

HUC 060200 Middle Tennessee-Hiwassee

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	13,366	5,160.7	494

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	23	26	Increase	27	32	Very Good	11	13	Likely	1	1
Ash	3			Medium	32	56	No Change	20	16	Good	17	21	Infill	18	18
Hickory	6			Low	41	16	Decrease	28	27	Fair	13	9	Migrate	2	10
Maple	7	Abundant	7	FIA	6		New	15	16	Poor	17	18			
Oak	15	Common	25				Unknown	12	11	Very Poor	17	13			
Pine	6	Rare	49							FIA Only	3	3			
Other	44	Absent	21							Unknown	6	5			
	81		102		102	98		102	102		84	82		21	29

Potential Changes in Climate Variables

Temperature (°F)

	Scenario	2009	2039	2069	2099
Annual Average	CCSM45	50.1	51.4	53.0	53.1
	CCSM85	50.1	51.7	53.5	55.5
	GFDL45	50.1	52.0	53.7	54.2
	GFDL85	50.1	52.1	54.5	57.0
	HAD45	50.1	51.7	53.9	54.8
	HAD85	50.1	52.0	55.1	57.8
Growing Season (May—Sep)	CCSM45	60.1	61.4	62.8	63.1
	CCSM85	60.1	61.6	63.5	66.0
	GFDL45	60.1	62.2	64.1	65.1
	GFDL85	60.1	62.4	65.2	68.1
	HAD45	60.1	62.4	64.3	65.4
	HAD85	60.1	62.4	66.9	69.4
Coldest Month (Average)	CCSM45	35.1	36.7	37.4	37.4
	CCSM85	35.1	37.1	37.7	38.6
	GFDL45	35.1	37.5	37.5	37.8
	GFDL85	35.1	36.4	37.1	37.5
	HAD45	35.1	34.9	36.4	36.6
	HAD85	35.1	35.8	36.8	38.0
Warmest Month (Average)	CCSM45	63.5	64.9	65.6	65.7
	CCSM85	63.5	65.0	66.2	67.4
	GFDL45	63.5	65.7	66.6	67.3
	GFDL85	63.5	65.9	67.6	69.0
	HAD45	63.5	66.4	67.9	68.4
	HAD85	63.5	66.9	70.0	71.2

Precipitation (in)

	Scenario	2009	2039	2069	2099
Annual Total	CCSM45	41.0	43.1	45.9	45.0
	CCSM85	41.0	44.2	45.4	49.6
	GFDL45	41.0	46.3	47.7	51.1
	GFDL85	41.0	45.9	48.6	50.0
	HAD45	41.0	39.9	43.6	44.5
	HAD85	41.0	43.6	39.3	42.8
Growing Season (May—Sep)	CCSM45	16.4	17.1	18.0	18.0
	CCSM85	16.4	17.3	16.8	18.6
	GFDL45	16.4	19.7	20.1	21.0
	GFDL85	16.4	19.0	20.7	21.2
	HAD45	16.4	15.9	16.3	16.5
	HAD85	16.4	17.6	13.4	15.1

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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Common Name	Scientific Name	Range	MR	%Cell	FIAsum	FIAiv	ChngCl45	ChngCl85	Adap	Abund	Capabil45	Capabil85	SHIFT45	SHIFT85	SSO	N
chestnut oak	Quercus prinus	NDH	High	69.2	1165.0	9.9	Sm. dec.	Sm. dec.	High	Abundant	Good	Good			1	1
red maple	Acer rubrum	WDH	High	87.8	1115.8	7.7	Sm. dec.	Sm. dec.	High	Abundant	Good	Good			1	2
Virginia pine	Pinus virginiana	NDH	High	80.2	1048.4	8.8	Sm. dec.	Sm. dec.	Medium	Abundant	Fair	Fair			0	3
loblolly pine	Pinus taeda	WDH	High	37.4	863.9	14.5	Lg. inc.	Lg. inc.	Medium	Abundant	Very Good	Very Good			1	4
yellow-poplar	Liriodendron tulipifera	WDH	High	81.1	854.4	6.6	Sm. dec.	Sm. dec.	High	Abundant	Good	Good			1	5
white oak	Quercus alba	WDH	Medium	80.9	839.3	6.1	Sm. inc.	No change	High	Abundant	Very Good	Very Good			1	6
sourwood	Oxydendrum arboreum	NDL	High	76	608.6	5.1	Sm. dec.	Lg. dec.	High	Abundant	Good	Good			1	7
scarlet oak	Quercus coccinea	WDL	Medium	61.1	447.8	4.0	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor			0	8
eastern white pine	Pinus strobus	WDH	High	33.4	400.6	8.3	No change	No change	Low	Common	Poor	Poor			0	9
pignut hickory	Carya glabra	WDL	Medium	64.2	338.1	3.1	No change	Sm. dec.	Medium	Common	Fair	Poor			1	10
black oak	Quercus velutina	WDH	High	66.4	315.9	3.2	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	11
blackgum	Nyssa sylvatica	WDL	Medium	79.1	314.7	2.4	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	12
southern red oak	Quercus falcata	WDL	Medium	50.5	303.8	4.5	Sm. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	13
shortleaf pine	Pinus echinata	WDH	High	54	298.9	4.0	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	14
mockernut hickory	Carya alba	WDL	Medium	66.2	290.7	2.8	Sm. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	15
sweetgum	Liquidambar styraciflua	WDH	High	34.6	286.4	5.7	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	16
black cherry	Prunus serotina	WDL	Medium	54.7	218.6	2.5	Sm. inc.	Sm. inc.	Low	Common	Fair	Fair			1	17
northern red oak	Quercus rubra	WDH	Medium	56.7	216.8	2.2	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	18
eastern redcedar	Juniperus virginiana	WDH	Medium	27.4	178.5	5.3	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	19
post oak	Quercus stellata	WDH	High	42.7	172.5	2.7	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	20
eastern hemlock	Tsuga canadensis	NSH	High	29.5	154.8	2.7	No change	No change	Low	Common	Poor	Poor			0	21
flowering dogwood	Cornus florida	WDL	Medium	62.1	149.8	1.7	No change	Sm. inc.	Medium	Common	Fair	Good			1	22
winged elm	Ulmus alata	WDL	Medium	26.3	134.7	4.2	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	23
shagbark hickory	Carya ovata	WSL	Medium	25	99.0	3.2	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor			0	24
sweet birch	Betula lenta	NDH	High	27.7	93.5	2.1	Sm. dec.	Sm. dec.	Low	Common	Poor	Poor	Infill +	Infill +	0	25
sugar maple	Acer saccharum	WDH	High	22.3	88.9	2.3	Lg. dec.	Lg. dec.	High	Common	Fair	Fair			1	26
green ash	Fraxinus pennsylvanica	WSH	Low	17.9	86.1	3.1	Sm. inc.	Lg. inc.	Medium	Common	Good	Very Good			1	27
red mulberry	Morus rubra	NSL	Low	5.6	84.1	9.9	Lg. dec.	Sm. dec.	Medium	Common	Poor	Poor			0	28
black locust	Robinia pseudoacacia	NDH	Low	29.2	78.5	1.6	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	29
sassafras	Sassafras albidum	WSL	Low	40.8	75.2	1.1	No change	Sm. inc.	Medium	Common	Fair	Good			1	30
boxelder	Acer negundo	WSH	Low	6.5	62.7	9.2	No change	No change	High	Common	Good	Good	Infill ++	Infill ++	1	31
American beech	Fagus grandifolia	WDH	High	17.3	57.2	2.0	Sm. inc.	Lg. inc.	Medium	Common	Good	Very Good	Infill ++	Infill ++	1	32
sycamore	Platanus occidentalis	NSL	Low	6.6	48.2	5.4	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	1	33
hackberry	Celtis occidentalis	WDH	Medium	7.8	46.7	4.9	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	1	34
pitch pine	Pinus rigida	NSH	High	8.7	45.2	2.8	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	1	35
black walnut	Juglans nigra	WDH	Low	11.2	43.1	3.3	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	36
white ash	Fraxinus americana	WDL	Medium	21.9	36.7	1.3	Lg. inc.	Lg. inc.	Low	Rare	Fair	Fair			1	37
eastern redbud	Cercis canadensis	NSL	Low	13.2	31.3	1.7	Lg. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	38
common persimmon	Diospyros virginiana	NSL	Low	7	31.1	3.2	No change	No change	High	Rare	Fair	Fair			1	39
blackjack oak	Quercus marilandica	NSL	Medium	6.9	28.6	3.2	Lg. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	1	40
slippery elm	Ulmus rubra	WSL	Low	6.9	27.2	2.3	Sm. dec.	No change	Medium	Rare	Very Poor	Poor			1	41
American basswood	Tilia americana	WSL	Medium	6	26.8	1.4	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	1	42
American elm	Ulmus americana	WDH	Medium	12.4	26.5	1.5	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	1	43
yellow birch	Betula alleghaniensis	NDL	High	2.8	26.3	3.4	No change	Sm. dec.	Medium	Rare	Poor	Very Poor	Infill +		2	44
chinkapin oak	Quercus muehlenbergii	NSL	Medium	5.4	26.3	3.0	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	1	45
American hornbeam; muscle	Carpinus caroliniana	WSL	Low	10.5	23.2	1.8	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			1	46
serviceberry	Amelanchier spp.	NSL	Low	20.1	22.0	0.6	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	47



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Common Name	Scientific Name	Range	MR	%Cell	FIAsum	FIAiv	ChngCl45	ChngCl85	Adap	Abund	Capabil45	Capabil85	SHIFT45	SHIFT85	SSO	N
silver maple	Acer saccharinum	NSH	Low	0.7	21.9	29.2	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor			0	48
American holly	Ilex opaca	NSL	Medium	17.7	20.1	0.7	Sm. dec.	Sm. inc.	Medium	Rare	Very Poor	Fair			1	49
mountain or Fraser magnolia	Magnolia fraseri	NSL	Low	8.7	18.1	1.3	No change	No change	Low	Rare	Very Poor	Very Poor			0	50
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	10.2	16.5	1.1	Lg. inc.	Lg. inc.	High	Rare	Good	Good			1	51
sugarberry	Celtis laevigata	NDH	Medium	2.7	14.8	4.7	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	2	52
bitternut hickory	Carya cordiformis	WSL	Low	6.4	13.2	1.3	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor	Infill +	Infill +	1	53
silverbell	Halesia spp.	NSL	Low	2.4	11.6	2.4	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	54
sand hickory	Carya pallida	NSL	FIA	3.8	9.9	2.0	Unknown	Unknown	NA	Rare	FIA Only	FIA Only			0	55
willow oak	Quercus phellos	NSL	Low	2.9	9.3	2.9	Sm. dec.	No change	Medium	Rare	Very Poor	Poor		Infill +	2	56
striped maple	Acer pensylvanicum	NSL	Medium	4.5	8.5	1.2	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			2	57
paulownia	Paulownia tomentosa	NSL	FIA	2.2	8.3	2.6	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	58
yellow buckeye	Aesculus flava	NSL	Low	5.5	7.4	1.0	No change	Sm. dec.	Low	Rare	Very Poor	Very Poor			0	59
water oak	Quercus nigra	WDH	High	3	7.0	1.2	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	60
cucumbertree	Magnolia acuminata	NSL	Low	6.1	6.2	0.5	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	61
florida maple	Acer barbatum	NSL	Low	3	5.5	1.3	Lg. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	2	62
Table Mountain pine	Pinus pungens	NSL	Low	2.1	3.4	0.8	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor		Infill +	2	63
ailanthus	Ailanthus altissima	NSL	FIA	3	3.3	0.7	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	64
swamp chestnut oak	Quercus michauxii	NSL	Low	1	2.9	1.4	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	65
honeylocust	Gleditsia triacanthos	NSH	Low	2.1	2.6	0.6	Lg. inc.	Lg. inc.	High	Rare	Good	Good			2	66
shellbark hickory	Carya laciniosa	NSL	Low	1.5	2.1	1.4	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	67
river birch	Betula nigra	NSL	Low	0.7	2.0	2.7	Sm. inc.	Lg. inc.	Medium	Rare	Fair	Good	Infill +		2	68
black willow	Salix nigra	NSH	Low	1.4	2.0	1.3	No change	Lg. inc.	Low	Rare	Very Poor	Fair		Infill +	2	69
bigleaf magnolia	Magnolia macrophylla	NSL	Low	2	1.7	0.3	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	70
American chestnut	Castanea dentata	NSLX	FIA	2.8	1.6	0.2	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	71
Shumard oak	Quercus shumardii	NSL	Low	2.2	1.5	0.7	No change	Sm. inc.	High	Rare	Fair	Good			2	72
Osage-orange	Maclura pomifera	NDH	Medium	0.5	1.1	1.1	Sm. dec.	Sm. inc.	High	Rare	Poor	Good			2	73
Kentucky coffeetree	Gymnocladus dioicus	NSLX	FIA	0.7	1.1	1.4	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	74
pin cherry	Prunus pensylvanica	NSL	Low	0.3	0.9	0.5	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	75
pawpaw	Asimina triloba	NSL	Low	1.5	0.8	0.5	Lg. dec.	Very Lg. dec.	Medium	Rare	Very Poor	Lost			0	76
cherrybark oak; swamp red o.	Quercus pagoda	NSL	Medium	0.7	0.7	0.9	Sm. inc.	Lg. inc.	Medium	Rare	Fair	Good	Infill +		2	77
white mulberry	Morus alba	NSL	FIA	0.7	0.4	0.5	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	78
mountain maple	Acer spicatum	NSL	Low	0.5	0.3	0.2	No change	No change	High	Rare	Fair	Fair			0	79
blue ash	Fraxinus quadrangulata	NSL	Low	0.7	0.2	0.3	Lg. dec.	Lg. dec.	Low	Rare	Very Poor	Very Poor			0	80
overcup oak	Quercus lyrata	NSL	Medium	0.7	0.1	0.1	Lg. dec.	Lg. dec.	Low	Rare	Very Poor	Very Poor			0	81
ashe juniper	Juniperus ashei	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	82
slash pine	Pinus elliottii	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate ++	3	83
longleaf pine	Pinus palustris	NSH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	84
pond cypress	Taxodium ascendens	NSH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	85
northern white-cedar	Thuja occidentalis	WSH	High	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	86
black maple	Acer nigrum	NSH	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			0	87
Ohio buckeye	Aesculus glabra	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	88
cittamwood/gum bumelia	Sideroxylon lanuginosum ssp.	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate ++	3	89
pecan	Carya illinoensis	NSH	Low	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat		Migrate +	3	90
black hickory	Carya texana	NDL	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	91
black ash	Fraxinus nigra	WSH	Medium	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat			3	92
southern magnolia	Magnolia grandiflora	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	93
sweetbay	Magnolia virginiana	NSL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	94

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swamp tupelo	<i>Nyssa biflora</i>	NDH	Medium	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat		Migrate +	3	95
bigtooth aspen	<i>Populus grandidentata</i>	NSL	Medium	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	96
laurel oak	<i>Quercus laurifolia</i>	NDH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Likely +	Likely +	3	97
pin oak	<i>Quercus palustris</i>	NSH	Low	0	0	0	Unknown	Unknown	Low	Absent	Unknown	Unknown			0	98
live oak	<i>Quercus virginiana</i>	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate ++	3	99
bluejack oak	<i>Quercus incana</i>	NSL	Low	0	0	0	Unknown	New Habitat	Medium	Absent	Unknown	New Habitat		Migrate +	3	100
American mountain-ash	<i>Sorbus americana</i>	NSL	Low	0	0	0	Unknown	Unknown	Low	Absent	Unknown	Unknown			0	101
cedar elm	<i>Ulmus crassifolia</i>	NDH	Medium	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat			3	102