

# HUC 090203 Lower Red

## 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	52,792	20,383	646

#### 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	14	17	Increase	17	19	Very Good	5	5
Hickory	0			Medium	21	33	No Change	9	7	Good	7	9
Maple	5	Abundant	1	Low	23	11	Decrease	6	6	Fair	9	8
Oak	3	Common	12	FIA	3		New	20	21	Poor	8	7
Pine	3	Rare	22				Unknown	9	8	Very Poor	3	1
Other	22	Absent	26							FIA Only	3	3
	<b>35</b>		<b>61</b>		<b>61</b>	<b>61</b>		<b>61</b>	<b>61</b>	Unknown	6	5
											<b>41</b>	<b>38</b>

#### Potential Changes in Climate Variables

##### Temperature (°F)

Scenario	2009	2039	2069	2099		
Annual	CCSM45	37.5	38.8	41.0	41.5	
Average	CCSM85	37.5	39.3	42.2	45.1	
	GFDL45	37.5	40.7	41.7	43.0	
	GFDL85	37.5	39.9	42.8	46.9	
	HAD45	37.5	40.2	43.1	44.8	
	HAD85	37.5	40.6	44.1	49.0	
Growing Season	CCSM45	55.2	56.6	58.5	59.0	
	CCSM85	55.2	57.4	59.8	62.9	
May—Sep	GFDL45	55.2	58.9	60.3	61.7	
	GFDL85	55.2	58.0	61.1	65.7	
	HAD45	55.2	57.8	60.1	62.0	
	HAD85	55.2	57.7	60.8	65.7	
Coldest Month	CCSM45	8.8	10.2	12.0	12.1	
	CCSM85	8.8	9.6	11.8	13.8	
Average	GFDL45	8.8	11.5	12.9	13.4	
	GFDL85	8.8	12.1	13.5	16.2	
	HAD45	8.8	10.7	13.9	13.8	
	HAD85	8.8	13.2	16.2	19.4	
Warmest Month	CCSM45	60.6	62.4	63.6	63.9	
	CCSM85	60.6	63.3	65.1	66.9	
Average	GFDL45	60.6	63.6	64.9	66.0	
	GFDL85	60.6	63.8	65.6	68.1	
	HAD45	60.6	63.5	64.6	66.2	
	HAD85	60.6	63.5	65.3	68.4	

##### Precipitation (in)

Scenario	2009	2039	2069	2099		
Annual	CCSM45	18.2	18.3	18.6	17.8	
Total	CCSM85	18.2	18.1	18.3	18.0	
	GFDL45	18.2	20.2	21.5	21.0	
	GFDL85	18.2	21.2	22.0	22.2	
	HAD45	18.2	19.0	17.6	18.7	
	HAD85	18.2	18.6	18.4	19.6	
Growing Season	CCSM45	12.7	12.5	12.4	11.9	
	CCSM85	12.7	12.1	12.0	11.5	
May—Sep	GFDL45	12.7	14.2	14.8	14.4	
	GFDL85	12.7	14.7	15.1	14.7	
	HAD45	12.7	12.7	11.2	11.4	
	HAD85	12.7	12.1	11.0	10.8	

**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
quaking aspen	Populus tremuloides	WDH	High	50	1187.0	37.2	Lg. dec.	Lg. dec.	Medium	Abundant	Fair	Fair	Infill +	Infill +	0	1
balsam poplar	Populus balsamifera	NSH	Medium	37.3	376.5	15.5	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor	Infill +	Infill +	0	2
tamarack (native)	Larix laricina	NSH	High	10.9	308.9	21.7	No change	No change	Low	Common	Poor	Poor	Infill +	Infill +	2	3
bur oak	Quercus macrocarpa	NDH	Medium	43.8	246.7	15.7	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good	Infill ++	Infill ++	1	4
black ash	Fraxinus nigra	WSH	Medium	23.6	172.9	8.7	No change	No change	Low	Common	Poor	Poor	Infill +	Infill +	0	5
black spruce	Picea mariana	NSH	High	8.6	161.5	10.2	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor	Infill +	Infill +	2	6
northern white-cedar	Thuja occidentalis	WSH	High	8.3	115.8	12.7	No change	No change	Medium	Common	Fair	Fair	Infill +	Infill +	2	7
green ash	Fraxinus pennsylvanica	WSH	Low	38.9	114.3	7.8	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good	Infill ++	Infill ++	1	8
balsam fir	Abies balsamea	NDH	High	12.6	89.7	5.8	No change	Sm. inc.	Low	Common	Poor	Fair	Infill +	Infill +	2	9
American elm	Ulmus americana	WDH	Medium	35	78.7	6.6	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good	Infill ++	Infill ++	1	10
American basswood	Tilia americana	WSL	Medium	18.8	70.5	7.1	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good	Infill ++	Infill ++	2	11
paper birch	Betula papyrifera	WDH	High	15.4	63.3	3.6	Sm. inc.	Sm. inc.	Medium	Common	Good	Good	Infill ++	Infill ++	2	12
boxelder	Acer negundo	WSH	Low	31.8	61.9	12.2	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good	Infill ++	Infill ++	1	13
sugar maple	Acer saccharum	WDH	High	6.3	34.9	6.6	No change	Sm. inc.	High	Rare	Fair	Good	Infill +		2	14
jack pine	Pinus banksiana	NSH	Medium	3	27.3	5.5	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	2	15
white spruce	Picea glauca	NSL	Medium	8.3	23.4	2.6	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	16
red pine	Pinus resinosa	NSH	Medium	3	23.4	6.2	No change	No change	Low	Rare	Very Poor	Very Poor			2	17
red maple	Acer rubrum	WDH	High	5.6	16.5	2.8	Sm. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	2	18
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	8.3	15.4	4.3	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	2	19
eastern white pine	Pinus strobus	WDH	High	2.4	14.7	5.4	Sm. inc.	Sm. inc.	Low	Rare	Poor	Poor	Infill +	Infill +	2	20
northern red oak	Quercus rubra	WDH	Medium	6	14.2	4.0	Sm. inc.	Sm. inc.	High	Rare	Good	Good			2	21
eastern cottonwood	Populus deltoides	NSH	Low	3.6	9.0	23.3	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	22
chokecherry	Prunus virginiana	NSLX	FIA	21.7	8.7	1.5	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	23
peachleaf willow	Salix amygdaloides	NSLX	FIA	1.8	5.3	7.7	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	24
bigtooth aspen	Populus grandidentata	NSL	Medium	1.1	4.1	4.2	Sm. inc.	Sm. inc.	Medium	Rare	Fair	Fair	Infill +	Infill +	2	25
silver maple	Acer saccharinum	NSH	Low	0.5	3.3	8.8	Lg. inc.	Lg. inc.	High	Rare	Good	Good			2	26
black cherry	Prunus serotina	WDL	Medium	2.8	2.9	1.1	Lg. inc.	Lg. inc.	Low	Rare	Fair	Fair	Infill +	Infill +	2	27
serviceberry	Amelanchier spp.	NSL	Low	6.7	2.3	0.8	Lg. dec.	Very Lg. dec.	Medium	Rare	Very Poor	Lost			0	28
mountain maple	Acer spicatum	NSL	Low	2.4	1.9	0.7	Lg. dec.	Lg. dec.	High	Rare	Poor	Poor			0	29
slippery elm	Ulmus rubra	WSL	Low	1.4	1.7	5.4	Sm. inc.	Lg. inc.	Medium	Rare	Fair	Good	Infill +		2	30
northern pin oak	Quercus ellipsoidalis	NSH	Medium	0.2	1.1	5.9	Lg. inc.	Lg. inc.	High	Rare	Good	Good			2	31
pin cherry	Prunus pensylvanica	NSL	Low	2.1	1.0	0.9	Lg. dec.	Very Lg. dec.	Medium	Rare	Very Poor	Lost			2	32
hackberry	Celtis occidentalis	WDH	Medium	1.9	0.2	1.7	Lg. inc.	Lg. inc.	High	Rare	Good	Good			2	33
black willow	Salix nigra	NSH	Low	1	0.1	1.6	Lg. inc.	Lg. inc.	Low	Rare	Fair	Fair	Infill +	Infill +	2	34
wild plum	Prunus americana	NSLX	FIA	0.2	0.0	0.2	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	35
ashe juniper	Juniperus ashei	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	36
eastern redcedar	Juniperus virginiana	WDH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	37
striped maple	Acer pensylvanicum	NSL	Medium	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	38
yellow buckeye	Aesculus flava	NSL	Low	0	0	0	Unknown	Unknown	Low	Absent	Unknown	Unknown			0	39
yellow birch	Betula alleghaniensis	NDL	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate ++	Migrate +	3	40
cittamwood/gum bumelia	Sideroxylon lanuginosum ssp.	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			0	41
American hornbeam; musclev	Carpinus caroliniana	WSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	42
bitternut hickory	Carya cordiformis	WSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate +	3	43
shagbark hickory	Carya ovata	WSL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	44
sugarberry	Celtis laevigata	NDH	Medium	0	0	0	Unknown	New Habitat	Medium	Absent	Unknown	New Habitat			0	45
eastern redbud	Cercis canadensis	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	46
honeylocust	Gleditsia triacanthos	NSH	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			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
black walnut	Juglans nigra	WDH	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	48
bigleaf magnolia	Magnolia macrophylla	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	49
red mulberry	Morus rubra	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	50
white oak	Quercus alba	WDH	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	51
swamp white oak	Quercus bicolor	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	52
Nuttall oak	Quercus texana	NSH	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			0	53
pin oak	Quercus palustris	NSH	Low	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat			0	54
post oak	Quercus stellata	WDH	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			0	55
black oak	Quercus velutina	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate ++	Migrate ++	3	56
live oak	Quercus virginiana	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	57
black locust	Robinia pseudoacacia	NDH	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	58
American mountain-ash	Sorbus americana	NSL	Low	0	0	0	Unknown	Unknown	Low	Absent	Unknown	Unknown			0	59
winged elm	Ulmus alata	WDL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	60
cedar elm	Ulmus crassifolia	NDH	Medium	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat			0	61