

# HUC 050301 Upper Ohio-Beaver

## 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    17,237    6,655.2    369

#### 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	19	25	Increase	16	19	Very Good	9	10	Likely	2	2
Hickory	4			Medium	29	46	No Change	15	13	Good	12	13	Infill	7	9
Maple	7	Abundant	4	Low	35	14	Decrease	27	26	Fair	7	6	Migrate	7	10
Oak	9	Common	26	FIA	7		New	16	18	Poor	12	12			
Pine	4	Rare	35				Unknown	16	14	Very Poor	15	13			
Other	38	Absent	24							FIA Only	2	2			
	<b>65</b>		<b>89</b>		<b>90</b>	<b>85</b>		<b>90</b>	<b>90</b>	Unknown	9	7			
											<b>66</b>	<b>63</b>			

#### Potential Changes in Climate Variables

##### Temperature (°F)

Scenario	2009	2039	2069	2099		
Annual	CCSM45	46.2	47.6	49.6	49.7	
Average	CCSM85	46.2	48.0	50.0	52.6	
	GFDL45	46.2	48.4	50.8	51.6	
	GFDL85	46.2	48.8	51.7	55.0	
	HAD45	46.2	48.5	51.3	52.5	
	HAD85	46.2	48.7	52.2	56.1	
Growing Season	CCSM45	58.9	60.3	62.1	62.5	
	CCSM85	58.9	60.7	62.7	65.9	
May—Sep	GFDL45	58.9	61.4	64.6	65.7	
	GFDL85	58.9	62.2	65.6	69.4	
	HAD45	58.9	61.6	64.1	65.8	
	HAD85	58.9	61.5	65.9	70.2	
Coldest Month	CCSM45	26.4	27.8	29.2	29.5	
	CCSM85	26.4	28.6	29.6	31.0	
Average	GFDL45	26.4	28.9	29.6	30.2	
	GFDL85	26.4	29.0	30.0	31.2	
	HAD45	26.4	27.3	29.5	29.6	
	HAD85	26.4	28.1	29.9	31.9	
Warmest Month	CCSM45	63.4	64.9	66.0	66.3	
	CCSM85	63.4	65.5	66.7	68.6	
Average	GFDL45	63.4	65.9	67.6	68.5	
	GFDL85	63.4	66.9	68.8	71.0	
	HAD45	63.4	66.4	68.2	69.4	
	HAD85	63.4	67.1	70.1	73.0	

##### Precipitation (in)

Scenario	2009	2039	2069	2099		
Annual	CCSM45	31.3	32.8	32.3	33.8	
Total	CCSM85	31.3	32.5	33.6	35.1	
	GFDL45	31.3	34.5	36.0	36.4	
	GFDL85	31.3	32.7	36.6	37.7	
	HAD45	31.3	32.4	32.8	32.4	
	HAD85	31.3	33.1	30.7	32.9	
Growing Season	CCSM45	15.1	15.8	15.3	15.8	
	CCSM85	15.1	15.0	15.5	15.2	
May—Sep	GFDL45	15.1	16.5	16.5	16.5	
	GFDL85	15.1	15.2	16.1	16.2	
	HAD45	15.1	15.8	14.2	14.6	
	HAD85	15.1	15.5	12.9	13.3	

**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
red maple	Acer rubrum	WDH	High	76	1809.0	17.1	Lg. dec.	Lg. dec.	High	Abundant	Good	Good			1	1
black cherry	Prunus serotina	WDL	Medium	83.8	1752.5	16.4	Lg. dec.	Lg. dec.	Low	Abundant	Poor	Poor			0	2
sugar maple	Acer saccharum	WDH	High	48.4	714.5	10.9	No change	No change	High	Abundant	Very Good	Very Good			1	3
American elm	Ulmus americana	WDH	Medium	61	570.1	7.3	No change	No change	Medium	Abundant	Good	Good			1	4
white ash	Fraxinus americana	WDL	Medium	54.9	499.0	7.1	No change	No change	Low	Common	Poor	Poor			0	5
black locust	Robinia pseudoacacia	NDH	Low	33.6	442.9	9.9	Sm. dec.	No change	Medium	Common	Poor	Fair			1	6
northern red oak	Quercus rubra	WDH	Medium	52.5	365.0	5.1	No change	No change	High	Common	Good	Good			1	7
American beech	Fagus grandifolia	WDH	High	35	269.4	6.4	No change	Sm. dec.	Medium	Common	Fair	Poor			1	8
yellow-poplar	Liriodendron tulipifera	WDH	High	30.9	242.4	5.9	Lg. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	9
shagbark hickory	Carya ovata	WSL	Medium	32.6	227.1	4.9	No change	No change	Medium	Common	Fair	Fair			1	10
white oak	Quercus alba	WDH	Medium	28	225.5	5.3	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	11
slippery elm	Ulmus rubra	WSL	Low	34	197.3	4.3	No change	No change	Medium	Common	Fair	Fair			1	12
pin oak	Quercus palustris	NSH	Low	16.2	189.4	10.9	Sm. dec.	Sm. dec.	Low	Common	Poor	Poor	Infill +	Infill +	0	13
black walnut	Juglans nigra	WDH	Low	25.7	170.8	5.8	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	14
sassafras	Sassafras albidum	WSL	Low	28.4	156.4	4.2	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	15
bigtooth aspen	Populus grandidentata	NSL	Medium	16.8	144.9	6.2	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	16
black willow	Salix nigra	NSH	Low	6.3	137.5	17.7	Lg. dec.	Sm. dec.	Low	Common	Very Poor	Poor			0	17
black oak	Quercus velutina	WDH	High	16.3	120.9	4.4	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	18
blackgum	Nyssa sylvatica	WDL	Medium	21.4	101.6	2.6	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	19
silver maple	Acer saccharinum	NSH	Low	5.1	97.2	12.2	No change	No change	High	Common	Good	Good	Infill ++	Infill ++	1	20
bitternut hickory	Carya cordiformis	WSL	Low	25.8	91.4	2.9	Sm. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	21
green ash	Fraxinus pennsylvanica	WSH	Low	19	90.7	3.9	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	22
boxelder	Acer negundo	WSH	Low	10.7	84.3	6.4	Sm. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	23
eastern white pine	Pinus strobus	WDH	High	6	83.8	11.3	Sm. dec.	Lg. dec.	Low	Common	Poor	Very Poor			0	24
ailanthus	Ailanthus altissima	NSL	FIA	12.6	82.7	4.1	Unknown	Unknown	NA	Common	NNIS	NNIS			0	25
quaking aspen	Populus tremuloides	WDH	High	11.3	74.5	4.5	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	26
Scots pine	Pinus sylvestris	NSH	FIA	5.1	73.8	11.2	Unknown	Unknown	NA	Common	NNIS	NNIS			0	27
American basswood	Tilia americana	WSL	Medium	14.7	72.0	3.5	Sm. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	28
sycamore	Platanus occidentalis	NSL	Low	8.7	56.3	5.5	No change	Sm. inc.	Medium	Common	Fair	Good			1	29
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	19.8	55.3	2.2	No change	Sm. inc.	High	Common	Good	Very Good			1	30
American hornbeam; muscle	Carpinus caroliniana	WSL	Low	11.5	49.4	1.8	Lg. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	31
pignut hickory	Carya glabra	WDL	Medium	14.5	44.5	2.9	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			1	32
shingle oak	Quercus imbricaria	NDH	Medium	9.8	42.4	4.3	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	1	33
cucumbertree	Magnolia acuminata	NSL	Low	11.2	37.1	2.9	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	34
mockernut hickory	Carya alba	WDL	Medium	8	35.5	2.8	Sm. inc.	Sm. inc.	High	Rare	Good	Good			1	35
scarlet oak	Quercus coccinea	WDL	Medium	6.2	34.8	2.1	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	1	36
Norway spruce	Picea abies	NSH	FIA	2.3	33.3	10.2	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	37
swamp white oak	Quercus bicolor	NSL	Low	9.1	31.3	3.3	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	38
chestnut oak	Quercus prinus	NDH	High	3.8	29.8	3.4	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	2	39
eastern hemlock	Tsuga canadensis	NSH	High	2	28.2	7.8	Lg. dec.	Lg. dec.	Low	Rare	Very Poor	Very Poor			0	40
eastern cottonwood	Populus deltoides	NSH	Low	5.2	26.5	4.6	Sm. dec.	No change	Medium	Rare	Very Poor	Poor		Infill +	1	41
yellow birch	Betula alleghaniensis	NDL	High	4.6	25.4	6.5	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	42
gray birch	Betula populifolia	NSL	Low	0.6	24.7	42.5	Very Lg. dec.	Very Lg. dec.	Medium	Rare	Lost	Lost			0	43
hackberry	Celtis occidentalis	WDH	Medium	9.3	22.3	2.2	Sm. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	1	44
Osage-orange	Maclura pomifera	NDH	Medium	2.9	21.9	5.8	No change	Sm. inc.	High	Rare	Fair	Good	Infill +	Infill ++	2	45
serviceberry	Amelanchier spp.	NSL	Low	7.1	20.0	2.3	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	46
sweet birch	Betula lenta	NDH	High	6.5	19.6	5.3	Lg. dec.	Lg. dec.	Low	Rare	Very Poor	Very Poor			0	47

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black maple	Acer nigrum	NSH	Low	4.2	15.8	3.2	Lg. dec.	Lg. dec.	High	Rare	Poor	Poor			0	48
yellow buckeye	Aesculus flava	NSL	Low	2.2	12.0	3.3	Sm. dec.	Sm. dec.	Low	Rare	Very Poor	Very Poor			0	49
chokecherry	Prunus virginiana	NSLX	FIA	1.4	11.9	6.7	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	50
flowering dogwood	Cornus florida	WDL	Medium	7.2	11.2	0.6	No change	Sm. inc.	Medium	Rare	Poor	Fair			1	51
red pine	Pinus resinosa	NSH	Medium	0.6	9.3	4.0	Very Lg. dec.	Very Lg. dec.	Low	Rare	Lost	Lost			0	52
butternut	Juglans cinerea	NSLX	FIA	1.9	9.0	3.5	Unknown	Unknown	Low	Rare	FIA Only	FIA Only			0	53
Norway maple	Acer platanoides	NSL	FIA	1.8	6.2	1.7	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	54
Ohio buckeye	Aesculus glabra	NSL	Low	1.7	5.7	3.3	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			2	55
pawpaw	Asimina triloba	NSL	Low	2.4	4.4	1.1	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	56
pitch pine	Pinus rigida	NSH	High	0.6	4.2	7.2	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	57
sourwood	Oxydendrum arboreum	NDL	High	0.7	2.8	2.0	Sm. inc.	No change	High	Rare	Good	Fair	Infill +		2	58
striped maple	Acer pensylvanicum	NSL	Medium	0.6	2.3	3.9	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	59
red mulberry	Morus rubra	NSL	Low	1.2	2.0	1.8	Sm. inc.	Lg. inc.	Medium	Rare	Fair	Good			2	60
eastern redbud	Cercis canadensis	NSL	Low	0	2.0	0.2	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	61
chinkapin oak	Quercus muehlenbergii	NSL	Medium	0.8	1.9	1.4	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	62
black ash	Fraxinus nigra	WSH	Medium	1	1.1	0.5	Lg. dec.	Very Lg. dec.	Low	Rare	Very Poor	Lost			0	63
pin cherry	Prunus pensylvanica	NSL	Low	1	1.1	0.9	Very Lg. dec.	Very Lg. dec.	Medium	Rare	Lost	Lost			0	64
white mulberry	Morus alba	NSL	FIA	0.6	0.3	0.4	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	65
Atlantic white-cedar	Chamaecyparis thyoides	NSH	Low	0	0	0	Unknown	Unknown	Low	Absent	Unknown	Unknown			0	66
eastern redcedar	Juniperus virginiana	WDH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate ++	Migrate ++	3	67
jack pine	Pinus banksiana	NSH	Medium	0	0	0	Unknown	Unknown	High	Absent	Unknown	Unknown			0	68
shortleaf pine	Pinus echinata	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	69
loblolly pine	Pinus taeda	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate ++	3	70
Virginia pine	Pinus virginiana	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Likely +	Likely +	3	71
florida maple	Acer barbatum	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate +	3	72
mountain maple	Acer spicatum	NSL	Low	0	0	0	Unknown	Unknown	High	Absent	Unknown	Unknown			0	73
pecan	Carya illinoensis	NSH	Low	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat			3	74
black hickory	Carya texana	NDL	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	75
sugarberry	Celtis laevigata	NDH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	76
common persimmon	Diospyros virginiana	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	77
honeylocust	Gleditsia triacanthos	NSH	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Likely +	Likely +	3	78
loblolly-bay	Gordonia lasianthus	NSH	Medium	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	79
American holly	Ilex opaca	NSL	Medium	0	0	0	Unknown	Unknown	Medium	Modeled	Unknown	Unknown			0	80
sweetgum	Liquidambar styraciflua	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate ++	3	81
bigleaf magnolia	Magnolia macrophylla	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	82
mountain or Fraser magnolia	Magnolia fraseri	NSL	Low	0	0	0	Unknown	Unknown	Low	Absent	Unknown	Unknown			0	83
southern red oak	Quercus falcata	WDL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	84
cherrybark oak; swamp red o.	Quercus pagoda	NSL	Medium	0	0	0	Unknown	New Habitat	Medium	Absent	Unknown	New Habitat			3	85
blackjack oak	Quercus marilandica	NSL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			3	86
Shumard oak	Quercus shumardii	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	87
post oak	Quercus stellata	WDH	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate ++	Migrate ++	3	88
bluejack oak	Quercus incana	NSL	Low	0	0	0	Unknown	New Habitat	Medium	Absent	Unknown	New Habitat			0	89
winged elm	Ulmus alata	WDL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	90

