S30 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	10,642	4,108.9	224

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	3
Maple	0
Oak	10
Pine	0
Other	11
	26

Abundance	
Abundant	2
Common	4
Rare	20
Absent	7
	33

	Model Reliability	Adaptability
High	4	8
Medium	13	19
Low	13	5
FIA	3	
	33	**32**

Potential Change in Habitat Suitability	Scenario RCP45	Scenario RCP85
Increase	3	2
No Change	5	6
Decrease	15	15
New	1	1
Unknown	9	9
	33	**33**

Capability to Cope or Persist	Scenario RCP45	Scenario RCP85
Very Good	1	0
Good	3	5
Fair	4	3
Poor	4	4
Very Poor	11	10
FIA Only	3	3
Unknown	6	6
	32	**31**

Migration Potential	SHIFT RCP45	SHIFT RCP85
Likely	1	1
Infill	1	1
Migrate	0	0
	2	**2**

Potential Changes in Climate Variables

Temperature (°F)

	Scenario	2009	2039	2069	2099
Annual Average	CCSM45	66.0	67.5	68.7	69.4
	CCSM85	66.0	67.9	69.9	72.4
	GFDL45	66.0	69.6	70.2	71.8
	GFDL85	66.0	68.7	71.9	75.5
	HAD45	66.0	68.1	70.5	71.3
	HAD85	66.0	68.6	71.9	74.9
Growing Season May—Sep	CCSM45	78.9	80.2	81.3	82.0
	CCSM85	78.9	80.9	82.8	85.7
	GFDL45	78.9	83.4	83.9	86.4
	GFDL85	78.9	82.6	86.1	90.7
	HAD45	78.9	81.1	83.0	83.5
	HAD85	78.9	81.6	85.1	87.8
Coldest Month Average	CCSM45	46.3	48.5	49.0	49.5
	CCSM85	46.3	48.3	49.3	50.7
	GFDL45	46.3	49.8	49.8	49.9
	GFDL85	46.3	47.5	48.5	48.9
	HAD45	46.3	46.8	48.4	48.8
	HAD85	46.3	49.5	50.9	52.5
Warmest Month Average	CCSM45	83.4	84.3	85.2	85.4
	CCSM85	83.4	85.3	86.0	87.4
	GFDL45	83.4	88.0	88.4	89.8
	GFDL85	83.4	88.2	89.8	92.9
	HAD45	83.4	85.7	86.6	86.9
	HAD85	83.4	86.4	88.2	89.3

Precipitation (in)

	Scenario	2009	2039	2069	2099
Annual Total	CCSM45	30.8	32.4	33.5	30.2
	CCSM85	30.8	31.0	34.0	32.7
	GFDL45	30.8	29.7	34.6	27.6
	GFDL85	30.8	29.1	30.8	28.7
	HAD45	30.8	31.8	30.6	32.6
	HAD85	30.8	31.0	28.0	30.7
Growing Season May—Sep	CCSM45	14.5	16.6	15.9	14.8
	CCSM85	14.5	15.4	15.9	14.2
	GFDL45	14.5	14.2	17.4	13.4
	GFDL85	14.5	14.4	14.9	13.7
	HAD45	14.5	14.3	14.1	15.7
	HAD85	14.5	14.3	12.7	14.2

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
ashe juniper	Juniperus ashei	NDH	High	87.7	3789.4	41.0	No change	No change	Medium	Abundant	Good	Good			0	1
live oak	Quercus virginiana	NDH	High	85.2	2713.7	35.3	No change	No change	Medium	Abundant	Good	Good			1	2
cedar elm	Ulmus crassifolia	NDH	Medium	43.1	296.6	8.0	Sm. inc.	Lg. inc.	Low	Common	Fair	Good			1	3
post oak	Quercus stellata	WDH	High	31.9	271.9	12.1	Sm. inc.	No change	High	Common	Very Good	Good			1	4
black walnut	Juglans nigra	WDH	Low	3.4	55.9	14.6	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor			0	5
sugarberry	Celtis laevigata	NDH	Medium	20.8	50.5	2.8	No change	No change	Medium	Common	Fair	Fair			1	6
blackjack oak	Quercus marilandica	NSL	Medium	9.2	39.0	7.0	No change	No change	High	Rare	Fair	Fair			1	7
black cherry	Prunus serotina	WDL	Medium	6.7	36.2	6.5	Sm. dec.	Sm. dec.	Low	Rare	Very Poor	Very Poor			0	8
cittamwood/gum bumelia	Sideroxylon lanuginosum ssp.	NSL	Low	12.5	27.2	3.5	Lg. inc.	Lg. inc.	High	Rare	Good	Good			1	9
white ash	Fraxinus americana	WDL	Medium	1.7	18.0	9.4	Sm. dec.	Sm. dec.	Low	Rare	Very Poor	Very Poor			0	10
pecan	Carya illinoinensis	NSH	Low	11.5	16.2	5.4	Sm. dec.	Sm. dec.	Low	Rare	Very Poor	Very Poor			0	11
swamp chestnut oak	Quercus michauxii	NSL	Low	0.9	7.4	7.9	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	12
Texas ash	Fraxinus texensis	NDH	FIA	1.5	4.6	1.9	Unknown	Unknown	NA	Rare	FIA Only	FIA Only			0	13
bear oak; scrub oak	Quercus ilicifolia	NSLX	FIA	0.9	3.8	4.0	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	14
nuttall oak	Quercus texana	NSH	Medium	0.9	3.8	4.0	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor			0	15
American elm	Ulmus americana	WDH	Medium	4.8	3.7	0.7	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	16
winged elm	Ulmus alata	WDL	Medium	0.9	3.3	3.4	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	17
hackberry	Celtis occidentalis	WDH	Medium	5.6	3.3	1.5	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	2	18
pin oak	Quercus palustris	NSH	Low	0.9	3.0	3.2	Sm. dec.	Sm. dec.	Low	Rare	Very Poor	Very Poor			0	19
pignut hickory	Carya glabra	WDL	Medium	4.7	2.8	3.2	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	20
black hickory	Carya texana	NDL	High	5.3	2.3	0.8	Lg. dec.	Very Lg. dec.	Medium	Rare	Very Poor	Lost			0	21
Shumard oak	Quercus shumardii	NSL	Low	0.9	2.2	2.3	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor			0	22
slippery elm	Ulmus rubra	WSL	Low	0.9	1.9	2.1	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	23
sycamore	Platanus occidentalis	NSL	Low	0.8	1.1	1.0	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	24
durand oak	Quercus sinuata var. sinuata	NSL	FIA	0.3	0.3	0.1	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	25
southern red oak	Quercus falcata	WDL	Medium	2.5	0.1	0.2	Lg. dec.	Lg. dec.	High	Rare	Poor	Poor			0	26
Ohio buckeye	Aesculus glabra	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	27
shellbark hickory	Carya laciniosa	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	28
eastern redbud	Cercis canadensis	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	29
flowering dogwood	Cornus florida	WDL	Medium	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	30
green ash	Fraxinus pennsylvanica	WSH	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Likely +	Likely +	3	31
cucumbertree	Magnolia acuminata	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	32
northern red oak	Quercus rubra	WDH	Medium	0	0	0	Unknown	Unknown	High	Absent	Unknown	Unknown			0	33