

	sq. km	sq. mi	FIA Plots
Area of Region	69,555	26,855	2,126

**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	21	24	Increase	14	14	Very Good	7	7	Likely	1	1
Hickory	2			Medium	30	51	No Change	15	13	Good	9	8	Infill	16	17
Maple	6	Abundant	2	Low	33	15	Decrease	21	23	Fair	9	9	Migrate	13	14
Oak	7	Common	30	FIA	11		New	25	29	Poor	13	15		<b>30</b>	<b>32</b>
Pine	4	Rare	29				Unknown	20	16	Very Poor	11	9			
Other	39	Absent	34					<b>95</b>	<b>95</b>	FIA Only	6	6			
	<b>61</b>		<b>95</b>		<b>95</b>	<b>90</b>				Unknown	9	5			
											<b>64</b>	<b>59</b>			

**Potential Changes in Climate Variables**

**Temperature (°F)**

	Scenario	2009	2039	2069	2099	
Annual Average	CCSM45	45.6	47.6	50.6	50.7	
	CCSM85	45.6	48.4	51.3	54.6	
	GFDL45	45.6	49.3	51.2	52.5	
	GFDL85	45.6	48.9	52.4	57.2	
	HAD45	45.6	48.7	52.3	54.1	
	HAD85	45.6	49.1	53.6	58.9	
Growing Season (May—Sep)	CCSM45	64.9	67.1	69.5	69.8	
	CCSM85	64.9	67.8	70.4	74.5	
	GFDL45	64.9	69.2	71.6	73.6	
	GFDL85	64.9	69.0	72.9	78.6	
	HAD45	64.9	68.1	70.8	73.0	
	HAD85	64.9	68.1	72.8	78.0	
Coldest Month (Average)	CCSM45	14.8	16.6	19.4	19.5	
	CCSM85	14.8	17.4	19.6	21.8	
	GFDL45	14.8	18.3	19.9	20.2	
	GFDL85	14.8	18.8	20.4	22.8	
	HAD45	14.8	16.1	20.3	20.3	
	HAD85	14.8	19.4	22.8	26.2	
Warmest Month (Average)	CCSM45	71.2	73.7	75.1	75.7	
	CCSM85	71.2	74.9	76.7	78.9	
	GFDL45	71.2	74.6	76.1	77.7	
	GFDL85	71.2	75.6	77.6	81.1	
	HAD45	71.2	74.4	76.1	77.4	
	HAD85	71.2	75.5	78.1	81.8	

**Precipitation (in)**

	Scenario	2009	2039	2069	2099	
Annual Total	CCSM45	33.6	33.6	33.4	33.6	
	CCSM85	33.6	33.4	33.9	34.0	
	GFDL45	33.6	36.2	39.6	37.8	
	GFDL85	33.6	37.2	40.3	39.5	
	HAD45	33.6	34.8	35.8	35.8	
	HAD85	33.6	35.2	34.7	37.1	
Growing Season (May—Sep)	CCSM45	20.0	19.8	19.3	19.9	
	CCSM85	20.0	19.5	19.6	18.6	
	GFDL45	20.0	20.9	22.9	21.2	
	GFDL85	20.0	21.9	22.3	20.9	
	HAD45	20.0	19.9	18.9	19.3	
	HAD85	20.0	19.8	17.3	17.9	

**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
American elm	Ulmus americana	WDH	Medium	66.9	579.6	8.5	No change	No change	Medium	Abundant	Good	Good			1	1
red maple	Acer rubrum	WDH	High	43.1	538.8	10.4	Sm. dec.	Sm. dec.	High	Abundant	Good	Good			1	2
boxelder	Acer negundo	WSH	Low	50.4	481.0	10.4	No change	Sm. dec.	High	Common	Good	Fair			1	3
black cherry	Prunus serotina	WDL	Medium	72.1	461.4	7.1	Sm. inc.	No change	Low	Common	Fair	Poor			1	4
eastern white pine	Pinus strobus	WDH	High	34.6	445.6	12.8	Lg. dec.	Lg. dec.	Low	Common	Very Poor	Very Poor			0	5
northern red oak	Quercus rubra	WDH	Medium	49.7	433.4	8.0	No change	No change	High	Common	Good	Good			1	6
white oak	Quercus alba	WDH	Medium	55.6	421.4	7.6	Sm. inc.	No change	High	Common	Very Good	Good			1	7
red pine	Pinus resinosa	NSH	Medium	25.1	387.4	15.0	Sm. dec.	Sm. dec.	Low	Common	Poor	Poor	Infill +	Infill +	0	8
quaking aspen	Populus tremuloides	WDH	High	42.9	378.8	8.5	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor			0	9
black oak	Quercus velutina	WDH	High	36.2	377.9	10.4	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	10
American basswood	Tilia americana	WSL	Medium	42.5	290.6	6.6	No change	No change	Medium	Common	Fair	Fair			1	11
bur oak	Quercus macrocarpa	NDH	Medium	43	281.0	7.5	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	12
sugar maple	Acer saccharum	WDH	High	28.1	266.7	8.8	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good	Infill ++	Infill ++	1	13
northern pin oak	Quercus ellipsoidalis	NSH	Medium	32.5	263.5	8.0	Sm. dec.	Lg. dec.	High	Common	Fair	Fair			1	14
green ash	Fraxinus pennsylvanica	WDH	Low	31.1	255.6	8.7	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	15
paper birch	Betula papyrifera	WDH	High	31.8	211.6	5.1	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor			0	16
shagbark hickory	Carya ovata	WSL	Medium	36.9	207.6	6.4	No change	Sm. dec.	Medium	Common	Fair	Poor			1	17
silver maple	Acer saccharinum	NSH	Low	13	190.1	11.0	Sm. inc.	Lg. inc.	High	Common	Very Good	Very Good	Infill ++	Infill ++	1	18
jack pine	Pinus banksiana	NSH	Medium	14.9	186.6	12.7	Sm. dec.	Lg. dec.	High	Common	Fair	Fair	Infill +	Infill +	1	19
black walnut	Juglans nigra	WDH	Low	21.4	182.6	9.2	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	20
bigtooth aspen	Populus grandidentata	NSL	Medium	27.5	173.3	5.3	Sm. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	21
white ash	Fraxinus americana	WDL	Medium	30.8	169.3	5.3	Sm. inc.	Sm. inc.	Low	Common	Fair	Fair			1	22
bitternut hickory	Carya cordiformis	WSL	Low	30.6	145.5	4.7	No change	Sm. inc.	High	Common	Good	Very Good			1	23
slippery elm	Ulmus rubra	WSL	Low	32.3	110.4	3.6	No change	No change	Medium	Common	Fair	Fair			1	24
black ash	Fraxinus nigra	WSH	Medium	17.9	102.8	4.8	Lg. dec.	Lg. dec.	Low	Common	Very Poor	Very Poor			0	25
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	23.5	101.1	3.4	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	26
eastern redcedar	Juniperus virginiana	WDH	Medium	14.8	87.7	6.3	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good	Infill ++	Infill ++	1	27
tamarack (native)	Larix laricina	NSH	High	6.2	84.4	10.3	Sm. dec.	Sm. dec.	Low	Common	Poor	Poor	Infill +	Infill +	2	28
black locust	Robinia pseudoacacia	NDH	Low	7.1	80.8	11.8	No change	No change	Medium	Common	Fair	Fair	Infill +	Infill +	1	29
black willow	Salix nigra	NSH	Low	6.8	76.4	14.3	Sm. dec.	No change	Low	Common	Poor	Poor	Infill +	Infill +	0	30
white spruce	Picea glauca	NSL	Medium	6.6	58.2	10.1	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor	Infill +	Infill +	0	31
hackberry	Celtis occidentalis	WDH	Medium	15.7	57.4	3.0	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good	Infill ++	Infill ++	1	32
Scots pine	Pinus sylvestris	NSH	FIA	5	44.5	9.3	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	33
red mulberry	Morus rubra	NSL	Low	8.7	43.0	6.3	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	1	34
eastern cottonwood	Populus deltoides	NSH	Low	7.9	40.6	4.7	No change	Sm. inc.	Medium	Rare	Poor	Fair	Infill +	Infill +	2	35
river birch	Betula nigra	NSL	Low	3	27.3	7.8	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			2	36
Siberian elm	Ulmus pumila	NDH	FIA	2.6	26.7	9.8	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	37
northern white-cedar	Thuja occidentalis	WSH	High	2.8	25.7	11.1	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	38
swamp white oak	Quercus bicolor	NSL	Low	4.8	21.1	4.6	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	39
butternut	Juglans cinerea	NSLX	FIA	6.7	20.6	2.4	Unknown	Unknown	Low	Rare	FIA Only	FIA Only			0	40
white mulberry	Morus alba	NSL	FIA	4.3	16.2	5.0	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	41
Norway spruce	Picea abies	NSH	FIA	3.6	14.1	9.2	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	42
yellow birch	Betula alleghaniensis	NDL	High	3.7	12.5	2.0	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			2	43
black spruce	Picea mariana	NSH	High	1.3	12.3	3.0	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	44
American beech	Fagus grandifolia	WDH	High	1.1	11.3	5.1	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	45
American hornbeam; musclev	Carpinus caroliniana	WSL	Low	6	8.2	0.9	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	46
serviceberry	Amelanchier spp.	NSL	Low	4.6	8.1	1.6	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	47

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
balsam fir	Abies balsamea	NDH	High	0.8	8.0	7.1	No change	Sm. dec.	Low	Rare	Very Poor	Very Poor			2	48
chokecherry	Prunus virginiana	NSLX	FIA	7.2	7.2	1.0	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	49
chinkapin oak	Quercus muehlenbergii	NSL	Medium	0.4	5.9	3.7	Sm. inc.	Sm. inc.	Medium	Rare	Fair	Fair	Infill +	Infill +	2	50
wild plum	Prunus americana	NSLX	FIA	1.8	5.6	2.9	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	51
pin cherry	Prunus pensylvanica	NSL	Low	3	4.1	1.8	Lg. dec.	Very Lg. dec.	Medium	Rare	Very Poor	Lost			0	52
black maple	Acer nigrum	NSH	Low	0.3	3.9	3.2	Sm. dec.	Lg. dec.	High	Rare	Poor	Poor			0	53
peachleaf willow	Salix amygdaloides	NSLX	FIA	1.5	3.1	3.4	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	54
eastern hemlock	Tsuga canadensis	NSH	High	0.2	2.3	2.1	No change	Sm. dec.	Low	Rare	Very Poor	Very Poor			2	55
honeylocust	Gleditsia triacanthos	NSH	Low	1.1	2.2	2.3	Lg. inc.	Lg. inc.	High	Rare	Good	Good			2	56
Norway maple	Acer platanoides	NSL	FIA	0.1	0.7	4.6	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	57
flowering dogwood	Cornus florida	WDL	Medium	0.1	0.4	3.0	Sm. dec.	No change	Medium	Rare	Very Poor	Poor		Infill +	2	58
rock elm	Ulmus thomasii	NSLX	FIA	0.2	0.4	0.3	Unknown	Unknown	Low	Rare	FIA Only	FIA Only			0	59
northern catalpa	Catalpa speciosa	NSHX	FIA	0.1	0.3	2.2	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	60
balsam poplar	Populus balsamifera	NSH	Medium	0.3	0.2	0.6	Very Lg. dec.	Very Lg. dec.	Medium	Rare	Lost	Lost			0	61
shortleaf pine	Pinus echinata	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	62
slash pine	Pinus elliotii	NDH	High	0	0	0	Unknown	New Habitat	Medium	Absent	Unknown	New Habitat			0	63
loblolly pine	Pinus taeda	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	64
Virginia pine	Pinus virginiana	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	65
striped maple	Acer pensylvanicum	NSL	Medium	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	66
mountain maple	Acer spicatum	NSL	Low	0	0	0	New Habitat	Unknown	High	Absent	New Habitat	Unknown			3	67
Ohio buckeye	Aesculus glabra	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Likely +	Likely +	3	68
cittamwood/gum bumelia	Sideroxylon lanuginosum ssp.	NSL	Low	0	0	0	Unknown	New Habitat	High	Absent	Unknown	New Habitat			3	69
pignut hickory	Carya glabra	WDL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	70
pecan	Carya illinoensis	NSH	Low	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat			3	71
shellbark hickory	Carya laciniosa	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	72
black hickory	Carya texana	NDL	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	73
mockernut hickory	Carya alba	WDL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	74
sugarberry	Celtis laevigata	NDH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	75
eastern redbud	Cercis canadensis	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	76
common persimmon	Diospyros virginiana	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate +	3	77
sweetgum	Liquidambar styraciflua	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	78
yellow-poplar	Liriodendron tulipifera	WDH	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	79
Osage-orange	Maclura pomifera	NDH	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	80
cucumbertree	Magnolia acuminata	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	81
mountain or Fraser magnolia	Magnolia fraseri	NSL	Low	0	0	0	Unknown	Unknown	Low	Absent	Unknown	Unknown			0	82
blackgum	Nyssa sylvatica	WDL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	83
sycamore	Platanus occidentalis	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	84
scarlet oak	Quercus coccinea	WDL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	85
shingle oak	Quercus imbricaria	NDH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	86
laurel oak	Quercus laurifolia	NDH	Medium	0	0	0	Unknown	New Habitat	Medium	Absent	Unknown	New Habitat			0	87
blackjack oak	Quercus marilandica	NSL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			3	88
pin oak	Quercus palustris	NSH	Low	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	89
Shumard oak	Quercus shumardii	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			3	90
post oak	Quercus stellata	WDH	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	91
bluejack oak	Quercus incana	NSL	Low	0	0	0	Unknown	New Habitat	Medium	Absent	Unknown	New Habitat			0	92
sassafras	Sassafras albidum	WSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	93
American mountain-ash	Sorbus americana	NSL	Low	0	0	0	Unknown	New Habitat	Low	Absent	Unknown	New Habitat			0	94

# Northwoods sWI

## NIACS EVAS Region 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

Common Name	Scientific Name	Range	MR	%Cell	FIAsum	FIAiv	ChngCl45	ChngCl85	Adap	Abund	Capabil45	Capabil85	SHIFT45	SHIFT85	SSO	N
winged elm	Ulmus alata	WDL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	95