilandica	NSL	Medium	1.5	6.1	2.1	Lg. inc.	Lg. inc.	High	Rare	Good	Good			2	56
bigtooth aspen	Populus grandidentata	NSL	Medium	0.4	4.9	7.1	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	57
paulownia	Paulownia tomentosa	NSL	FIA	2.1	3.9	1.8	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	58
eastern cottonwood	Populus deltoides	NSH	Low	1.5	3.8	2.3	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	59
swamp chestnut oak	Quercus michauxii	NSL	Low	1.1	3.8	3.5	Sm. dec.	No change	Medium	Rare	Very Poor	Poor		Infill +	2	60
river birch	Betula nigra	NSL	Low	1.1	2.4	2.2	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	2	61
Ohio buckeye	Aesculus glabra	NSL	Low	1.6	2.2	1.4	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	62
pecan	Carya illinoensis	NSH	Low	0.5	1.6	3.0	Lg. inc.	Lg. inc.	Low	Rare	Fair	Fair	Infill +	Infill +	2	63
white mulberry	Morus alba	NSL	FIA	1.5	1.5	0.9	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	64
bur oak	Quercus macrocarpa	NDH	Medium	0.5	1.4	2.7	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor			0	65
willow oak	Quercus phellos	NSL	Low	0.5	1.2	2.3	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	66
American chestnut	Castanea dentata	NSLX	FIA	0.2	1.1	0.8	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	67
overcup oak	Quercus lyrata	NSL	Medium	0.5	0.9	1.8	Sm. inc.	Lg. inc.	Low	Rare	Poor	Fair	Infill +	Infill +	2	68
pin oak	Quercus palustris	NSH	Low	0.3	0.9	0.9	No change	No change	Low	Rare	Very Poor	Very Poor			0	69
Kentucky coffeetree	Gymnocladus dioicus	NSLX	FIA	0.5	0.6	1.2	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	70
butternut	Juglans cinerea	NSLX	FIA	2.1	0.4	2.9	Unknown	Unknown	Low	Rare	FIA Only	FIA Only			0	71
pin cherry	Prunus pensylvanica	NSL	Low	0.5	0.3	0.5	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	72
ashe juniper	Juniperus ashei	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	73
red spruce	Picea rubens	NDH	High	0	0	0	Unknown	Unknown	Low	Absent	Unknown	Unknown			0	74
shortleaf pine	Pinus echinata	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Likely +	Likely +	3	75
slash pine	Pinus elliottii	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	76
longleaf pine	Pinus palustris	NSH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	77
bald cypress	Taxodium distichum	NSH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Likely +	Likely +	3	78
florida maple	Acer barbatum	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate +	3	79
striped maple	Acer pensylvanicum	NSL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	80
cittamwood/gum bumelia	Sideroxylon lanuginosum ssp.	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	81
black hickory	Carya texana	NDL	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	82
black ash	Fraxinus nigra	WSH	Medium	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat			3	83
American holly	Ilex opaca	NSL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	84
cucumbertree	Magnolia acuminata	NSL	Low	0	0	0	Unknown	Unknown	Medium	Modeled	Unknown	Unknown			0	85
southern magnolia	Magnolia grandiflora	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	86
bigleaf magnolia	Magnolia macrophylla	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	87
water elm	Planera aquatica	NSL	Low	0	0	0	Unknown	Unknown	Medium	Modeled	Unknown	Unknown			0	88
quaking aspen	Populus tremuloides	WDH	High	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	89
swamp white oak	Quercus bicolor	NSL	Low	0	0	0	Unknown	Unknown	Medium	Modeled	Unknown	Unknown			0	90
laurel oak	Quercus laurifolia	NDH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	91
water oak	Quercus nigra	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	92
live oak	Quercus virginiana	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	93
bluejack oak	Quercus incana	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	94



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cedar elm	Ulmus crassifolia	NDH	Medium	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat			3	95