S43 E98

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	10

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	1
Hickory	0
Maple	1
Oak	1
Pine	1
Other	8
	12

Abundance	
Abundant	0
Common	2
Rare	10
Absent	10
	22

	Model Reliability	Adaptability
High	2	8
Medium	8	12
Low	10	0
FIA	2	
	22	**20**

Potential Change in Habitat Suitability	Scenario RCP45	Scenario RCP85
Increase	0	2
No Change	6	4
Decrease	4	4
New	9	10
Unknown	3	2
	22	**22**

Capability to Cope or Persist	Scenario RCP45	Scenario RCP85
Very Good	0	0
Good	0	1
Fair	3	3
Poor	7	6
Very Poor	0	0
FIA Only	0	0
Unknown	1	0
	11	**10**

Migration Potential	SHIFT RCP45	SHIFT RCP85
Likely	1	2
Infill	8	7
Migrate	1	2
	10	**11**

Potential Changes in Climate Variables

Temperature (°F)

	Scenario	2009	2039	2069	2099
Annual Average	CCSM45	47.9	49.8	52.2	52.9
	CCSM85	47.9	50.4	53.0	56.3
	GFDL45	47.9	53.9	52.4	53.9
	GFDL85	47.9	50.6	53.7	58.3
	HAD45	47.9	50.9	54.7	56.0
	HAD85	47.9	51.4	56.6	60.7
Growing Season May—Sep	CCSM45	67.9	70.0	72.7	73.4
	CCSM85	67.9	70.9	73.4	77.6
	GFDL45	67.9	75.7	73.8	75.7
	GFDL85	67.9	71.3	74.9	80.5
	HAD45	67.9	70.3	73.4	75.0
	HAD85	67.9	70.9	75.2	79.4
Coldest Month Average	CCSM45	17.3	19.6	20.9	21.9
	CCSM85	17.3	18.9	20.4	22.5
	GFDL45	17.3	20.9	21.6	21.9
	GFDL85	17.3	20.6	22.0	23.9
	HAD45	17.3	20.0	23.7	23.1
	HAD85	17.3	23.0	27.8	29.9
Warmest Month Average	CCSM45	75.1	77.8	79.7	80.4
	CCSM85	75.1	79.2	80.8	83.9
	GFDL45	75.1	78.8	80.2	81.2
	GFDL85	75.1	79.4	80.9	84.6
	HAD45	75.1	77.8	79.7	80.7
	HAD85	75.1	78.9	81.5	84.3

Precipitation (in)

	Scenario	2009	2039	2069	2099
Annual Total	CCSM45	24.0	24.5	23.6	23.5
	CCSM85	24.0	23.9	24.7	24.9
	GFDL45	24.0	27.7	30.3	29.2
	GFDL85	24.0	27.5	31.1	30.5
	HAD45	24.0	27.7	26.1	27.3
	HAD85	24.0	25.8	27.0	29.3
Growing Season May—Sep	CCSM45	15.2	14.8	13.8	13.3
	CCSM85	15.2	13.9	14.6	13.8
	GFDL45	15.2	17.9	19.5	18.0
	GFDL85	15.2	17.9	19.3	18.3
	HAD45	15.2	16.5	15.1	15.4
	HAD85	15.2	15.0	14.8	14.0

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
American elm	Ulmus americana	WDH	Medium	11.7	54.0	35.6	Lg. dec.	Sm. dec.	Medium	Common	Poor	Poor	Infill +	Infill +	2	1
eastern redcedar	Juniperus virginiana	WDH	Medium	15.1	53.8	14.6	No change	Sm. inc.	Medium	Common	Fair	Good	Infill +		2	2
bur oak	Quercus macrocarpa	NDH	Medium	9.1	42.3	14.9	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	2	3
Siberian elm	Ulmus pumila	NDH	FIA	6.8	37.0	48.0	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	4
hackberry	Celtis occidentalis	WDH	Medium	4.4	19.3	4.7	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	2	5
boxelder	Acer negundo	WSH	Low	4.1	16.7	12.2	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor	Infill +	Infill +	2	6
honeylocust	Gleditsia triacanthos	NSH	Low	1.7	13.9	19.1	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor	Infill +		2	7
green ash	Fraxinus pennsylvanica	WSH	Low	7	10.3	4.0	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	8
Scots pine	Pinus sylvestris	NSH	FIA	3.2	5.0	12.8	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	9
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	5.2	2.6	2.3	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor			0	10
American basswood	Tilia americana	WSL	Medium	5.2	1.5	1.6	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	11
black walnut	Juglans nigra	WDH	Low	2.4	0.8	1.5	No change	Sm. inc.	Medium	Rare	Poor	Fair		Infill +	2	12
ashe juniper	Juniperus ashei	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	13
eastern redbud	Cercis canadensis	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	14
Osage-orange	Maclura pomifera	NDH	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			3	15
red mulberry	Morus rubra	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	16
eastern cottonwood	Populus deltoides	NSH	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Likely +	Likely +	3	17
chinkapin oak	Quercus muehlenbergii	NSL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	18
northern red oak	Quercus rubra	WDH	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate +	3	19
post oak	Quercus stellata	WDH	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			3	20
black locust	Robinia pseudoacacia	NDH	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	21
slippery elm	Ulmus rubra	WSL	Low	0	0	0	Unknown	New Habitat	Medium	Absent	Unknown	New Habitat		Likely +	3	22