

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	9,412.7	3,634.3	194

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	19	22	Increase	16	17	Very Good	7	5	Likely	0	0
Hickory	5			Medium	25	42	No Change	12	11	Good	10	15	Infill	9	10
Maple	5	Abundant	4	Low	28	11	Decrease	26	26	Fair	13	9	Migrate	8	11
Oak	8	Common	26	FIA	6		New	14	14	Poor	7	10			
Pine	5	Rare	30				Unknown	10	10	Very Poor	13	9			
Other	34	Absent	17							FIA Only	3	3			
	60		77		78	75		78	78	Unknown	4	4			
											57	55			

Potential Changes in Climate Variables

Temperature (°F)

	Scenario	2009	2039	2069	2099	
Annual Average	CCSM45	50.7	52.4	55.0	55.1	
	CCSM85	50.7	53.0	55.5	58.8	
	GFDL45	50.7	54.6	56.5	57.5	
	GFDL85	50.7	54.0	57.6	61.8	
	HAD45	50.7	53.6	57.2	58.7	
	HAD85	50.7	53.9	58.5	63.3	
Growing Season (May—Sep)	CCSM45	67.1	68.8	71.2	71.6	
	CCSM85	67.1	69.4	71.9	76.0	
	GFDL45	67.1	71.8	74.2	75.6	
	GFDL85	67.1	71.2	75.5	80.3	
	HAD45	67.1	70.6	73.8	75.9	
	HAD85	67.1	70.5	76.3	81.6	
Coldest Month Average	CCSM45	25.0	26.6	28.4	28.7	
	CCSM85	25.0	27.7	28.8	30.6	
	GFDL45	25.0	28.2	29.1	29.9	
	GFDL85	25.0	28.3	29.4	30.8	
	HAD45	25.0	26.0	28.9	29.0	
	HAD85	25.0	27.2	29.5	32.0	
Warmest Month Average	CCSM45	72.7	74.6	75.9	76.4	
	CCSM85	72.7	75.4	77.0	79.3	
	GFDL45	72.7	75.8	78.0	79.0	
	GFDL85	72.7	76.9	79.3	82.1	
	HAD45	72.7	76.6	79.0	80.4	
	HAD85	72.7	77.6	81.6	85.2	

Precipitation (in)

	Scenario	2009	2039	2069	2099	
Annual Total	CCSM45	38.9	41.0	40.7	42.3	
	CCSM85	38.9	40.7	41.9	43.9	
	GFDL45	38.9	43.1	45.2	46.5	
	GFDL85	38.9	40.6	45.8	48.1	
	HAD45	38.9	40.4	40.7	40.4	
	HAD85	38.9	41.0	37.9	41.3	
Growing Season (May—Sep)	CCSM45	19.0	20.1	19.6	20.1	
	CCSM85	19.0	19.0	19.5	19.1	
	GFDL45	19.0	21.0	21.1	21.6	
	GFDL85	19.0	19.3	20.7	21.0	
	HAD45	19.0	20.1	17.5	18.5	
	HAD85	19.0	19.3	15.8	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.

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
black cherry	Prunus serotina	WDL	Medium	89.6	1028.2	12.9	Lg. dec.	Lg. dec.	Low	Abundant	Poor	Poor			0	1
red maple	Acer rubrum	WDH	High	85	1008.4	13.2	Lg. dec.	Lg. dec.	High	Abundant	Good	Good			1	2
American elm	Ulmus americana	WDH	Medium	82.2	530.7	7.1	Sm. dec.	No change	Medium	Abundant	Fair	Good			1	3
yellow-poplar	Liriodendron tulipifera	WDH	High	52.4	511.8	10.3	No change	Sm. dec.	High	Abundant	Very Good	Good			1	4
sugar maple	Acer saccharum	WDH	High	47.4	336.7	7.4	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	5
silver maple	Acer saccharinum	NSH	Low	18.9	265.2	12.6	Lg. dec.	Sm. dec.	High	Common	Fair	Fair			1	6
white oak	Quercus alba	WDH	Medium	41.6	264.8	6.9	Lg. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	7
black locust	Robinia pseudoacacia	NDH	Low	32.1	260.7	8.2	Sm. dec.	No change	Medium	Common	Poor	Fair			1	8
sassafras	Sassafras albidum	WSL	Low	49	241.3	5.5	No change	Sm. dec.	Medium	Common	Fair	Poor			1	9
white ash	Fraxinus americana	WDL	Medium	56.6	232.1	4.7	Sm. inc.	Sm. inc.	Low	Common	Fair	Fair			1	10
blackgum	Nyssa sylvatica	WDL	Medium	40.1	218.9	5.8	Sm. dec.	Sm. dec.	High	Common	Fair	Fair			1	11
northern red oak	Quercus rubra	WDH	Medium	51.3	197.1	3.8	Sm. inc.	No change	High	Common	Very Good	Good			1	12
ailanthus	Ailanthus altissima	NSL	FIA	21.2	191.4	9.0	Unknown	Unknown	NA	Common	NNIS	NNIS			0	13
bigtooth aspen	Populus grandidentata	NSL	Medium	28.3	179.1	7.2	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	14
shagbark hickory	Carya ovata	WSL	Medium	36.8	162.2	4.0	No change	No change	Medium	Common	Fair	Fair			1	15
American beech	Fagus grandifolia	WDH	High	40.3	162.2	4.2	No change	Sm. dec.	Medium	Common	Fair	Poor			1	16
green ash	Fraxinus pennsylvanica	WSH	Low	45.3	157.0	4.1	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	17
black oak	Quercus velutina	WDH	High	36.1	147.1	4.5	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	18
slippery elm	Ulmus rubra	WSL	Low	38.3	146.5	3.7	No change	Sm. inc.	Medium	Common	Fair	Good			1	19
sycamore	Platanus occidentalis	NSL	Low	25.3	141.7	6.3	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	20
black walnut	Juglans nigra	WDH	Low	34.8	136.3	4.6	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	21
eastern white pine	Pinus strobus	WDH	High	12.7	109.1	6.5	Lg. dec.	Very Lg. dec.	Low	Common	Very Poor	Lost			0	22
bitternut hickory	Carya cordiformis	WSL	Low	29.8	104.2	3.6	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	23
pin oak	Quercus palustris	NSH	Low	15.1	97.7	6.8	Lg. dec.	Sm. dec.	Low	Common	Very Poor	Poor		Infill +	0	24
eastern cottonwood	Populus deltoides	NSH	Low	8.2	79.5	7.6	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor			0	25
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	31	79.2	2.9	Sm. dec.	Sm. dec.	High	Common	Fair	Fair			1	26
black willow	Salix nigra	NSH	Low	12.1	72.5	9.7	Lg. dec.	No change	Low	Common	Very Poor	Poor			0	27
boxelder	Acer negundo	WSH	Low	19.1	65.8	4.7	Sm. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	28
flowering dogwood	Cornus florida	WDL	Medium	28.1	60.3	2.0	No change	No change	Medium	Common	Fair	Fair			1	29
chestnut oak	Quercus prinus	NDH	High	8.4	55.0	6.4	No change	No change	High	Common	Good	Good	Infill ++	Infill ++	2	30
American basswood	Tilia americana	WSL	Medium	13.3	40.2	2.7	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	31
mockernut hickory	Carya alba	WDL	Medium	17.2	35.1	2.7	Lg. inc.	Lg. inc.	High	Rare	Good	Good			1	32
pignut hickory	Carya glabra	WDL	Medium	15	34.0	2.3	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	1	33
cucumbertree	Magnolia acuminata	NSL	Low	11.4	22.9	2.5	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	34
Scots pine	Pinus sylvestris	NSH	FIA	11	22.0	11.1	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	35
honeylocust	Gleditsia triacanthos	NSH	Low	8.1	18.6	3.4	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	1	36
American hornbeam; muscle	Carpinus caroliniana	WSL	Low	10.7	18.2	1.5	Lg. dec.	No change	Medium	Rare	Very Poor	Poor			1	37
red mulberry	Morus rubra	NSL	Low	1.1	17.9	16.9	Sm. dec.	No change	Medium	Rare	Very Poor	Poor		Infill +	1	38
shingle oak	Quercus imbricaria	NDH	Medium	3.1	16.3	4.9	No change	Sm. dec.	Medium	Rare	Poor	Very Poor	Infill +		2	39
sweetgum	Liquidambar styraciflua	WDH	High	2.1	16.1	7.6	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good		Infill ++	2	40
red pine	Pinus resinosa	NSH	Medium	5.3	15.0	2.8	Very Lg. dec.	Very Lg. dec.	Low	Rare	Lost	Lost			0	41
eastern redbud	Cercis canadensis	NSL	Low	2.7	12.3	3.5	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	1	42
river birch	Betula nigra	NSL	Low	1.8	12.1	4.1	Sm. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	43
chokecherry	Prunus virginiana	NSLX	FIA	5.5	9.0	4.0	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	44
scarlet oak	Quercus coccinea	WDL	Medium	6.5	7.3	1.7	Sm. inc.	Sm. inc.	Medium	Rare	Fair	Fair	Infill +	Infill +	2	45
Osage-orange	Maclura pomifera	NDH	Medium	1.1	6.1	5.7	No change	Lg. inc.	High	Rare	Fair	Good	Infill +	Infill ++	2	46
swamp white oak	Quercus bicolor	NSL	Low	1.5	5.9	0.8	No change	Sm. dec.	Medium	Rare	Poor	Very Poor	Infill +		2	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
northern catalpa	Catalpa speciosa	NSHX	FIA	0.8	5.4	4.1	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	48
rock elm	Ulmus thomasii	NSLX	FIA	1.1	4.6	4.4	Unknown	Unknown	Low	Rare	FIA Only	FIA Only			0	49
quaking aspen	Populus tremuloides	WDH	High	4.5	4.1	2.7	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	50
black maple	Acer nigrum	NSH	Low	2.1	3.8	1.8	Very Lg. dec.	Very Lg. dec.	High	Rare	Lost	Lost			0	51
shellbark hickory	Carya laciniosa	NSL	Low	1.7	3.6	1.4	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	52
hackberry	Celtis occidentalis	WDH	Medium	7.8	3.1	0.8	Lg. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	2	53
pitch pine	Pinus rigida	NSH	High	1.8	2.6	1.0	Very Lg. dec.	Very Lg. dec.	Medium	Rare	Lost	Lost			0	54
black ash	Fraxinus nigra	WSH	Medium	1.1	1.9	1.8	Very Lg. dec.	Very Lg. dec.	Low	Rare	Lost	Lost			0	55
Norway spruce	Picea abies	NSH	FIA	6.4	1.7	0.7	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	56
eastern hemlock	Tsuga canadensis	NSH	High	4.2	1.0	3.7	Lg. dec.	Very Lg. dec.	Low	Rare	Very Poor	Lost			0	57
Ohio buckeye	Aesculus glabra	NSL	Low	4.2	0.9	3.3	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			2	58
sweet birch	Betula lenta	NDH	High	5.7	0.5	0.7	Lg. dec.	Lg. dec.	Low	Rare	Very Poor	Very Poor			0	59
Virginia pine	Pinus virginiana	NDH	High	1.5	0.2	0.2	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	60
eastern redcedar	Juniperus virginiana	WDH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate ++	Migrate ++	3	61
shortleaf pine	Pinus echinata	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	62
loblolly pine	Pinus taeda	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate ++	3	63
yellow birch	Betula alleghaniensis	NDL	High	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	64
pecan	Carya illinoensis	NSH	Low	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat			3	65
black hickory	Carya texana	NDL	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	66
sugarberry	Celtis laevigata	NDH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate ++	3	67
common persimmon	Diospyros virginiana	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	68
loblolly-bay	Gordonia lasianthus	NSH	Medium	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	69
sourwood	Oxydendrum arboreum	NDL	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	70
pin cherry	Prunus pensylvanica	NSL	Low	0	0	0	Unknown	Unknown	Medium	Modeled	Unknown	Unknown			0	71
southern red oak	Quercus falcata	WDL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate ++	3	72
blackjack oak	Quercus marilandica	NSL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			3	73
chinkapin oak	Quercus muehlenbergii	NSL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	74
Shumard oak	Quercus shumardii	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	75
post oak	Quercus stellata	WDH	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate ++	Migrate ++	3	76
bluejack oak	Quercus incana	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	77
winged elm	Ulmus alata	WDL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	78