

HUC 050902 Middle Ohio-Little Miami

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	13,645	5,268.3	283

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	Low	RCP45	RCP85	RCP45	RCP85	RCP45	RCP85
Ash	4			22	27	Increase	21	26	Very Good	9	13
Hickory	5			28	47	No Change	20	12	Good	15	11
Maple	5	Abundant	3	37	18	Decrease	26	29	Fair	14	15
Oak	13	Common	31	9		New	12	13	Poor	13	13
Pine	5	Rare	42			Unknown	17	16	Very Poor	11	10
Other	44	Absent	20	96	92		96	96	FIA Only	5	5
	76		96						Unknown	8	7
										75	74

Potential Changes in Climate Variables

Temperature (°F)

	Scenario	2009	2039	2069	2099	
Annual Average	CCSM45	46.8	47.9	49.6	49.7	
	CCSM85	46.8	48.3	50.1	52.3	
	GFDL45	46.8	48.9	50.6	51.2	
	GFDL85	46.8	48.9	51.3	54.0	
	HAD45	46.8	48.6	51.1	52.0	
	HAD85	46.8	48.9	52.1	55.2	
Growing Season (May—Sep)	CCSM45	57.9	59.1	60.5	60.9	
	CCSM85	57.9	59.5	61.3	64.1	
	GFDL45	57.9	60.4	62.6	63.5	
	GFDL85	57.9	60.6	63.5	66.6	
	HAD45	57.9	60.1	62.5	63.8	
	HAD85	57.9	60.4	64.7	67.8	
Coldest Month (Average)	CCSM45	29.3	30.2	31.3	31.7	
	CCSM85	29.3	31.2	31.8	33.0	
	GFDL45	29.3	31.9	32.2	32.6	
	GFDL85	29.3	31.1	31.9	32.5	
	HAD45	29.3	29.9	31.7	31.7	
	HAD85	29.3	30.8	32.3	33.7	
Warmest Month (Average)	CCSM45	61.7	62.7	63.6	64.0	
	CCSM85	61.7	63.3	64.5	65.9	
	GFDL45	61.7	63.9	65.4	66.0	
	GFDL85	61.7	64.4	66.3	68.0	
	HAD45	61.7	64.3	66.2	67.0	
	HAD85	61.7	65.5	68.6	70.4	

Precipitation (in)

	Scenario	2009	2039	2069	2099	
Annual Total	CCSM45	29.8	30.7	32.7	32.3	
	CCSM85	29.8	31.4	32.4	34.6	
	GFDL45	29.8	33.1	34.4	36.4	
	GFDL85	29.8	31.3	35.3	37.1	
	HAD45	29.8	31.3	32.1	31.6	
	HAD85	29.8	30.9	29.2	31.9	
Growing Season (May—Sep)	CCSM45	13.6	13.6	14.2	14.0	
	CCSM85	13.6	13.2	13.2	13.6	
	GFDL45	13.6	15.1	14.4	15.1	
	GFDL85	13.6	13.8	14.3	14.6	
	HAD45	13.6	14.1	12.5	13.0	
	HAD85	13.6	13.4	11.1	11.5	

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-DGP30 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
sugar maple	Acer saccharum	WDH	High	71.2	830.3	9.4	Sm. dec.	Sm. dec.	High	Abundant	Good	Good			1	1
white ash	Fraxinus americana	WDL	Medium	78.2	789.2	8.7	Sm. dec.	Sm. dec.	Low	Abundant	Fair	Fair			0	2
eastern redcedar	Juniperus virginiana	WDH	Medium	46.7	653.5	10.7	Sm. inc.	Sm. inc.	Medium	Abundant	Very Good	Very Good			1	3
red maple	Acer rubrum	WDH	High	37.1	475.2	10.2	Lg. dec.	Sm. dec.	High	Common	Fair	Fair			1	4
black walnut	Juglans nigra	WDH	Low	65.9	460.6	5.5	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor			0	5
black locust	Robinia pseudoacacia	NDH	Low	52.9	359.1	5.5	Sm. dec.	No change	Medium	Common	Poor	Fair			1	6
American elm	Ulmus americana	WDH	Medium	67.1	327.4	3.7	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	7
white oak	Quercus alba	WDH	Medium	36.6	312.1	6.0	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	8
yellow-poplar	Liriodendron tulipifera	WDH	High	31.5	304.0	5.8	Sm. dec.	Lg. dec.	High	Common	Fair	Fair			1	9
black cherry	Prunus serotina	WDL	Medium	56.6	286.4	4.3	No change	Sm. dec.	Low	Common	Poor	Poor			0	10
hackberry	Celtis occidentalis	WDH	Medium	50.3	239.7	3.9	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	11
slippery elm	Ulmus rubra	WSL	Low	49.7	228.9	3.2	No change	No change	Medium	Common	Fair	Fair			1	12
chinkapin oak	Quercus muehlenbergii	NSL	Medium	33.6	219.1	3.9	No change	Sm. dec.	Medium	Common	Fair	Poor			1	13
shagbark hickory	Carya ovata	WSL	Medium	43.3	209.2	3.7	No change	No change	Medium	Common	Fair	Fair			1	14
boxelder	Acer negundo	WSH	Low	48.2	202.2	5.1	No change	Sm. inc.	High	Common	Good	Very Good			1	15
Osage-orange	Maclura pomifera	NDH	Medium	24.5	181.0	6.6	No change	Sm. inc.	High	Common	Good	Very Good			1	16
northern red oak	Quercus rubra	WDH	Medium	38	171.3	3.2	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	17
green ash	Fraxinus pennsylvanica	WSH	Low	41.2	164.1	4.6	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	18
sassafras	Sassafras albidum	WSL	Low	29.3	150.3	3.1	No change	Sm. dec.	Medium	Common	Fair	Poor			1	19
chestnut oak	Quercus prinus	NDH	High	9.2	148.4	8.8	No change	Sm. dec.	High	Common	Good	Fair	Infill ++	Infill +	2	20
pignut hickory	Carya glabra	WDL	Medium	36.8	146.3	3.0	No change	No change	Medium	Common	Fair	Fair			1	21
bitternut hickory	Carya cordiformis	WSL	Low	38.7	134.0	3.3	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	22
sycamore	Platanus occidentalis	NSL	Low	29.6	131.4	4.9	Sm. inc.	Lg. inc.	Medium	Common	Good	Very Good			1	23
black oak	Quercus velutina	WDH	High	28	119.2	3.2	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	24
honeylocust	Gleditsia triacanthos	NSH	Low	34.5	110.6	2.7	Sm. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	25
Ohio buckeye	Aesculus glabra	NSL	Low	25.8	105.7	3.0	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	26
mockernut hickory	Carya alba	WDL	Medium	21	96.3	2.8	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	27
scarlet oak	Quercus coccinea	WDL	Medium	22.6	85.9	3.0	Sm. dec.	Lg. dec.	Medium	Common	Poor	Poor	Infill +	Infill +	0	28
American beech	Fagus grandifolia	WDH	High	18.1	80.2	3.4	No change	Sm. dec.	Medium	Common	Fair	Poor	Infill +	Infill +	1	29
eastern redbud	Cercis canadensis	NSL	Low	38.5	77.9	1.5	No change	No change	Medium	Common	Fair	Fair			1	30
blackgum	Nyssa sylvatica	WDL	Medium	18.2	72.2	2.0	No change	Sm. inc.	High	Common	Good	Very Good			1	31
yellow buckeye	Aesculus flava	NSL	Low	8.7	71.2	5.3	Lg. dec.	Lg. dec.	Low	Common	Very Poor	Very Poor			0	32
pin oak	Quercus palustris	NSH	Low	8.6	58.5	6.9	No change	No change	Low	Common	Poor	Poor	Infill +	Infill +	0	33
eastern cottonwood	Populus deltoides	NSH	Low	8.7	56.7	6.1	Sm. dec.	No change	Medium	Common	Poor	Fair	Infill +	Infill +	1	34
shingle oak	Quercus imbricaria	NDH	Medium	8.7	47.2	5.3	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	1	35
shellbark hickory	Carya laciniosa	NSL	Low	5.9	46.4	5.8	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	36
American basswood	Tilia americana	WSL	Medium	19.3	44.2	2.2	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	37
sweetgum	Liquidambar styraciflua	WDH	High	7.3	41.2	2.4	Sm. inc.	Sm. inc.	Medium	Rare	Fair	Fair	Infill +	Infill +	2	38
Shumard oak	Quercus shumardii	NSL	Low	4.3	39.0	2.5	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	2	39
sourwood	Oxydendrum arboreum	NDL	High	8	34.5	2.3	No change	Sm. dec.	High	Rare	Fair	Poor	Infill +	Infill +	2	40
silver maple	Acer saccharinum	NSH	Low	10.7	29.0	4.7	Sm. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	2	41
pawpaw	Asimina triloba	NSL	Low	15.3	26.5	1.1	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	42
white mulberry	Morus alba	NSL	FIA	14.5	26.2	4.4	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	43
black maple	Acer nigrum	NSH	Low	2.4	25.2	3.5	Lg. dec.	Lg. dec.	High	Rare	Poor	Poor			0	44
blue ash	Fraxinus quadrangulata	NSL	Low	11.6	20.5	1.2	Sm. dec.	Sm. dec.	Low	Rare	Very Poor	Very Poor			0	45
ailanthus	Ailanthus altissima	NSL	FIA	9.8	20.0	3.0	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	46
flowering dogwood	Cornus florida	WDL	Medium	19.3	19.1	0.6	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			1	47



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Virginia pine	Pinus virginiana	NDH	High	5.8	17.9	1.5	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	1	48
Norway spruce	Picea abies	NSH	FIA	0.7	17.2	23.5	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	49
bigtooth aspen	Populus grandidentata	NSL	Medium	4.1	13.8	2.8	Very Lg. dec.	Very Lg. dec.	Medium	Rare	Lost	Lost			0	50
sweet birch	Betula lenta	NDH	High	2.1	13.1	5.8	Sm. dec.	Sm. dec.	Low	Rare	Very Poor	Very Poor			2	51
bur oak	Quercus macrocarpa	NDH	Medium	5.9	11.2	1.9	Sm. dec.	No change	High	Rare	Poor	Fair		Infill +	2	52
eastern white pine	Pinus strobus	WDH	High	1.5	10.7	4.0	Very Lg. dec.	Very Lg. dec.	Low	Rare	Lost	Lost			0	53
northern catalpa	Catalpa speciosa	NSHX	FIA	1.6	8.8	2.6	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	54
American hornbeam; musclev	Carpinus caroliniana	WDL	Low	10.7	8.7	0.6	Sm. inc.	Lg. inc.	Medium	Rare	Fair	Good			1	55
shortleaf pine	Pinus echinata	WDH	High	2.6	8.2	0.8	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	56
Kentucky coffeetree	Gymnocladus dioicus	NSLX	FIA	2.3	7.8	2.3	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	57
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	5.3	6.0	0.6	Sm. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	1	58
red mulberry	Morus rubra	NSL	Low	5.2	4.4	1.0	No change	Sm. inc.	Medium	Rare	Poor	Fair	Infill +	Infill +	1	59
black willow	Salix nigra	NSH	Low	3.2	3.6	1.8	No change	Lg. inc.	Low	Rare	Very Poor	Fair		Infill +	2	60
swamp white oak	Quercus bicolor	NSL	Low	0.8	3.4	0.4	Sm. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	61
post oak	Quercus stellata	WDH	High	4.4	3.4	1.3	Lg. inc.	Lg. inc.	High	Rare	Good	Good			2	62
pitch pine	Pinus rigida	NSH	High	1.1	3.3	0.5	Very Lg. dec.	Very Lg. dec.	Medium	Rare	Lost	Lost			0	63
butternut	Juglans cinerea	NSLX	FIA	0.1	2.7	0.7	Unknown	Unknown	Low	Rare	FIA Only	FIA Only			0	64
common persimmon	Diospyros virginiana	NSL	Low	2.2	2.5	1.1	Lg. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	2	65
black ash	Fraxinus nigra	WSH	Medium	1.2	1.9	1.2	Lg. dec.	Sm. dec.	Low	Rare	Very Poor	Very Poor			0	66
serviceberry	Amelanchier spp.	NSL	Low	2.8	1.9	0.4	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	67
eastern hemlock	Tsuga canadensis	NSH	High	0.7	1.7	2.2	Very Lg. dec.	Very Lg. dec.	Low	Rare	Lost	Lost			0	68
mountain or Fraser magnolia	Magnolia fraseri	NSL	Low	0.7	1.4	1.9	Sm. dec.	Sm. dec.	Low	Rare	Very Poor	Very Poor			0	69
wild plum	Prunus americana	NSLX	FIA	0.3	1.2	0.7	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	70
red pine	Pinus resinosa	NSH	Medium	0.7	0.8	1.2	Very Lg. dec.	Very Lg. dec.	Low	Rare	Lost	Lost			0	71
southern red oak	Quercus falcata	WDL	Medium	0.4	0.7	0.6	Lg. inc.	Lg. inc.	High	Rare	Good	Good			2	72
sugarberry	Celtis laevigata	NDH	Medium	0.7	0.7	0.8	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	73
paulownia	Paulownia tomentosa	NSL	FIA	0.5	0.3	0.3	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	74
yellow birch	Betula alleghaniensis	NDL	High	0.4	0.2	0.2	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	75
rock elm	Ulmus thomasii	NSLX	FIA	0.2	0.2	0.1	Unknown	Unknown	Low	Rare	FIA Only	FIA Only			0	76
Atlantic white-cedar	Chamaecyparis thyoides	NSH	Low	0	0	0	Unknown	Unknown	Low	Absent	Unknown	Unknown			0	77
ashe juniper	Juniperus ashei	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	78
red spruce	Picea rubens	NDH	High	0	0	0	Unknown	Unknown	Low	Absent	Unknown	Unknown			0	79
loblolly pine	Pinus taeda	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Likely +	Likely +	3	80
florida maple	Acer barbatum	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +		3	81
striped maple	Acer pensylvanicum	NSL	Medium	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	82
mountain maple	Acer spicatum	NSL	Low	0	0	0	Unknown	Unknown	High	Absent	Unknown	Unknown			0	83
cittamwood/gum bumelia	Sideroxylon lanuginosum ssp.	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			3	84
pecan	Carya illinoensis	NSH	Low	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat		Migrate ++	3	85
black hickory	Carya texana	NDL	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	86
cucumbertree	Magnolia acuminata	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	87
bigleaf magnolia	Magnolia macrophylla	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	88
redbay	Persea borbonia	NSL	Low	0	0	0	Unknown	Unknown	High	Absent	Unknown	Unknown			0	89
pin cherry	Prunus pensylvanica	NSL	Low	0	0	0	Unknown	New Habitat	Medium	Absent	Unknown	New Habitat			3	90
cherrybark oak; swamp red o	Quercus pagoda	NSL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	91
blackjack oak	Quercus marilandica	NSL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	92
water oak	Quercus nigra	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate ++	3	93
live oak	Quercus virginiana	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	94



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winged elm	<i>Ulmus alata</i>	WDL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate ++	Migrate ++	3	95
cedar elm	<i>Ulmus crassifolia</i>	NDH	Medium	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat			0	96