

Current and Potential Future Habitat, Capability, and Migration

	sq. km	sq. mi	FIA Plots
Area of Region	34,784	13,430	1,807

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	15	17	Increase	19	20	Very Good	8	8	Likely	0	0
Hickory	1			Medium	21	34	No Change	8	8	Good	11	10	Infill	3	5
Maple	5	Abundant	8	Low	22	12	Decrease	10	9	Fair	11	13	Migrate	7	10
Oak	4	Common	14	FIA	6		New	16	17	Poor	2	3			
Pine	4	Rare	21				Unknown	11	10	Very Poor	5	2			
Other	27	Absent	21							FIA Only	5	5			
	43		64		64	63		64	64	Unknown	5	4			
											47	45			

Potential Changes in Climate Variables

Temperature (°F)

Scenario	2009	2039	2069	2099		
Annual	CCSM45	39.9	41.5	44.5	44.9	
Average	CCSM85	39.9	42.3	45.7	49.4	
	GFDL45	39.9	42.8	45.5	47.2	
	GFDL85	39.9	43.2	46.8	51.9	
	HAD45	39.9	43.0	46.7	48.7	
	HAD85	39.9	43.5	47.9	53.8	
Growing Season	CCSM45	61.1	62.8	65.3	65.8	
	CCSM85	61.1	63.8	66.8	70.9	
May—Sep	GFDL45	61.1	64.3	67.7	69.8	
	GFDL85	61.1	64.9	68.8	74.5	
	HAD45	61.1	64.2	67.2	69.4	
	HAD85	61.1	64.1	68.3	74.3	
Coldest Month	CCSM45	5.5	7.3	9.6	9.9	
	CCSM85	5.5	6.9	9.5	11.9	
Average	GFDL45	5.5	9.2	11.0	11.7	
	GFDL85	5.5	10.0	11.7	15.0	
	HAD45	5.5	7.5	11.7	11.4	
	HAD85	5.5	11.1	14.4	18.4	
Warmest Month	CCSM45	67.8	69.7	71.3	71.8	
	CCSM85	67.8	71.1	73.2	75.7	
Average	GFDL45	67.8	71.4	72.8	74.6	
	GFDL85	67.8	72.0	74.1	77.3	
	HAD45	67.8	71.1	72.6	74.4	
	HAD85	67.8	71.3	73.6	77.6	

Precipitation (in)

Scenario	2009	2039	2069	2099		
Annual	CCSM45	27.2	27.9	28.0	27.3	
Total	CCSM85	27.2	27.1	27.4	27.2	
	GFDL45	27.2	30.2	31.7	29.6	
	GFDL85	27.2	30.6	33.0	32.2	
	HAD45	27.2	28.8	27.0	28.8	
	HAD85	27.2	28.9	28.2	29.8	
Growing Season	CCSM45	17.8	17.8	17.1	17.1	
	CCSM85	17.8	17.1	16.5	15.7	
May—Sep	GFDL45	17.8	20.1	20.4	19.0	
	GFDL85	17.8	20.2	21.0	19.7	
	HAD45	17.8	18.1	16.2	16.8	
	HAD85	17.8	17.9	15.8	15.5	

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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Climate Change Atlas Tree Species

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
quaking aspen	Populus tremuloides	WDH	High	94.3	2602.3	21.2	Sm. dec.	Sm. dec.	Medium	Abundant	Fair	Fair			0	1
tamarack (native)	Larix laricina	NSH	High	51.6	805.5	13.2	Sm. inc.	No change	Low	Abundant	Good	Fair			1	2
black ash	Fraxinus nigra	WSH	Medium	73.4	727.4	7.8	No change	No change	Low	Abundant	Fair	Fair			0	3
paper birch	Betula papyrifera	WDH	High	86.4	709.3	6.3	No change	Sm. dec.	Medium	Abundant	Good	Fair			1	4
bur oak	Quercus macrocarpa	NDH	Medium	68.6	665.5	7.8	Sm. inc.	Sm. inc.	High	Abundant	Very Good	Very Good			1	5
black spruce	Picea mariana	NSH	High	45.6	645.0	11.3	Lg. dec.	Lg. dec.	Medium	Abundant	Fair	Fair			0	6
balsam fir	Abies balsamea	NDH	High	67.6	601.7	6.8	Sm. dec.	No change	Low	Abundant	Fair	Fair			0	7
red pine	Pinus resinosa	NSH	Medium	43.1	593.2	11.6	No change	No change	Low	Abundant	Fair	Fair			0	8
American basswood	Tilia americana	WSL	Medium	53	452.1	6.4	Sm. inc.	No change	Medium	Common	Good	Fair			1	9
red maple	Acer rubrum	WDH	High	70.6	423.9	4.7	Sm. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	10
northern red oak	Quercus rubra	WDH	Medium	49.4	370.6	6.0	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	11
sugar maple	Acer saccharum	WDH	High	45.7	342.8	5.4	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	12
jack pine	Pinus banksiana	NSH	Medium	36	333.3	8.2	Sm. dec.	Sm. dec.	High	Common	Fair	Fair			1	13
northern white-cedar	Thuja occidentalis	WSH	High	26.7	332.3	9.4	No change	Sm. inc.	Medium	Common	Fair	Good			1	14
balsam poplar	Populus balsamifera	NSH	Medium	48.6	263.5	4.0	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	15
bigtooth aspen	Populus grandidentata	NSL	Medium	39.1	211.8	4.3	No change	No change	Medium	Common	Fair	Fair			1	16
green ash	Fraxinus pennsylvanica	WSH	Low	52.4	199.9	3.0	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	17
American elm	Ulmus americana	WDH	Medium	58.7	183.3	2.3	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	18
eastern white pine	Pinus strobus	WDH	High	25.7	121.3	3.9	Lg. inc.	Lg. inc.	Low	Common	Good	Good			1	19
white spruce	Picea glauca	NSL	Medium	41.7	120.3	2.2	No change	Sm. inc.	Medium	Common	Fair	Good			1	20
northern pin oak	Quercus ellipsoidalis	NSH	Medium	18.5	103.3	4.5	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good	Infill ++	Infill ++	1	21
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	38.6	97.4	1.9	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	22
silver maple	Acer saccharinum	NSH	Low	4.2	37.4	7.9	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	2	23
boxelder	Acer negundo	WSH	Low	8.5	36.7	3.9	Lg. inc.	Lg. inc.	High	Rare	Good	Good			1	24
black cherry	Prunus serotina	WDL	Medium	17	17.8	0.9	Lg. inc.	Lg. inc.	Low	Rare	Fair	Fair			1	25
yellow birch	Betula alleghaniensis	NDL	High	10.9	15.9	1.2	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	1	26
chokecherry	Prunus virginiana	NSLX	FIA	25.5	15.9	0.5	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	27
pin cherry	Prunus pensylvanica	NSL	Low	12	14.6	1.1	Lg. dec.	Very Lg. dec.	Medium	Rare	Very Poor	Lost			0	28
mountain maple	Acer spicatum	NSL	Low	18.2	14.2	0.7	Lg. dec.	Lg. dec.	High	Rare	Poor	Poor			1	29
serviceberry	Amelanchier spp.	NSL	Low	12.5	10.3	0.5	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	30
black willow	Salix nigra	NSH	Low	2.8	3.3	0.8	No change	Lg. inc.	Low	Rare	Very Poor	Fair		Infill +	2	31
white oak	Quercus alba	WDH	Medium	1.7	3.0	1.7	Lg. inc.	Lg. inc.	High	Rare	Good	Good			2	32
butternut	Juglans cinerea	NSLX	FIA	1.1	2.4	1.3	Unknown	Unknown	Low	Rare	FIA Only	FIA Only			0	33
slippery elm	Ulmus rubra	WSL	Low	0.3	2.2	0.4	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	34
eastern cottonwood	Populus deltoides	NSH	Low	0.6	2.1	3.6	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	35
American hornbeam; muscle	Carpinus caroliniana	WSL	Low	2.3	1.6	0.7	Lg. dec.	No change	Medium	Rare	Very Poor	Poor		Infill +	2	36
Scots pine	Pinus sylvestris	NSH	FIA	0.6	1.2	2.0	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	37
peachleaf willow	Salix amygdaloides	NSLX	FIA	1.1	1.1	0.4	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	38
rock elm	Ulmus thomasii	NSLX	FIA	0.4	1.0	0.6	Unknown	Unknown	Low	Rare	FIA Only	FIA Only			0	39
American mountain-ash	Sorbus americana	NSL	Low	0.4	0.6	0.3	Lg. dec.	Lg. dec.	Low	Rare	Very Poor	Very Poor			0	40
hackberry	Celtis occidentalis	WDH	Medium	0.3	0.2	0.7	Lg. inc.	Lg. inc.	High	Rare	Good	Good			2	41
bitternut hickory	Carya cordiformis	WSL	Low	0	0.2	0.1	Lg. inc.	Lg. inc.	High	Rare	Good	Good			2	42
wild plum	Prunus americana	NSLX	FIA	0.2	0.1	0.2	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	43
eastern redcedar	Juniperus virginiana	WDH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate ++	Migrate ++	3	44
eastern hemlock	Tsuga canadensis	NSH	High	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	45
striped maple	Acer pensylvanicum	NSL	Medium	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	46
Ohio buckeye	Aesculus glabra	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	47



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pignut hickory	<i>Carya glabra</i>	WDL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	48
shagbark hickory	<i>Carya ovata</i>	WSL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	49
mockernut hickory	<i>Carya alba</i>	WDL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			0	50
American beech	<i>Fagus grandifolia</i>	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	51
white ash	<i>Fraxinus americana</i>	WDL	Medium	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	52
honeylocust	<i>Gleditsia triacanthos</i>	NSH	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			3	53
black walnut	<i>Juglans nigra</i>	WDH	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	54
sweetgum	<i>Liquidambar styraciflua</i>	WDH	High	0	0	0	Unknown	New Habitat	Medium	Absent	Unknown	New Habitat			0	55
bigleaf magnolia	<i>Magnolia macrophylla</i>	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	56
red mulberry	<i>Morus rubra</i>	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	57
sycamore	<i>Platanus occidentalis</i>	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	58
swamp white oak	<i>Quercus bicolor</i>	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	59
Shumard oak	<i>Quercus shumardii</i>	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			0	60
post oak	<i>Quercus stellata</i>	WDH	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			0	61
black oak	<i>Quercus velutina</i>	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	62
black locust	<i>Robinia pseudoacacia</i>	NDH	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	63
winged elm	<i>Ulmus alata</i>	WDL	Medium	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	64