

sq. km sq. mi FIA Plots
Area of Region 8,800.0 3,397.7 430

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	21	16	Increase	14	16	Very Good	3	4
Hickory	0			Medium	21	35	No Change	8	7	Good	11	9
Maple	5	Abundant	8	Low	23	15	Decrease	14	13	Fair	5	9
Oak	2	Common	8	FIA	1		New	21	22	Poor	9	8
Pine	3	Rare	21				Unknown	9	8	Very Poor	6	4
Other	24	Absent	28							FIA Only	1	1
	37		65		66	66		66	66	Unknown	8	7
											43	42

Potential Changes in Climate Variables

Temperature (°F)

Scenario	2009	2039	2069	2099		
Annual	CCSM45	41.4	43.3	45.7	45.8	
Average	CCSM85	41.4	43.9	46.5	49.8	
	GFDL45	41.4	44.3	47.8	49.3	
	GFDL85	41.4	44.9	49.3	54.3	
	HAD45	41.4	44.5	47.6	49.3	
	HAD85	41.4	44.6	48.8	54.4	
Growing Season	CCSM45	59.1	61.2	63.1	63.5	
	CCSM85	59.1	61.5	64.0	67.7	
May—Sep	GFDL45	59.1	62.3	66.0	67.7	
	GFDL85	59.1	62.8	67.5	72.9	
	HAD45	59.1	62.1	64.8	67.1	
	HAD85	59.1	61.8	66.4	72.4	
Coldest Month	CCSM45	13.6	15.4	17.4	17.8	
	CCSM85	13.6	16.7	17.9	20.4	
Average	GFDL45	13.6	16.6	19.0	20.4	
	GFDL85	13.6	17.6	20.0	22.9	
	HAD45	13.6	16.4	19.3	19.6	
	HAD85	13.6	17.8	20.2	23.9	
Warmest Month	CCSM45	65.2	67.5	68.7	68.7	
	CCSM85	65.2	68.0	69.7	71.6	
Average	GFDL45	65.2	68.2	70.1	71.4	
	GFDL85	65.2	68.7	71.7	74.5	
	HAD45	65.2	68.4	69.8	71.2	
	HAD85	65.2	68.0	70.6	74.9	

Precipitation (in)

Scenario	2009	2039	2069	2099		
Annual	CCSM45	50.6	49.6	47.8	53.6	
Total	CCSM85	50.6	50.4	51.7	54.2	
	GFDL45	50.6	54.9	58.1	56.5	
	GFDL85	50.6	53.2	56.4	58.2	
	HAD45	50.6	54.6	57.2	55.8	
	HAD85	50.6	55.8	55.4	58.6	
Growing Season	CCSM45	22.6	22.8	21.0	22.7	
	CCSM85	22.6	22.2	22.9	22.2	
May—Sep	GFDL45	22.6	22.7	22.0	22.1	
	GFDL85	22.6	22.9	22.1	21.1	
	HAD45	22.6	24.5	24.4	25.0	
	HAD85	22.6	23.6	23.4	25.4	

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
balsam fir	Abies balsamea	NDH	High	90.9	1394.8	15.3	Lg. dec.	Lg. dec.	Low	Abundant	Poor	Poor			0	1
red maple	Acer rubrum	WDH	High	97.7	1363.3	14.0	Sm. inc.	No change	High	Abundant	Very Good	Very Good			1	2
American beech	Fagus grandifolia	WDH	High	86.4	1008.8	11.7	No change	Sm. dec.	Medium	Abundant	Good	Fair			1	3
yellow birch	Betula alleghaniensis	NDL	High	94.3	954.8	10.1	Sm. dec.	Sm. dec.	Medium	Abundant	Fair	Fair			0	4
paper birch	Betula papyrifera	WDH	High	94.3	913.0	9.7	Sm. dec.	Lg. dec.	Medium	Abundant	Fair	Fair			0	5
red spruce	Picea rubens	NDH	High	87.5	799.7	9.1	Sm. dec.	Sm. dec.	Low	Abundant	Fair	Fair			0	6
sugar maple	Acer saccharum	WDH	High	89.8	786.1	8.8	No change	No change	High	Abundant	Very Good	Very Good			1	7
eastern hemlock	Tsuga canadensis	NSH	High	71.6	756.6	10.6	Sm. inc.	No change	Low	Abundant	Good	Fair			1	8
eastern white pine	Pinus strobus	WDH	High	54.5	446.6	8.2	Lg. inc.	Sm. inc.	Low	Common	Good	Fair			1	9
northern red oak	Quercus rubra	WDH	Medium	53.4	411.3	7.7	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	10
white ash	Fraxinus americana	WDL	Medium	64.8	241.7	3.7	Sm. inc.	Lg. inc.	Low	Common	Fair	Good			1	11
quaking aspen	Populus tremuloides	WDH	High	47.7	188.2	3.9	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	12
striped maple	Acer pensylvanicum	NSL	Medium	77.3	186.6	2.4	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor			0	13
bigtooth aspen	Populus grandidentata	NSL	Medium	29.5	107.4	3.6	Sm. inc.	Lg. inc.	Medium	Common	Good	Very Good			1	14
pin cherry	Prunus sylvanica	NSL	Low	40.9	84.5	2.1	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	15
black cherry	Prunus serotina	WDL	Medium	33	70.4	2.1	Lg. inc.	Lg. inc.	Low	Common	Good	Good			1	16
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	25	38.5	1.5	Lg. inc.	Lg. inc.	High	Rare	Good	Good			1	17
American mountain-ash	Sorbus americana	NSL	Low	28.4	26.2	0.9	Lg. dec.	Lg. dec.	Low	Rare	Very Poor	Very Poor			0	18
black spruce	Picea mariana	NSH	High	2.3	26.0	11.4	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			2	19
red pine	Pinus resinosa	NSH	Medium	8	25.6	3.2	No change	Sm. inc.	Low	Rare	Very Poor	Poor	Infill +		2	20
gray birch	Betula populifolia	NSL	Low	19.3	22.8	1.2	No change	Sm. inc.	Medium	Rare	Poor	Fair			1	21
silver maple	Acer saccharinum	NSH	Low	1.1	20.8	18.3	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor			0	22
tamarack (native)	Larix laricina	NSH	High	5.7	18.0	3.2	No change	No change	Low	Rare	Very Poor	Very Poor			2	23
American basswood	Tilia americana	WSL	Medium	12.5	17.7	1.4	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	1	24
northern white-cedar	Thuja occidentalis	WSH	High	6.8	15.9	2.3	No change	Sm. inc.	Medium	Rare	Poor	Fair	Infill +	Infill +	2	25
white oak	Quercus alba	WDH	Medium	5.7	14.9	2.6	Lg. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	2	26
mountain maple	Acer spicatum	NSL	Low	17	13.3	0.8	Lg. dec.	Lg. dec.	High	Rare	Poor	Poor			1	27
serviceberry	Amelanchier spp.	NSL	Low	10.2	6.5	0.6	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			1	28
white spruce	Picea glauca	NSL	Medium	8	6.0	0.8	No change	No change	Medium	Rare	Poor	Poor			1	29
black ash	Fraxinus nigra	WSH	Medium	9.1	5.7	0.6	Sm. dec.	No change	Low	Rare	Very Poor	Very Poor			0	30
American elm	Ulmus americana	WDH	Medium	5.7	3.7	0.7	Sm. dec.	No change	Medium	Rare	Very Poor	Poor			2	31
pitch pine	Pinus rigida	NSH	High	2.3	2.4	1.1	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	1	32
balsam poplar	Populus balsamifera	NSH	Medium	2.3	2.1	0.9	Very Lg. dec.	Very Lg. dec.	Medium	Rare	Lost	Lost			0	33
green ash	Fraxinus pennsylvanica	WSH	Low	2.3	1.4	0.6	No change	Lg. inc.	Medium	Rare	Poor	Good			2	34
slippery elm	Ulmus rubra	WDL	Low	1.1	1.1	1.0	Very Lg. dec.	Very Lg. dec.	Medium	Rare	Lost	Lost			0	35
sweet birch	Betula lenta	NDH	High	1.1	0.3	0.3	Lg. inc.	Lg. inc.	Low	Rare	Fair	Fair	Infill +	Infill +	2	36
chokecherry	Prunus virginiana	NSLX	FIA	1.1	0.2	0.2	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	37
eastern redcedar	Juniperus virginiana	WDH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate ++	3	38
jack pine	Pinus banksiana	NSH	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate +	3	39
sand pine	Pinus clausa	NDH	High	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat			0	40
loblolly pine	Pinus taeda	WDH	High	0	0	0	Unknown	New Habitat	Medium	Absent	Unknown	New Habitat			0	41
Virginia pine	Pinus virginiana	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	42
black maple	Acer nigrum	NSH	Low	0	0	0	Unknown	Unknown	High	Absent	Unknown	Unknown			0	43
yellow buckeye	Aesculus flava	NSL	Low	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat			0	44
pawpaw	Asimina triloba	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	45
American hornbeam; musclev	Carpinus caroliniana	WSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Likely +	Likely +	3	46
bitternut hickory	Carya cordiformis	WSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate +	3	47

White Mountain

National Forests and Grasslands 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

Common Name	Scientific Name	Range	MR	%Cell	FIAsum	FIaiv	ChngCl45	ChngCl85	Adap	Abund	Capabil45	Capabil85	SHIFT45	SHIFT85	SSO	N
pignut hickory	<i>Carya glabra</i>	WDL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	48
pecan	<i>Carya illinoensis</i>	NSH	Low	0	0	0	Unknown	Unknown	Low	Absent	Unknown	Unknown				49
shagbark hickory	<i>Carya ovata</i>	WSL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	50
mockernut hickory	<i>Carya alba</i>	WDL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate +	3	51
flowering dogwood	<i>Cornus florida</i>	WDL	Medium	0	0	0	Unknown	Unknown	Medium	Modeled	Unknown	Unknown				52
silverbell	<i>Halesia spp.</i>	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat				53
yellow-poplar	<i>Liriodendron tulipifera</i>	WDH	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate ++	3	54
Osage-orange	<i>Maclura pomifera</i>	NDH	Medium	0	0	0	Unknown	Unknown	High	Absent	Unknown	Unknown				55
bigleaf magnolia	<i>Magnolia macrophylla</i>	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown				56
mountain or Fraser magnolia	<i>Magnolia fraseri</i>	NSL	Low	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat				57
blackgum	<i>Nyssa sylvatica</i>	WDL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Likely +	Likely +	3	58
redbay	<i>Persea borbonia</i>	NSL	Low	0	0	0	Unknown	Unknown	High	Absent	Unknown	Unknown				59
sycamore	<i>Platanus occidentalis</i>	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	60
swamp white oak	<i>Quercus bicolor</i>	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	61
scarlet oak	<i>Quercus coccinea</i>	WDL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	62
chestnut oak	<i>Quercus prinus</i>	NDH	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate ++	Migrate ++	3	63
black oak	<i>Quercus velutina</i>	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Likely +	Likely +	3	64
black locust	<i>Robinia pseudoacacia</i>	NDH	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	65
sassafras	<i>Sassafras albidum</i>	WSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	66