

sq. km sq. mi FIA Plots
Area of Region 22,906 8,844.0 18

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	Reliability	Adaptability	Potential Change in Habitat Suitability		Capability to Cope or Persist		Migration Potential	
							Scenario	Scenario	Scenario	Scenario	SHIFT	SHIFT
							RCP45	RCP85	RCP45	RCP85	RCP45	RCP85
Ash	1			High	0	10	Increase	2	3	Very Good	0	0
Hickory	0			Medium	8	11	No Change	7	6	Good	2	3
Maple	2	Abundant	0	Low	12	1	Decrease	5	5	Fair	2	2
Oak	1	Common	1	FIA	3		New	4	5	Poor	9	8
Pine	1	Rare	16				Unknown	5	4	Very Poor	0	0
Other	12	Absent	6							FIA Only	2	2
	17		23		23	22		23	23	Unknown	2	1
											17	16

Potential Changes in Climate Variables

Temperature (°F)

	Scenario	2009	2039	2069	2099	
Annual Average	CCSM45	40.6	42.0	43.8	44.2	
	CCSM85	40.6	42.5	44.4	46.8	
	GFDL45	40.6	44.9	44.0	44.9	
	GFDL85	40.6	42.6	44.8	48.0	
	HAD45	40.6	42.7	45.3	46.4	
	HAD85	40.6	43.1	46.4	49.5	
Growing Season May—Sep	CCSM45	54.8	56.2	58.0	58.4	
	CCSM85	54.8	56.8	58.7	61.6	
	GFDL45	54.8	60.1	58.9	60.1	
	GFDL85	54.8	57.2	59.7	63.5	
	HAD45	54.8	56.5	58.6	59.8	
	HAD85	54.8	56.9	59.8	62.7	
Coldest Month Average	CCSM45	18.4	20.1	21.4	21.9	
	CCSM85	18.4	19.7	21.0	22.5	
	GFDL45	18.4	20.9	21.5	21.8	
	GFDL85	18.4	20.6	21.7	23.3	
	HAD45	18.4	20.2	22.8	22.5	
	HAD85	18.4	22.3	25.4	27.3	
Warmest Month Average	CCSM45	59.3	61.2	62.3	62.9	
	CCSM85	59.3	62.2	63.4	65.3	
	GFDL45	59.3	61.7	62.7	63.6	
	GFDL85	59.3	62.1	63.3	65.8	
	HAD45	59.3	61.1	62.3	63.1	
	HAD85	59.3	61.9	63.5	65.6	

Precipitation (in)

	Scenario	2009	2039	2069	2099	
Annual Total	CCSM45	17.7	18.1	17.8	17.6	
	CCSM85	17.7	17.9	17.9	18.2	
	GFDL45	17.7	20.1	21.9	20.6	
	GFDL85	17.7	20.3	22.1	21.7	
	HAD45	17.7	19.9	18.7	19.1	
	HAD85	17.7	18.6	19.2	21.0	
Growing Season May—Sep	CCSM45	11.4	11.1	10.6	10.4	
	CCSM85	11.4	10.7	10.3	10.1	
	GFDL45	11.4	13.0	14.0	12.7	
	GFDL85	11.4	13.2	13.7	12.8	
	HAD45	11.4	12.0	11.0	10.9	
	HAD85	11.4	11.0	10.6	10.2	

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>.

HUC 101702 Big Sioux

HUC 6 Watershed 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	ChngCI45	ChngCI85	Adap	Abund	Capabil45	Capabil85	SHIFT45	SHIFT85	SSO	N
green ash	Fraxinus pennsylvanica	WSH	Low	16.1	71.8	28.7	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor	Infill +	Infill +	2	1
American elm	Ulmus americana	WDH	Medium	7.3	26.9	20.8	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	2
boxelder	Acer negundo	WSH	Low	8	26.8	15.4	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor	Infill +	Infill +	2	3
hackberry	Celtis occidentalis	WDH	Medium	4.4	13.9	29.8	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	2	4
red pine	Pinus resinosa	NSH	Medium	1.7	10.9	100.0	Very Lg. dec.	Very Lg. dec.	Low	Rare	Lost	Lost			0	5
silver maple	Acer saccharinum	NSH	Low	3.3	9.6	42.6	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor			0	6
bur oak	Quercus macrocarpa	NDH	Medium	2.7	8.9	33.5	Sm. inc.	Sm. inc.	High	Rare	Good	Good			2	7
red mulberry	Morus rubra	NSL	Low	3.3	8.4	37.9	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	8
Siberian elm	Ulmus pumila	NDH	FIA	4.7	6.2	11.6	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	9
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	2.8	5.5	18.1	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor	Infill +	Infill +	2	10
chokecherry	Prunus virginiana	NSLX	FIA	1.7	5.0	46.1	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	11
eastern cottonwood	Populus deltoides	NSH	Low	1.7	3.6	32.4	No change	Lg. inc.	Medium	Rare	Poor	Good	Infill +		2	12
American basswood	Tilia americana	WSL	Medium	2.8	2.7	10.0	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	13
honeylocust	Gleditsia triacanthos	NSH	Low	0.5	2.3	5.4	No change	No change	High	Rare	Fair	Fair			0	14
eastern redcedar	Juniperus virginiana	WDH	Medium	2.6	1.3	2.1	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	15
wild plum	Prunus americana	NSLX	FIA	0.5	0.4	1.0	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	16
slippery elm	Ulmus rubra	WSL	Low	1.6	0.3	2.8	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	17
mountain maple	Acer spicatum	NSL	Low	0	0	0	Unknown	Unknown	High	Absent	Unknown	Unknown			0	18
bitternut hickory	Carya cordiformis	WSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Likely +	Likely +	3	19
eastern redbud	Cercis canadensis	NSL	Low	0	0	0	Unknown	New Habitat	Medium	Absent	Unknown	New Habitat		Migrate +	3	20
black walnut	Juglans nigra	WDH	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate ++	Migrate ++	3	21
Osage-orange	Maclura pomifera	NDH	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			3	22
northern red oak	Quercus rubra	WDH	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate +	3	23