

HUC 041000 Western Lake Erie

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	30,747	11,872	206

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	4			High	14	22	Increase	17	16	Very Good	2	1	Likely	0	0
Hickory	5			Medium	29	40	No Change	16	13	Good	10	10	Infill	31	31
Maple	5	Abundant	0	Low	30	14	Decrease	26	30	Fair	15	15	Migrate	2	3
Oak	11	Common	13	FIA	7		New	11	11	Poor	13	12			
Pine	4	Rare	53				Unknown	10	10	Very Poor	19	20			
Other	37	Absent	12							FIA Only	3	3			
	66		78		80	76		80	80	Unknown	3	3			
											65	64			

Potential Changes in Climate Variables

Temperature (°F)

Scenario	2009	2039	2069	2099		
Annual	CCSM45	44.8	46.0	47.9	48.0	
Average	CCSM85	44.8	46.5	48.5	50.7	
	GFDL45	44.8	48.4	48.9	49.6	
	GFDL85	44.8	47.0	49.6	52.7	
	HAD45	44.8	47.0	49.5	50.7	
	HAD85	44.8	47.2	50.5	54.1	
Growing Season	CCSM45	57.4	58.7	60.4	60.7	
	CCSM85	57.4	59.3	61.1	63.9	
May—Sep	GFDL45	57.4	61.8	62.4	63.4	
	GFDL85	57.4	60.3	63.3	67.0	
	HAD45	57.4	59.9	62.0	63.7	
	HAD85	57.4	59.8	63.8	67.6	
Coldest Month	CCSM45	25.0	26.2	27.8	27.8	
	CCSM85	25.0	26.9	28.0	29.4	
Average	GFDL45	25.0	27.4	28.0	28.5	
	GFDL85	25.0	27.3	28.3	29.4	
	HAD45	25.0	26.2	28.7	28.6	
	HAD85	25.0	27.4	29.4	31.6	
Warmest Month	CCSM45	61.7	63.0	64.2	64.5	
	CCSM85	61.7	64.0	65.2	66.7	
Average	GFDL45	61.7	63.9	65.3	65.9	
	GFDL85	61.7	64.6	66.1	68.4	
	HAD45	61.7	64.5	66.1	67.1	
	HAD85	61.7	65.1	68.0	70.6	

Precipitation (in)

Scenario	2009	2039	2069	2099		
Annual	CCSM45	26.1	26.3	26.2	27.0	
Total	CCSM85	26.1	26.8	26.8	27.7	
	GFDL45	26.1	28.2	30.9	31.6	
	GFDL85	26.1	27.8	31.5	32.8	
	HAD45	26.1	26.6	27.8	27.7	
	HAD85	26.1	27.8	26.0	28.2	
Growing Season	CCSM45	13.0	13.1	12.7	12.7	
	CCSM85	13.0	12.5	12.6	12.2	
May—Sep	GFDL45	13.0	13.8	14.5	15.1	
	GFDL85	13.0	13.7	14.5	14.6	
	HAD45	13.0	13.1	12.1	12.7	
	HAD85	13.0	12.8	10.5	11.2	

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
sugar maple	Acer saccharum	WDH	High	47.8	172.6	10.3	No change	Sm. dec.	High	Common	Good	Fair	Infill ++	Infill +	1	1
American elm	Ulmus americana	WDH	Medium	65.9	147.9	7.0	Sm. inc.	Sm. inc.	Medium	Common	Good	Good	Infill ++	Infill ++	1	2
black cherry	Prunus serotina	WDL	Medium	42.7	146.8	7.6	No change	Sm. dec.	Low	Common	Poor	Poor	Infill +	Infill +	0	3
shagbark hickory	Carya ovata	WSL	Medium	50.1	137.5	10.6	Sm. dec.	Lg. dec.	Medium	Common	Poor	Poor	Infill +	Infill +	0	4
American basswood	Tilia americana	WSL	Medium	46.4	127.9	10.9	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor	Infill +	Infill +	0	5
red maple	Acer rubrum	WDH	High	43.9	124.3	11.3	Sm. dec.	Sm. dec.	High	Common	Fair	Fair	Infill +	Infill +	1	6
black walnut	Juglans nigra	WDH	Low	37.4	108.2	8.3	No change	No change	Medium	Common	Fair	Fair	Infill +	Infill +	1	7
green ash	Fraxinus pennsylvanica	WSH	Low	43.7	105.6	11.5	Sm. inc.	Sm. inc.	Medium	Common	Good	Good	Infill ++	Infill ++	1	8
northern red oak	Quercus rubra	WDH	Medium	40.7	95.3	7.1	No change	Sm. dec.	High	Common	Good	Fair	Infill ++	Infill +	1	9
white ash	Fraxinus americana	WDL	Medium	55.4	87.1	7.9	Sm. inc.	Sm. inc.	Low	Common	Fair	Fair	Infill +	Infill +	1	10
white oak	Quercus alba	WDH	Medium	25.4	74.9	7.6	Sm. inc.	No change	High	Common	Very Good	Good	Infill ++	Infill ++	2	11
black oak	Quercus velutina	WDH	High	12.4	68.3	8.8	No change	No change	Medium	Common	Fair	Fair	Infill +	Infill +	2	12
eastern white pine	Pinus strobus	WDH	High	4	62.2	11.1	Lg. dec.	Lg. dec.	Low	Rare	Very Poor	Very Poor			2	13
silver maple	Acer saccharinum	NSH	Low	19.4	56.5	8.3	Lg. inc.	Sm. inc.	High	Common	Very Good	Very Good	Infill ++	Infill ++	2	14
bitternut hickory	Carya cordiformis	WSL	Low	35.7	49.3	4.3	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	1	15
eastern cottonwood	Populus deltoides	NSH	Low	16	44.2	6.1	Sm. inc.	Sm. inc.	Medium	Rare	Fair	Fair	Infill +	Infill +	2	16
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	35.5	33.9	3.3	Sm. dec.	Lg. dec.	High	Rare	Poor	Poor	Infill +	Infill +	1	17
swamp white oak	Quercus bicolor	NSL	Low	9.1	33.1	7.7	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	18
bur oak	Quercus macrocarpa	NDH	Medium	20.5	32.3	12.1	No change	Sm. inc.	High	Rare	Fair	Good	Infill +	Infill ++	2	19
Scots pine	Pinus sylvestris	NSH	FIA	2.3	28.5	11.6	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	20
hackberry	Celtis occidentalis	WDH	Medium	29	28.2	7.5	Lg. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	2	21
boxelder	Acer negundo	WSH	Low	16.2	27.9	5.3	Lg. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	2	22
slippery elm	Ulmus rubra	WSL	Low	29.2	26.9	3.6	No change	Sm. inc.	Medium	Rare	Poor	Fair	Infill +	Infill +	2	23
scarlet oak	Quercus coccinea	WDL	Medium	5.9	22.9	19.8	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	24
red pine	Pinus resinosa	NSH	Medium	3.1	21.4	11.1	Lg. dec.	Lg. dec.	Low	Rare	Very Poor	Very Poor			0	25
white mulberry	Morus alba	NSL	FIA	9.1	19.4	5.5	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	26
American beech	Fagus grandifolia	WDH	High	21.2	18.4	5.0	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			2	27
Ohio buckeye	Aesculus glabra	NSL	Low	16	18.2	4.0	Sm. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			2	28
sassafras	Sassafras albidum	WSL	Low	12.4	17.2	4.5	Sm. inc.	Lg. dec.	Medium	Rare	Fair	Very Poor	Infill +		2	29
black locust	Robinia pseudoacacia	NDH	Low	4.7	16.2	10.7	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	30
pin oak	Quercus palustris	NSH	Low	20.4	15.4	5.7	Lg. inc.	Lg. inc.	Low	Rare	Fair	Fair	Infill +	Infill +	2	31
pignut hickory	Carya glabra	WDL	Medium	12.5	15.4	4.8	Sm. inc.	No change	Medium	Rare	Fair	Poor	Infill +	Infill +	2	32
bigtooth aspen	Populus grandidentata	NSL	Medium	3.2	11.0	6.0	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			2	33
Norway spruce	Picea abies	NSH	FIA	2.7	10.9	7.9	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	34
honeylocust	Gleditsia triacanthos	NSH	Low	6.7	8.4	8.8	No change	Sm. inc.	High	Rare	Fair	Good	Infill +		2	35
black willow	Salix nigra	NSH	Low	4.4	8.4	5.2	Sm. dec.	No change	Low	Rare	Very Poor	Very Poor			2	36
sycamore	Platanus occidentalis	NSL	Low	9.1	7.2	5.7	Sm. inc.	Sm. inc.	Medium	Rare	Fair	Fair	Infill +	Infill +	2	37
shingle oak	Quercus imbricaria	NDH	Medium	1	6.7	3.4	No change	Sm. dec.	Medium	Rare	Poor	Very Poor	Infill +		2	38
eastern redcedar	Juniperus virginiana	WDH	Medium	1.1	6.1	3.2	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	39
white spruce	Picea glauca	NSL	Medium	0.1	5.2	5.2	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	40
blue ash	Fraxinus quadrangulata	NSL	Low	4.8	4.8	3.9	Sm. dec.	Sm. dec.	Low	Rare	Very Poor	Very Poor			0	41
mockernut hickory	Carya alba	WDL	Medium	7.5	4.4	2.5	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	2	42
American hornbeam; muscle	Carpinus caroliniana	WSL	Low	8.6	4.0	1.2	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	43
black ash	Fraxinus nigra	WSH	Medium	8.2	4.0	3.2	Lg. dec.	Lg. dec.	Low	Rare	Very Poor	Very Poor			0	44
northern pin oak	Quercus ellipsoidalis	NSH	Medium	0.7	3.8	5.9	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor			0	45
yellow-poplar	Liriodendron tulipifera	WDH	High	8.1	2.9	3.4	Sm. inc.	No change	High	Rare	Good	Fair		Infill +	2	46
winged elm	Ulmus alata	WDL	Medium	0.3	2.9	8.8	Sm. inc.	Lg. inc.	Medium	Rare	Fair	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
chinkapin oak	Quercus muehlenbergii	NSL	Medium	6.6	2.9	2.4	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	48
quaking aspen	Populus tremuloides	WDH	High	4.5	2.1	1.6	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor				49
Osage-orange	Maclura pomifera	NDH	Medium	2.9	1.8	3.9	Lg. inc.	Lg. inc.	High	Rare	Good	Good				50
northern catalpa	Catalpa speciosa	NSHX	FIA	1	1.8	17.9	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only				51
flowering dogwood	Cornus florida	WDL	Medium	7.1	1.5	1.3	Sm. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor				52
tamarack (native)	Larix laricina	NSH	High	0.3	1.3	4.0	Sm. dec.	Sm. dec.	Low	Rare	Very Poor	Very Poor				53
eastern redbud	Cercis canadensis	NSL	Low	2.5	1.2	1.9	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	54
butternut	Juglans cinerea	NSLX	FIA	1.1	1.1	2.3	Unknown	Unknown	Low	Rare	FIA Only	FIA Only				55
chokecherry	Prunus virginiana	NSLX	FIA	1.2	1.0	2.5	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only				56
Siberian elm	Ulmus pumila	NDH	FIA	1	0.8	7.8	Unknown	Unknown	NA	Rare	NNIS	NNIS				57
black maple	Acer nigrum	NSH	Low	0.9	0.8	2.9	Lg. dec.	Lg. dec.	High	Rare	Poor	Poor				58
red mulberry	Morus rubra	NSL	Low	1.3	0.6	6.8	Lg. inc.	Sm. inc.	Medium	Rare	Good	Fair		Infill +		59
blackgum	Nyssa sylvatica	WDL	Medium	0.4	0.6	2.2	No change	No change	High	Rare	Fair	Fair		Infill +		60
pawpaw	Asimina triloba	NSL	Low	2	0.2	0.6	Lg. dec.	Very Lg. dec.	Medium	Rare	Very Poor	Lost				61
shellbark hickory	Carya laciniosa	NSL	Low	1.2	0.2	2.5	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor				62
overcup oak	Quercus lyrata	NSL	Medium	1.3	0.1	1.6	Lg. dec.	Lg. dec.	Low	Rare	Very Poor	Very Poor				63
yellow buckeye	Aesculus flava	NSL	Low	1.3	0.1	1.4	Sm. dec.	Sm. dec.	Low	Rare	Very Poor	Very Poor				64
serviceberry	Amelanchier spp.	NSL	Low	0.2	0.1	0.2	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor				65
jack pine	Pinus banksiana	NSH	Medium	0.2	0.1	0.1	Lg. dec.	Lg. dec.	High	Rare	Poor	Poor				66
ashe juniper	Juniperus ashei	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat				67
yellow birch	Betula alleghaniensis	NDL	High	0	0	0	Unknown	Unknown	Medium	Modeled	Unknown	Unknown				68
pecan	Carya illinoensis	NSH	Low	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat				69
black hickory	Carya texana	NDL	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat				70
sugarberry	Celtis laevigata	NDH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat				71
common persimmon	Diospyros virginiana	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate +		72
sweetgum	Liquidambar styraciflua	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +			73
pin cherry	Prunus pensylvanica	NSL	Low	0	0	0	Unknown	Unknown	Medium	Modeled	Unknown	Unknown				74
blackjack oak	Quercus marilandica	NSL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat				75
Shumard oak	Quercus shumardii	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate +		76
post oak	Quercus stellata	WDH	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate ++	Migrate ++		77
live oak	Quercus virginiana	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat				78
bluejack oak	Quercus incana	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown				79
cedar elm	Ulmus crassifolia	NDH	Medium	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat				80