

# HUC 020502 West Branch Susquehanna

## 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	18,075	6,978.7	576

### 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	1			High	22	23	Increase	17	22	Very Good	11	12	Likely	2	2
Hickory	4			Medium	25	45	No Change	9	9	Good	7	11	Infill	8	11
Maple	6	Abundant	8	Low	26	9	Decrease	24	19	Fair	9	7	Migrate	4	12
Oak	8	Common	23	FIA	7		New	15	18	Poor	14	11			
Pine	5	Rare	26				Unknown	15	12	Very Poor	5	4			
Other	33	Absent	22							FIA Only	4	4			
	<b>57</b>		<b>79</b>		<b>80</b>	<b>77</b>		<b>80</b>	<b>80</b>	Unknown	8	5			
											<b>58</b>	<b>54</b>			

### Potential Changes in Climate Variables

#### Temperature (°F)

	Scenario	2009	2039	2069	2099	
Annual Average	CCSM45	43.9	45.4	47.4	47.5	
	CCSM85	43.9	45.8	47.9	50.5	
	GFDL45	43.9	46.2	48.8	49.8	
	GFDL85	43.9	46.8	49.8	53.3	
	HAD45	43.9	46.3	49.0	50.3	
	HAD85	43.9	46.4	49.8	54.0	
Growing Season (May—Sep)	CCSM45	57.1	58.7	60.4	60.8	
	CCSM85	57.1	58.9	61.1	64.3	
	GFDL45	57.1	59.6	63.0	64.3	
	GFDL85	57.1	60.8	64.2	68.1	
	HAD45	57.1	59.8	62.1	64.0	
	HAD85	57.1	59.4	63.6	68.2	
Coldest Month (Average)	CCSM45	23.7	25.2	26.8	27.0	
	CCSM85	23.7	25.8	26.8	28.3	
	GFDL45	23.7	26.2	27.2	27.7	
	GFDL85	23.7	26.5	27.5	29.1	
	HAD45	23.7	24.9	27.2	27.3	
	HAD85	23.7	25.8	27.5	29.7	
Warmest Month (Average)	CCSM45	61.8	63.6	64.6	64.8	
	CCSM85	61.8	63.9	65.2	67.1	
	GFDL45	61.8	64.2	66.1	67.2	
	GFDL85	61.8	65.5	67.6	70.1	
	HAD45	61.8	64.7	66.3	67.6	
	HAD85	61.8	65.0	67.6	71.0	

#### Precipitation (in)

	Scenario	2009	2039	2069	2099	
Annual Total	CCSM45	34.0	35.1	35.0	37.4	
	CCSM85	34.0	35.3	36.6	38.2	
	GFDL45	34.0	37.6	38.9	38.5	
	GFDL85	34.0	35.2	38.7	39.7	
	HAD45	34.0	35.0	35.5	35.2	
	HAD85	34.0	36.5	34.1	37.0	
Growing Season (May—Sep)	CCSM45	16.3	16.9	16.8	17.7	
	CCSM85	16.3	16.5	17.2	17.2	
	GFDL45	16.3	17.1	16.8	16.7	
	GFDL85	16.3	15.8	16.6	16.2	
	HAD45	16.3	16.6	15.1	15.5	
	HAD85	16.3	16.7	14.6	15.4	

**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
red maple	Acer rubrum	WDH	High	95.6	2440.6	18.1	Sm. dec.	Lg. dec.	High	Abundant	Good	Good			1	1
sugar maple	Acer saccharum	WDH	High	58.2	1014.7	11.6	Sm. dec.	Sm. dec.	High	Abundant	Good	Good			1	2
sweet birch	Betula lenta	NDH	High	84.6	802.1	7.7	Sm. dec.	Lg. dec.	Low	Abundant	Fair	Poor			0	3
northern red oak	Quercus rubra	WDH	Medium	71.5	765.4	8.5	No change	No change	High	Abundant	Very Good	Very Good			1	4
chestnut oak	Quercus prinus	NDH	High	57.2	762.6	11.9	Sm. inc.	Sm. inc.	High	Abundant	Very Good	Very Good			1	5
black cherry	Prunus serotina	WDL	Medium	65.5	761.7	7.7	No change	No change	Low	Abundant	Fair	Fair			0	6
eastern hemlock	Tsuga canadensis	NSH	High	58.4	645.4	8.2	Sm. dec.	Lg. dec.	Low	Abundant	Fair	Poor			0	7
American beech	Fagus grandifolia	WDH	High	49.9	527.9	7.1	Sm. dec.	Sm. dec.	Medium	Abundant	Fair	Fair			0	8
white oak	Quercus alba	WDH	Medium	54.3	486.1	8.6	Sm. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	9
eastern white pine	Pinus strobus	WDH	High	50.4	404.6	6.8	No change	Sm. dec.	Low	Common	Poor	Poor			0	10
white ash	Fraxinus americana	WDL	Medium	53.9	369.7	4.8	No change	No change	Low	Common	Poor	Poor			0	11
yellow birch	Betula alleghaniensis	NDL	High	35.7	176.5	3.2	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	12
black oak	Quercus velutina	WDH	High	38.3	152.0	3.7	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	13
bigtooth aspen	Populus grandidentata	NSL	Medium	24.2	135.7	4.5	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	14
black locust	Robinia pseudoacacia	NDH	Low	19	132.8	5.6	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	15
pin cherry	Prunus pensylvanica	NSL	Low	14.7	122.2	5.8	Lg. dec.	Very Lg. dec.	Medium	Common	Poor	Lost			0	16
quaking aspen	Populus tremuloides	WDH	High	13.2	119.3	5.2	Lg. dec.	Very Lg. dec.	Medium	Common	Poor	Lost			0	17
blackgum	Nyssa sylvatica	WDL	Medium	34	118.1	3.0	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	18
American basswood	Tilia americana	WSL	Medium	29	107.6	3.0	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	19
scarlet oak	Quercus coccinea	WDL	Medium	25.2	97.1	3.8	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	20
red pine	Pinus resinosa	NSH	Medium	9.7	91.2	7.4	Very Lg. dec.	Very Lg. dec.	Low	Common	Lost	Lost			0	21
sassafras	Sassafras albidum	WSL	Low	21.6	80.6	2.6	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	22
yellow-poplar	Liriodendron tulipifera	WDH	High	19	71.6	3.2	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	23
serviceberry	Amelanchier spp.	NSL	Low	41.7	65.7	1.3	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor			0	24
American elm	Ulmus americana	WDH	Medium	9	62.1	4.0	No change	No change	Medium	Common	Fair	Fair	Infill +	Infill +	1	25
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	22.2	58.2	1.5	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	26
paper birch	Betula papyrifera	WDH	High	10.6	57.9	3.9	Lg. dec.	Very Lg. dec.	Medium	Common	Poor	Lost			0	27
pignut hickory	Carya glabra	WDL	Medium	20.9	52.0	1.9	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	28
striped maple	Acer pensylvanicum	NSL	Medium	23.3	51.4	1.6	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	29
black walnut	Juglans nigra	WDH	Low	9.7	51.1	6.8	No change	No change	Medium	Common	Fair	Fair	Infill +	Infill +	1	30
Virginia pine	Pinus virginiana	NDH	High	6.3	50.3	10.4	Sm. inc.	Lg. inc.	Medium	Common	Good	Very Good	Infill ++	Infill ++	1	31
pitch pine	Pinus rigida	NSH	High	9.5	46.4	4.6	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	32
Norway spruce	Picea abies	NSH	FIA	6	36.6	5.3	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	33
Scots pine	Pinus sylvestris	NSH	FIA	5.5	29.8	3.1	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	34
shagbark hickory	Carya ovata	WSL	Medium	10.9	28.2	2.0	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	1	35
mockernut hickory	Carya alba	WDL	Medium	7.8	25.2	3.1	Lg. inc.	Lg. inc.	High	Rare	Good	Good			1	36
American hornbeam; muscle	Carpinus caroliniana	WSL	Low	10.5	22.6	1.6	Lg. dec.	Sm. inc.	Medium	Rare	Very Poor	Fair			1	37
bitternut hickory	Carya cordiformis	WSL	Low	4.7	22.2	3.2	No change	Sm. inc.	High	Rare	Fair	Good	Infill +	Infill ++	2	38
cucumbertree	Magnolia acuminata	NSL	Low	8.5	19.8	1.7	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	1	39
sycamore	Platanus occidentalis	NSL	Low	1.7	19.5	11.8	Sm. inc.	Lg. inc.	Medium	Rare	Fair	Good	Infill +	Infill ++	2	40
butternut	Juglans cinerea	NSLX	FIA	0.8	14.8	12.9	Unknown	Unknown	Low	Rare	FIA Only	FIA Only			0	41
gray birch	Betula populifolia	NSL	Low	2.1	14.3	1.9	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	42
hackberry	Celtis occidentalis	WDH	Medium	1.1	13.4	12.1	Sm. dec.	No change	High	Rare	Poor	Fair		Infill +	2	43
Norway maple	Acer platanoides	NSL	FIA	1.7	12.4	7.5	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	44
red spruce	Picea rubens	NDH	High	0.7	12.3	2.2	Lg. dec.	Lg. dec.	Low	Rare	Very Poor	Very Poor			0	45
white spruce	Picea glauca	NSL	Medium	0.6	12.2	22.0	Very Lg. dec.	Very Lg. dec.	Medium	Rare	Lost	Lost			0	46
bear oak; scrub oak	Quercus ilicifolia	NSLX	FIA	1.8	6.6	2.0	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	47



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Common Name	Scientific Name	Range	MR	%Cell	FIAsum	FIAiv	ChngCl45	ChngCl85	Adap	Abund	Capabil45	Capabil85	SHIFT45	SHIFT85	SSO	N
flowering dogwood	Cornus florida	WDL	Medium	3.2	3.2	1.0	No change	Sm. inc.	Medium	Rare	Poor	Fair		Infill +	1	48
eastern redcedar	Juniperus virginiana	WDH	Medium	1.1	3.1	2.8	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	49
slippery elm	Ulmus rubra	WSL	Low	4.8	1.1	0.5	Sm. inc.	Lg. inc.	Medium	Rare	Fair	Good	Infill +	Infill ++	2	50
American chestnut	Castanea dentata	NSLX	FIA	1.9	1.1	0.4	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	51
river birch	Betula nigra	NSL	Low	0.6	0.9	1.7	Lg. dec.	No change	Medium	Rare	Very Poor	Poor		Infill +	2	52
boxelder	Acer negundo	WSH	Low	0.6	0.8	0.3	Lg. dec.	Lg. inc.	High	Rare	Poor	Good			2	53
pin oak	Quercus palustris	NSH	Low	2.1	0.7	0.8	Very Lg. dec.	No change	Low	Rare	Lost	Very Poor			2	54
silver maple	Acer saccharinum	NSH	Low	0.6	0.6	1.1	Very Lg. dec.	Sm. inc.	High	Rare	Lost	Good			2	55
chokecherry	Prunus virginiana	NSLX	FIA	0.6	0.4	0.8	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	56
northern pin oak	Quercus ellipsoidalis	NSH	Medium	1.9	0.3	1.7	Lg. dec.	Lg. dec.	High	Rare	Poor	Poor			0	57
shortleaf pine	Pinus echinata	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate ++	3	58
loblolly pine	Pinus taeda	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate ++	3	59
northern white-cedar	Thuja occidentalis	WSH	High	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	60
florida maple	Acer barbatum	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate +	3	61
black maple	Acer nigrum	NSH	Low	0	0	0	Unknown	Unknown	High	Modeled	Unknown	Unknown			0	62
mountain maple	Acer spicatum	NSL	Low	0	0	0	Unknown	Unknown	High	Absent	Unknown	Unknown			0	63
cittamwood/gum bumelia	Sideroxylon lanuginosum ssp.	NSL	Low	0	0	0	Unknown	New Habitat	High	Absent	Unknown	New Habitat			0	64
black hickory	Carya texana	NDL	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	65
sugarberry	Celtis laevigata	NDH	Medium	0	0	0	Unknown	New Habitat	Medium	Absent	Unknown	New Habitat			3	66
eastern redbud	Cercis canadensis	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Likely +	Likely +	3	67
common persimmon	Diospyros virginiana	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate +	3	68
green ash	Fraxinus pennsylvanica	WSH	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Likely +	Likely +	3	69
sweetgum	Liquidambar styraciflua	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate ++	3	70
southern magnolia	Magnolia grandiflora	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	71
bigleaf magnolia	Magnolia macrophylla	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	72
sourwood	Oxydendrum arboreum	NDL	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	73
eastern cottonwood	Populus deltoides	NSH	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	74
southern red oak	Quercus falcata	WDL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate ++	3	75
cherrybark oak; swamp red o	Quercus pagoda	NSL	Medium	0	0	0	Unknown	New Habitat	Medium	Absent	Unknown	New Habitat			3	76
blackjack oak	Quercus marilandica	NSL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate ++	3	77
chinkapin oak	Quercus muehlenbergii	NSL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	78
post oak	Quercus stellata	WDH	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	79
winged elm	Ulmus alata	WDL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate ++	3	80