

One x One Degree
Climate Change Atlas Tree Species
 Current and Potential Future Habitat, Capability, and Migration

sq. km sq. mi FIA Plots
 Area of Region 9,549.4 3,687.0 231

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	2			High	20	23	Increase	14	21	Very Good	3	4	Likely	0	0
Hickory	5			Medium	25	42	No Change	14	13	Good	16	23	Infill	8	11
Maple	5	Abundant	3	Low	29	12	Decrease	35	29	Fair	10	6	Migrate	4	7
Oak	10	Common	28	FIA	7		New	8	9	Poor	14	11			
Pine	6	Rare	39				Unknown	10	9	Very Poor	17	14			
Other	42	Absent	10							FIA Only	3	3			
	70		80		81	77		81	81	Unknown	3	2			
											66	63			

Potential Changes in Climate Variables

Temperature (°F)

	Scenario	2009	2039	2069	2099	
Annual Average	CCSM45	52.0	53.7	56.2	56.4	
	CCSM85	52.0	54.3	56.8	60.0	
	GFDL45	52.0	56.0	57.7	58.6	
	GFDL85	52.0	55.2	58.7	62.8	
	HAD45	52.0	54.7	58.3	59.7	
	HAD85	52.0	55.1	59.7	64.3	
Growing Season May—Sep	CCSM45	68.2	69.9	72.3	72.8	
	CCSM85	68.2	70.5	73.1	77.2	
	GFDL45	68.2	73.0	75.2	76.4	
	GFDL85	68.2	72.2	76.5	81.3	
	HAD45	68.2	71.5	74.9	76.8	
	HAD85	68.2	71.7	77.8	82.6	
Coldest Month Average	CCSM45	26.6	28.0	29.7	30.1	
	CCSM85	26.6	29.3	30.3	32.0	
	GFDL45	26.6	30.3	31.0	31.7	
	GFDL85	26.6	29.6	30.8	31.8	
	HAD45	26.6	27.4	30.1	30.1	
	HAD85	26.6	28.6	30.7	32.9	
Warmest Month Average	CCSM45	73.6	75.4	76.7	77.2	
	CCSM85	73.6	76.1	77.8	79.9	
	GFDL45	73.6	76.8	79.0	80.0	
	GFDL85	73.6	77.8	80.4	83.1	
	HAD45	73.6	77.5	80.1	81.5	
	HAD85	73.6	78.8	83.2	86.2	

Precipitation (in)

	Scenario	2009	2039	2069	2099	
Annual Total	CCSM45	40.0	42.4	43.6	44.5	
	CCSM85	40.0	42.7	44.1	47.1	
	GFDL45	40.0	44.0	45.7	47.9	
	GFDL85	40.0	41.4	46.6	48.6	
	HAD45	40.0	41.3	41.6	41.5	
	HAD85	40.0	41.2	38.4	42.1	
Growing Season May—Sep	CCSM45	18.7	19.8	19.8	20.4	
	CCSM85	18.7	18.7	19.1	19.3	
	GFDL45	18.7	20.6	20.0	20.9	
	GFDL85	18.7	18.6	19.3	19.8	
	HAD45	18.7	19.8	16.9	18.1	
	HAD85	18.7	18.5	15.5	16.2	

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.

Cite as: 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. *Forests*. 10(11): 989. <https://doi.org/10.3390/f10110989>.

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
sugar maple	Acer saccharum	WDH	High	75.8	830.7	9.8	Sm. dec.	Sm. dec.	High	Abundant	Good	Good			1	1
yellow-poplar	Liriodendron tulipifera	WDH	High	61.3	781.8	12.9	Lg. dec.	Lg. dec.	High	Abundant	Good	Good			1	2
red maple	Acer rubrum	WDH	High	74.3	734.0	10.0	Lg. dec.	Lg. dec.	High	Abundant	Good	Good			1	3
white oak	Quercus alba	WDH	Medium	57.3	450.9	6.4	Sm. inc.	No change	High	Common	Very Good	Good			1	4
black cherry	Prunus serotina	WDL	Medium	73	372.8	5.9	Sm. dec.	Sm. dec.	Low	Common	Poor	Poor			0	5
white ash	Fraxinus americana	WDL	Medium	75.5	332.4	4.5	No change	No change	Low	Common	Poor	Poor			0	6
shagbark hickory	Carya ovata	WSL	Medium	51.6	280.4	4.5	Sm. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	7
black oak	Quercus velutina	WDH	High	64.1	275.1	4.3	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	8
sassafras	Sassafras albidum	WSL	Low	66.5	246.3	4.0	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor			0	9
chestnut oak	Quercus prinus	NDH	High	26.8	233.6	7.8	Lg. dec.	Lg. dec.	High	Common	Fair	Fair			1	10
black locust	Robinia pseudoacacia	NDH	Low	47.5	228.7	5.4	Lg. dec.	No change	Medium	Common	Poor	Fair			1	11
American elm	Ulmus americana	WDH	Medium	69.6	218.7	3.8	No change	Sm. inc.	Medium	Common	Fair	Good			1	12
American beech	Fagus grandifolia	WDH	High	55.5	215.3	4.3	Sm. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	13
northern red oak	Quercus rubra	WDH	Medium	51.6	194.2	4.0	No change	No change	High	Common	Good	Good			1	14
bigtooth aspen	Populus grandidentata	NSL	Medium	32.5	183.1	5.5	Very Lg. dec.	Very Lg. dec.	Medium	Common	Lost	Lost			0	15
pignut hickory	Carya glabra	WDL	Medium	53.3	169.1	2.8	Sm. inc.	No change	Medium	Common	Good	Fair			1	16
mockernut hickory	Carya alba	WDL	Medium	38.1	149.9	3.1	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	17
slippery elm	Ulmus rubra	WSL	Low	47.6	138.2	2.6	No change	No change	Medium	Common	Fair	Fair			1	18
sycamore	Platanus occidentalis	NSL	Low	34	131.5	4.7	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	19
bitternut hickory	Carya cordiformis	WSL	Low	34.4	128.0	2.9	No change	Sm. inc.	High	Common	Good	Very Good			1	20
black walnut	Juglans nigra	WDH	Low	41.5	115.9	2.8	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	21
yellow buckeye	Aesculus flava	NSL	Low	16.3	111.9	4.1	Lg. dec.	Lg. dec.	Low	Common	Very Poor	Very Poor			0	22
scarlet oak	Quercus coccinea	WDL	Medium	26.5	101.8	3.7	No change	Sm. dec.	Medium	Common	Fair	Poor			1	23
boxelder	Acer negundo	WSH	Low	30.6	97.0	7.2	No change	Sm. inc.	High	Common	Good	Very Good			1	24
Virginia pine	Pinus virginiana	NDH	High	17	91.6	4.4	No change	Sm. dec.	Medium	Common	Fair	Poor			1	25
sourwood	Oxydendrum arboreum	NDL	High	32.4	90.0	3.2	Lg. dec.	Lg. dec.	High	Common	Fair	Fair			1	26
blackgum	Nyssa sylvatica	WDL	Medium	46.9	88.3	2.2	Sm. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	27
silver maple	Acer saccharinum	NSH	Low	14.2	63.9	14.5	Sm. dec.	No change	High	Common	Fair	Good	Infill +	Infill ++	1	28
river birch	Betula nigra	NSL	Low	4.2	61.5	14.5	Lg. dec.	Sm. dec.	Medium	Common	Poor	Poor		Infill +	0	29
eastern white pine	Pinus strobus	WDH	High	10.9	58.3	5.8	Very Lg. dec.	Very Lg. dec.	Low	Common	Lost	Lost			0	30
flowering dogwood	Cornus florida	WDL	Medium	37.8	50.1	1.3	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	31
ailanthus	Ailanthus altissima	NSL	FIA	13.1	41.5	3.3	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	32
eastern hemlock	Tsuga canadensis	NSH	High	4.2	37.0	8.8	Lg. dec.	Very Lg. dec.	Low	Rare	Very Poor	Lost			0	33
American hornbeam; musclev	Carpinus caroliniana	WSL	Low	25	34.2	1.2	Lg. dec.	No change	Medium	Rare	Very Poor	Poor			1	34
sweet birch	Betula lenta	NDH	High	4.2	29.1	6.9	Lg. dec.	Lg. dec.	Low	Rare	Very Poor	Very Poor			0	35
pitch pine	Pinus rigida	NSH	High	7.7	27.7	3.2	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	36
hackberry	Celtis occidentalis	WDH	Medium	16.7	26.2	4.2	Lg. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	1	37
loblolly pine	Pinus taeda	WDH	High	2.1	25.1	11.8	No change	Lg. inc.	Medium	Rare	Poor	Good		Infill ++	2	38
American basswood	Tilia americana	WSL	Medium	11	24.9	2.5	Lg. dec.	Very Lg. dec.	Medium	Rare	Very Poor	Lost			0	39
eastern redbud	Cercis canadensis	NSL	Low	13.2	24.6	1.5	Sm. inc.	Lg. inc.	Medium	Rare	Fair	Good			1	40
honeylocust	Gleditsia triacanthos	NSH	Low	13.3	23.6	4.4	Sm. dec.	Lg. inc.	High	Rare	Poor	Good	Infill +	Infill ++	1	41
green ash	Fraxinus pennsylvanica	WSH	Low	18.9	22.7	1.9	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			1	42
Ohio buckeye	Aesculus glabra	NSL	Low	14.1	22.4	1.8	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	43
black willow	Salix nigra	NSH	Low	3.1	22.0	7.0	Sm. dec.	No change	Low	Rare	Very Poor	Very Poor			0	44
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	12.8	20.9	1.5	Lg. dec.	Sm. inc.	High	Rare	Poor	Good			1	45
pawpaw	Asimina triloba	NSL	Low	7.6	20.1	2.3	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	46
red pine	Pinus resinosa	NSH	Medium	1	17.2	16.0	Lg. dec.	Lg. dec.	Low	Rare	Very Poor	Very Poor			0	47

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

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Common Name	Scientific Name	Range	MR	%Cell	FIAsum	FIAiv	ChngCl45	ChngCl85	Adap	Abund	Capabil45	Capabil85	SHIFT45	SHIFT85	SSO	N
common persimmon	Diospyros virginiana	NSL	Low	7.6	15.8	1.8	No change	Lg. inc.	High	Rare	Fair	Good	Infill +	Infill ++	1	48
chinkapin oak	Quercus muehlenbergii	NSL	Medium	1	14.7	14.1	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	49
shingle oak	Quercus imbricaria	NDH	Medium	8.4	13.3	1.6	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	50
Osage-orange	Maclura pomifera	NDH	Medium	4.4	12.7	7.4	No change	Lg. inc.	High	Rare	Fair	Good	Infill +	Infill ++	1	51
eastern cottonwood	Populus deltoides	NSH	Low	5.8	12.4	4.1	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	52
shellbark hickory	Carya laciniosa	NSL	Low	0.3	10.7	3.2	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	53
Scots pine	Pinus sylvestris	NSH	FIA	2.1	9.0	4.3	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	54
Norway spruce	Picea abies	NSH	FIA	1	7.8	7.4	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	55
sweetgum	Liquidambar styraciflua	WDH	High	6.3	7.7	7.5	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	1	56
quaking aspen	Populus tremuloides	WDH	High	2.1	7.4	3.5	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	57
black maple	Acer nigrum	NSH	Low	5.6	5.7	2.2	Lg. dec.	Very Lg. dec.	High	Rare	Poor	Lost			0	58
pin oak	Quercus palustris	NSH	Low	2.6	4.7	11.2	No change	No change	Low	Rare	Very Poor	Very Poor			2	59
serviceberry	Amelanchier spp.	NSL	Low	5.2	4.4	0.8	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	60
eastern redcedar	Juniperus virginiana	WDH	Medium	1	3.2	3.1	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	61
cucumbertree	Magnolia acuminata	NSL	Low	2.1	2.9	1.4	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	62
butternut	Juglans cinerea	NSLX	FIA	2.1	1.7	0.8	Unknown	Unknown	Low	Rare	FIA Only	FIA Only			0	63
chokecherry	Prunus virginiana	NSLX	FIA	4.5	1.5	1.6	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	64
post oak	Quercus stellata	WDH	High	2.7	1.4	3.5	Lg. inc.	Lg. inc.	High	Rare	Good	Good			2	65
northern catalpa	Catalpa speciosa	NSHX	FIA	0.3	1.1	0.3	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	66
white mulberry	Morus alba	NSL	FIA	6.8	1.0	1.4	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	67
red spruce	Picea rubens	NDH	High	1	0.9	0.9	Sm. dec.	Sm. dec.	Low	Rare	Very Poor	Very Poor			0	68
red mulberry	Morus rubra	NSL	Low	1	0.7	0.7	Very Lg. dec.	Lg. inc.	Medium	Rare	Lost	Good			2	69
bur oak	Quercus macrocarpa	NDH	Medium	0.3	0.5	0.2	Lg. dec.	No change	High	Rare	Poor	Fair		Infill +	2	70
shortleaf pine	Pinus echinata	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	71
cittamwood/gum bumelia	Sideroxylon lanuginosum ssp.	NSL	Low	0	0	0	Unknown	New Habitat	High	Absent	Unknown	New Habitat			3	72
pecan	Carya illinoensis	NSH	Low	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat		Migrate ++	3	73
black hickory	Carya texana	NDL	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	74
sugarberry	Celtis laevigata	NDH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate ++	3	75
American holly	Ilex opaca	NSL	Medium	0	0	0	Unknown	Unknown	Medium	Modeled	Unknown	Unknown			0	76
southern red oak	Quercus falcata	WDL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	77
blackjack oak	Quercus marilandica	NSL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	78
water oak	Quercus nigra	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	79
bluejack oak	Quercus incana	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	80
winged elm	Ulmus alata	WDL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	81