S38 E99

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	9,683.1	3,738.7	5

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	0
Pine	0
Other	8
	10

Abundance	
Abundant	0
Common	0
Rare	10
Absent	15
	25

	Model Reliability	Adaptability
High	4	8
Medium	9	14
Low	11	3
FIA	2	
	26	**25**

Potential Change in Habitat Suitability	Scenario RCP45	Scenario RCP85
Increase	2	3
No Change	3	3
Decrease	3	2
New	13	13
Unknown	5	5
	26	**26**

Capability to Cope or Persist	Scenario RCP45	Scenario RCP85
Very Good	0	0
Good	1	1
Fair	3	5
Poor	3	1
Very Poor	1	1
FIA Only	1	1
Unknown	3	3
	12	**12**

Migration Potential	SHIFT RCP45	SHIFT RCP85
Likely	0	0
Infill	4	4
Migrate	6	8
	10	**12**

Potential Changes in Climate Variables

Temperature (°F)

	Scenario	2009	2039	2069	2099
Annual Average	CCSM45	54.4	56.2	58.1	58.8
	CCSM85	54.4	56.7	58.7	61.9
	GFDL45	54.4	60.5	59.2	60.5
	GFDL85	54.4	57.2	60.3	64.4
	HAD45	54.4	57.0	60.0	61.0
	HAD85	54.4	57.3	62.2	65.0
Growing Season May—Sep	CCSM45	72.4	74.8	77.0	77.6
	CCSM85	72.4	75.2	77.5	81.2
	GFDL45	72.4	80.8	78.5	80.8
	GFDL85	72.4	76.1	79.7	84.9
	HAD45	72.4	74.7	77.2	78.1
	HAD85	72.4	75.2	80.3	82.7
Coldest Month Average	CCSM45	28.4	30.1	31.0	32.0
	CCSM85	28.4	30.7	31.1	32.9
	GFDL45	28.4	31.9	32.1	32.5
	GFDL85	28.4	29.9	31.3	32.1
	HAD45	28.4	30.6	32.7	32.7
	HAD85	28.4	32.4	35.1	36.5
Warmest Month Average	CCSM45	79.6	82.2	83.8	84.4
	CCSM85	79.6	83.2	84.7	86.9
	GFDL45	79.6	83.7	84.9	86.5
	GFDL85	79.6	84.0	85.4	89.4
	HAD45	79.6	81.8	83.3	83.7
	HAD85	79.6	83.5	85.6	87.0

Precipitation (in)

	Scenario	2009	2039	2069	2099
Annual Total	CCSM45	23.3	23.4	22.8	22.5
	CCSM85	23.3	23.8	24.0	24.3
	GFDL45	23.3	24.9	26.7	25.9
	GFDL85	23.3	25.8	28.4	26.2
	HAD45	23.3	25.4	24.4	26.3
	HAD85	23.3	24.0	22.9	25.9
Growing Season May—Sep	CCSM45	14.9	13.9	13.3	13.1
	CCSM85	14.9	14.5	14.1	14.2
	GFDL45	14.9	15.7	16.7	16.0
	GFDL85	14.9	16.5	18.2	16.6
	HAD45	14.9	15.6	16.2	16.6
	HAD85	14.9	14.5	13.6	14.6

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	7.6	44.7	32.3	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			2	1
hackberry	Celtis occidentalis	WDH	Medium	10.9	18.2	22.2	Sm. dec.	No change	High	Rare	Poor	Fair	Infill +	Infill +	2	2
Siberian elm	Ulmus pumila	NDH	FIA	4.1	11.4	44.2	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	3
American elm	Ulmus americana	WDH	Medium	7.6	10.2	8.7	No change	Sm. inc.	Medium	Rare	Poor	Fair	Infill +	Infill +	2	4
honeylocust	Gleditsia triacanthos	NSH	Low	2.6	6.3	15.5	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	2	5
Osage-orange	Maclura pomifera	NDH	Medium	2.6	6.0	14.7	No change	No change	High	Rare	Fair	Fair			0	6
boxelder	Acer negundo	WSH	Low	6.7	4.6	8.0	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor			0	7
peachleaf willow	Salix amygdaloides	NSLX	FIA	2.6	0.7	1.8	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	8
eastern redcedar	Juniperus virginiana	WDH	Medium	2.6	0.6	1.5	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	9
red mulberry	Morus rubra	NSL	Low	2.6	0.5	1.3	Sm. inc.	Sm. inc.	Medium	Rare	Fair	Fair	Infill +	Infill +	2	10
ashe juniper	Juniperus ashei	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	11
shortleaf pine	Pinus echinata	WDH	High	0	0	0	Unknown	Unknown	Medium	Modeled	Unknown	Unknown			0	12
serviceberry	Amelanchier spp.	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	13
cittamwood/gum bumelia	Sideroxylon lanuginosum ssp.	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	14
pecan	Carya illinoinensis	NSH	Low	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat		Migrate +	3	15
sugarberry	Celtis laevigata	NDH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	16
white ash	Fraxinus americana	WDL	Medium	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat			3	17
black walnut	Juglans nigra	WDH	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	18
eastern cottonwood	Populus deltoides	NSH	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	19
pin cherry	Prunus pensylvanica	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	20
bur oak	Quercus macrocarpa	NDH	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			3	21
blackjack oak	Quercus marilandica	NSL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	22
post oak	Quercus stellata	WDH	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate ++	3	23
live oak	Quercus virginiana	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	24
black locust	Robinia pseudoacacia	NDH	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	25
cedar elm	Ulmus crassifolia	NDH	Medium	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat			0	26