

HUC 040601 Northeastern Lake Michigan

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 29,130 11,247 1,025

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	23	21	Increase	16	17	Very Good	6	5	Likely	1	1
Hickory	1			Medium	26	40	No Change	13	10	Good	13	14	Infill	6	9
Maple	6	Abundant	7	Low	22	12	Decrease	19	21	Fair	11	12	Migrate	4	8
Oak	7	Common	22	FIA	5		New	21	22	Poor	8	8			
Pine	4	Rare	24				Unknown	7	6	Very Poor	10	8			
Other	32	Absent	23							FIA Only	2	2			
	53		76		76	73		76	76	Unknown	2	1			
											52	50			

Potential Changes in Climate Variables

Temperature (°F)

Scenario	2009	2039	2069	2099		
Annual	CCSM45	41.4	42.7	45.0	44.9	
Average	CCSM85	41.4	43.3	45.6	48.1	
	GFDL45	41.4	43.6	45.8	46.8	
	GFDL85	41.4	43.9	46.7	50.4	
	HAD45	41.4	43.9	46.3	47.8	
	HAD85	41.4	44.1	47.3	51.7	
Growing Season	CCSM45	54.6	55.8	57.6	57.7	
	CCSM85	54.6	56.2	58.3	61.2	
May—Sep	GFDL45	54.6	57.5	60.4	61.9	
	GFDL85	54.6	58.1	61.5	65.7	
	HAD45	54.6	57.3	58.9	60.8	
	HAD85	54.6	57.0	60.3	64.8	
Coldest Month	CCSM45	21.5	22.9	25.1	24.7	
Average	CCSM85	21.5	23.6	25.4	27.1	
	GFDL45	21.5	22.9	24.3	24.7	
	GFDL85	21.5	23.6	24.8	26.7	
	HAD45	21.5	22.9	25.7	25.9	
	HAD85	21.5	24.6	26.6	29.9	
Warmest Month	CCSM45	59.2	60.7	61.8	62.1	
Average	CCSM85	59.2	61.4	62.7	64.2	
	GFDL45	59.2	62.2	63.6	64.6	
	GFDL85	59.2	62.8	64.6	66.7	
	HAD45	59.2	62.2	62.9	64.3	
	HAD85	59.2	62.4	64.2	67.4	

Precipitation (in)

Scenario	2009	2039	2069	2099		
Annual	CCSM45	25.1	25.2	24.7	25.4	
Total	CCSM85	25.1	25.7	25.2	26.0	
	GFDL45	25.1	26.8	28.8	28.4	
	GFDL85	25.1	27.4	29.6	30.3	
	HAD45	25.1	26.1	27.2	27.0	
	HAD85	25.1	27.1	26.9	28.9	
Growing Season	CCSM45	12.3	12.7	12.0	12.4	
Season	CCSM85	12.3	12.7	12.1	11.8	
May—Sep	GFDL45	12.3	12.7	13.9	13.7	
	GFDL85	12.3	13.6	13.6	13.7	
	HAD45	12.3	12.2	11.6	11.9	
	HAD85	12.3	12.7	10.8	11.5	

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	51.5	1327.7	16.2	Sm. dec.	Sm. dec.	High	Abundant	Good	Good			1	1
red maple	Acer rubrum	WDH	High	77	1298.1	11.5	No change	No change	High	Abundant	Very Good	Very Good			1	2
red pine	Pinus resinosa	NSH	Medium	45.8	1097.3	19.1	Sm. dec.	Sm. dec.	Low	Abundant	Fair	Fair			0	3
northern white-cedar	Thuja occidentalis	WSH	High	36.9	711.0	12.9	Sm. dec.	Sm. dec.	Medium	Abundant	Fair	Fair			0	4
quaking aspen	Populus tremuloides	WDH	High	51.2	701.8	8.9	No change	Sm. dec.	Medium	Abundant	Good	Fair			1	5
eastern white pine	Pinus strobus	WDH	High	53.8	670.1	9.0	No change	Sm. dec.	Low	Abundant	Fair	Fair			0	6
bigtooth aspen	Populus grandidentata	NSL	Medium	48.4	534.6	7.6	Sm. dec.	Sm. dec.	Medium	Abundant	Fair	Fair			0	7
northern red oak	Quercus rubra	WDH	Medium	41.2	497.5	8.4	Sm. inc.	No change	High	Common	Very Good	Good			1	8
jack pine	Pinus banksiana	NSH	Medium	32.1	477.3	12.6	Sm. dec.	Sm. dec.	High	Common	Fair	Fair			1	9
black cherry	Prunus serotina	WDL	Medium	57	415.7	5.3	Sm. inc.	Sm. inc.	Low	Common	Fair	Fair			1	10
white oak	Quercus alba	WDH	Medium	32	403.8	10.1	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	11
American beech	Fagus grandifolia	WDH	High	42.8	287.8	4.0	No change	No change	Medium	Common	Fair	Fair			1	12
balsam fir	Abies balsamea	NDH	High	29.4	272.7	5.3	Lg. dec.	Lg. dec.	Low	Common	Very Poor	Very Poor			0	13
Scots pine	Pinus sylvestris	NSH	FIA	8.6	211.7	20.0	Unknown	Unknown	NA	Common	NNIS	NNIS			0	14
black oak	Quercus velutina	WDH	High	20.7	207.5	8.7	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	15
northern pin oak	Quercus ellipsoidalis	NSH	Medium	22.6	205.7	6.9	No change	No change	High	Common	Good	Good			1	16
American basswood	Tilia americana	WSL	Medium	25.9	196.1	5.6	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	17
white ash	Fraxinus americana	WDL	Medium	25.2	189.4	5.0	No change	Sm. inc.	Low	Common	Poor	Fair			1	18
eastern hemlock	Tsuga canadensis	NSH	High	26.7	176.3	4.0	No change	Sm. dec.	Low	Common	Poor	Poor			0	19
paper birch	Betula papyrifera	WDH	High	36.8	168.7	2.7	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	20
green ash	Fraxinus pennsylvanica	WSH	Low	23.5	147.6	4.4	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	21
black ash	Fraxinus nigra	WSH	Medium	27.7	141.5	3.5	No change	No change	Low	Common	Poor	Poor			0	22
black spruce	Picea mariana	NSH	High	18.4	130.0	4.2	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor	Infill +	Infill +	0	23
tamarack (native)	Larix laricina	NSH	High	13.5	118.3	5.4	No change	No change	Low	Common	Poor	Poor	Infill +	Infill +	0	24
silver maple	Acer saccharinum	NSH	Low	9.2	111.3	9.1	No change	No change	High	Common	Good	Good	Infill ++	Infill ++	1	25
white spruce	Picea glauca	NSL	Medium	13.8	101.5	4.3	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	26
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	26.1	80.3	2.3	Lg. dec.	Lg. dec.	High	Common	Fair	Fair			1	27
American elm	Ulmus americana	WDH	Medium	26.2	79.8	2.1	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	28
yellow birch	Betula alleghaniensis	NDH	High	19.7	53.6	1.9	No change	Sm. inc.	Medium	Common	Fair	Good			1	29
balsam poplar	Populus balsamifera	NSH	Medium	9.5	47.4	3.0	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	30
serviceberry	Amelanchier spp.	NSL	Low	12.4	19.5	1.0	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	31
American hornbeam; musclev	Carpinus caroliniana	WSL	Low	8.6	18.4	1.5	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	32
black locust	Robinia pseudoacacia	NDH	Low	0.7	15.8	23.0	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	2	33
bur oak	Quercus macrocarpa	NDH	Medium	3.1	12.9	3.7	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	2	34
sassafras	Sassafras albidum	WSL	Low	7.7	12.7	1.2	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	1	35
pin cherry	Prunus pensylvanica	NSL	Low	5.3	11.7	1.5	Lg. dec.	Very Lg. dec.	Medium	Rare	Very Poor	Lost			0	36
swamp white oak	Quercus bicolor	NSL	Low	2.1	8.0	2.2	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	37
peachleaf willow	Salix amygdaloides	NSLX	FIA	2	6.4	3.1	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	38
Norway spruce	Picea abies	NSH	FIA	1.4	6.3	4.6	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	39
bitternut hickory	Carya cordiformis	WSL	Low	2.1	6.2	3.0	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor		Infill +	2	40
mountain maple	Acer spicatum	NSL	Low	1.3	5.8	2.8	Lg. dec.	Lg. dec.	High	Rare	Poor	Poor			0	41
black willow	Salix nigra	NSL	Low	0.7	5.7	4.8	No change	No change	Low	Rare	Very Poor	Very Poor			2	42
slippery elm	Ulmus rubra	WSL	Low	2.4	4.5	1.6	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	43
chokecherry	Prunus virginiana	NSLX	FIA	2	3.6	1.1	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	44
striped maple	Acer pensylvanicum	NSL	Medium	1.1	3.4	1.7	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	45
eastern cottonwood	Populus deltoides	NSH	Low	0.7	3.0	4.4	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	46
boxelder	Acer negundo	WSH	Low	0.7	2.8	4.0	Sm. inc.	Lg. inc.	High	Rare	Good	Good			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
blackgum	Nyssa sylvatica	WDL	Medium	0.7	1.1	1.6	Lg. inc.	Lg. inc.	High	Rare	Good	Good			2	48
pin oak	Quercus palustris	NSH	Low	0.1	1.1	0.5	Lg. inc.	Lg. inc.	Low	Rare	Fair	Fair		Infill +	2	49
flowering dogwood	Cornus florida	WDL	Medium	0.7	1.1	1.5	Sm. dec.	No change	Medium	Rare	Very Poor	Poor		Infill +	2	50
Siberian elm	Ulmus pumila	NDH	FIA	0.1	0.9	0.6	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	51
eastern redcedar	Juniperus virginiana	WDH	Medium	0.3	0.5	1.6	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	52
American mountain-ash	Sorbus americana	NSL	Low	0.3	0.2	0.1	Sm. dec.	Sm. dec.	Low	Rare	Very Poor	Very Poor			0	53
shortleaf pine	Pinus echinata	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	54
loblolly pine	Pinus taeda	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate ++	3	55
Virginia pine	Pinus virginiana	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	56
sweet birch	Betula lenta	NDH	High	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat			3	57
pignut hickory	Carya glabra	WDL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	58
shellbark hickory	Carya laciniosa	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	59
shagbark hickory	Carya ovata	WSL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Likely +	Likely +	3	60
black hickory	Carya texana	NDL	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	61
mockernut hickory	Carya alba	WDL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	62
hackberry	Celtis occidentalis	WDH	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			3	63
common persimmon	Diospyros virginiana	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate +	3	64
black walnut	Juglans nigra	WDH	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate ++	Migrate ++	3	65
sweetgum	Liquidambar styraciflua	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	66
yellow-poplar	Liriodendron tulipifera	WDH	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	67
bigleaf magnolia	Magnolia macrophylla	NSL	Low	0	0	0	Unknown	New Habitat	Medium	Absent	Unknown	New Habitat			0	68
sycamore	Platanus occidentalis	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	69
scarlet oak	Quercus coccinea	WDL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	70
southern red oak	Quercus falcata	WDL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			0	71
blackjack oak	Quercus marilandica	NSL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			0	72
chestnut oak	Quercus prinus	NDH	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			3	73
post oak	Quercus stellata	WDH	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			3	74
live oak	Quercus virginiana	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	75
winged elm	Ulmus alata	WDL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	76