

Current and Potential Future Habitat, Capability, and Migration

	sq. km	sq. mi	FIA Plots
Area of Region	16,131	6,228.3	219

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	16	20	Increase	12	13	Very Good	3	3
Hickory	3			Medium	24	34	No Change	17	15	Good	9	9
Maple	5	Abundant	5	Low	24	13	Decrease	20	21	Fair	14	14
Oak	8	Common	18	FIA	5		New	13	14	Poor	10	11
Pine	4	Rare	31				Unknown	7	6	Very Poor	10	10
Other	31	Absent	15							FIA Only	3	3
	54		69		69	67		69	69	Unknown	2	1
											23	29
											51	51

Potential Changes in Climate Variables

Temperature (°F)

	Scenario	2009	2039	2069	2099	
Annual Average	CCSM45	43.2	44.6	46.8	46.8	
	CCSM85	43.2	45.1	47.3	49.9	
	GFDL45	43.2	45.4	47.5	48.4	
	GFDL85	43.2	45.6	48.4	51.9	
	HAD45	43.2	45.7	48.2	49.6	
HAD85	43.2	45.8	49.2	53.4		
Growing Season (May—Sep)	CCSM45	56.6	57.9	59.8	59.9	
	CCSM85	56.6	58.4	60.4	63.4	
	GFDL45	56.6	59.4	62.0	63.2	
	GFDL85	56.6	59.7	63.0	67.0	
	HAD45	56.6	59.3	61.1	63.0	
HAD85	56.6	58.9	62.5	66.9		
Coldest Month Average	CCSM45	22.7	24.0	26.2	26.1	
	CCSM85	22.7	24.8	26.5	28.1	
	GFDL45	22.7	24.7	25.9	26.2	
	GFDL85	22.7	25.3	26.4	28.0	
	HAD45	22.7	24.0	26.9	26.9	
HAD85	22.7	25.6	27.8	30.7		
Warmest Month Average	CCSM45	61.2	62.9	64.1	64.3	
	CCSM85	61.2	63.7	65.0	66.6	
	GFDL45	61.2	63.8	65.1	66.0	
	GFDL85	61.2	64.4	66.1	68.4	
	HAD45	61.2	64.4	65.4	66.7	
HAD85	61.2	64.6	66.8	69.9		

Precipitation (in)

	Scenario	2009	2039	2069	2099	
Annual Total	CCSM45	24.4	24.1	23.4	24.6	
	CCSM85	24.4	24.6	24.3	24.9	
	GFDL45	24.4	26.0	28.6	28.2	
	GFDL85	24.4	26.4	28.9	29.8	
	HAD45	24.4	25.1	26.3	25.9	
HAD85	24.4	26.3	24.8	27.5		
Growing Season (May—Sep)	CCSM45	12.5	12.6	11.9	12.3	
	CCSM85	12.5	12.5	12.2	11.8	
	GFDL45	12.5	12.8	14.1	13.9	
	GFDL85	12.5	13.4	13.4	13.6	
	HAD45	12.5	12.2	11.5	11.9	
HAD85	12.5	12.6	10.1	11.1		

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
red maple	Acer rubrum	WDH	High	51.9	1283.2	17.5	Sm. dec.	Sm. dec.	High	Abundant	Good	Good			1	1
green ash	Fraxinus pennsylvanica	WSH	Low	55.4	915.4	16.5	No change	No change	Medium	Abundant	Good	Good			1	2
bigtooth aspen	Populus grandidentata	NSL	Medium	25.6	673.0	16.8	Lg. dec.	Lg. dec.	Medium	Abundant	Fair	Fair			0	3
quaking aspen	Populus tremuloides	WDH	High	36.4	656.1	14.1	Lg. dec.	Lg. dec.	Medium	Abundant	Fair	Fair			0	4
black cherry	Prunus serotina	WDL	Medium	41	509.7	8.2	No change	No change	Low	Abundant	Fair	Fair			0	5
northern red oak	Quercus rubra	WDH	Medium	39.1	477.9	9.4	Sm. dec.	Sm. dec.	High	Common	Fair	Fair			1	6
American elm	Ulmus americana	WDH	Medium	47.2	425.2	7.6	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	7
white oak	Quercus alba	WDH	Medium	22.1	259.4	9.6	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	8
silver maple	Acer saccharinum	NSH	Low	18	217.7	12.8	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	9
red pine	Pinus resinosa	NSH	Medium	8.6	204.7	13.2	No change	No change	Low	Common	Poor	Poor	Infill +	Infill +	0	10
paper birch	Betula papyrifera	WDH	High	27.3	197.3	5.4	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	11
eastern cottonwood	Populus deltoides	NSH	Low	15.5	193.8	16.0	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	12
northern pin oak	Quercus ellipsoidalis	NSH	Medium	7.7	187.4	11.6	Sm. dec.	Sm. dec.	High	Common	Fair	Fair	Infill +	Infill +	1	13
sugar maple	Acer saccharum	WDH	High	18.8	163.3	9.2	Lg. inc.	Sm. inc.	High	Common	Very Good	Very Good	Infill ++	Infill ++	1	14
Scots pine	Pinus sylvestris	NSH	FIA	8.1	157.3	19.0	Unknown	Unknown	NA	Common	NNIS	NNIS			0	15
white ash	Fraxinus americana	WDL	Medium	20.8	143.2	6.5	Sm. inc.	Sm. inc.	Low	Common	Fair	Fair			1	16
eastern white pine	Pinus strobus	WDH	High	18.4	129.0	7.0	No change	Lg. dec.	Low	Common	Poor	Very Poor			0	17
American basswood	Tilia americana	WSL	Medium	20.4	127.7	7.1	Sm. inc.	No change	Medium	Common	Good	Fair			1	18
boxelder	Acer negundo	WSH	Low	7.9	127.7	15.7	No change	No change	High	Common	Good	Good	Infill ++	Infill ++	1	19
black oak	Quercus velutina	WDH	High	8.6	117.0	5.7	No change	No change	Medium	Common	Fair	Fair	Infill +	Infill +	1	20
northern white-cedar	Thuja occidentalis	WSH	High	5.9	113.8	13.6	Lg. dec.	Sm. dec.	Medium	Common	Poor	Poor	Infill +	Infill +	0	21
jack pine	Pinus banksiana	NSH	Medium	3.1	85.4	9.8	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	1	22
scarlet oak	Quercus coccinea	WDL	Medium	0.3	62.0	51.3	Very Lg. dec.	Lg. dec.	Medium	Rare	Lost	Very Poor			2	23
black ash	Fraxinus nigra	WSH	Medium	11.5	60.7	3.0	Lg. dec.	Lg. dec.	Low	Common	Very Poor	Very Poor			0	24
swamp white oak	Quercus bicolor	NSL	Low	9.5	58.1	4.7	No change	No change	Medium	Common	Fair	Fair	Infill +	Infill +	1	25
slippery elm	Ulmus rubra	WSL	Low	3.8	53.4	6.2	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	26
shagbark hickory	Carya ovata	WSL	Medium	6.2	42.6	5.5	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	27
black willow	Salix nigra	NSH	Low	12.2	42.3	4.4	Sm. dec.	Lg. inc.	Low	Rare	Very Poor	Fair		Infill +	1	28
American beech	Fagus grandifolia	WDH	High	13.7	41.8	2.4	Lg. inc.	Sm. inc.	Medium	Rare	Good	Fair	Infill ++	Infill +	2	29
tamarack (native)	Larix laricina	NSH	High	2.1	38.2	4.2	Sm. dec.	Sm. dec.	Low	Rare	Very Poor	Very Poor			2	30
sassafras	Sassafras albidum	WSL	Low	9	33.7	5.0	Sm. inc.	No change	Medium	Rare	Fair	Poor	Infill +	Infill +	1	31
bur oak	Quercus macrocarpa	NDH	Medium	10.2	33.6	4.0	Lg. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	2	32
peachleaf willow	Salix amygdaloides	NSLX	FIA	0.9	33.5	21.6	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	33
serviceberry	Amelanchier spp.	NSL	Low	14.5	33.4	2.0	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	34
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	10.2	30.0	3.0	Sm. dec.	Lg. dec.	High	Rare	Poor	Poor	Infill +	Infill +	1	35
American hornbeam; musclev	Carpinus caroliniana	WSL	Low	16.5	26.1	2.5	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	36
bitternut hickory	Carya cordiformis	WSL	Low	6.6	26.1	3.2	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	2	37
Norway spruce	Picea abies	NSH	FIA	0.7	22.2	16.8	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	38
black walnut	Juglans nigra	WDH	Low	4.9	20.8	6.8	Sm. inc.	Lg. inc.	Medium	Rare	Fair	Good	Infill +	Infill ++	1	39
blackgum	Nyssa sylvatica	WDL	Medium	3.5	20.1	4.8	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	2	40
hackberry	Celtis occidentalis	WDH	Medium	0.8	19.9	5.5	No change	Sm. inc.	High	Rare	Fair	Good	Infill +		2	41
eastern redcedar	Juniperus virginiana	WDH	Medium	1.3	18.0	9.6	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	42
pignut hickory	Carya glabra	WDL	Medium	2.4	17.5	4.4	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	43
eastern hemlock	Tsuga canadensis	NSH	High	2.3	16.4	6.4	No change	Sm. dec.	Low	Rare	Very Poor	Very Poor			2	44
white spruce	Picea glauca	NSL	Medium	1	14.5	11.1	Very Lg. dec.	Very Lg. dec.	Medium	Rare	Lost	Lost			0	45
balsam poplar	Populus balsamifera	NSH	Medium	4.4	13.3	2.0	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	46
pin oak	Quercus palustris	NSH	Low	1.2	10.7	8.6	No change	Sm. inc.	Low	Rare	Very Poor	Poor		Infill +	2	47

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
balsam fir	Abies balsamea	NDH	High	2.5	10.2	3.1	Lg. dec.	Lg. dec.	Low	Rare	Very Poor	Very Poor			0	48
rock elm	Ulmus thomasii	NSLX	FIA	0.2	8.7	3.5	Unknown	Unknown	Low	Rare	FIA Only	FIA Only			0	49
pin cherry	Prunus pensylvanica	NSL	Low	5	8.0	2.9	Very Lg. dec.	Very Lg. dec.	Medium	Rare	Lost	Lost			0	50
yellow birch	Betula alleghaniensis	NDL	High	4.3	7.3	2.0	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	51
black maple	Acer nigrum	NSH	Low	0.6	3.5	5.6	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor			0	52
chokecherry	Prunus virginiana	NSLX	FIA	4.2	2.4	1.3	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	53
red mulberry	Morus rubra	NSL	Low	1.4	0.8	3.0	No change	No change	Medium	Rare	Poor	Poor		Infill +	2	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			0	56
mockernut hickory	Carya alba	WDL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Likely +	Likely +	3	57
eastern redbud	Cercis canadensis	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	58
honeylocust	Gleditsia triacanthos	NSH	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate +	3	59
sweetgum	Liquidambar styraciflua	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	60
yellow-poplar	Liriodendron tulipifera	WDH	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate +	3	61
Osage-orange	Maclura pomifera	NDH	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	62
bigleaf magnolia	Magnolia macrophylla	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	63
sycamore	Platanus occidentalis	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	64
blackjack oak	Quercus marilandica	NSL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			0	65
chinkapin oak	Quercus muehlenbergii	NSL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	66
post oak	Quercus stellata	WDH	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			3	67
black locust	Robinia pseudoacacia	NDH	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Likely +	Likely +	3	68
American mountain-ash	Sorbus americana	NSL	Low	0	0	0	Unknown	New Habitat	Low	Absent	Unknown	New Habitat			0	69