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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	10,421	4,023.6	85

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	0
Hickory	1
Maple	0
Oak	6
Pine	0
Other	8
	15

Abundance	
Abundant	1
Common	8
Rare	6
Absent	1
	16

	Model Reliability	Adaptability
High	4	5
Medium	7	8
Low	5	4
FIA	1	
	17	**17**

Potential Change in Habitat Suitability	Scenario RCP45	Scenario RCP85
Increase	2	2
No Change	4	2
Decrease	8	10
New	0	0
Unknown	3	3
	17	**17**

Capability to Cope or Persist	Scenario RCP45	Scenario RCP85
Very Good	2	2
Good	1	0
Fair	3	4
Poor	4	4
Very Poor	4	4
FIA Only	1	1
Unknown	2	2
	17	**17**

Migration Potential	SHIFT RCP45	SHIFT RCP85
Likely	0	0
Infill	2	2
Migrate	0	0
	2	**2**

Potential Changes in Climate Variables

Temperature (°F)

	Scenario	2009	2039	2069	2099
Annual Average	CCSM45	64.2	65.5	67.2	68.0
	CCSM85	64.2	66.3	68.1	70.8
	GFDL45	64.2	68.5	68.7	70.4
	GFDL85	64.2	67.3	70.3	74.4
	HAD45	64.2	66.5	69.0	69.8
	HAD85	64.2	67.0	70.7	73.6
Growing Season May—Sep	CCSM45	78.6	79.7	81.5	82.3
	CCSM85	78.6	80.8	82.6	85.8
	GFDL45	78.6	84.1	84.1	87.0
	GFDL85	78.6	83.0	86.6	91.9
	HAD45	78.6	80.7	82.7	83.2
	HAD85	78.6	81.3	85.2	87.8
Coldest Month Average	CCSM45	42.6	45.1	45.7	46.4
	CCSM85	42.6	44.8	45.7	47.1
	GFDL45	42.6	45.8	45.8	45.9
	GFDL85	42.6	43.5	44.7	45.0
	HAD45	42.6	43.2	45.3	45.5
	HAD85	42.6	46.1	47.8	49.3
Warmest Month Average	CCSM45	84.1	85.2	86.5	86.6
	CCSM85	84.1	86.1	86.8	88.6
	GFDL45	84.1	89.5	89.8	91.9
	GFDL85	84.1	90.1	91.8	96.0
	HAD45	84.1	86.1	87.1	87.3
	HAD85	84.1	87.0	89.0	90.1

Precipitation (in)

	Scenario	2009	2039	2069	2099
Annual Total	CCSM45	26.4	27.9	26.1	25.6
	CCSM85	26.4	25.7	28.0	27.0
	GFDL45	26.4	26.4	30.9	24.8
	GFDL85	26.4	25.9	27.7	25.3
	HAD45	26.4	27.7	26.7	28.1
	HAD85	26.4	26.3	24.2	27.2
Growing Season May—Sep	CCSM45	13.9	15.2	13.0	13.2
	CCSM85	13.9	14.3	14.3	13.1
	GFDL45	13.9	14.0	16.4	13.0
	GFDL85	13.9	14.2	14.5	13.1
	HAD45	13.9	14.3	14.3	15.3
	HAD85	13.9	13.3	11.7	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
ashe juniper	Juniperus ashei	NDH	High	23.2	512.6	28.8	Lg. inc.	Lg. inc.	Medium	Abundant	Very Good	Very Good			0	1
post oak	Quercus stellata	WDH	High	14.4	456.4	24.2	Sm. dec.	Sm. dec.	High	Common	Fair	Fair			1	2
live oak	Quercus virginiana	NDH	High	15.6	337.7	18.3	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	3
cittamwood/gum bumelia	Sideroxylon lanuginosum ssp.	NSL	Low	29.8	250.2	14.3	No change	Sm. dec.	High	Common	Good	Fair			1	4
blackjack oak	Quercus marilandica	NSL	Medium	9.6	117.7	19.4	Sm. dec.	Sm. dec.	High	Common	Fair	Fair			1	5
cedar elm	Ulmus crassifolia	NDH	Medium	2.5	93.5	28.6	No change	No change	Low	Common	Poor	Poor	Infill +	Infill +	0	6
hackberry	Celtis occidentalis	WDH	Medium	6.9	81.2	10.4	Sm. dec.	Sm. dec.	High	Common	Fair	Fair			1	7
American elm	Ulmus americana	WDH	Medium	4.8	79.2	15.3	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor			0	8
black willow	Salix nigra	NSH	Low	6.1	65.3	18.1	Lg. dec.	Lg. dec.	Low	Common	Very Poor	Very Poor			0	9
sugarberry	Celtis laevigata	NDH	Medium	10	43.3	3.4	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	1	10
black oak	Quercus velutina	WDH	High	1	21.2	22.1	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	11
black walnut	Juglans nigra	WDH	Low	1	17.0	17.8	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	12
durand oak	Quercus sinuata var. sinuata	NSL	FIA	1.9	11.0	5.7	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	13
southern red oak	Quercus falcata	WDL	Medium	0.7	8.5	6.4	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor			0	14
pecan	Carya illinoinensis	NSH	Low	1.5	1.2	1.9	No change	Sm. dec.	Low	Rare	Very Poor	Very Poor			0	15
shagbark hickory	Carya ovata	WSL	Medium	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	16
pin oak	Quercus palustris	NSH	Low	0	0	0	Unknown	Unknown	Low	Modeled	Unknown	Unknown			0	17