

Section 251B

EcoMap 2007 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 132,757 51,258 209

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	11	17	Increase	5	5	Very Good	0	0	
Hickory	2		Medium	21	33	No Change	18	18	Good	2	4	
Maple	5	Abundant 0	Low	23	10	Decrease	18	18	Fair	9	7	
Oak	6	Common 2	FIA	9		New	8	8	Poor	15	15	
Pine	3	Rare 48				Unknown	15	15	Very Poor	14	13	
Other	31	Absent 14							FIA Only	5	5	
	50	64		64	60		64	64	Unknown	6	6	
										51	50	
											22	24

Potential Changes in Climate Variables

Temperature (°F)

Scenario	2009	2039	2069	2099		
Annual	CCSM45	45.4	47.3	50.0	50.6	
Average	CCSM85	45.4	48.1	51.0	54.4	
	GFDL45	45.4	51.7	50.5	51.8	
	GFDL85	45.4	48.4	51.6	56.3	
	HAD45	45.4	48.3	52.0	53.7	
	HAD85	45.4	48.9	53.6	58.3	
Growing Season	CCSM45	66.1	68.2	70.7	71.4	
	CCSM85	66.1	69.0	71.9	76.0	
May—Sep	GFDL45	66.1	74.0	72.2	74.1	
	GFDL85	66.1	69.7	73.4	78.9	
	HAD45	66.1	68.6	71.6	73.5	
	HAD85	66.1	69.1	73.5	78.0	
Coldest Month	CCSM45	12.6	14.9	17.0	17.7	
	CCSM85	12.6	14.8	16.8	19.0	
Average	GFDL45	12.6	16.3	17.4	17.7	
	GFDL85	12.6	16.0	17.7	20.0	
	HAD45	12.6	14.8	18.7	18.5	
	HAD85	12.6	18.0	22.2	25.1	
Warmest Month	CCSM45	72.5	75.1	76.8	77.5	
	CCSM85	72.5	76.7	78.4	81.1	
Average	GFDL45	72.5	75.9	77.3	78.7	
	GFDL85	72.5	76.5	78.2	81.9	
	HAD45	72.5	75.1	76.9	78.0	
	HAD85	72.5	76.5	78.8	81.9	

Precipitation (in)

Scenario	2009	2039	2069	2099		
Annual	CCSM45	28.6	29.2	28.9	28.4	
Total	CCSM85	28.6	28.8	28.9	29.4	
	GFDL45	28.6	32.0	34.7	32.8	
	GFDL85	28.6	32.4	35.0	34.2	
	HAD45	28.6	31.7	30.5	30.8	
	HAD85	28.6	29.8	30.5	33.1	
Growing Season	CCSM45	18.2	18.0	17.3	17.1	
	CCSM85	18.2	17.3	16.7	16.4	
May—Sep	GFDL45	18.2	20.5	21.9	19.9	
	GFDL85	18.2	20.9	21.4	20.0	
	HAD45	18.2	19.1	17.9	17.7	
	HAD85	18.2	17.6	16.9	16.5	

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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Common Name	Scientific Name	Range	MR	%Cell	FIAsum	FIAiv	ChngCl45	ChngCl85	Adap	Abund	Capabil45	Capabil85	SHIFT45	SHIFT85	SSO	N
green ash	Fraxinus pennsylvanica	WSH	Low	24.8	65.6	25.1	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor	Infill +	Infill +	2	1
boxelder	Acer negundo	WSH	Low	22.2	54.1	23.1	Sm. dec.	Lg. dec.	High	Common	Fair	Fair	Infill +	Infill +	2	2
bur oak	Quercus macrocarpa	NDH	Medium	13.1	40.5	19.5	Sm. inc.	Sm. inc.	High	Rare	Good	Good			2	3
American elm	Ulmus americana	WDH	Medium	19.4	29.8	11.2	Sm. inc.	Sm. inc.	Medium	Rare	Fair	Fair	Infill +	Infill +	2	4
American basswood	Tilia americana	WSL	Medium	10.3	25.3	11.2	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			2	5
silver maple	Acer saccharinum	NSH	Low	6.4	18.0	25.6	No change	Sm. dec.	High	Rare	Fair	Poor	Infill +	Infill +	2	6
hackberry	Celtis occidentalis	WDH	Medium	11.1	16.8	11.1	Sm. inc.	Sm. inc.	High	Rare	Good	Good			2	7
eastern redcedar	Juniperus virginiana	WDH	Medium	5	16.6	16.1	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	8
eastern cottonwood	Populus deltoides	NSH	Low	6.1	13.7	19.8	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	9
northern red oak	Quercus rubra	WDH	Medium	5.4	11.0	10.4	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor	Infill +	Infill +	2	10
red mulberry	Morus rubra	NSL	Low	6.4	10.3	12.8	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	11
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	7.3	8.9	6.7	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	2	12
slippery elm	Ulmus rubra	WSL	Low	9	8.7	6.0	Sm. dec.	No change	Medium	Rare	Very Poor	Poor		Infill +	2	13
black walnut	Juglans nigra	WDH	Low	6.2	8.4	9.9	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	14
black willow	Salix nigra	NSH	Low	3.3	7.7	11.2	Sm. dec.	No change	Low	Rare	Very Poor	Very Poor			2	15
Siberian elm	Ulmus pumila	NDH	FIA	3	6.4	17.5	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	16
sugar maple	Acer saccharum	WDH	High	2.1	6.4	7.8	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor	Infill +	Infill +	2	17
black ash	Fraxinus nigra	WSH	Medium	2.6	5.7	12.2	Sm. dec.	Sm. dec.	Low	Rare	Very Poor	Very Poor			2	18
honeylocust	Gleditsia triacanthos	NSH	Low	2.6	4.8	13.4	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	2	19
quaking aspen	Populus tremuloides	WDH	High	1.8	4.4	13.7	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	20
white oak	Quercus alba	WDH	Medium	2.4	3.8	5.9	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor	Infill +	Infill +	2	21
red pine	Pinus resinosa	NSH	Medium	1	3.7	39.7	Sm. dec.	Sm. dec.	Low	Rare	Very Poor	Very Poor			2	22
black cherry	Prunus serotina	WDL	Medium	3.6	2.6	2.3	No change	No change	Low	Rare	Very Poor	Very Poor			2	23
bitternut hickory	Carya cordiformis	WSL	Low	4.3	2.5	6.0	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	2	24
shagbark hickory	Carya ovata	WSL	Medium	2.5	2.1	6.1	No change	Sm. dec.	Medium	Rare	Poor	Very Poor	Infill +		2	25
white ash	Fraxinus americana	WDL	Medium	2.9	1.5	5.6	No change	No change	Low	Rare	Very Poor	Very Poor			2	26
chokecherry	Prunus virginiana	NSLX	FIA	1.7	1.2	7.2	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	27
wild plum	Prunus americana	NSLX	FIA	1.9	0.9	4.3	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	28
eastern white pine	Pinus strobus	WDH	High	0.2	0.7	4.7	No change	Sm. dec.	Low	Rare	Very Poor	Very Poor			2	29
black maple	Acer nigrum	NSH	Low	1.3	0.7	4.2	Lg. dec.	Lg. dec.	High	Rare	Poor	Poor			0	30
bigtooth aspen	Populus grandidentata	NSL	Medium	0.3	0.7	8.3	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	31
white spruce	Picea glauca	NSL	Medium	0.7	0.7	4.2	Very Lg. dec.	Very Lg. dec.	Medium	Rare	Lost	Lost			0	32
black oak	Quercus velutina	WDH	High	0.5	0.6	3.9	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	33
peachleaf willow	Salix amygdaloides	NSLX	FIA	1.2	0.6	7.4	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	34
white mulberry	Morus alba	NSL	FIA	0.9	0.6	9.8	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	35
rock elm	Ulmus thomasii	NSLX	FIA	0.3	0.4	6.4	Unknown	Unknown	Low	Rare	FIA Only	FIA Only			0	36
serviceberry	Amelanchier spp.	NSL	Low	1.4	0.3	1.4	Lg. dec.	Very Lg. dec.	Medium	Rare	Very Poor	Lost			0	37
yellow birch	Betula alleghaniensis	NDL	High	0.2	0.3	1.8	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			2	38
northern pin oak	Quercus ellipsoidalis	NSH	Medium	0	0.3	0.5	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	2	39
paper birch	Betula papyrifera	WDH	High	0.1	0.2	0.6	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	40
sycamore	Platanus occidentalis	NSL	Low	0.5	0.2	3.1	Sm. inc.	Lg. inc.	Medium	Rare	Fair	Good			2	41
Ohio buckeye	Aesculus glabra	NSL	Low	0.2	0.2	4.2	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	42
butternut	Juglans cinerea	NSLX	FIA	0.4	0.2	2.4	Unknown	Unknown	Low	Rare	FIA Only	FIA Only			0	43
black locust	Robinia pseudoacacia	NDH	Low	0	0.2	0.2	No change	Lg. inc.	Medium	Rare	Poor	Good			2	44
tamarack (native)	Larix laricina	NSH	High	0	0.1	0.3	Sm. inc.	No change	Low	Rare	Poor	Very Poor	Infill +		2	45
red maple	Acer rubrum	WDH	High	0.4	0.1	0.7	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	2	46
American hornbeam; musclev	Carpinus caroliniana	WSL	Low	0.7	0.1	1.1	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	47



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chinkapin oak	Quercus muehlenbergii	NSL	Medium	0.6	0.1	2.5	Sm. dec.	No change	Medium	Rare	Very Poor	Poor	Infill +		2	48
Scots pine	Pinus sylvestris	NSH	FIA	0.3	0.1	2.7	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	49
ailanthus	Ailanthus altissima	NSL	FIA	0.2	0.1	1.4	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	50
ashe juniper	Juniperus ashei	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	51
jack pine	Pinus banksiana	NSH	Medium	0	0	0	Unknown	Unknown	High	Absent	Unknown	Unknown			0	52
mountain maple	Acer spicatum	NSL	Low	0	0	0	Unknown	Unknown	High	Absent	Unknown	Unknown			0	53
pawpaw	Asimina triloba	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	54
pecan	Carya illinoensis	NSH	Low	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat			3	55
black hickory	Carya texana	NDL	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	56
sugarberry	Celtis laevigata	NDH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	57
eastern redbud	Cercis canadensis	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	58
flowering dogwood	Cornus florida	WDL	Medium	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	59
Osage-orange	Maclura pomifera	NDH	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate ++	Migrate ++	3	60
pin cherry	Prunus pensylvanica	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	61
swamp white oak	Quercus bicolor	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	62
shingle oak	Quercus imbricaria	NDH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	63
post oak	Quercus stellata	WDH	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate ++	3	64