

HUC 060400 Lower Tennessee

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 20,952 8,089.5 570

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	22	25	Increase	29	35	Very Good	16	18	Likely	2	2
Ash	3			Medium	36	58	No Change	19	14	Good	13	14	Infill	13	14
Hickory	6			Low	38	16	Decrease	27	26	Fair	15	14	Migrate	4	7
Maple	5	Abundant	4	FIA	8		New	13	14	Poor	13	14			
Oak	19	Common	35				Unknown	16	15	Very Poor	18	15			
Pine	6	Rare	44							FIA Only	4	4			
Other	44	Absent	21							Unknown	8	7			
	83		104		104	99		104	104		87	86		19	23

Potential Changes in Climate Variables

Temperature (°F)

Scenario	2009	2039	2069	2099		
Annual	CCSM45	52.5	53.8	55.5	55.7	
Average	CCSM85	52.5	54.1	56.2	58.4	
	GFDL45	52.5	54.6	56.2	56.8	
	GFDL85	52.5	54.5	57.0	59.7	
	HAD45	52.5	54.4	56.9	57.8	
	HAD85	52.5	54.7	58.2	61.2	
Growing Season	CCSM45	63.9	65.2	66.7	67.2	
	CCSM85	63.9	65.5	67.8	70.6	
May—Sep	GFDL45	63.9	66.3	68.2	69.3	
	GFDL85	63.9	66.3	69.3	72.5	
	HAD45	63.9	66.5	68.9	70.1	
	HAD85	63.9	66.9	71.9	74.6	
Coldest Month	CCSM45	34.8	36.3	37.4	37.6	
	CCSM85	34.8	37.2	38.0	39.3	
Average	GFDL45	34.8	37.6	37.6	37.8	
	GFDL85	34.8	36.0	36.9	37.3	
	HAD45	34.8	35.3	37.0	37.2	
	HAD85	34.8	36.1	37.5	38.8	
Warmest Month	CCSM45	68.0	69.1	69.9	70.1	
	CCSM85	68.0	69.4	70.6	72.0	
Average	GFDL45	68.0	70.6	71.4	72.1	
	GFDL85	68.0	70.4	72.1	73.8	
	HAD45	68.0	71.4	73.4	73.8	
	HAD85	68.0	72.4	75.9	77.0	

Precipitation (in)

Scenario	2009	2039	2069	2099		
Annual	CCSM45	41.6	42.5	46.7	45.2	
Total	CCSM85	41.6	45.4	45.9	49.0	
	GFDL45	41.6	47.4	50.0	52.1	
	GFDL85	41.6	47.7	50.6	53.4	
	HAD45	41.6	39.4	43.4	43.5	
	HAD85	41.6	41.4	38.4	42.4	
Growing Season	CCSM45	16.7	15.9	16.6	16.5	
	CCSM85	16.7	17.0	15.4	16.8	
May—Sep	GFDL45	16.7	19.2	19.9	20.6	
	GFDL85	16.7	19.7	20.5	21.4	
	HAD45	16.7	15.2	15.4	14.8	
	HAD85	16.7	15.9	12.1	13.1	

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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Current and Potential Future Habitat, Capability, and Migration

Common Name	Scientific Name	Range	MR	%Cell	FIAsum	FIAiv	ChngCl45	ChngCl85	Adap	Abund	Capabil45	Capabil85	SHIFT45	SHIFT85	SSO	N
white oak	Quercus alba	WDH	Medium	69.7	1148.7	12.5	Sm. dec.	Sm. dec.	High	Abundant	Good	Good			1	1
loblolly pine	Pinus taeda	WDH	High	31.6	700.0	15.4	Lg. inc.	Lg. inc.	Medium	Abundant	Very Good	Very Good			1	2
yellow-poplar	Liriodendron tulipifera	WDH	High	62.8	683.0	7.6	Lg. dec.	Lg. dec.	High	Abundant	Good	Good			1	3
sweetgum	Liquidambar styraciflua	WDH	High	60.5	633.1	8.6	Sm. inc.	Sm. inc.	Medium	Abundant	Very Good	Very Good			1	4
eastern redcedar	Juniperus virginiana	WDH	Medium	53.2	497.2	7.7	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	5
pignut hickory	Carya glabra	WDL	Medium	66.2	445.3	5.0	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	6
southern red oak	Quercus falcata	WDL	Medium	53.4	387.0	5.6	Sm. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	7
red maple	Acer rubrum	WDH	High	59.3	380.3	4.7	No change	No change	High	Common	Good	Good			1	8
post oak	Quercus stellata	WDH	High	57.3	361.8	4.6	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	9
chestnut oak	Quercus prinus	NDH	High	33	359.3	8.2	Sm. dec.	Lg. dec.	High	Common	Fair	Fair			1	10
sugar maple	Acer saccharum	WDH	High	51.7	318.6	4.5	Lg. dec.	Lg. dec.	High	Common	Fair	Fair			1	11
winged elm	Ulmus alata	WDL	Medium	65.4	297.6	3.8	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	12
black oak	Quercus velutina	WDH	High	54.1	279.7	3.6	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	13
blackgum	Nyssa sylvatica	WDL	Medium	67.3	275.7	3.0	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	14
scarlet oak	Quercus coccinea	WDL	Medium	39.3	262.2	4.2	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	15
sourwood	Oxydendrum arboreum	NDL	High	45.7	245.0	4.2	Lg. dec.	Lg. dec.	High	Common	Fair	Fair			1	16
mockernut hickory	Carya alba	WDL	Medium	51.3	243.9	3.7	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	17
black cherry	Prunus serotina	WDL	Medium	58.5	231.8	2.9	No change	Sm. inc.	Low	Common	Poor	Fair			1	18
shagbark hickory	Carya ovata	WSL	Medium	44.1	223.5	4.0	Sm. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	19
hackberry	Celtis occidentalis	WDH	Medium	23.3	206.0	7.5	No change	No change	High	Common	Good	Good			1	20
American beech	Fagus grandifolia	WDH	High	41.1	194.0	3.6	No change	No change	Medium	Common	Fair	Fair			1	21
green ash	Fraxinus pennsylvanica	WSH	Low	44.2	159.7	3.2	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	22
boxelder	Acer negundo	WSH	Low	20.9	145.3	5.9	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	23
sassafras	Sassafras albidum	WSL	Low	33.8	137.5	2.6	Sm. dec.	No change	Medium	Common	Poor	Fair			1	24
northern red oak	Quercus rubra	WDH	Medium	38.1	133.7	3.0	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	25
American elm	Ulmus americana	WDH	Medium	35.7	132.3	3.3	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	26
flowering dogwood	Cornus florida	WDL	Medium	50	125.3	1.6	No change	No change	Medium	Common	Fair	Fair			1	27
white ash	Fraxinus americana	WDL	Medium	31.9	119.6	3.2	Sm. inc.	Sm. inc.	Low	Common	Fair	Fair			1	28
black locust	Robinia pseudoacacia	NDH	Low	13.9	116.2	5.2	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	29
sugarberry	Celtis laevigata	NDH	Medium	17.7	112.4	5.3	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	30
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	41.5	101.6	2.0	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	31
sycamore	Platanus occidentalis	NSL	Low	20.7	97.9	3.5	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	32
cherrybark oak; swamp red o	Quercus pagoda	NSL	Medium	18	90.3	4.6	Sm. inc.	Lg. inc.	Medium	Common	Good	Very Good			1	33
black walnut	Juglans nigra	WDH	Low	24.8	81.0	2.5	No change	No change	Medium	Common	Fair	Fair			1	34
slippery elm	Ulmus rubra	WSL	Low	30.9	80.2	2.1	Sm. inc.	Lg. inc.	Medium	Common	Good	Very Good			1	35
common persimmon	Diospyros virginiana	NSL	Low	31.7	74.1	1.4	Sm. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	36
American hornbeam; muscle	Carpinus caroliniana	WSL	Low	26.3	73.7	2.3	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	37
shortleaf pine	Pinus echinata	WDH	High	10.2	64.0	4.9	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good	Infill ++	Infill ++	1	38
chinkapin oak	Quercus muehlenbergii	NSL	Medium	21.9	62.3	2.4	No change	Sm. dec.	Medium	Common	Fair	Poor			1	39
water tupelo	Nyssa aquatica	NSH	Medium	3.4	52.6	15.8	Lg. dec.	Lg. dec.	Low	Rare	Very Poor	Very Poor			0	40
Osage-orange	Maclura pomifera	NDH	Medium	4.2	48.3	7.8	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	2	41
ailanthus	Ailanthus altissima	NSL	FIA	7.5	47.6	3.9	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	42
river birch	Betula nigra	NSL	Low	9.6	43.1	3.9	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	1	43
bitternut hickory	Carya cordiformis	WSL	Low	9	41.8	3.0	No change	No change	High	Rare	Fair	Fair			1	44
eastern redbud	Cercis canadensis	NSL	Low	22.6	36.0	1.1	No change	No change	Medium	Rare	Poor	Poor			1	45
black willow	Salix nigra	NSH	Low	9.1	34.7	5.1	No change	Sm. inc.	Low	Rare	Very Poor	Poor			1	46
silver maple	Acer saccharinum	NSH	Low	4.4	33.2	6.5	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor	Infill +	Infill +	2	47

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willow oak	Quercus phellos	NSL	Low	6.8	28.0	3.0	Sm. inc.	Sm. inc.	Medium	Rare	Fair	Fair	Infill +	Infill +	1	48
blue ash	Fraxinus quadrangulata	NSL	Low	4.3	27.4	5.1	Sm. dec.	Sm. dec.	Low	Rare	Very Poor	Very Poor			2	49
red mulberry	Morus rubra	NSL	Low	8.7	26.2	2.2	Sm. dec.	No change	Medium	Rare	Very Poor	Poor			1	50
blackjack oak	Quercus marilandica	NSL	Medium	5.1	22.5	3.8	Lg. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	1	51
honeylocust	Gleditsia triacanthos	NSH	Low	6.8	18.2	2.2	Sm. inc.	Sm. inc.	High	Rare	Good	Good	Infill ++	Infill ++	1	52
water oak	Quercus nigra	WDH	High	4.6	15.1	2.9	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	2	53
Virginia pine	Pinus virginiana	NDH	High	3.2	14.7	4.3	Sm. inc.	Sm. inc.	Medium	Rare	Fair	Fair	Infill +	Infill +	1	54
shellbark hickory	Carya laciniosa	NSL	Low	6.9	14.1	1.7	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			2	55
swamp chestnut oak	Quercus michauxii	NSL	Low	3.8	13.2	2.8	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	56
American basswood	Tilia americana	WSL	Medium	3	12.9	1.9	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	57
Shumard oak	Quercus shumardii	NSL	Low	4.8	11.8	2.7	No change	Sm. inc.	High	Rare	Fair	Good	Infill +	Infill ++	2	58
serviceberry	Amelanchier spp.	NSL	Low	9.1	11.1	0.7	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	59
pin oak	Quercus palustris	NSH	Low	2.6	10.6	3.5	Sm. dec.	Sm. dec.	Low	Rare	Very Poor	Very Poor			2	60
yellow buckeye	Aesculus flava	NSL	Low	1	6.5	4.2	Sm. dec.	Sm. dec.	Low	Rare	Very Poor	Very Poor			0	61
shingle oak	Quercus imbricaria	NDH	Medium	1.3	5.0	3.4	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	62
overcup oak	Quercus lyrata	NSL	Medium	3.3	4.6	2.5	No change	Sm. inc.	Low	Rare	Very Poor	Poor		Infill +	2	63
bigtooth aspen	Populus grandidentata	NSL	Medium	0.1	4.4	2.1	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	64
swamp tupelo	Nyssa biflora	NDH	Medium	1.3	3.5	2.3	No change	No change	Low	Rare	Very Poor	Very Poor			0	65
pawpaw	Asimina triloba	NSL	Low	2.3	3.2	1.0	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	66
white mulberry	Morus alba	NSL	FIA	0.9	3.0	3.1	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	67
rock elm	Ulmus thomasii	NSLX	FIA	1	2.9	3.1	Unknown	Unknown	Low	Rare	FIA Only	FIA Only			0	68
sand hickory	Carya pallida	NSL	FIA	1.4	2.9	2.0	Unknown	Unknown	NA	Rare	FIA Only	FIA Only			0	69
sweetbay	Magnolia virginiana	NSL	Medium	0.1	2.7	1.3	Sm. inc.	Lg. inc.	Medium	Rare	Fair	Good	Infill +		2	70
eastern cottonwood	Populus deltoides	NSH	Low	0.5	2.7	5.6	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	71
American holly	Ilex opaca	NSL	Medium	1.9	2.6	0.8	No change	Sm. inc.	Medium	Rare	Poor	Fair		Infill +	2	72
swamp white oak	Quercus bicolor	NSL	Low	1.4	2.6	1.8	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	73
florida maple	Acer barbatum	NSL	Low	1	2.5	1.1	No change	Sm. inc.	High	Rare	Fair	Good			2	74
bald cypress	Taxodium distichum	NSH	Medium	1.5	2.4	1.8	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	75
pitch pine	Pinus rigida	NSH	High	0.5	2.0	4.1	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	76
Nuttall oak	Quercus texana	NSH	Medium	0.5	1.8	3.7	Lg. dec.	Sm. dec.	High	Rare	Poor	Poor			0	77
paulownia	Paulownia tomentosa	NSL	FIA	1	1.7	1.7	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	78
wild plum	Prunus americana	NSLX	FIA	0.9	1.0	1.0	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	79
American chestnut	Castanea dentata	NSLX	FIA	0.3	1.0	1.3	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	80
Siberian elm	Ulmus pumila	NDH	FIA	0.5	0.3	0.6	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	81
slash pine	Pinus elliotii	NDH	High	0.3	0.2	0.3	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	82
eastern white pine	Pinus strobus	WDH	High	0.5	0.1	0.3	Lg. dec.	Lg. dec.	Low	Rare	Very Poor	Very Poor			0	83
ashe juniper	Juniperus ashei	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	84
red spruce	Picea rubens	NDH	High	0	0	0	Unknown	Unknown	Low	Absent	Unknown	Unknown			0	85
longleaf pine	Pinus palustris	NSH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	86
striped maple	Acer pensylvanicum	NSL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Likely +	Likely +	3	87
mountain maple	Acer spicatum	NSL	Low	0	0	0	Unknown	Unknown	High	Absent	Unknown	Unknown			0	88
Ohio buckeye	Aesculus glabra	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	89
sweet birch	Betula lenta	NDH	High	0	0	0	Unknown	Unknown	Low	Absent	Unknown	Unknown			0	90
cittamwood/gum bumelia	Sideroxylon lanuginosum ssp.	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	91
water hickory	Carya aquatica	NSL	Medium	0	0	0	Unknown	New Habitat	Medium	Absent	Unknown	New Habitat			3	92
pecan	Carya illinoensis	NSH	Low	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	93
black hickory	Carya texana	NDL	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	94



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black ash	Fraxinus nigra	WSH	Medium	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat			3	95
silverbell	Halesia spp.	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	96
southern magnolia	Magnolia grandiflora	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	97
bigleaf magnolia	Magnolia macrophylla	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	98
quaking aspen	Populus tremuloides	WDH	High	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	99
pin cherry	Prunus pensylvanica	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	100
laurel oak	Quercus laurifolia	NDH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Likely +	Likely +	3	101
live oak	Quercus virginiana	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	102
bluejack oak	Quercus incana	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	103
cedar elm	Ulmus crassifolia	NDH	Medium	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	104