

HUC 070400 Upper Mississippi-Black-Root

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	27,873	10,762	809

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	18	22	Increase	16	16	Very Good	10	9	Likely	0	0
Hickory	2			Medium	28	41	No Change	10	10	Good	8	7	Infill	20	20
Maple	6	Abundant	3	Low	24	12	Decrease	21	21	Fair	7	10	Migrate	10	13
Oak	6	Common	27	FIA	9		New	18	22	Poor	11	9		30	33
Pine	4	Rare	26				Unknown	14	10	Very Poor	10	9			
Other	35	Absent	23					79	79	FIA Only	5	5			
	56		79		79	75				Unknown	5	1			
											56	50			

Potential Changes in Climate Variables

Temperature (°F)

	Scenario	2009	2039	2069	2099	
Annual Average	CCSM45	42.1	43.6	46.1	46.2	
	CCSM85	42.1	44.3	46.7	49.5	
	GFDL45	42.1	44.6	46.5	47.6	
	GFDL85	42.1	44.7	47.4	51.3	
	HAD45	42.1	44.5	47.4	48.9	
HAD85	42.1	44.9	48.4	52.7		
Growing Season May—Sep	CCSM45	57.9	59.5	61.6	61.9	
	CCSM85	57.9	60.2	62.5	65.8	
	GFDL45	57.9	60.8	63.1	64.8	
	GFDL85	57.9	61.1	64.2	68.8	
	HAD45	57.9	60.4	62.8	64.5	
HAD85	57.9	60.5	64.3	68.5		
Coldest Month Average	CCSM45	16.6	18.0	20.1	20.4	
	CCSM85	16.6	18.6	20.3	22.2	
	GFDL45	16.6	19.5	20.8	21.0	
	GFDL85	16.6	19.7	21.1	23.2	
	HAD45	16.6	17.6	21.0	20.9	
HAD85	16.6	20.5	23.2	25.9		
Warmest Month Average	CCSM45	62.9	64.9	66.1	66.6	
	CCSM85	62.9	65.9	67.4	69.4	
	GFDL45	62.9	65.6	66.8	68.1	
	GFDL85	62.9	66.3	67.9	70.9	
	HAD45	62.9	65.5	66.9	68.0	
HAD85	62.9	66.5	68.5	71.5		

Precipitation (in)

	Scenario	2009	2039	2069	2099	
Annual Total	CCSM45	26.4	26.8	26.4	26.2	
	CCSM85	26.4	25.9	26.3	26.5	
	GFDL45	26.4	28.8	30.8	28.8	
	GFDL85	26.4	29.1	31.1	30.0	
	HAD45	26.4	27.8	28.1	28.1	
HAD85	26.4	27.5	28.0	29.7		
Growing Season May—Sep	CCSM45	16.5	16.3	15.7	15.9	
	CCSM85	16.5	15.8	15.6	14.9	
	GFDL45	16.5	17.8	18.6	16.7	
	GFDL85	16.5	18.0	18.1	16.5	
	HAD45	16.5	16.6	15.8	15.9	
HAD85	16.5	16.2	14.9	15.2		

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
American elm	Ulmus americana	WDH	Medium	68.6	738.1	9.8	No change	No change	Medium	Abundant	Good	Good			1	1
boxelder	Acer negundo	WDH	Low	63.5	702.2	12.9	Sm. dec.	Sm. dec.	High	Abundant	Good	Good			1	2
northern red oak	Quercus rubra	WDH	Medium	62.4	638.4	9.6	Sm. dec.	Sm. dec.	High	Abundant	Good	Good			1	3
red maple	Acer rubrum	WDH	High	29	486.7	9.6	No change	Sm. dec.	High	Common	Good	Fair	Infill ++	Infill +	1	4
quaking aspen	Populus tremuloides	WDH	High	44.7	475.7	7.7	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor			0	5
American basswood	Tilia americana	WSL	Medium	56.7	418.5	7.4	No change	Sm. dec.	Medium	Common	Fair	Poor			1	6
eastern white pine	Pinus strobus	WDH	High	22.6	387.2	12.8	Lg. dec.	Lg. dec.	Low	Common	Very Poor	Very Poor			0	7
bur oak	Quercus macrocarpa	NDH	Medium	45.7	356.4	8.8	Sm. inc.	No change	High	Common	Very Good	Good			1	8
white oak	Quercus alba	WDH	Medium	44.9	335.8	6.0	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	9
paper birch	Betula papyrifera	WDH	High	41.6	314.0	5.7	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor			0	10
black cherry	Prunus serotina	WDL	Medium	65.2	311.1	4.4	Sm. inc.	Sm. inc.	Low	Common	Fair	Fair			1	11
black oak	Quercus velutina	WDH	High	26	309.9	9.2	Sm. inc.	Sm. inc.	Medium	Common	Good	Good	Infill ++	Infill ++	1	12
sugar maple	Acer saccharum	WDH	High	28	248.0	8.0	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good	Infill ++	Infill ++	1	13
silver maple	Acer saccharinum	NSH	Low	15.7	198.6	15.4	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good	Infill ++	Infill ++	1	14
shagbark hickory	Carya ovata	WSL	Medium	25.2	194.8	6.8	Sm. inc.	No change	Medium	Common	Good	Fair	Infill ++	Infill +	1	15
red pine	Pinus resinosa	NSH	Medium	16.6	179.2	10.7	Sm. dec.	Sm. dec.	Low	Common	Poor	Poor	Infill +	Infill +	0	16
slippery elm	Ulmus rubra	WSL	Low	39.7	161.1	4.3	No change	No change	Medium	Common	Fair	Fair	Infill +	Infill +	1	17
jack pine	Pinus banksiana	NSH	Medium	12.7	160.7	12.6	Lg. dec.	Lg. dec.	High	Common	Fair	Fair	Infill +	Infill +	2	18
northern pin oak	Quercus ellipsoidalis	NSH	Medium	28.2	149.7	5.4	Sm. dec.	Lg. dec.	High	Common	Fair	Fair	Infill +	Infill +	1	19
bigtooth aspen	Populus grandidentata	NSL	Medium	26.7	140.0	3.8	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor			0	20
black walnut	Juglans nigra	WDH	Low	26.1	133.2	6.5	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good	Infill ++	Infill ++	1	21
bitternut hickory	Carya cordiformis	WSL	Low	29.3	118.7	3.9	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	22
green ash	Fraxinus pennsylvanica	WSH	Low	34.3	108.6	3.7	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	23
black ash	Fraxinus nigra	WSH	Medium	17.2	106.6	3.7	Sm. dec.	Lg. dec.	Low	Common	Poor	Very Poor	Infill +		0	24
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	29.8	101.7	3.7	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	25
eastern redcedar	Juniperus virginiana	WDH	Medium	21	98.5	6.4	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good	Infill ++	Infill ++	1	26
hackberry	Celtis occidentalis	WDH	Medium	27.8	91.2	3.6	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good	Infill ++	Infill ++	1	27
white spruce	Picea glauca	NSL	Medium	11	87.8	8.2	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor	Infill +	Infill +	0	28
eastern cottonwood	Populus deltoides	NSH	Low	9.8	76.3	5.6	No change	No change	Medium	Common	Fair	Fair	Infill +	Infill +	1	29
white ash	Fraxinus americana	WDL	Medium	14.5	67.6	2.5	Lg. inc.	Lg. inc.	Low	Common	Good	Good	Infill ++	Infill ++	1	30
tamarack (native)	Larix laricina	NSH	High	4.7	58.6	7.0	No change	No change	Low	Rare	Very Poor	Very Poor			2	31
black locust	Robinia pseudoacacia	NDH	Low	3.9	32.2	8.0	Sm. inc.	Sm. inc.	Medium	Rare	Fair	Fair	Infill +	Infill +	1	32
black willow	Salix nigra	NSH	Low	4.4	32.2	9.4	Sm. dec.	No change	Low	Rare	Very Poor	Very Poor			2	33
balsam fir	Abies balsamea	NDH	High	3.6	30.1	3.6	Sm. dec.	No change	Low	Rare	Very Poor	Very Poor			2	34
yellow birch	Betula alleghaniensis	NDL	High	6.2	29.4	1.6	Sm. dec.	No change	Medium	Rare	Very Poor	Poor		Infill +	2	35
Scots pine	Pinus sylvestris	NSH	FIA	2.4	29.0	8.2	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	36
butternut	Juglans cinerea	NSLX	FIA	9.7	28.1	2.6	Unknown	Unknown	Low	Rare	FIA Only	FIA Only			0	37
river birch	Betula nigra	NSL	Low	3.6	21.6	5.1	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	38
eastern hemlock	Tsuga canadensis	NSH	High	1.7	20.8	3.8	No change	Sm. dec.	Low	Rare	Very Poor	Very Poor			2	39
chokecherry	Prunus virginiana	NSLX	FIA	14.7	16.0	1.2	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	40
serviceberry	Amelanchier spp.	NSL	Low	3.5	14.2	2.4	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	41
peachleaf willow	Salix amygdaloides	NSLX	FIA	0.6	14.2	9.0	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	42
American hornbeam; muscle	Carpinus caroliniana	WSL	Low	5.4	12.8	1.0	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	43
black spruce	Picea mariana	NSH	High	2.9	9.2	2.2	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			2	44
northern white-cedar	Thuja occidentalis	WSH	High	1.2	9.1	3.9	No change	Sm. inc.	Medium	Rare	Poor	Fair	Infill +	Infill +	2	45
wild plum	Prunus americana	NSLX	FIA	3	7.0	3.7	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	46
Siberian elm	Ulmus pumila	NDH	FIA	2.9	6.7	7.9	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	47



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pin cherry	<i>Prunus pensylvanica</i>	NSL	Low	1.5	5.6	1.2	Lg. dec.	Very Lg. dec.	Medium	Rare	Very Poor	Lost				0	48			
rock elm	<i>Ulmus thomasii</i>	NSLX	FIA	2.5	5.1	1.7	Unknown	Unknown	Low	Rare	FIA Only	FIA Only					0	49		
swamp white oak	<i>Quercus bicolor</i>	NSL	Low	1.4	4.7	3.3	No change	Sm. inc.	Medium	Rare	Poor	Fair	Infill +	Infill +			2	50		
Norway spruce	<i>Picea abies</i>	NSH	FIA	0.7	3.9	1.9	Unknown	Unknown	NA	Rare	NNIS	NNIS						0	51	
red mulberry	<i>Morus rubra</i>	NSL	Low	0.4	1.5	4.2	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good						2	52	
black maple	<i>Acer nigrum</i>	NSH	Low	0.4	1.0	2.7	Lg. dec.	Very Lg. dec.	High	Rare	Poor	Lost						0	53	
white mulberry	<i>Morus alba</i>	NSL	FIA	1.3	0.9	0.6	Unknown	Unknown	NA	Rare	NNIS	NNIS						0	54	
balsam poplar	<i>Populus balsamifera</i>	NSH	Medium	0.5	0.4	0.4	Very Lg. dec.	Very Lg. dec.	Medium	Rare	Lost	Lost						0	55	
mountain maple	<i>Acer spicatum</i>	NSL	Low	1.5	0.3	1.1	Lg. dec.	Lg. dec.	High	Rare	Poor	Poor						0	56	
slash pine	<i>Pinus elliotii</i>	NDH	High	0	0	0	Unknown	New Habitat	Medium	Absent	Unknown	New Habitat						0	57	
Virginia pine	<i>Pinus virginiana</i>	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat						0	58	
striped maple	<i>Acer pensylvanicum</i>	NSL	Medium	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown						0	59	
cittamwood/gum bumelia	<i>Sideroxylon lanuginosum ssp.</i>	NSL	Low	0	0	0	Unknown	New Habitat	High	Absent	Unknown	New Habitat						0	60	
pignut hickory	<i>Carya glabra</i>	WDL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +				3	61	
black hickory	<i>Carya texana</i>	NDL	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat						3	62	
mockernut hickory	<i>Carya alba</i>	WDL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate +				3	63	
sugarberry	<i>Celtis laevigata</i>	NDH	Medium	0	0	0	Unknown	New Habitat	Medium	Absent	Unknown	New Habitat						0	64	
eastern redbud	<i>Cercis canadensis</i>	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat							3	65
American beech	<i>Fagus grandifolia</i>	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +				3	66	
honeylocust	<i>Gleditsia triacanthos</i>	NSH	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate ++				3	67	
yellow-poplar	<i>Liriodendron tulipifera</i>	WDH	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate +				3	68	
Osage-orange	<i>Maclura pomifera</i>	NDH	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate ++				3	69	
blackgum	<i>Nyssa sylvatica</i>	WDL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate +				3	70	
sycamore	<i>Platanus occidentalis</i>	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +				3	71	
scarlet oak	<i>Quercus coccinea</i>	WDL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat						3	72	
shingle oak	<i>Quercus imbricaria</i>	NDH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat							3	73
laurel oak	<i>Quercus laurifolia</i>	NDH	Medium	0	0	0	Unknown	New Habitat	Medium	Absent	Unknown	New Habitat						0	74	
blackjack oak	<i>Quercus marilandica</i>	NSL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat						3	75	
chinkapin oak	<i>Quercus muehlenbergii</i>	NSL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +				3	76	
pin oak	<i>Quercus palustris</i>	NSH	Low	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat						3	77	
post oak	<i>Quercus stellata</i>	WDH	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat						3	78	
sassafras	<i>Sassafras albidum</i>	WSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +				3	79	