

# HUC 071100 Upper Mississippi-Salt

## 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	26,110	10,081	258

### 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	12	24	Increase	21	27	Very Good	6	7	Likely	0	0
Hickory	7			Medium	29	44	No Change	12	9	Good	11	16	Infill	16	15
Maple	5	Abundant	0	Low	34	11	Decrease	23	20	Fair	15	10	Migrate	5	10
Oak	15	Common	23	FIA	8		New	14	15	Poor	10	12		21	25
Pine	2	Rare	41				Unknown	13	12	Very Poor	12	10			
Other	32	Absent	18							FIA Only	4	4			
	<b>64</b>		<b>82</b>		<b>83</b>	<b>79</b>		<b>83</b>	<b>83</b>	Unknown	5	4			
											<b>63</b>	<b>63</b>			

### Potential Changes in Climate Variables

#### Temperature (°F)

	Scenario	2009	2039	2069	2099	
Annual Average	CCSM45	48.6	50.1	51.5	51.9	
	CCSM85	48.6	50.6	52.4	54.7	
	GFDL45	48.6	51.5	52.6	53.4	
	GFDL85	48.6	50.8	53.3	56.4	
	HAD45	48.6	50.7	53.2	54.5	
	HAD85	48.6	51.0	54.6	57.7	
Growing Season (May—Sep)	CCSM45	62.2	63.9	65.0	65.7	
	CCSM85	62.2	64.6	66.4	69.2	
	GFDL45	62.2	65.7	67.0	68.3	
	GFDL85	62.2	65.0	67.9	71.8	
	HAD45	62.2	64.5	66.6	68.2	
	HAD85	62.2	64.8	69.1	72.1	
Coldest Month Average	CCSM45	26.7	28.3	29.7	30.0	
	CCSM85	26.7	29.1	30.1	31.3	
	GFDL45	26.7	30.1	30.5	30.9	
	GFDL85	26.7	29.1	30.3	31.1	
	HAD45	26.7	27.9	30.1	30.3	
	HAD85	26.7	29.5	31.7	33.3	
Warmest Month Average	CCSM45	67.1	68.8	69.7	70.3	
	CCSM85	67.1	69.9	71.1	72.3	
	GFDL45	67.1	69.8	71.0	71.9	
	GFDL85	67.1	70.2	71.5	74.1	
	HAD45	67.1	69.4	71.0	71.7	
	HAD85	67.1	70.7	73.3	74.9	

#### Precipitation (in)

	Scenario	2009	2039	2069	2099	
Annual Total	CCSM45	30.6	29.1	31.8	30.3	
	CCSM85	30.6	29.8	31.5	31.1	
	GFDL45	30.6	33.5	34.9	35.3	
	GFDL85	30.6	33.4	37.5	37.7	
	HAD45	30.6	31.8	32.9	32.5	
	HAD85	30.6	32.1	31.1	33.4	
Growing Season (May—Sep)	CCSM45	16.1	15.3	16.6	15.0	
	CCSM85	16.1	15.0	15.7	15.0	
	GFDL45	16.1	17.2	17.1	17.4	
	GFDL85	16.1	17.5	18.5	18.1	
	HAD45	16.1	16.1	15.7	15.8	
	HAD85	16.1	16.0	14.2	14.4	

**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
white oak	Quercus alba	WDH	Medium	56.3	479.4	11.9	Lg. dec.	Lg. dec.	High	Common	Fair	Fair			1	1
shagbark hickory	Carya ovata	WSL	Medium	71.2	352.9	9.7	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	2
American elm	Ulmus americana	WDH	Medium	76.2	277.4	7.4	No change	Sm. inc.	Medium	Common	Fair	Good			1	3
shingle oak	Quercus imbricaria	NDH	Medium	55.3	246.2	9.2	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	4
eastern redcedar	Juniperus virginiana	WDH	Medium	38.8	178.1	8.3	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	5
hackberry	Celtis occidentalis	WDH	Medium	56.1	175.0	6.3	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	6
black oak	Quercus velutina	WDH	High	49.1	159.0	5.9	Sm. inc.	No change	Medium	Common	Good	Fair			1	7
honeylocust	Gleditsia triacanthos	NSH	Low	50.4	157.2	8.4	No change	No change	High	Common	Good	Good			1	8
sugar maple	Acer saccharum	WDH	High	20.9	142.2	8.4	No change	No change	High	Common	Good	Good	Infill ++	Infill ++	1	9
black walnut	Juglans nigra	WDH	Low	53.5	132.4	6.6	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	10
pin oak	Quercus palustris	NSH	Low	35.6	131.7	11.9	Sm. dec.	Sm. dec.	Low	Common	Poor	Poor			0	11
northern red oak	Quercus rubra	WDH	Medium	42.4	129.6	5.8	Sm. dec.	Sm. dec.	High	Common	Fair	Fair			1	12
silver maple	Acer saccharinum	NSH	Low	23.8	114.4	14.3	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	13
white ash	Fraxinus americana	WDL	Medium	41.1	100.1	5.4	Sm. inc.	Sm. inc.	Low	Common	Fair	Fair			1	14
green ash	Fraxinus pennsylvanica	WDL	Low	32.5	82.2	5.2	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	15
post oak	Quercus stellata	WDH	High	14.7	77.1	5.1	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good	Infill ++	Infill ++	1	16
bitternut hickory	Carya cordiformis	WSL	Low	44.9	76.5	4.0	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	17
black willow	Salix nigra	NSH	Low	11.8	74.7	11.6	Lg. dec.	No change	Low	Common	Very Poor	Poor		Infill +	0	18
slippery elm	Ulmus rubra	WSL	Low	40.3	64.2	2.7	Sm. inc.	Lg. inc.	Medium	Common	Good	Very Good			1	19
black cherry	Prunus serotina	WDL	Medium	50.2	61.6	2.9	Sm. inc.	Sm. inc.	Low	Common	Fair	Fair			1	20
bur oak	Quercus macrocarpa	NDH	Medium	13.7	58.4	6.8	Sm. dec.	Sm. dec.	High	Common	Fair	Fair	Infill +	Infill +	2	21
swamp white oak	Quercus bicolor	NSL	Low	27.7	56.7	6.2	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor	Infill +		0	22
Osage-orange	Maclura pomifera	NDH	Medium	18.3	53.9	6.3	Sm. inc.	Lg. inc.	High	Common	Very Good	Very Good	Infill ++	Infill ++	1	23
boxelder	Acer negundo	WSH	Low	15.8	48.1	4.5	No change	Sm. inc.	High	Rare	Fair	Good	Infill +	Infill ++	1	24
red mulberry	Morus rubra	NSL	Low	32	44.4	2.6	Sm. inc.	Sm. inc.	Medium	Rare	Fair	Fair			1	25
sassafras	Sassafras albidum	WSL	Low	19.9	41.5	3.9	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	1	26
sycamore	Platanus occidentalis	NSL	Low	11.1	39.4	7.4	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	1	27
pignut hickory	Carya glabra	WDL	Medium	8	39.0	4.8	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			2	28
black locust	Robinia pseudoacacia	NDH	Low	8.9	36.2	7.0	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	1	29
chinkapin oak	Quercus muehlenbergii	NSL	Medium	14.9	34.6	5.0	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	30
American basswood	Tilia americana	WSL	Medium	7.5	32.4	3.8	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	31
eastern cottonwood	Populus deltoides	NSH	Low	5.9	26.6	8.6	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	32
mockernut hickory	Carya alba	WDL	Medium	24	23.7	2.1	Lg. inc.	Lg. inc.	High	Rare	Good	Good			1	33
river birch	Betula nigra	NSL	Low	16.8	20.9	4.8	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	34
eastern redbud	Cercis canadensis	NSL	Low	14.7	20.6	3.0	Sm. dec.	Sm. inc.	Medium	Rare	Very Poor	Fair		Infill +	1	35
common persimmon	Diospyros virginiana	NSL	Low	5.8	16.1	2.4	No change	Sm. inc.	High	Rare	Fair	Good	Infill +	Infill ++	1	36
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	13.1	14.7	1.6	No change	Sm. inc.	High	Rare	Fair	Good			1	37
black hickory	Carya texana	NDL	High	8.6	14.4	2.8	Sm. inc.	Sm. inc.	Medium	Rare	Fair	Fair	Infill +	Infill +	2	38
blue ash	Fraxinus quadrangulata	NSL	Low	0.8	14.0	18.2	Very Lg. dec.	Very Lg. dec.	Low	Rare	Lost	Lost			0	39
sugarberry	Celtis laevigata	NDH	Medium	0.3	13.8	30.1	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	40
scarlet oak	Quercus coccinea	WDL	Medium	1	12.1	7.1	Sm. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	41
white mulberry	Morus alba	NSL	FIA	12	11.3	3.6	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	42
Ohio buckeye	Aesculus glabra	NSL	Low	10.3	9.9	2.9	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	43
northern pin oak	Quercus ellipsoidalis	NSH	Medium	1.8	9.7	11.7	Lg. dec.	Lg. dec.	High	Rare	Poor	Poor			0	44
flowering dogwood	Cornus florida	WDL	Medium	7.3	6.8	1.2	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	1	45
southern red oak	Quercus falcata	WDL	Medium	0.7	6.1	7.7	No change	Lg. inc.	High	Rare	Fair	Good	Infill +		2	46
shellbark hickory	Carya laciniosa	NSL	Low	12.3	5.2	2.5	Lg. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			2	47



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Common Name	Scientific Name	Range	MR	%Cell	FIAsum	FIAiv	ChngCl45	ChngCl85	Adap	Abund	Capabil45	Capabil85	SHIFT45	SHIFT85	SSO	N
pawpaw	Asimina triloba	NSL	Low	2	3.0	2.3	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			2	48
pecan	Carya illinoensis	NSH	Low	1.5	2.5	1.5	Lg. inc.	Lg. inc.	Low	Rare	Fair	Fair	Infill +	Infill +	2	49
Shumard oak	Quercus shumardii	NSL	Low	0.8	2.2	1.6	No change	Lg. inc.	High	Rare	Fair	Good			2	50
Scots pine	Pinus sylvestris	NSH	FIA	0.4	2.0	5.2	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	51
Kentucky coffeetree	Gymnocladus dioicus	NSLX	FIA	0.9	1.9	1.5	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	52
cherrybark oak; swamp red o	Quercus pagoda	NSL	Medium	0.2	1.9	3.1	Sm. inc.	Lg. inc.	Medium	Rare	Fair	Good	Infill +		2	53
northern catalpa	Catalpa speciosa	NSHX	FIA	0.3	1.7	3.8	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	54
serviceberry	Amelanchier spp.	NSL	Low	5	1.7	1.0	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	55
ailanthus	Ailanthus altissima	NSL	FIA	0.5	1.6	1.4	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	56
red maple	Acer rubrum	WDH	High	0.9	1.1	0.3	Lg. inc.	Lg. inc.	High	Rare	Good	Good			2	57
blackjack oak	Quercus marilandica	NSL	Medium	0.6	1.0	1.1	Lg. inc.	Lg. inc.	High	Rare	Good	Good			2	58
butternut	Juglans cinerea	NSLX	FIA	0.4	1.0	2.5	Unknown	Unknown	Low	Rare	FIA Only	FIA Only			0	59
wild plum	Prunus americana	NSLX	FIA	0.4	0.9	2.3	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	60
American hornbeam; muscle	Carpinus caroliniana	WSL	Low	0.4	0.5	1.3	Very Lg. dec.	No change	Medium	Rare	Lost	Poor			0	61
black maple	Acer nigrum	NSH	Low	0.3	0.4	0.8	Lg. dec.	Lg. dec.	High	Rare	Poor	Poor			0	62
Siberian elm	Ulmus pumila	NDH	FIA	0.2	0.2	0.2	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	63
red pine	Pinus resinosa	NSH	Medium	0.1	0.1	0.0	Lg. dec.	Lg. dec.	Low	Rare	Very Poor	Very Poor			0	64
ashe juniper	Juniperus ashei	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	65
loblolly pine	Pinus taeda	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate ++	3	66
striped maple	Acer pensylvanicum	NSL	Medium	0	0	0	Unknown	New Habitat	Medium	Absent	Unknown	New Habitat			3	67
mountain maple	Acer spicatum	NSL	Low	0	0	0	Unknown	Unknown	High	Absent	Unknown	Unknown			0	68
cittamwood/gum bumelia	Sideroxylon lanuginosum ssp.	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate +	3	69
American beech	Fagus grandifolia	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	70
black ash	Fraxinus nigra	WSH	Medium	0	0	0	Unknown	Unknown	Low	Absent	Unknown	Unknown			0	71
sweetgum	Liquidambar styraciflua	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	72
yellow-poplar	Liriodendron tulipifera	WDH	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	73
cucumbertree	Magnolia acuminata	NSL	Low	0	0	0	Unknown	Unknown	Medium	Modeled	Unknown	Unknown			0	74
bignonia	Magnolia macrophylla	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	75
blackgum	Nyssa sylvatica	WDL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate ++	3	76
pin cherry	Prunus pensylvanica	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	77
overcup oak	Quercus lyrata	NSL	Medium	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat		Migrate +	3	78
water oak	Quercus nigra	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate ++	3	79
willow oak	Quercus phellos	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	80
live oak	Quercus virginiana	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	81
winged elm	Ulmus alata	WDL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate ++	Migrate ++	3	82
cedar elm	Ulmus crassifolia	NDH	Medium	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat			3	83