

One x One Degree
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 8,837.4 3,412.1 416

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	RCP45	RCP85	
												RCP45
Ash	3									SHIFT	SHIFT	
Hickory	2			High	19	21	Increase	18	18	Very Good	8	8
Maple	5	Abundant	8	Medium	23	36	No Change	10	8	Good	12	12
Oak	6	Common	17	Low	23	12	Decrease	13	15	Fair	8	7
Pine	4	Rare	21	FIA	5		New	22	23	Poor	5	7
Other	26	Absent	24				Unknown	7	6	Very Poor	7	5
	46		70		70	69		70	70	FIA Only	4	4
										Unknown	2	1
											46	44

Potential Changes in Climate Variables

Temperature (°F)					
Scenario	2009	2039	2069	2099	
Annual	CCSM45	43.8	45.7	48.9	48.9
Average	CCSM85	43.8	46.5	49.5	53.0
	GFDL45	43.8	47.0	49.5	50.9
	GFDL85	43.8	47.2	50.6	55.6
	HAD45	43.8	46.9	50.6	52.4
	HAD85	43.8	47.4	51.8	57.3
Growing	CCSM45	63.4	65.4	68.1	68.3
Season	CCSM85	63.4	66.3	69.0	73.2
May—Sep	GFDL45	63.4	67.1	70.1	72.3
	GFDL85	63.4	67.5	71.5	77.3
	HAD45	63.4	66.7	69.5	71.8
	HAD85	63.4	66.7	71.4	77.0
Coldest	CCSM45	12.3	14.0	16.8	17.1
Month	CCSM85	12.3	14.6	16.8	19.3
Average	GFDL45	12.3	15.9	17.6	18.0
	GFDL85	12.3	16.5	18.1	21.0
	HAD45	12.3	13.6	17.9	17.7
	HAD85	12.3	17.1	20.4	23.9
Warmest	CCSM45	69.7	72.1	73.6	74.1
Month	CCSM85	69.7	73.4	75.1	77.6
Average	GFDL45	69.7	73.1	74.7	76.4
	GFDL85	69.7	74.1	76.2	79.8
	HAD45	69.7	73.1	74.7	76.3
	HAD85	69.7	74.2	76.7	80.7

Precipitation (in)					
Scenario	2009	2039	2069	2099	
Annual	CCSM45	32.7	33.1	32.6	32.8
Total	CCSM85	32.7	32.3	32.8	33.0
	GFDL45	32.7	35.4	37.7	35.7
	GFDL85	32.7	35.9	38.5	37.2
	HAD45	32.7	33.8	34.8	35.0
	HAD85	32.7	33.9	34.8	36.6
Growing	CCSM45	20.3	20.1	19.2	19.9
Season	CCSM85	20.3	19.8	19.6	18.7
May—Sep	GFDL45	20.3	21.4	22.5	20.5
	GFDL85	20.3	21.9	22.1	20.2
	HAD45	20.3	20.0	19.3	19.6
	HAD85	20.3	19.8	18.2	18.6

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
red maple	Acer rubrum	WDH	High	87.7	1522.7	13.3	No change	Sm. dec.	High	Abundant	Very Good	Good			1	1
eastern white pine	Pinus strobus	WDH	High	72.9	1371.5	14.5	Lg. dec.	Lg. dec.	Low	Abundant	Poor	Poor			0	2
quaking aspen	Populus tremuloides	WDH	High	79.3	1340.7	13.7	Sm. dec.	Lg. dec.	Medium	Abundant	Fair	Fair			0	3
jack pine	Pinus banksiana	NSH	Medium	41	800.6	12.1	Sm. dec.	Lg. dec.	High	Abundant	Good	Good			1	4
red pine	Pinus resinosa	NSH	Medium	49.2	626.7	8.5	No change	Sm. dec.	Low	Abundant	Fair	Fair			0	5
northern pin oak	Quercus ellipsoidalis	NSH	Medium	48.8	596.9	6.9	Sm. dec.	Sm. dec.	High	Abundant	Good	Good			1	6
black oak	Quercus velutina	WDH	High	44.7	595.7	7.1	Sm. inc.	Sm. inc.	Medium	Abundant	Very Good	Very Good			1	7
northern red oak	Quercus rubra	WDH	Medium	66.3	559.5	7.0	No change	No change	High	Abundant	Very Good	Very Good			1	8
American elm	Ulmus americana	WDH	Medium	48.4	417.5	7.7	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	9
white oak	Quercus alba	WDH	Medium	64.1	412.7	5.1	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	10
paper birch	Betula papyrifera	WDH	High	59.9	312.5	4.4	No change	No change	Medium	Common	Fair	Fair			1	11
bigtooth aspen	Populus grandidentata	NSL	Medium	50.3	260.3	4.9	No change	No change	Medium	Common	Fair	Fair			1	12
white ash	Fraxinus americana	WDL	Medium	37.2	225.5	6.3	Sm. inc.	Sm. inc.	Low	Common	Fair	Fair			1	13
green ash	Fraxinus pennsylvanica	WSH	Low	29.4	184.9	5.0	Sm. inc.	Lg. inc.	Medium	Common	Good	Very Good			1	14
sugar maple	Acer saccharum	WDH	High	29.9	165.6	6.0	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good	Infill ++	Infill ++	1	15
American basswood	Tilia americana	WSL	Medium	40.1	163.2	3.9	Lg. inc.	Sm. inc.	Medium	Common	Very Good	Good			1	16
black ash	Fraxinus nigra	WSH	Medium	32.6	160.1	5.2	No change	Sm. dec.	Low	Common	Poor	Poor			0	17
bur oak	Quercus macrocarpa	NDH	Medium	39.2	142.9	2.9	Lg. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	18
black cherry	Prunus serotina	WDL	Medium	50.9	133.8	1.4	Lg. inc.	Lg. inc.	Low	Common	Good	Good			1	19
tamarack (native)	Larix laricina	NSH	High	16.4	127.8	7.5	Sm. dec.	Sm. dec.	Low	Common	Poor	Poor			0	20
white spruce	Picea glauca	NSL	Medium	13.6	92.8	10.8	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor			0	21
silver maple	Acer saccharinum	NSH	Low	14.5	88.8	5.3	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good	Infill ++	Infill ++	1	22
bitternut hickory	Carya cordiformis	WSL	Low	20	83.9	4.0	No change	Sm. inc.	High	Common	Good	Very Good			1	23
Scots pine	Pinus sylvestris	NSH	FIA	7.5	79.1	6.6	Unknown	Unknown	NA	Common	NNIS	NNIS			0	24
boxelder	Acer negundo	WSH	Low	8.5	73.0	4.8	No change	No change	High	Common	Good	Good			1	25
American hornbeam; musclev	Carpinus caroliniana	WSL	Low	27.4	43.4	1.6	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	26
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	27	37.9	1.7	Lg. inc.	Lg. inc.	High	Rare	Good	Good			1	27
shagbark hickory	Carya ovata	WSL	Medium	4.5	37.2	4.1	Sm. inc.	No change	Medium	Rare	Fair	Poor	Infill +	Infill +	2	28
serviceberry	Amelanchier spp.	NSL	Low	11.1	35.8	2.6	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	29
river birch	Betula nigra	NSL	Low	5.8	34.9	4.1	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	30
yellow birch	Betula alleghaniensis	NDL	High	22.3	33.1	2.2	Sm. dec.	No change	Medium	Rare	Very Poor	Poor			1	31
butternut	Juglans cinerea	NSLX	FIA	4.8	26.8	3.2	Unknown	Unknown	Low	Rare	FIA Only	FIA Only			0	32
swamp white oak	Quercus bicolor	NSL	Low	3.2	23.5	2.6	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	33
black spruce	Picea mariana	NSH	High	5.1	21.5	3.6	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	34
slippery elm	Ulmus rubra	WSL	Low	9.7	9.7	1.5	Sm. inc.	Sm. inc.	Medium	Rare	Fair	Fair	Infill +	Infill +	1	35
pin cherry	Prunus pensylvanica	NSL	Low	5	9.7	0.9	Lg. dec.	Very Lg. dec.	Medium	Rare	Very Poor	Lost			0	36
black walnut	Juglans nigra	WDH	Low	2.8	9.5	2.3	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	1	37
eastern hemlock	Tsuga canadensis	NSH	High	6.7	8.7	1.9	No change	No change	Low	Rare	Very Poor	Very Poor			2	38
peachleaf willow	Salix amygdaloides	NSLX	FIA	1.1	6.2	5.5	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	39
balsam fir	Abies balsamea	NDH	High	10.1	5.2	2.5	Lg. inc.	Lg. inc.	Low	Rare	Fair	Fair	Infill +	Infill +	2	40
hackberry	Celtis occidentalis	WDH	Medium	2.9	4.8	0.7	Sm. inc.	Lg. inc.	High	Rare	Good	Good			2	41
chokecherry	Prunus virginiana	NSLX	FIA	6.2	3.6	0.3	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	42
black locust	Robinia pseudoacacia	NDH	Low	1.1	2.5	2.2	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	2	43
eastern redcedar	Juniperus virginiana	WDH	Medium	2	2.4	1.0	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	44
rock elm	Ulmus thomasii	NSLX	FIA	1.1	1.9	1.6	Unknown	Unknown	Low	Rare	FIA Only	FIA Only			0	45
black maple	Acer nigrum	NSH	Low	1.1	0.9	0.8	Very Lg. dec.	Very Lg. dec.	High	Rare	Lost	Lost			0	46
loblolly pine	Pinus taeda	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	47

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Common Name	Scientific Name	Range	MR	%Cell	FIAsum	FIaiv	ChngCl45	ChngCl85	Adap	Abund	Capabil45	Capabil85	SHIFT45	SHIFT85	SSO	N
Virginia pine	<i>Pinus virginiana</i>	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	48
northern white-cedar	<i>Thuja occidentalis</i>	WSH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Likely +	Likely +	3	49
mountain maple	<i>Acer spicatum</i>	NSL	Low	0	0	0	Unknown	Unknown	High	Absent	Unknown	Unknown			0	50
cittamwood/gum bumelia	<i>Sideroxylon lanuginosum</i> ssp.	NSL	Low	0	0	0	Unknown	New Habitat	High	Absent	Unknown	New Habitat			0	51
pignut hickory	<i>Carya glabra</i>	WDL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	52
black hickory	<i>Carya texana</i>	NDL	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	53
mockernut hickory	<i>Carya alba</i>	WDL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate +	3	54
eastern redbud	<i>Cercis canadensis</i>	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	55
American beech	<i>Fagus grandifolia</i>	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	56
honeylocust	<i>Gleditsia triacanthos</i>	NSH	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate +	3	57
sweetgum	<i>Liquidambar styraciflua</i>	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	58
yellow-poplar	<i>Liriodendron tulipifera</i>	WDH	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	59
blackgum	<i>Nyssa sylvatica</i>	WDL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	60
sycamore	<i>Platanus occidentalis</i>	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	61
eastern cottonwood	<i>Populus deltoides</i>	NSH	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Likely +	Likely +	3	62
scarlet oak	<i>Quercus coccinea</i>	WDL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	63
shingle oak	<i>Quercus imbricaria</i>	NDH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	64
blackjack oak	<i>Quercus marilandica</i>	NSL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			3	65
chinkapin oak	<i>Quercus muehlenbergii</i>	NSL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	66
pin oak	<i>Quercus palustris</i>	NSH	Low	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat		Migrate +	3	67
post oak	<i>Quercus stellata</i>	WDH	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			3	68
black willow	<i>Salix nigra</i>	NSH	Low	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat	Likely +	Likely +	3	69
sassafras	<i>Sassafras albidum</i>	WSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	70