S43 E94

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	8,985.5	3,469.3	8

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	3
Hickory	1
Maple	4
Oak	2
Pine	0
Other	15
	25

Abundance	
Abundant	0
Common	0
Rare	25
Absent	7
	32

	Model Reliability	Adaptability
High	5	12
Medium	11	15
Low	14	5
FIA	3	
	33	**32**

Potential Change in Habitat Suitability	Scenario RCP45	Scenario RCP85
Increase	5	4
No Change	8	9
Decrease	9	9
New	7	7
Unknown	4	4
	33	**33**

Capability to Cope or Persist	Scenario RCP45	Scenario RCP85
Very Good	0	0
Good	5	2
Fair	2	5
Poor	9	9
Very Poor	6	6
FIA Only	2	2
Unknown	1	1
	25	**25**

Migration Potential	SHIFT RCP45	SHIFT RCP85
Likely	0	0
Infill	8	9
Migrate	1	3
	9	**12**

Potential Changes in Climate Variables

Temperature (°F)

	Scenario	2009	2039	2069	2099
Annual Average	CCSM45	45.7	47.7	50.5	51.0
	CCSM85	45.7	48.5	51.4	54.8
	GFDL45	45.7	52.2	50.9	52.2
	GFDL85	45.7	48.8	52.0	56.7
	HAD45	45.7	48.6	52.2	54.0
	HAD85	45.7	49.2	53.7	58.4
Growing Season May—Sep	CCSM45	66.3	68.4	71.0	71.6
	CCSM85	66.3	69.3	72.1	76.3
	GFDL45	66.3	74.4	72.5	74.4
	GFDL85	66.3	70.0	73.7	79.3
	HAD45	66.3	68.9	71.7	73.7
	HAD85	66.3	69.5	73.9	78.3
Coldest Month Average	CCSM45	12.9	15.2	17.4	18.2
	CCSM85	12.9	15.4	17.5	19.6
	GFDL45	12.9	16.4	17.8	18.0
	GFDL85	12.9	16.3	18.0	20.2
	HAD45	12.9	14.9	18.9	18.8
	HAD85	12.9	18.1	22.1	25.1
Warmest Month Average	CCSM45	72.5	75.1	76.7	77.6
	CCSM85	72.5	76.8	78.5	81.2
	GFDL45	72.5	75.7	77.2	78.5
	GFDL85	72.5	76.5	78.2	82.0
	HAD45	72.5	75.0	77.0	78.0
	HAD85	72.5	76.6	79.0	82.1

Precipitation (in)

	Scenario	2009	2039	2069	2099
Annual Total	CCSM45	30.9	31.4	30.8	30.7
	CCSM85	30.9	31.0	31.7	32.0
	GFDL45	30.9	34.3	37.5	35.2
	GFDL85	30.9	35.0	37.4	36.4
	HAD45	30.9	33.8	32.9	32.6
	HAD85	30.9	31.6	32.5	35.5
Growing Season May—Sep	CCSM45	19.8	19.6	18.7	18.8
	CCSM85	19.8	18.8	18.3	17.9
	GFDL45	19.8	22.0	23.6	21.3
	GFDL85	19.8	22.6	22.8	21.3
	HAD45	19.8	20.7	19.4	19.0
	HAD85	19.8	18.8	18.3	18.2

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.

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Common Name	Scientific Name	Range	MR	%Cell	FIAsum	FIAiv	ChngCl45	ChngCl85	Adap	Abund	Capabil45	Capabil85	SHIFT45	SHIFT85	SSO	N
green ash	Fraxinus pennsylvanica	WSH	Low	22	49.1	10.3	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	1
boxelder	Acer negundo	WSH	Low	25.1	44.6	13.5	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor	Infill +	Infill +	2	2
American elm	Ulmus americana	WDH	Medium	22.6	37.4	8.6	No change	Sm. inc.	Medium	Rare	Poor	Fair	Infill +	Infill +	2	3
silver maple	Acer saccharinum	NSH	Low	13	24.3	12.3	Sm. dec.	Lg. dec.	High	Rare	Poor	Poor	Infill +	Infill +	2	4
American basswood	Tilia americana	WSL	Medium	7.9	23.3	10.5	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	5
bur oak	Quercus macrocarpa	NDH	Medium	9.3	17.7	11.4	Sm. inc.	No change	High	Rare	Good	Fair		Infill +	2	6
black walnut	Juglans nigra	WDH	Low	8.2	14.7	3.9	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	7
slippery elm	Ulmus rubra	WSL	Low	8.5	13.1	2.8	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			2	8
white ash	Fraxinus americana	WDL	Medium	6.2	12.9	18.4	Lg. dec.	Lg. dec.	Low	Rare	Very Poor	Very Poor			2	9
eastern cottonwood	Populus deltoides	NSH	Low	5.7	11.9	8.5	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	10
white mulberry	Morus alba	NSL	FIA	6.9	7.1	10.6	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	11
black willow	Salix nigra	NSH	Low	5.2	6.2	7.0	Sm. dec.	No change	Low	Rare	Very Poor	Very Poor			2	12
hackberry	Celtis occidentalis	WDH	Medium	16.1	6.0	2.1	Lg. inc.	Lg. inc.	High	Rare	Good	Good			2	13
peachleaf willow	Salix amygdaloides	NSLX	FIA	3.1	3.5	8.9	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	14
wild plum	Prunus americana	NSLX	FIA	3.7	3.1	2.0	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	15
red mulberry	Morus rubra	NSL	Low	11.2	2.1	2.2	Lg. inc.	Sm. inc.	Medium	Rare	Good	Fair			2	16
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	3.2	1.8	1.4	Sm. inc.	No change	High	Rare	Good	Fair		Infill +	2	17
quaking aspen	Populus tremuloides	WDH	High	0.1	1.7	0.1	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	18
northern red oak	Quercus rubra	WDH	Medium	0.1	1.3	0.1	No change	Sm. dec.	High	Rare	Fair	Poor	Infill +		2	19
black cherry	Prunus serotina	WDL	Medium	2.4	1.2	0.6	No change	No change	Low	Rare	Very Poor	Very Poor			2	20
sugar maple	Acer saccharum	WDH	High	0.1	1.0	0.1	No change	No change	High	Rare	Fair	Fair			0	21
bitternut hickory	Carya cordiformis	WSL	Low	5.4	0.7	0.7	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor			0	22
eastern redcedar	Juniperus virginiana	WDH	Medium	0.1	0.6	0.0	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	23
red maple	Acer rubrum	WDH	High	3.1	0.5	1.1	Lg. dec.	Lg. dec.	High	Rare	Poor	Poor			0	24
black ash	Fraxinus nigra	WSH	Medium	0.1	0.2	0.0	Lg. dec.	Lg. dec.	Low	Rare	Very Poor	Very Poor			0	25
pawpaw	Asimina triloba	NSL	Low	0	0	0	Unknown	Unknown	Medium	Modeled	Unknown	Unknown			0	26
pecan	Carya illinoinensis	NSH	Low	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat			3	27
shagbark hickory	Carya ovata	WSL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	28
honeylocust	Gleditsia triacanthos	NSH	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	29
Osage-orange	Maclura pomifera	NDH	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate +	3	30
sycamore	Platanus occidentalis	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	31
post oak	Quercus stellata	WDH	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			3	32
black oak	Quercus velutina	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	33