S42 E95

One x One Degree
Climate Change Atlas Tree Species
Current and Potential Future Habitat, Capability, and Migration

USDA Forest Service
Northern Research Station
Landscape Change Research Group
Iverson, Peters, Prasad, Matthews

	sq. km	sq. mi	FIA Plots
Area of Region	9,130.7	3,525.4	14

Species Information

The columns below provide breif 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
Ash	2
Hickory	1
Maple	2
Oak	2
Pine	0
Other	13
	20

Abundance	
Abundant	0
Common	3
Rare	17
Absent	10
	30

	Model Reliability	Adaptability
High	2	10
Medium	12	15
Low	15	4
FIA	1	
	30	**29**

Potential Change in Habitat Suitability	Scenario RCP45	Scenario RCP85
Increase	6	7
No Change	7	5
Decrease	6	7
New	10	10
Unknown	1	1
	30	**30**

Capability to Cope or Persist	Scenario RCP45	Scenario RCP85
Very Good	0	0
Good	4	5
Fair	4	4
Poor	9	9
Very Poor	2	1
FIA Only	0	0
Unknown	0	0
	19	**19**

Migration Potential	SHIFT RCP45	SHIFT RCP85
Likely	0	0
Infill	11	12
Migrate	4	7
	15	**19**

Potential Changes in Climate Variables

Temperature (°F)

	Scenario	2009	2039	2069	2099
Annual Average	CCSM45	47.5	49.5	52.0	52.6
	CCSM85	47.5	50.1	52.8	56.1
	GFDL45	47.5	53.8	52.5	53.8
	GFDL85	47.5	50.4	53.7	58.2
	HAD45	47.5	50.3	53.7	55.3
	HAD85	47.5	51.0	55.6	59.8
Growing Season May—Sep	CCSM45	67.4	69.6	72.1	72.8
	CCSM85	67.4	70.3	73.0	77.0
	GFDL45	67.4	75.4	73.4	75.4
	GFDL85	67.4	71.1	74.7	80.3
	HAD45	67.4	69.7	72.2	74.0
	HAD85	67.4	70.5	74.9	78.8
Coldest Month Average	CCSM45	15.8	18.3	20.1	20.9
	CCSM85	15.8	18.6	20.2	22.2
	GFDL45	15.8	19.2	20.1	20.4
	GFDL85	15.8	18.6	20.3	22.1
	HAD45	15.8	18.2	21.8	21.6
	HAD85	15.8	21.1	25.0	27.8
Warmest Month Average	CCSM45	73.5	76.1	77.8	78.6
	CCSM85	73.5	77.7	79.4	82.0
	GFDL45	73.5	76.9	78.3	79.7
	GFDL85	73.5	77.7	79.3	83.1
	HAD45	73.5	75.6	77.6	78.4
	HAD85	73.5	77.5	80.0	82.7

Precipitation (in)

	Scenario	2009	2039	2069	2099
Annual Total	CCSM45	31.4	31.6	31.2	31.0
	CCSM85	31.4	32.0	32.6	32.9
	GFDL45	31.4	34.7	37.9	36.7
	GFDL85	31.4	35.2	37.9	37.0
	HAD45	31.4	35.0	33.9	33.5
	HAD85	31.4	32.3	32.5	36.4
Growing Season May—Sep	CCSM45	20.0	19.6	18.8	19.0
	CCSM85	20.0	19.2	18.8	18.5
	GFDL45	20.0	22.2	23.7	22.2
	GFDL85	20.0	22.8	23.2	21.6
	HAD45	20.0	21.5	20.1	19.7
	HAD85	20.0	19.5	18.6	18.5

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.

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Common Name	Scientific Name	Range	MR	%Cell	FIAsum	FIAiv	ChngCl45	ChngCl85	Adap	Abund	Capabil45	Capabil85	SHIFT45	SHIFT85	SSO	N
bur oak	Quercus macrocarpa	NDH	Medium	17.6	60.2	18.9	No change	No change	High	Common	Good	Good			2	1
red mulberry	Morus rubra	NSL	Low	20.5	54.1	14.7	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor	Infill +	Infill +	2	2
black walnut	Juglans nigra	WDH	Low	19.8	51.8	25.6	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor	Infill +	Infill +	2	3
boxelder	Acer negundo	WSH	Low	13.9	47.6	25.5	Lg. dec.	Lg. dec.	High	Rare	Poor	Poor	Infill +	Infill +	2	4
eastern cottonwood	Populus deltoides	NSH	Low	5.3	27.4	10.9	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	5
eastern redcedar	Juniperus virginiana	WDH	Medium	16.8	25.8	17.9	Sm. inc.	Lg. inc.	Medium	Rare	Fair	Good	Infill +		2	6
hackberry	Celtis occidentalis	WDH	Medium	10.3	19.9	2.3	Lg. inc.	Lg. inc.	High	Rare	Good	Good			2	7
green ash	Fraxinus pennsylvanica	WSH	Low	13.2	15.9	4.5	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	8
American elm	Ulmus americana	WDH	Medium	12.5	14.5	5.7	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	9
silver maple	Acer saccharinum	NSH	Low	4.4	11.6	42.2	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor			2	10
northern red oak	Quercus rubra	WDH	Medium	11.4	9.9	11.7	Sm. dec.	Lg. dec.	High	Rare	Poor	Poor	Infill +	Infill +	2	11
bitternut hickory	Carya cordiformis	WSL	Low	15.4	8.6	7.0	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor	Infill +	Infill +	2	12
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	8.1	8.4	4.6	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	2	13
slippery elm	Ulmus rubra	WSL	Low	12	5.8	2.8	Sm. inc.	Sm. inc.	Medium	Rare	Fair	Fair	Infill +	Infill +	2	14
black locust	Robinia pseudoacacia	NDH	Low	0.2	5.7	0.7	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	15
American basswood	Tilia americana	WSL	Medium	7.1	5.5	7.7	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	16
black cherry	Prunus serotina	WDL	Medium	0.9	5.0	3.7	No change	Sm. dec.	Low	Rare	Very Poor	Very Poor			2	17
Siberian elm	Ulmus pumila	NDH	FIA	4.8	3.1	2.8	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	18
black willow	Salix nigra	NSH	Low	3.9	1.2	4.0	No change	Lg. inc.	Low	Rare	Very Poor	Fair		Infill +	2	19
white ash	Fraxinus americana	WDL	Medium	3.9	0.3	0.9	Lg. inc.	Lg. inc.	Low	Rare	Fair	Fair		Infill +	2	20
pecan	Carya illinoinensis	NSH	Low	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat			3	21
shagbark hickory	Carya ovata	WSL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	22
sugarberry	Celtis laevigata	NDH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	23
eastern redbud	Cercis canadensis	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	24
honeylocust	Gleditsia triacanthos	NSH	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate ++	Migrate ++	3	25
Osage-orange	Maclura pomifera	NDH	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	26
sycamore	Platanus occidentalis	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	27
chinkapin oak	Quercus muehlenbergii	NSL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	28
post oak	Quercus stellata	WDH	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	29
black oak	Quercus velutina	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	30