

# HUC 040400 Southwestern Lake Michigan

## HUC 6 Watershed Climate Change Atlas Tree Species Current and Potential Future Habitat, Capability, and Migration

USDA Forest Service  
Northern Research Station  
Landscape Change Research Group  
Iverson, Peters, Prasad, Matthews

	sq. km	sq. mi	FIA Plots
Area of Region	5,147.2	1,987.4	94

### 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	Scenario	Scenario	Scenario	SHIFT	SHIFT			
							RCP45	RCP85	RCP45	RCP85	RCP45	RCP85			
Ash	3														
Hickory	4			High	17	22	Increase	15	15	Very Good	5	4	Likely	1	1
Maple	6	Abundant	6	Medium	26	40	No Change	16	13	Good	16	16	Infill	27	26
Oak	7	Common	23	Low	27	11	Decrease	22	25	Fair	7	8	Migrate	3	8
Pine	4	Rare	33	FIA	9		New	14	15	Poor	13	13			
Other	38	Absent	17				Unknown	12	11	Very Poor	9	9			
	62		79		79	73		79	79	FIA Only	3	3			
										Unknown	3	2			
											56	55			

### Potential Changes in Climate Variables

Temperature (°F)						Precipitation (in)						
	Scenario	2009	2039	2069	2099		Scenario	2009	2039	2069	2099	
Annual Average	CCSM45	39.4	40.3	41.6	41.6		Annual Total	CCSM45	16.7	16.5	16.3	16.6
	CCSM85	39.4	40.6	41.9	43.4			CCSM85	16.7	16.8	16.8	16.9
	GFDL45	39.4	41.0	42.0	42.5			GFDL45	16.7	17.8	19.8	19.6
	GFDL85	39.4	40.9	42.5	44.6			GFDL85	16.7	18.4	20.4	20.6
	HAD45	39.4	40.8	42.4	43.3			HAD45	16.7	17.1	18.0	17.8
	HAD85	39.4	41.0	43.1	45.5			HAD85	16.7	17.9	16.9	18.3
Growing Season (May-Sep)	CCSM45	47.8	48.7	49.8	49.9		Growing Season (May-Sep)	CCSM45	8.8	8.9	8.7	8.7
	CCSM85	47.8	49.0	50.2	51.9			CCSM85	8.8	8.6	8.7	8.2
	GFDL45	47.8	49.7	50.9	51.8			GFDL45	8.8	9.0	10.3	10.0
	GFDL85	47.8	49.6	51.6	54.0			GFDL85	8.8	9.7	10.2	10.0
	HAD45	47.8	49.3	50.4	51.5			HAD45	8.8	8.7	8.2	8.5
	HAD85	47.8	49.2	51.4	53.9			HAD85	8.8	8.8	7.4	7.7
Coldest Month (Average)	CCSM45	26.2	26.9	28.2	28.2		<p><b>NOTE:</b> 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.</p>					
	CCSM85	26.2	27.4	28.4	29.3							
	GFDL45	26.2	27.7	28.4	28.6							
	GFDL85	26.2	27.9	28.5	29.4							
	HAD45	26.2	26.8	28.6	28.7							
	HAD85	26.2	28.0	29.6	31.1							
Warmest Month (Average)	CCSM45	50.7	51.8	52.4	52.7		<p><b>Cite as:</b> Iverson, L.R.; Prasad, A.M.; Peters, M.P.; Matthews, S.N. 2019. Facilitating Adaptive Forest Management under Climate Change: A Spatially Specific Synthesis of 125 Species for Habitat Changes and Assisted Migration over the Eastern United States. <i>Forests</i>. 10(11): 989. <a href="https://doi.org/10.3390/f10110989">https://doi.org/10.3390/f10110989</a>.</p>					
	CCSM85	50.7	52.3	53.1	53.9							
	GFDL45	50.7	52.2	53.0	53.6							
	GFDL85	50.7	52.8	53.7	55.2							
	HAD45	50.7	52.3	53.1	53.7							
	HAD85	50.7	52.7	54.0	55.7							





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Common Name	Scientific Name	Range	MR	%Cell	FIAsum	FIAiv	ChngCl45	ChngCl85	Adap	Abund	Capabil45	Capabil85	SHIFT45	SHIFT85	SSO	N
eastern redcedar	Juniperus virginiana	WDH	Medium	11.2	11.5	3.2	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	2	48
chokecherry	Prunus virginiana	NSLX	FIA	3.9	8.7	2.2	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	49
white spruce	Picea glauca	NSL	Medium	9.9	7.6	2.0	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	50
black spruce	Picea mariana	NSH	High	1.9	6.0	3.1	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	51
American hornbeam; musclev	Carpinus caroliniana	WSL	Low	2.2	4.8	0.3	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	52
jack pine	Pinus banksiana	NSH	Medium	1.8	4.4	2.1	Lg. dec.	Lg. dec.	High	Rare	Poor	Poor			0	53
butternut	Juglans cinerea	NSLX	FIA	0.1	4.1	0.1	Unknown	Unknown	Low	Rare	FIA Only	FIA Only			0	54
ailanthus	Ailanthus altissima	NSL	FIA	2.8	3.1	0.6	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	55
sycamore	Platanus occidentalis	NSL	Low	0.7	3.0	0.1	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	56
balsam poplar	Populus balsamifera	NSH	Medium	0.4	2.2	0.2	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	57
pawpaw	Asimina triloba	NSL	Low	1.9	1.9	1.0	Very Lg. dec.	Very Lg. dec.	Medium	Rare	Lost	Lost			0	58
Siberian elm	Ulmus pumila	NDH	FIA	6.2	1.6	2.5	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	59
black maple	Acer nigrum	NSH	Low	0.4	1.2	0.1	Very Lg. dec.	Very Lg. dec.	High	Rare	Lost	Lost			0	60
honeylocust	Gleditsia triacanthos	NSH	Low	0.6	1.1	0.2	Lg. inc.	Lg. inc.	High	Rare	Good	Good			2	61
Norway maple	Acer platanoides	NSL	FIA	1.8	0.3	0.1	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	62
slash pine	Pinus elliottii	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	63
loblolly pine	Pinus taeda	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate ++	3	64
Ohio buckeye	Aesculus glabra	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Likely +	Likely +	3	65
cittamwood/gum bumelia	Sideroxylon lanuginosum ssp.	NSL	Low	0	0	0	Unknown	New Habitat	High	Absent	Unknown	New Habitat			3	66
pecan	Carya illinoensis	NSH	Low	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat			3	67
black hickory	Carya texana	NDL	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	68
sugarberry	Celtis laevigata	NDH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	69
eastern redbud	Cercis canadensis	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	70
common persimmon	Diospyros virginiana	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate +	3	71
sweetgum	Liquidambar styraciflua	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	72
shingle oak	Quercus imbricaria	NDH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	73
blackjack oak	Quercus marilandica	NSL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			3	74
chinkapin oak	Quercus muehlenbergii	NSL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	75
post oak	Quercus stellata	WDH	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate ++	Migrate ++	3	76
bluejack oak	Quercus incana	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	77
American mountain-ash	Sorbus americana	NSL	Low	0	0	0	Unknown	Unknown	Low	Absent	Unknown	Unknown			0	78
winged elm	Ulmus alata	WDL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate ++	3	79