

HUC 050302 Upper Ohio-Little Kanawha

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	17,450	6,737.6	521

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	2			High	21	27	Increase	16	23	Very Good	5	6
Hickory	5			Medium	27	49	No Change	17	12	Good	18	22
Maple	6	Abundant	4	Low	38	14	Decrease	36	34	Fair	9	8
Oak	11	Common	29	FIA	9		New	13	13	Poor	15	10
Pine	6	Rare	45				Unknown	13	13	Very Poor	22	23
Other	48	Absent	17							FIA Only	4	4
	78		95		95	90		95	95	Unknown	4	4
											77	77

Potential Changes in Climate Variables

Temperature (°F)

	Scenario	2009	2039	2069	2099	
Annual Average	CCSM45	47.6	49.0	50.9	51.0	
	CCSM85	47.6	49.4	51.3	53.8	
	GFDL45	47.6	49.8	52.0	52.7	
	GFDL85	47.6	50.1	52.8	56.0	
	HAD45	47.6	49.7	52.4	53.4	
HAD85	47.6	50.0	53.4	56.8		
Growing Season (May—Sep)	CCSM45	59.6	61.0	62.8	63.2	
	CCSM85	59.6	61.4	63.4	66.5	
	GFDL45	59.6	62.0	65.0	66.0	
	GFDL85	59.6	62.7	66.1	69.6	
	HAD45	59.6	62.1	64.7	66.1	
HAD85	59.6	62.3	66.7	70.4		
Coldest Month (Average)	CCSM45	29.1	30.4	31.6	31.9	
	CCSM85	29.1	31.3	32.1	33.3	
	GFDL45	29.1	31.8	32.3	32.9	
	GFDL85	29.1	31.3	32.1	33.0	
	HAD45	29.1	29.7	31.5	31.6	
HAD85	29.1	30.4	31.8	33.4		
Warmest Month (Average)	CCSM45	63.7	65.2	66.2	66.5	
	CCSM85	63.7	65.6	66.9	68.5	
	GFDL45	63.7	66.3	68.0	68.9	
	GFDL85	63.7	67.2	69.3	71.3	
	HAD45	63.7	66.7	68.6	69.6	
HAD85	63.7	67.6	70.7	73.1		

Precipitation (in)

	Scenario	2009	2039	2069	2099	
Annual Total	CCSM45	33.0	35.3	35.8	36.7	
	CCSM85	33.0	35.4	36.7	39.2	
	GFDL45	33.0	36.1	37.0	38.7	
	GFDL85	33.0	34.1	37.8	39.2	
	HAD45	33.0	34.2	34.3	34.0	
HAD85	33.0	34.3	32.2	34.3		
Growing Season (May—Sep)	CCSM45	15.3	16.4	16.4	16.8	
	CCSM85	15.3	15.8	15.9	16.5	
	GFDL45	15.3	16.6	16.1	16.8	
	GFDL85	15.3	15.1	15.7	16.0	
	HAD45	15.3	16.4	14.2	14.9	
HAD85	15.3	15.5	13.3	14.0		

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
sugar maple	Acer saccharum	WDH	High	89.1	1208.3	9.2	Sm. dec.	Sm. dec.	High	Abundant	Good	Good			1	1
red maple	Acer rubrum	WDH	High	84.4	1124.1	8.9	Sm. dec.	Lg. dec.	High	Abundant	Good	Good			1	2
yellow-poplar	Liriodendron tulipifera	WDH	High	79	959.3	8.4	Sm. dec.	Lg. dec.	High	Abundant	Good	Good			1	3
white oak	Quercus alba	WDH	Medium	78.1	949.0	9.1	No change	No change	High	Abundant	Very Good	Very Good			1	4
white ash	Fraxinus americana	WDL	Medium	73.2	493.2	4.7	No change	No change	Low	Common	Poor	Poor			0	5
black oak	Quercus velutina	WDH	High	69	432.5	4.3	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	6
chestnut oak	Quercus prinus	NDH	High	48.1	425.8	5.7	Sm. dec.	Sm. dec.	High	Common	Fair	Fair			1	7
northern red oak	Quercus rubra	WDH	Medium	66.3	419.1	4.5	No change	No change	High	Common	Good	Good			1	8
pignut hickory	Carya glabra	WDL	Medium	72.4	395.3	4.0	No change	Sm. dec.	Medium	Common	Fair	Poor			1	9
black cherry	Prunus serotina	WDL	Medium	58.1	368.8	4.0	No change	No change	Low	Common	Poor	Poor			0	10
black locust	Robinia pseudoacacia	NDH	Low	45.1	366.9	4.9	Sm. dec.	No change	Medium	Common	Poor	Fair			1	11
American beech	Fagus grandifolia	WDH	High	63.4	362.8	4.2	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor			0	12
American elm	Ulmus americana	WDH	Medium	56.3	349.9	4.8	No change	Sm. inc.	Medium	Common	Fair	Good			1	13
mockernut hickory	Carya alba	WDL	Medium	56.6	321.0	4.0	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	14
shagbark hickory	Carya ovata	WSL	Medium	58.4	306.0	3.8	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor			0	15
sassafras	Sassafras albidum	WSL	Low	58.3	298.5	3.2	No change	No change	Medium	Common	Fair	Fair			1	16
Virginia pine	Pinus virginiana	NDH	High	32.9	262.1	7.0	No change	Sm. dec.	Medium	Common	Fair	Poor			1	17
black walnut	Juglans nigra	WDH	Low	50	236.4	3.1	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	18
slippery elm	Ulmus rubra	WSL	Low	51.1	205.8	2.7	No change	Sm. inc.	Medium	Common	Fair	Good			1	19
sycamore	Platanus occidentalis	NSL	Low	35.7	186.4	3.8	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	20
yellow buckeye	Aesculus flava	NSL	Low	31.4	165.6	4.5	Lg. dec.	Lg. dec.	Low	Common	Very Poor	Very Poor			0	21
scarlet oak	Quercus coccinea	WDL	Medium	29.2	153.3	3.9	No change	No change	Medium	Common	Fair	Fair			1	22
eastern white pine	Pinus strobus	WDH	High	11.4	150.5	10.6	Lg. dec.	Lg. dec.	Low	Common	Very Poor	Very Poor			0	23
blackgum	Nyssa sylvatica	WDL	Medium	52	149.4	2.0	Sm. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	24
bigtooth aspen	Populus grandidentata	NSL	Medium	20	134.4	4.6	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	25
boxelder	Acer negundo	WSH	Low	23.4	113.4	3.8	No change	Lg. inc.	High	Common	Good	Very Good			1	26
bitternut hickory	Carya cordiformis	WSL	Low	27.4	93.7	2.3	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	27
American basswood	Tilia americana	WSL	Medium	22.9	89.5	3.0	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	28
sourwood	Oxydendrum arboreum	NDL	High	26.5	80.5	2.3	No change	Sm. dec.	High	Common	Good	Fair			1	29
loblolly pine	Pinus taeda	WDH	High	4.6	60.2	13.1	No change	Lg. inc.	Medium	Rare	Poor	Good	Infill +	Infill ++	1	30
American hornbeam; musclev	Carpinus caroliniana	WSL	Low	28.2	60.1	1.3	Sm. dec.	No change	Medium	Common	Poor	Fair			1	31
sweet birch	Betula lenta	NDH	High	9.2	58.6	3.1	Sm. dec.	Lg. dec.	Low	Common	Poor	Very Poor	Infill +		0	32
ailanthus	Ailanthus altissima	NSL	FIA	15.8	56.6	2.5	Unknown	Unknown	NA	Common	NNIS	NNIS			0	33
flowering dogwood	Cornus florida	WDL	Medium	38.3	56.3	1.0	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	34
silver maple	Acer saccharinum	NSH	Low	4.5	46.4	9.9	Sm. dec.	No change	High	Rare	Poor	Fair		Infill +	1	35
pitch pine	Pinus rigida	NSH	High	10.1	44.3	3.9	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	36
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	29.8	42.4	0.9	No change	Sm. inc.	High	Rare	Fair	Good			1	37
cucumbertree	Magnolia acuminata	NSL	Low	13.3	39.2	2.0	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	38
eastern redbud	Cercis canadensis	NSL	Low	20.7	36.6	1.2	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			1	39
pawpaw	Asimina triloba	NSL	Low	15.2	34.5	1.8	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	40
Osage-orange	Maclura pomifera	NDH	Medium	3.3	32.4	3.1	Sm. dec.	No change	High	Rare	Poor	Fair	Infill +	Infill +	2	41
Siberian elm	Ulmus pumila	NDH	FIA	0.2	24.6	14.5	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	42
eastern hemlock	Tsuga canadensis	NSH	High	2.6	24.5	2.7	No change	Sm. dec.	Low	Rare	Very Poor	Very Poor			2	43
hackberry	Celtis occidentalis	WDH	Medium	7.4	22.7	1.8	Sm. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	1	44
green ash	Fraxinus pennsylvanica	WSH	Low	10.7	20.7	1.4	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			1	45
wild plum	Prunus americana	NSLX	FIA	1.1	20.3	15.7	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	46
common persimmon	Diospyros virginiana	NSL	Low	8.5	19.3	1.9	No change	Lg. inc.	High	Rare	Fair	Good			1	47

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black willow	Salix nigra	NSH	Low	2.5	18.9	4.3	Sm. dec.	No change	Low	Rare	Very Poor	Very Poor			0	48
honeylocust	Gleditsia triacanthos	NSH	Low	3.1	17.5	3.0	Sm. dec.	Lg. inc.	High	Rare	Poor	Good	Infill +	Infill ++	2	49
river birch	Betula nigra	NSL	Low	2.2	12.4	2.4	Lg. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			2	50
eastern redcedar	Juniperus virginiana	WDH	Medium	3.7	12.3	1.8	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	2	51
chinkapin oak	Quercus muehlenbergii	NSL	Medium	2.1	12.3	3.5	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	2	52
Ohio buckeye	Aesculus glabra	NSL	Low	6.2	12.1	1.6	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	53
black maple	Acer nigrum	NSH	Low	5.4	10.8	1.4	Lg. dec.	Lg. dec.	High	Rare	Poor	Poor			0	54
post oak	Quercus stellata	WDH	High	3.6	7.6	1.6	Lg. inc.	Lg. inc.	High	Rare	Good	Good			2	55
shellbark hickory	Carya laciniosa	NSL	Low	0.6	5.9	10.3	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	56
serviceberry	Amelanchier spp.	NSL	Low	6.8	5.6	0.8	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	57
eastern cottonwood	Populus deltoides	NSH	Low	1.7	5.1	3.0	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			2	58
yellow birch	Betula alleghaniensis	NDL	High	0.3	5.1	0.9	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	59
Scots pine	Pinus sylvestris	NSH	FIA	0.6	4.5	7.9	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	60
shingle oak	Quercus imbricaria	NDH	Medium	1.4	4.4	2.1	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	61
quaking aspen	Populus tremuloides	WDH	High	0.9	4.0	3.4	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	62
sweetgum	Liquidambar styraciflua	WDH	High	1.6	3.2	4.7	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	63
swamp white oak	Quercus bicolor	NSL	Low	1.1	3.1	2.7	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	64
mountain or Fraser magnolia	Magnolia fraseri	NSL	Low	0.8	2.2	0.4	No change	No change	Low	Rare	Very Poor	Very Poor			0	65
shortleaf pine	Pinus echinata	WDH	High	1.1	2.1	1.9	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	66
paulownia	Paulownia tomentosa	NSL	FIA	1.4	1.6	0.7	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	67
striped maple	Acer pensylvanicum	NSL	Medium	0.8	1.5	0.3	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	68
southern red oak	Quercus falcata	WDL	Medium	0.6	1.5	2.5	Lg. inc.	Lg. inc.	High	Rare	Good	Good			2	69
butternut	Juglans cinerea	NSLX	FIA	1.1	1.0	0.4	Unknown	Unknown	Low	Rare	FIA Only	FIA Only			0	70
chokecherry	Prunus virginiana	NSLX	FIA	0.7	0.8	0.4	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	71
white mulberry	Morus alba	NSL	FIA	1.1	0.8	0.7	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	72
pin cherry	Prunus pensylvanica	NSL	Low	0.6	0.6	1.1	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	73
northern catalpa	Catalpa speciosa	NSHX	FIA	0.6	0.6	1.0	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	74
bald cypress	Taxodium distichum	NSH	Medium	0.6	0.6	1.0	Sm. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	75
red spruce	Picea rubens	NDH	High	0.6	0.5	0.9	Sm. dec.	Sm. dec.	Low	Rare	Very Poor	Very Poor			0	76
bur oak	Quercus macrocarpa	NDH	Medium	0.6	0.3	0.5	Lg. dec.	Lg. dec.	High	Rare	Poor	Poor			0	77
American holly	Ilex opaca	NSL	Medium	0.2	0.2	0.2	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	78
Atlantic white-cedar	Chamaecyparis thyoides	NSH	Low	0	0	0	New Habitat	Unknown	Low	Absent	New Habitat	Unknown			3	79
florida maple	Acer barbatum	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	80
mountain maple	Acer spicatum	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			3	81
cittamwood/gum bumelia	Sideroxylon lanuginosum ssp.	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			3	82
pecan	Carya illinoensis	NSH	Low	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat		Migrate ++	3	83
black hickory	Carya texana	NDL	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	84
sugarberry	Celtis laevigata	NDH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	85
black ash	Fraxinus nigra	WSH	Medium	0	0	0	Unknown	Unknown	Low	Absent	Unknown	Unknown			0	86
bigleaf magnolia	Magnolia macrophylla	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	87
red mulberry	Morus rubra	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Likely +	Likely +	3	88
redbay	Persea borbonia	NSL	Low	0	0	0	Unknown	Unknown	High	Absent	Unknown	Unknown			0	89
blackjack oak	Quercus marilandica	NSL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	90
water oak	Quercus nigra	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	91
pin oak	Quercus palustris	NSH	Low	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat	Likely +	Likely +	3	92
Shumard oak	Quercus shumardii	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate +	3	93
bluejack oak	Quercus incana	NSL	Low	0	0	0	Unknown	New Habitat	Medium	Absent	Unknown	New Habitat			3	94



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winged elm	Ulmus alata	WDL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	95