S31 E97

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	10,533	4,066.9	119

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	1
Oak	7
Pine	0
Other	18
	29

Abundance	
Abundant	1
Common	5
Rare	23
Absent	5
	34

	Model Reliability	Adaptability
High	3	9
Medium	12	20
Low	16	4
FIA	3	
	34	**33**

Potential Change in Habitat Suitability	Scenario RCP45	Scenario RCP85
Increase	5	8
No Change	9	6
Decrease	12	12
New	0	0
Unknown	8	8
	34	**34**

Capability to Cope or Persist	Scenario RCP45	Scenario RCP85
Very Good	0	0
Good	4	7
Fair	8	6
Poor	6	5
Very Poor	8	8
FIA Only	3	3
Unknown	5	5
	34	**34**

Migration Potential	SHIFT RCP45	SHIFT RCP85
Likely	0	0
Infill	10	7
Migrate	0	0
	10	**7**

Potential Changes in Climate Variables

Temperature (°F)

	Scenario	2009	2039	2069	2099
Annual Average	CCSM45	66.0	67.6	68.9	69.5
	CCSM85	66.0	68.0	70.1	72.4
	GFDL45	66.0	71.1	70.2	71.7
	GFDL85	66.0	68.8	71.8	75.4
	HAD45	66.0	68.1	70.6	71.6
	HAD85	66.0	68.5	72.1	75.4
Growing Season May—Sep	CCSM45	79.7	81.2	82.1	82.9
	CCSM85	79.7	81.8	83.6	86.5
	GFDL45	79.7	86.3	84.5	87.1
	GFDL85	79.7	83.3	86.8	91.3
	HAD45	79.7	81.9	83.9	84.6
	HAD85	79.7	82.4	86.4	89.2
Coldest Month Average	CCSM45	45.3	47.6	48.2	48.6
	CCSM85	45.3	47.6	48.7	49.9
	GFDL45	45.3	48.9	48.9	49.0
	GFDL85	45.3	46.4	47.5	47.9
	HAD45	45.3	45.7	47.5	47.9
	HAD85	45.3	48.1	49.6	51.3
Warmest Month Average	CCSM45	84.6	85.7	86.4	86.8
	CCSM85	84.6	86.6	87.3	88.9
	GFDL45	84.6	89.4	89.7	91.4
	GFDL85	84.6	89.6	91.2	94.6
	HAD45	84.6	86.9	87.9	88.3
	HAD85	84.6	87.7	89.7	90.6

Precipitation (in)

	Scenario	2009	2039	2069	2099
Annual Total	CCSM45	34.9	34.8	36.9	34.5
	CCSM85	34.9	34.4	38.2	36.5
	GFDL45	34.9	34.8	40.6	33.2
	GFDL85	34.9	34.2	36.6	34.7
	HAD45	34.9	35.7	34.9	35.8
	HAD85	34.9	35.5	31.9	34.2
Growing Season May—Sep	CCSM45	15.4	16.7	16.2	15.7
	CCSM85	15.4	15.6	16.5	14.9
	GFDL45	15.4	15.9	19.2	15.1
	GFDL85	15.4	16.1	16.9	16.0
	HAD45	15.4	15.3	14.5	15.4
	HAD85	15.4	15.0	12.8	13.8

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	68.6	1237.2	42.2	Sm. dec.	Sm. dec.	Medium	Abundant	Fair	Fair			0	1
cedar elm	Ulmus crassifolia	NDH	Medium	77.8	423.9	17.1	No change	No change	Low	Common	Poor	Poor			0	2
live oak	Quercus virginiana	NDH	High	52.6	195.7	10.0	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	3
post oak	Quercus stellata	WDH	High	16.9	109.6	10.5	Sm. dec.	Sm. dec.	High	Common	Fair	Fair			1	4
bur oak	Quercus macrocarpa	NDH	Medium	5.1	74.8	25.3	Lg. dec.	Lg. dec.	High	Common	Fair	Fair			0	5
sugarberry	Celtis laevigata	NDH	Medium	46.4	70.4	7.8	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	6
pecan	Carya illinoinensis	NSH	Low	21.4	41.4	9.5	Sm. inc.	Sm. inc.	Low	Rare	Poor	Poor			1	7
green ash	Fraxinus pennsylvanica	WSH	Low	31.7	37.9	11.4	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	8
durand oak	Quercus sinuata var. sinuata	NSL	FIA	9.5	35.2	10.0	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	9
cittamwood/gum bumelia	Sideroxylon lanuginosum ssp.	NSL	Low	34.2	28.6	3.6	Sm. inc.	Sm. inc.	High	Rare	Good	Good			1	10
hackberry	Celtis occidentalis	WDH	Medium	17	26.8	4.9	No change	Sm. inc.	High	Rare	Fair	Good	Infill +	Infill ++	1	11
Texas ash	Fraxinus texensis	NDH	FIA	20.6	16.8	2.4	Unknown	Unknown	NA	Rare	FIA Only	FIA Only			0	12
American elm	Ulmus americana	WDH	Medium	9.9	9.0	3.7	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	13
blackjack oak	Quercus marilandica	NSL	Medium	5.7	7.7	3.1	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	2	14
eastern redcedar	Juniperus virginiana	WDH	Medium	10.2	7.7	4.6	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	2	15
Shumard oak	Quercus shumardii	NSL	Low	10.1	7.1	1.6	Lg. dec.	Lg. dec.	High	Rare	Poor	Poor	Infill +	Infill +	2	16
black willow	Salix nigra	NSH	Low	4.1	6.9	10.3	Sm. dec.	Sm. dec.	Low	Rare	Very Poor	Very Poor			0	17
water elm	Planera aquatica	NSL	Low	3.8	4.8	20.0	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	18
eastern cottonwood	Populus deltoides	NSH	Low	2.4	3.4	8.9	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	19
honeylocust	Gleditsia triacanthos	NSH	Low	2.9	3.3	1.1	No change	No change	High	Rare	Fair	Fair	Infill +		2	20
winged elm	Ulmus alata	WDL	Medium	6	3.1	2.9	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	21
Osage-orange	Maclura pomifera	NDH	Medium	7.6	3.0	1.4	No change	Sm. inc.	High	Rare	Fair	Good	Infill +		2	22
boxelder	Acer negundo	WSH	Low	3.8	2.7	11.5	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	2	23
eastern redbud	Cercis canadensis	NSL	Low	4.4	0.6	0.5	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	24
black walnut	Juglans nigra	WDH	Low	3.8	0.5	2.0	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	25
bear oak; scrub oak	Quercus ilicifolia	NSLX	FIA	3	0.4	1.4	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	26
slippery elm	Ulmus rubra	WSL	Low	3	0.4	1.2	No change	Lg. inc.	Medium	Rare	Poor	Good	Infill +		2	27
red mulberry	Morus rubra	NSL	Low	3.8	0.2	0.7	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	28
black locust	Robinia pseudoacacia	NDH	Low	1.7	0.1	0.1	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	29
shellbark hickory	Carya laciniosa	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	30
flowering dogwood	Cornus florida	WDL	Medium	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	31
black cherry	Prunus serotina	WDL	Medium	0	0	0	Unknown	Unknown	Low	Absent	Unknown	Unknown			0	32
sassafras	Sassafras albidum	WSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	33
American basswood	Tilia americana	WSL	Medium	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	34