HUC 051002 Kentucky

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	18,041	6,965.7	492

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
Ash	4
Hickory	5
Maple	6
Oak	14
Pine	5
Other	46
	80

Abundance	
Abundant	3
Common	38
Rare	39
Absent	14
	94

	Model Reliability	Adaptability
High	23	26
Medium	28	50
Low	35	14
FIA	8	
	94	**90**

Potential Change in Habitat Suitability	Scenario RCP45	Scenario RCP85
Increase	23	27
No Change	15	15
Decrease	34	30
New	11	12
Unknown	11	10
	94	**94**

Capability to Cope or Persist	Scenario RCP45	Scenario RCP85
Very Good	9	12
Good	18	17
Fair	15	14
Poor	8	10
Very Poor	22	19
FIA Only	4	4
Unknown	3	2
	79	**78**

Migration Potential	SHIFT RCP45	SHIFT RCP85
Likely	0	0
Infill	10	12
Migrate	4	6
	14	**18**

Potential Changes in Climate Variables

Temperature (°F)

	Scenario	2009	2039	2069	2099
Annual Average	CCSM45	49.3	50.7	52.5	52.6
	CCSM85	49.3	51.0	53.0	55.3
	GFDL45	49.3	51.5	53.4	54.0
	GFDL85	49.3	51.6	54.2	57.0
	HAD45	49.3	51.2	53.8	54.7
	HAD85	49.3	51.6	54.9	58.1
Growing Season May—Sep	CCSM45	60.7	62.0	63.6	64.1
	CCSM85	60.7	62.4	64.4	67.4
	GFDL45	60.7	63.3	65.6	66.6
	GFDL85	60.7	63.5	66.7	69.8
	HAD45	60.7	63.1	65.5	66.8
	HAD85	60.7	63.4	68.1	71.1
Coldest Month Average	CCSM45	31.7	32.9	33.9	34.3
	CCSM85	31.7	33.7	34.4	35.6
	GFDL45	31.7	34.6	34.7	35.1
	GFDL85	31.7	33.4	34.1	34.7
	HAD45	31.7	32.1	33.9	34.1
	HAD85	31.7	33.1	34.4	35.8
Warmest Month Average	CCSM45	64.6	66.0	67.0	67.2
	CCSM85	64.6	66.3	67.7	69.0
	GFDL45	64.6	67.3	68.7	69.4
	GFDL85	64.6	67.8	69.9	71.6
	HAD45	64.6	67.6	69.6	70.3
	HAD85	64.6	68.8	72.1	73.7

Precipitation (in)

	Scenario	2009	2039	2069	2099
Annual Total	CCSM45	34.7	36.2	39.1	38.7
	CCSM85	34.7	38.6	39.5	42.2
	GFDL45	34.7	38.5	39.7	42.4
	GFDL85	34.7	37.4	40.7	42.9
	HAD45	34.7	35.0	36.6	36.5
	HAD85	34.7	35.2	33.5	35.9
Growing Season May—Sep	CCSM45	15.7	16.0	17.1	16.7
	CCSM85	15.7	16.8	16.0	17.1
	GFDL45	15.7	17.6	16.9	17.8
	GFDL85	15.7	16.6	17.1	17.6
	HAD45	15.7	15.9	14.7	15.0
	HAD85	15.7	15.6	13.0	13.5

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.

Cite as: Iverson, L.R.; Prasad, A.M.; Peters, M.P.; Matthews, S.N. 2019. Facilitating Adaptive Forest Management under Climate Change: A Spatially Specific Synthesis of 125 Species for Habitat Changes and Assisted Migration over the Eastern United States. Forests. 10(11): 989. https://doi.org/10.3390/f10110989.

HUC 051002 Kentucky

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

Common Name	Scientific Name	Range	MR	%Cell	FIAsum	FIAiv	ChngCl45	ChngCl85	Adap	Abund	Capabil45	Capabil85	SHIFT45	SHIFT85	SSO	N
yellow-poplar	Liriodendron tulipifera	WDH	High	62.6	875.1	9.8	Lg. dec.	Lg. dec.	High	Abundant	Good	Good			1	1
red maple	Acer rubrum	WDH	High	63.1	718.3	7.9	Sm. dec.	Sm. dec.	High	Abundant	Good	Good			1	2
white oak	Quercus alba	WDH	Medium	60.2	647.1	7.7	No change	No change	High	Abundant	Very Good	Very Good			1	3
eastern redcedar	Juniperus virginiana	WDH	Medium	43.6	499.4	13.0	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	4
sugar maple	Acer saccharum	WDH	High	77.3	492.1	5.0	Sm. dec.	Sm. dec.	High	Common	Fair	Fair			1	5
chestnut oak	Quercus prinus	NDH	High	48.4	449.8	6.2	Sm. dec.	Sm. dec.	High	Common	Fair	Fair			1	6
American beech	Fagus grandifolia	WDH	High	50.6	420.8	6.2	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor			0	7
white ash	Fraxinus americana	WDL	Medium	54.6	301.3	4.3	No change	No change	Low	Common	Poor	Poor			0	8
black locust	Robinia pseudoacacia	NDH	Low	64.1	287.8	3.7	No change	No change	Medium	Common	Fair	Fair			1	9
scarlet oak	Quercus coccinea	WDL	Medium	52	274.4	3.9	Sm. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	10
Virginia pine	Pinus virginiana	NDH	High	33.1	267.5	5.7	No change	No change	Medium	Common	Fair	Fair			1	11
pignut hickory	Carya glabra	WDL	Medium	59.3	223.8	2.9	No change	No change	Medium	Common	Fair	Fair			1	12
black walnut	Juglans nigra	WDH	Low	44.3	214.8	4.1	No change	No change	Medium	Common	Fair	Fair			1	13
sycamore	Platanus occidentalis	NSL	Low	26.3	207.2	6.2	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	14
black oak	Quercus velutina	WDH	High	41.5	205.6	3.4	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	15
sourwood	Oxydendrum arboreum	NDL	High	56.8	205.5	2.7	Sm. dec.	Lg. dec.	High	Common	Fair	Fair			1	16
northern red oak	Quercus rubra	WDH	Medium	57.7	186.1	2.7	Lg. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	17
hackberry	Celtis occidentalis	WDH	Medium	29.9	180.6	7.3	No change	No change	High	Common	Good	Good	Infill ++	Infill ++	1	18
blackgum	Nyssa sylvatica	WDL	Medium	55.4	175.8	2.1	No change	Sm. inc.	High	Common	Good	Very Good			1	19
chinkapin oak	Quercus muehlenbergii	NSL	Medium	34.2	166.7	5.6	No change	Sm. dec.	Medium	Common	Fair	Poor			1	20
sassafras	Sassafras albidum	WSL	Low	50.5	162.2	2.3	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor			0	21
mockernut hickory	Carya alba	WDL	Medium	46.1	148.0	2.6	Sm. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	22
slippery elm	Ulmus rubra	WSL	Low	43.5	144.8	2.6	No change	Sm. inc.	Medium	Common	Fair	Good			1	23
shagbark hickory	Carya ovata	WSL	Medium	45.4	144.1	2.7	No change	No change	Medium	Common	Fair	Fair			1	24
green ash	Fraxinus pennsylvanica	WSH	Low	36.7	129.3	3.1	Sm. inc.	Lg. inc.	Medium	Common	Good	Very Good			1	25
black cherry	Prunus serotina	WDL	Medium	35.4	123.6	2.8	Sm. inc.	Sm. inc.	Low	Common	Fair	Fair			1	26
American elm	Ulmus americana	WDH	Medium	42.5	118.9	3.0	Sm. inc.	Lg. inc.	Medium	Common	Good	Very Good			1	27
American basswood	Tilia americana	WSL	Medium	27.9	103.4	2.9	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	28
flowering dogwood	Cornus florida	WDL	Medium	53.1	100.0	1.5	No change	No change	Medium	Common	Fair	Fair			1	29
eastern redbud	Cercis canadensis	NSL	Low	54.6	94.5	1.5	No change	No change	Medium	Common	Fair	Fair			1	30
sweet birch	Betula lenta	NDH	High	29.9	91.0	1.8	Lg. dec.	Lg. dec.	Low	Common	Very Poor	Very Poor			0	31
eastern hemlock	Tsuga canadensis	NSH	High	17.6	89.4	3.6	Lg. dec.	Lg. dec.	Low	Common	Very Poor	Very Poor			0	32
bitternut hickory	Carya cordiformis	WSL	Low	37	88.3	2.4	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	33
eastern white pine	Pinus strobus	WDH	High	10.2	87.7	5.8	Lg. dec.	Lg. dec.	Low	Common	Very Poor	Very Poor			0	34
boxelder	Acer negundo	WSH	Low	27.8	83.5	4.3	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	35
pitch pine	Pinus rigida	NSH	High	15.3	72.5	2.7	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	36
shortleaf pine	Pinus echinata	WDH	High	21.3	72.4	2.5	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	37
Shumard oak	Quercus shumardii	NSL	Low	9.3	70.1	5.5	No change	No change	High	Common	Good	Good	Infill ++	Infill ++	2	38
honeylocust	Gleditsia triacanthos	NSH	Low	18.1	66.4	4.4	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good	Infill ++	Infill ++	1	39
yellow buckeye	Aesculus flava	NSL	Low	20.2	62.6	2.3	Lg. dec.	Lg. dec.	Low	Common	Very Poor	Very Poor			0	40
southern red oak	Quercus falcata	WDL	Medium	11.8	53.5	2.4	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good	Infill ++	Infill ++	1	41
sweetgum	Liquidambar styraciflua	WDH	High	11.8	44.7	2.8	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	1	42
cucumbertree	Magnolia acuminata	NSL	Low	21.4	39.2	1.7	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	43
shellbark hickory	Carya laciniosa	NSL	Low	14.3	38.7	2.0	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	44
American hornbeam; muscle	Carpinus caroliniana	WSL	Low	23.5	38.2	1.4	Sm. inc.	Lg. inc.	Medium	Rare	Fair	Good			1	45
post oak	Quercus stellata	WDH	High	9.5	32.0	1.6	Lg. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	2	46
Osage-orange	Maclura pomifera	NDH	Medium	11.6	31.5	3.6	Lg. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	1	47

HUC 051002 Kentucky

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

Common Name	Scientific Name	Range	MR	%Cell	FIAsum	FIAiv	ChngCl45	ChngCl85	Adap	Abund	Capabil45	Capabil85	SHIFT45	SHIFT85	SSO	N
Ohio buckeye	Aesculus glabra	NSL	Low	14.8	29.8	2.3	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	48
ailanthus	Ailanthus altissima	NSL	FIA	11.4	23.3	2.0	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	49
blue ash	Fraxinus quadrangulata	NSL	Low	8.6	21.5	6.3	Sm. dec.	No change	Low	Rare	Very Poor	Very Poor			0	50
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	16.1	20.4	1.0	Lg. inc.	Lg. inc.	High	Rare	Good	Good			1	51
river birch	Betula nigra	NSL	Low	3.9	19.8	4.2	Sm. dec.	No change	Medium	Rare	Very Poor	Poor		Infill +	1	52
red mulberry	Morus rubra	NSL	Low	13.2	18.4	0.9	Sm. dec.	Sm. inc.	Medium	Rare	Very Poor	Fair			1	53
serviceberry	Amelanchier spp.	NSL	Low	13.2	15.1	0.8	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	54
bigleaf magnolia	Magnolia macrophylla	NSL	Low	6.4	13.6	1.3	Sm. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	55
silver maple	Acer saccharinum	NSH	Low	2.6	13.4	1.4	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	2	56
paulownia	Paulownia tomentosa	NSL	FIA	2.8	13.2	3.9	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	57
loblolly pine	Pinus taeda	WDH	High	0.4	11.1	12.9	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	58
pin oak	Quercus palustris	NSH	Low	3.3	10.1	2.3	Sm. dec.	Sm. dec.	Low	Rare	Very Poor	Very Poor			2	59
mountain or Fraser magnolia	Magnolia fraseri	NSL	Low	4.7	9.7	1.2	Sm. dec.	Sm. dec.	Low	Rare	Very Poor	Very Poor			0	60
butternut	Juglans cinerea	NSLX	FIA	4.9	6.4	1.5	Unknown	Unknown	Low	Rare	FIA Only	FIA Only			0	61
pawpaw	Asimina triloba	NSL	Low	5.3	5.6	0.8	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	62
bur oak	Quercus macrocarpa	NDH	Medium	0.6	5.1	2.6	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor			0	63
black willow	Salix nigra	NSH	Low	1.4	4.9	1.2	Sm. dec.	Lg. inc.	Low	Rare	Very Poor	Fair		Infill +	2	64
shingle oak	Quercus imbricaria	NDH	Medium	3.5	4.4	2.1	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	65
winged elm	Ulmus alata	WDL	Medium	8.8	4.1	0.8	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	1	66
American holly	Ilex opaca	NSL	Medium	2.4	3.6	1.2	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	67
black maple	Acer nigrum	NSH	Low	0.2	2.6	1.7	Lg. dec.	Lg. dec.	High	Rare	Poor	Poor			0	68
common persimmon	Diospyros virginiana	NSL	Low	2.1	2.3	0.9	Lg. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	2	69
Kentucky coffeetree	Gymnocladus dioicus	NSLX	FIA	4.5	1.6	3.2	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	70
bigtooth aspen	Populus grandidentata	NSL	Medium	1.7	1.6	0.5	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	71
Siberian elm	Ulmus pumila	NDH	FIA	1.1	1.6	1.5	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	72
American chestnut	Castanea dentata	NSLX	FIA	1.3	1.4	0.5	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	73
yellow birch	Betula alleghaniensis	NDL	High	1	0.6	0.5	Sm. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	74
blackjack oak	Quercus marilandica	NSL	Medium	0.4	0.4	0.6	Lg. inc.	Lg. inc.	High	Rare	Good	Good			2	75
northern catalpa	Catalpa speciosa	NSHX	FIA	1.7	0.4	2.2	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	76
water oak	Quercus nigra	WDH	High	0.6	0.4	0.7	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	77
white mulberry	Morus alba	NSL	FIA	0.3	0.4	0.4	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	78
striped maple	Acer pensylvanicum	NSL	Medium	0.6	0.3	0.6	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	79
black ash	Fraxinus nigra	WSH	Medium	0.6	0.3	0.5	Sm. dec.	No change	Low	Rare	Very Poor	Very Poor			0	80
ashe juniper	Juniperus ashei	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	81
slash pine	Pinus elliottii	NDH	High	0	0	0	Unknown	New Habitat	Medium	Absent	Unknown	New Habitat		Migrate +	3	82
northern white-cedar	Thuja occidentalis	WSH	High	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	83
florida maple	Acer barbatum	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	84
mountain maple	Acer spicatum	NSL	Low	0	0	0	Unknown	Unknown	High	Absent	Unknown	Unknown			0	85
cittamwood/gum bumelia	Sideroxylon lanuginosum ssp.	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			3	86
pecan	Carya illinoinensis	NSH	Low	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	87
black hickory	Carya texana	NDL	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	88
sugarberry	Celtis laevigata	NDH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	89
cherrybark oak; swamp red o	Quercus pagoda	NSL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	90
willow oak	Quercus phellos	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	91
live oak	Quercus virginiana	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	92
bluejack oak	Quercus incana	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	93
cedar elm	Ulmus crassifolia	NDH	Medium	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat			0	94