

George Washington Memorial Parkway

National Park 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

	sq. km	sq. mi	FIA Plots
Area of Region	8,679.3	3,351.1	146

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					
		High	Low	Reliability	Adaptability	Scenario RCP45	Scenario RCP85	Scenario RCP45	Scenario RCP85	SHIFT RCP45	SHIFT RCP85				
Ash	2					Increase	19	24	Very Good	4	8	Likely	0	0	
Hickory	3					No Change	12	8	Good	18	16	Infill	0	0	
Maple	5	Abundant	4	High	21	23	Decrease	25	24	Fair	10	11	Migrate	0	0
Oak	12	Common	27	Medium	31	52	New	24	26	Poor	12	10		0	0
Pine	4	Rare	31	Low	33	11	Unknown	11	9	Very Poor	9	8		0	0
Other	36	Absent	28	FIA	6					FIA Only	1	1			
	62		90		91	86		91	91	Unknown	5	3			
											59	57			

Potential Changes in Climate Variables

Temperature (°F)

Scenario	2009	2039	2069	2099		
Annual	CCSM45	55.7	57.4	59.5	59.8	
Average	CCSM85	55.7	57.8	60.3	63.3	
	GFDL45	55.7	59.2	61.1	62.2	
	GFDL85	55.7	58.9	62.3	66.3	
	HAD45	55.7	58.2	61.5	62.9	
	HAD85	55.7	58.4	62.4	66.9	
Growing Season	CCSM45	71.4	73.1	74.9	75.4	
	CCSM85	71.4	73.3	76.0	79.7	
May—Sep	GFDL45	71.4	75.4	77.7	79.3	
	GFDL85	71.4	75.3	79.2	83.6	
	HAD45	71.4	74.2	77.4	79.1	
	HAD85	71.4	74.1	78.9	83.8	
Coldest Month	CCSM45	32.2	34.1	35.5	36.0	
	CCSM85	32.2	34.6	35.9	37.4	
Average	GFDL45	32.2	35.3	35.9	36.5	
	GFDL85	32.2	34.9	36.0	37.4	
	HAD45	32.2	33.9	35.9	36.1	
	HAD85	32.2	34.3	36.0	37.9	
Warmest Month	CCSM45	77.2	79.2	80.1	80.3	
	CCSM85	77.2	79.3	81.2	82.7	
Average	GFDL45	77.2	80.2	81.9	83.2	
	GFDL85	77.2	81.6	83.8	86.5	
	HAD45	77.2	80.4	82.4	83.4	
	HAD85	77.2	80.7	83.7	87.0	

Precipitation (in)

Scenario	2009	2039	2069	2099		
Annual	CCSM45	42.7	46.3	48.9	49.7	
Total	CCSM85	42.7	47.1	48.3	55.3	
	GFDL45	42.7	47.8	51.2	51.8	
	GFDL85	42.7	44.4	51.1	52.3	
	HAD45	42.7	45.4	46.6	45.3	
	HAD85	42.7	49.3	44.4	48.0	
Growing Season	CCSM45	19.4	22.9	24.2	24.8	
	CCSM85	19.4	22.9	23.2	26.7	
May—Sep	GFDL45	19.4	20.7	22.5	22.9	
	GFDL85	19.4	19.0	22.0	22.4	
	HAD45	19.4	21.3	20.0	18.6	
	HAD85	19.4	21.8	18.4	19.5	

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>.



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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	75.6	958.1	14.3	Sm. dec.	Sm. dec.	High	Abundant	Good	Good			0	1
yellow-poplar	Liriodendron tulipifera	WDH	High	73.5	881.8	14.8	Lg. dec.	Lg. dec.	High	Abundant	Good	Good			0	2
white oak	Quercus alba	WDH	Medium	56.5	706.2	13.4	Sm. dec.	Sm. dec.	High	Abundant	Good	Good			0	3
sweetgum	Liquidambar styraciflua	WDH	High	34.3	541.0	15.9	Sm. inc.	Sm. inc.	Medium	Abundant	Very Good	Very Good			0	4
American beech	Fagus grandifolia	WDH	High	48.1	369.2	8.9	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	5
Virginia pine	Pinus virginiana	NDH	High	39.4	340.6	9.8	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	6
blackgum	Nyssa sylvatica	WDL	Medium	58.5	312.4	5.7	Sm. dec.	No change	High	Common	Fair	Good			0	7
chestnut oak	Quercus prinus	NDH	High	34.5	309.8	13.4	Lg. dec.	Lg. dec.	High	Common	Fair	Fair			0	8
mockernut hickory	Carya alba	WDL	Medium	36.2	210.0	6.5	No change	Sm. inc.	High	Common	Good	Very Good			0	9
eastern redcedar	Juniperus virginiana	WDH	Medium	25	176.0	9.8	Sm. inc.	Lg. inc.	Medium	Common	Good	Very Good			0	10
black locust	Robinia pseudoacacia	NDH	Low	27.2	175.8	10.4	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	11
southern red oak	Quercus falcata	WDL	Medium	27.2	172.1	6.3	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			0	12
black oak	Quercus velutina	WDH	High	34.7	170.7	5.1	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			0	13
northern red oak	Quercus rubra	WDH	Medium	39.3	157.1	5.1	No change	Sm. dec.	High	Common	Good	Fair			0	14
black cherry	Prunus serotina	WDL	Medium	38	150.8	5.3	Sm. inc.	Sm. inc.	Low	Common	Fair	Fair			0	15
pignut hickory	Carya glabra	WDL	Medium	35.5	141.2	4.2	No change	Sm. dec.	Medium	Common	Fair	Poor			0	16
scarlet oak	Quercus coccinea	WDL	Medium	24	135.5	6.2	Sm. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	17
American holly	Ilex opaca	NSL	Medium	26.9	119.9	3.8	No change	No change	Medium	Common	Fair	Fair			0	18
sycamore	Platanus occidentalis	NSL	Low	30.3	103.0	6.6	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			0	19
boxelder	Acer negundo	WSH	Low	16.8	96.0	7.0	Sm. dec.	No change	High	Common	Fair	Good			0	20
white ash	Fraxinus americana	WDL	Medium	24.6	91.8	7.6	Sm. inc.	Sm. inc.	Low	Common	Fair	Fair			0	21
American elm	Ulmus americana	WDH	Medium	29.4	88.3	4.8	Sm. inc.	Lg. inc.	Medium	Common	Good	Very Good			0	22
loblolly pine	Pinus taeda	WDH	High	6.3	85.5	8.8	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			0	23
sassafras	Sassafras albidum	WSL	Low	21.6	83.5	5.1	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	24
bitternut hickory	Carya cordiformis	WSL	Low	11.5	64.6	8.9	No change	No change	High	Common	Good	Good			0	25
eastern cottonwood	Populus deltoides	NSH	Low	1.2	64.2	55.7	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor			0	26
green ash	Fraxinus pennsylvanica	WSH	Low	12.3	63.8	7.3	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			0	27
pin oak	Quercus palustris	NSH	Low	10.4	62.8	9.3	Sm. dec.	Sm. dec.	Low	Common	Poor	Poor			0	28
black walnut	Juglans nigra	WDH	Low	20.7	60.4	3.6	No change	No change	Medium	Common	Fair	Fair			0	29
Norway spruce	Picea abies	NSH	FIA	1.2	57.6	50.0	Unknown	Unknown	NA	Common	NNIS	NNIS			0	30
American hornbeam; muscley	Carpinus caroliniana	WSL	Low	24.6	55.6	2.7	Sm. inc.	Lg. inc.	Medium	Common	Good	Very Good			0	31
willow oak	Quercus phellos	NSL	Low	9.4	49.1	3.9	No change	Sm. inc.	Medium	Rare	Poor	Fair			0	32
slippery elm	Ulmus rubra	WSL	Low	11.5	34.8	3.4	No change	Sm. inc.	Medium	Rare	Poor	Fair			0	33
silver maple	Acer saccharinum	NSH	Low	3.5	33.1	9.6	No change	No change	High	Rare	Fair	Fair			0	34
pawpaw	Asimina triloba	NSL	Low	12.2	25.7	2.8	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	35
bigtooth aspen	Populus grandidentata	NSL	Medium	4.6	22.4	4.9	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	36
hackberry	Celtis occidentalis	WDH	Medium	12.3	21.9	2.5	No change	Sm. inc.	High	Rare	Fair	Good			0	37
flowering dogwood	Cornus florida	WDL	Medium	22	20.1	1.2	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			0	38
river birch	Betula nigra	NSL	Low	5.8	17.8	3.1	No change	Sm. inc.	Medium	Rare	Poor	Fair			0	39
ailanthus	Ailanthus altissima	NSL	FIA	14.6	15.8	2.2	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	40
swamp chestnut oak	Quercus michauxii	NSL	Low	4.6	15.0	4.4	No change	No change	Medium	Rare	Poor	Poor			0	41
post oak	Quercus stellata	WDH	High	1.6	9.4	2.0	Lg. inc.	Lg. inc.	High	Rare	Good	Good			0	42
sweet birch	Betula lenta	NDH	High	3.5	9.2	2.7	Lg. dec.	Lg. dec.	Low	Rare	Very Poor	Very Poor			0	43
eastern redbud	Cercis canadensis	NSL	Low	5.8	9.1	4.5	Sm. dec.	No change	Medium	Rare	Very Poor	Poor			0	44
common persimmon	Diospyros virginiana	NSL	Low	9.9	9.0	1.5	Sm. inc.	Lg. inc.	High	Rare	Good	Good			0	45
red mulberry	Morus rubra	NSL	Low	5.8	8.5	11.2	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	46
sugar maple	Acer saccharum	WDH	High	2.3	7.8	3.4	Lg. inc.	Lg. inc.	High	Rare	Good	Good			0	47



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Common Name	Scientific Name	Range	MR	%Cell	FIAsum	FIAiv	ChngCl45	ChngCl85	Adap	Abund	Capabil45	Capabil85	SHIFT45	SHIFT85	SSO	N
paulownia	Paulownia tomentosa	NSL	FIA	2.3	7.7	3.3	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	48
black willow	Salix nigra	NSH	Low	2.3	7.3	3.2	Sm. inc.	Lg. inc.	Low	Rare	Poor	Fair				49
shingle oak	Quercus imbricaria	NDH	Medium	2.3	5.9	2.6	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor				50
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	1.2	5.4	4.7	Lg. inc.	Lg. inc.	High	Rare	Good	Good				51
cherrybark oak; swamp red o	Quercus pagoda	NSL	Medium	0.5	4.0	1.5	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good				52
white mulberry	Morus alba	NSL	FIA	1.2	3.8	3.3	Unknown	Unknown	NA	Rare	NNIS	NNIS				53
American chestnut	Castanea dentata	NSLX	FIA	2.3	2.0	0.9	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only				54
pitch pine	Pinus rigida	NSH	High	1.2	2.0	1.7	Very Lg. dec.	Very Lg. dec.	Medium	Rare	Lost	Lost				55
serviceberry	Amelanchier spp.	NSL	Low	1.2	2.0	1.7	Very Lg. dec.	Lg. dec.	Medium	Rare	Lost	Very Poor				56
eastern hemlock	Tsuga canadensis	NSH	High	1.2	1.6	1.4	Very Lg. dec.	Very Lg. dec.	Low	Rare	Lost	Lost				57
pin cherry	Prunus pensylvanica	NSL	Low	1.2	1.6	1.4	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor				58
Norway maple	Acer platanoides	NSL	FIA	4.6	1.5	5.2	Unknown	Unknown	NA	Rare	NNIS	NNIS				59
quaking aspen	Populus tremuloides	WDH	High	1.1	1.1	0.9	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor				60
yellow birch	Betula alleghaniensis	NDL	High	1.2	1.0	0.9	Lg. dec.	Very Lg. dec.	Medium	Rare	Very Poor	Lost				61
shortleaf pine	Pinus echinata	WDH	High	1.2	0.6	0.5	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good				62
slash pine	Pinus elliotii	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat				63
longleaf pine	Pinus palustris	NSH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat				64
bald cypress	Taxodium distichum	NSH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat				65
florida maple	Acer barbatum	NSL	Low	0	0	0	Unknown	New Habitat	High	Absent	Unknown	New Habitat				66
mountain maple	Acer spicatum	NSL	Low	0	0	0	Unknown	Unknown	High	Absent	Unknown	Unknown				67
cittamwood/gum bumelia	Sideroxylon lanuginosum ssp.	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat				68
water hickory	Carya aquatica	NSL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat				69
pecan	Carya illinoensis	NSH	Low	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat				70
shellbark hickory	Carya laciniosa	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown				71
shagbark hickory	Carya ovata	WSL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat				72
black hickory	Carya texana	NDL	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat				73
sugarberry	Celtis laevigata	NDH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat				74
honeylocust	Gleditsia triacanthos	NSH	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat				75
cucumbertree	Magnolia acuminata	NSL	Low	0	0	0	Unknown	Unknown	Medium	Modeled	Unknown	Unknown				76
sweetbay	Magnolia virginiana	NSL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat				77
water tupelo	Nyssa aquatica	NSH	Medium	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat				78
swamp tupelo	Nyssa biflora	NDH	Medium	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat				79
sourwood	Oxydendrum arboreum	NDL	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat				80
redbay	Persea borbonia	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat				81
water elm	Planera aquatica	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat				82
laurel oak	Quercus laurifolia	NDH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat				83
overcup oak	Quercus lyrata	NSL	Medium	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat				84
blackjack oak	Quercus marilandica	NSL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat				85
chinkapin oak	Quercus muehlenbergii	NSL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat				86
water oak	Quercus nigra	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat				87
live oak	Quercus virginiana	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat				88
bluejack oak	Quercus incana	NSL	Low	0	0	0	Unknown	New Habitat	Medium	Absent	Unknown	New Habitat				89
winged elm	Ulmus alata	WDL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat				90
cedar elm	Ulmus crassifolia	NDH	Medium	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat				91