

HUC 050901 Middle Ohio-Raccoon

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	9,410.3	3,633.3	290

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 RCP45	Scenario RCP85	Scenario RCP45	Scenario RCP85	SHIFT RCP45	SHIFT RCP85	
Ash	3			High	23	26	Increase	19	28	Very Good	6	7
Hickory	5			Medium	28	47	No Change	11	7	Good	18	22
Maple	4	Abundant	6	Low	36	16	Decrease	35	30	Fair	9	10
Oak	10	Common	29	FIA	7		New	14	16	Poor	14	11
Pine	7	Rare	37				Unknown	15	13	Very Poor	17	12
Other	43	Absent	22							FIA Only	2	2
	72		94		94	89		94	94	Unknown	8	6
											74	70

Potential Changes in Climate Variables

Temperature (°F)

	Scenario	2009	2039	2069	2099
Annual Average	CCSM45	46.9	48.2	49.9	50.0
	CCSM85	46.9	48.6	50.3	52.5
	GFDL45	46.9	48.8	50.8	51.4
	GFDL85	46.9	49.1	51.6	54.3
	HAD45	46.9	48.7	51.1	52.1
HAD85	46.9	49.0	52.1	55.2	
Growing Season (May—Sep)	CCSM45	57.6	59.0	60.5	60.9
	CCSM85	57.6	59.3	61.1	63.9
	GFDL45	57.6	59.8	62.4	63.3
	GFDL85	57.6	60.4	63.4	66.5
	HAD45	57.6	59.9	62.2	63.5
HAD85	57.6	60.2	64.4	67.4	
Coldest Month (Average)	CCSM45	30.4	31.5	32.5	32.8
	CCSM85	30.4	32.3	32.9	34.0
	GFDL45	30.4	33.0	33.3	33.7
	GFDL85	30.4	32.2	32.9	33.6
	HAD45	30.4	30.8	32.4	32.6
HAD85	30.4	31.5	32.7	34.1	
Warmest Month (Average)	CCSM45	61.4	62.7	63.6	63.9
	CCSM85	61.4	63.1	64.3	65.6
	GFDL45	61.4	63.8	65.3	65.9
	GFDL85	61.4	64.4	66.3	68.0
	HAD45	61.4	64.1	65.9	66.8
HAD85	61.4	65.1	68.1	69.9	

Precipitation (in)

	Scenario	2009	2039	2069	2099
Annual Total	CCSM45	29.2	31.0	32.7	33.0
	CCSM85	29.2	32.3	33.3	35.9
	GFDL45	29.2	32.1	33.0	35.2
	GFDL85	29.2	30.4	33.9	35.3
	HAD45	29.2	29.8	30.4	30.0
HAD85	29.2	29.7	27.9	30.2	
Growing Season (May—Sep)	CCSM45	13.5	14.1	14.6	14.6
	CCSM85	13.5	13.9	13.8	14.6
	GFDL45	13.5	14.8	14.2	15.0
	GFDL85	13.5	13.5	13.9	14.3
	HAD45	13.5	13.9	12.4	12.8
HAD85	13.5	13.3	11.3	11.9	

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
yellow-poplar	Liriodendron tulipifera	WDH	High	82.6	1487.9	11.4	Lg. dec.	Lg. dec.	High	Abundant	Good	Good			1	1
white oak	Quercus alba	WDH	Medium	81.2	1416.9	10.1	Sm. dec.	Sm. dec.	High	Abundant	Good	Good			1	2
red maple	Acer rubrum	WDH	High	84.8	1184.5	8.5	Lg. dec.	Lg. dec.	High	Abundant	Good	Good			1	3
sugar maple	Acer saccharum	WDH	High	68.5	772.3	6.8	No change	Sm. dec.	High	Abundant	Very Good	Good			1	4
chestnut oak	Quercus prinus	NDH	High	57.4	674.7	6.5	Sm. dec.	Lg. dec.	High	Abundant	Good	Good			1	5
black oak	Quercus velutina	WDH	High	72.2	532.1	4.3	Sm. inc.	Sm. inc.	Medium	Abundant	Very Good	Very Good			1	6
Virginia pine	Pinus virginiana	NDH	High	48.8	445.1	5.9	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor			0	7
pignut hickory	Carya glabra	WDL	Medium	65.9	419.7	4.0	No change	Sm. dec.	Medium	Common	Fair	Poor			1	8
mockernut hickory	Carya alba	WDL	Medium	67.6	416.4	4.0	No change	Sm. inc.	High	Common	Good	Very Good			1	9
scarlet oak	Quercus coccinea	WDL	Medium	48.1	377.4	3.9	Sm. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	10
American beech	Fagus grandifolia	WDH	High	51	340.5	3.4	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor			0	11
white ash	Fraxinus americana	WDL	Medium	55.3	319.0	3.3	No change	Sm. inc.	Low	Common	Poor	Fair			1	12
blackgum	Nyssa sylvatica	WDL	Medium	62.8	317.2	2.9	No change	Sm. inc.	High	Common	Good	Very Good			1	13
northern red oak	Quercus rubra	WDH	Medium	57.5	313.9	3.3	Sm. inc.	No change	High	Common	Very Good	Good			1	14
black locust	Robinia pseudoacacia	NDH	Low	47.6	299.4	3.8	Lg. dec.	No change	Medium	Common	Poor	Fair			1	15
sassafras	Sassafras albidum	WSL	Low	57.9	278.1	2.9	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor			0	16
black cherry	Prunus serotina	WDL	Medium	44.7	243.6	3.5	Sm. inc.	Sm. inc.	Low	Common	Fair	Fair			1	17
American elm	Ulmus americana	WDH	Medium	39.4	241.3	3.9	No change	Sm. inc.	Medium	Common	Fair	Good			1	18
shagbark hickory	Carya ovata	WSL	Medium	61.2	237.3	2.3	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor			0	19
sycamore	Platanus occidentalis	NSL	Low	28.3	212.6	4.7	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	20
sourwood	Oxydendrum arboreum	NDL	High	51.9	204.6	2.3	Sm. dec.	Lg. dec.	High	Common	Fair	Fair			1	21
black walnut	Juglans nigra	WDH	Low	32.5	147.9	3.3	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	22
eastern redbud	Cercis canadensis	NSL	Low	43.2	140.2	1.7	Sm. dec.	No change	Medium	Common	Poor	Fair			1	23
flowering dogwood	Cornus florida	WDL	Medium	41.7	133.6	2.0	No change	No change	Medium	Common	Fair	Fair			1	24
slippery elm	Ulmus rubra	WSL	Low	44.5	117.5	1.7	No change	Sm. inc.	Medium	Common	Fair	Good			1	25
boxelder	Acer negundo	WSH	Low	14.4	102.4	4.6	No change	Lg. inc.	High	Common	Good	Very Good			1	26
yellow buckeye	Aesculus flava	NSL	Low	23	94.0	3.3	Lg. dec.	Lg. dec.	Low	Common	Very Poor	Very Poor			0	27
bitternut hickory	Carya cordiformis	WSL	Low	27.1	92.8	2.0	Sm. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	28
post oak	Quercus stellata	WDH	High	15	83.0	2.9	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good	Infill ++	Infill ++	1	29
silver maple	Acer saccharinum	NSH	Low	5.5	82.3	12.4	Sm. dec.	Sm. dec.	High	Common	Fair	Fair		Infill +	1	30
bigtooth aspen	Populus grandidentata	NSL	Medium	16.1	79.2	3.0	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	31
ailanthus	Ailanthus altissima	NSL	FIA	9.4	72.4	4.8	Unknown	Unknown	NA	Common	NNIS	NNIS			0	32
pitch pine	Pinus rigida	NSH	High	12.8	63.1	2.8	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	33
green ash	Fraxinus pennsylvanica	WSH	Low	18	56.6	2.2	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	34
American hornbeam; muscley	Carpinus caroliniana	WSL	Low	29	55.1	1.3	Sm. dec.	Sm. inc.	Medium	Common	Poor	Good			1	35
eastern hemlock	Tsuga canadensis	NSH	High	3.6	45.6	5.2	Lg. dec.	Lg. dec.	Low	Rare	Very Poor	Very Poor			2	36
shortleaf pine	Pinus echinata	WDH	High	12.7	43.7	2.6	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	1	37
American basswood	Tilia americana	WSL	Medium	11.2	43.5	1.7	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	38
loblolly pine	Pinus taeda	WDH	High	3.6	37.9	6.0	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	2	39
common persimmon	Diospyros virginiana	NSL	Low	15	37.2	1.3	Lg. inc.	Lg. inc.	High	Rare	Good	Good			1	40
sweet birch	Betula lenta	NDH	High	5.4	34.5	2.2	Sm. dec.	Sm. dec.	Low	Rare	Very Poor	Very Poor			0	41
sweetgum	Liquidambar styraciflua	WDH	High	3.2	24.1	7.6	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	2	42
eastern redcedar	Juniperus virginiana	WDH	Medium	12.4	22.8	1.5	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			1	43
red pine	Pinus resinosa	NSH	Medium	1.1	22.4	21.1	Lg. dec.	Lg. dec.	Low	Rare	Very Poor	Very Poor			0	44
river birch	Betula nigra	NSL	Low	3	22.2	6.2	Sm. dec.	No change	Medium	Rare	Very Poor	Poor		Infill +	1	45
cucumbertree	Magnolia acuminata	NSL	Low	5.3	21.4	2.0	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	46
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	14.7	20.6	0.9	Lg. inc.	Lg. inc.	High	Rare	Good	Good			1	47



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shellbark hickory	Carya laciniosa	NSL	Low	8.3	20.6	2.4	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	48
pawpaw	Asimina triloba	NSL	Low	7.4	18.6	0.9	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	49
Osage-orange	Maclura pomifera	NDH	Medium	0.7	18.5	11.1	Sm. dec.	Sm. inc.	High	Rare	Poor	Good			2	50
hackberry	Celtis occidentalis	WDH	Medium	6.8	13.9	1.3	No change	Sm. inc.	High	Rare	Fair	Good	Infill +	Infill ++	2	51
serviceberry	Amelanchier spp.	NSL	Low	9.8	13.5	0.5	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	52
red mulberry	Morus rubra	NSL	Low	3.4	12.6	2.1	Lg. dec.	No change	Medium	Rare	Very Poor	Poor		Infill +	1	53
eastern white pine	Pinus strobus	WDH	High	4.6	12.2	2.2	Very Lg. dec.	Very Lg. dec.	Low	Rare	Lost	Lost			0	54
chinkapin oak	Quercus muehlenbergii	NSL	Medium	5.7	9.3	1.0	Sm. inc.	Sm. inc.	Medium	Rare	Fair	Fair	Infill +	Infill +	2	55
white mulberry	Morus alba	NSL	FIA	1.9	9.2	3.7	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	56
shingle oak	Quercus imbricaria	NDH	Medium	5.1	8.3	1.1	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	57
black willow	Salix nigra	NSH	Low	1.7	8.1	3.4	Sm. dec.	Lg. inc.	Low	Rare	Very Poor	Fair		Infill +	2	58
Norway spruce	Picea abies	NSH	FIA	0.8	7.9	5.3	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	59
butternut	Juglans cinerea	NSLX	FIA	3	6.7	2.1	Unknown	Unknown	Low	Rare	FIA Only	FIA Only			0	60
Scots pine	Pinus sylvestris	NSH	FIA	1.1	4.1	3.9	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	61
Ohio buckeye	Aesculus glabra	NSL	Low	2	3.6	0.7	Lg. dec.	Very Lg. dec.	Medium	Rare	Very Poor	Lost			0	62
honeylocust	Gleditsia triacanthos	NSH	Low	1.2	3.5	0.9	Sm. inc.	Lg. inc.	High	Rare	Good	Good			2	63
southern red oak	Quercus falcata	WDL	Medium	1.2	2.4	0.7	Lg. inc.	Lg. inc.	High	Rare	Good	Good			2	64
sugarberry	Celtis laevigata	NDH	Medium	0.3	1.6	0.4	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	65
blue ash	Fraxinus quadrangulata	NSL	Low	0.1	1.6	0.2	Sm. dec.	Sm. dec.	Low	Rare	Very Poor	Very Poor			0	66
pin oak	Quercus palustris	NSH	Low	1.1	1.2	1.2	Sm. inc.	Lg. inc.	Low	Rare	Poor	Fair		Infill +	2	67
paulownia	Paulownia tomentosa	NSL	FIA	1.1	1.0	1.0	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	68
Atlantic white-cedar	Chamaecyparis thyoides	NSH	Low	1.1	1.0	0.9	Lg. dec.	Very Lg. dec.	Low	Rare	Very Poor	Lost			0	69
quaking aspen	Populus tremuloides	WDH	High	0.4	0.9	0.3	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	70
yellow birch	Betula alleghaniensis	NDL	High	0.5	0.3	0.1	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	71
American chestnut	Castanea dentata	NSLX	FIA	0.9	0.3	0.3	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	72
red spruce	Picea rubens	NDH	High	0	0	0	Unknown	Unknown	Low	Absent	Unknown	Unknown			0	73
slash pine	Pinus elliotii	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	74
longleaf pine	Pinus palustris	NSH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	75
florida maple	Acer barbatum	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	76
black maple	Acer nigrum	NSH	Low	0	0	0	Unknown	Unknown	High	Absent	Unknown	Unknown			0	77
striped maple	Acer pensylvanicum	NSL	Medium	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	78
mountain maple	Acer spicatum	NSL	Low	0	0	0	Unknown	Unknown	High	Absent	Unknown	Unknown			0	79
cittamwood/gum bumelia	Sideroxylon lanuginosum ssp.	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			3	80
pecan	Carya illinoensis	NSH	Low	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat		Migrate +	3	81
black hickory	Carya texana	NDL	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	82
American holly	Ilex opaca	NSL	Medium	0	0	0	Unknown	New Habitat	Medium	Absent	Unknown	New Habitat		Likely +	3	83
swamp tupelo	Nyssa biflora	NDH	Medium	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat			3	84
redbay	Persea borbonia	NSL	Low	0	0	0	Unknown	Unknown	High	Absent	Unknown	Unknown			0	85
pin cherry	Prunus pensylvanica	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	86
blackjack oak	Quercus marilandica	NSL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	87
water oak	Quercus nigra	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	88
willow oak	Quercus phellos	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	89
Shumard oak	Quercus shumardii	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate +	3	90
live oak	Quercus virginiana	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	91
bluejack oak	Quercus incana	NSL	Low	0	0	0	Unknown	New Habitat	Medium	Absent	Unknown	New Habitat		Migrate +	3	92
winged elm	Ulmus alata	WDL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	93
cedar elm	Ulmus crassifolia	NDH	Medium	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat			0	94

