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One x One Degree
Climate Change Atlas Tree Species
Current and Potential Future Habitat, Capability, and Migration

USDA Forest Service
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Iverson, Peters, Prasad, Matthews

	sq. km	sq. mi	FIA Plots
Area of Region	9,273.2	3,580.4	24

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	3
Hickory	2
Maple	4
Oak	6
Pine	0
Other	19
	34

Abundance	
Abundant	0
Common	0
Rare	34
Absent	14
	48

	Model Reliability	Adaptability
High	5	17
Medium	20	25
Low	22	6
FIA	2	
	49	**48**

Potential Change in Habitat Suitability	Scenario RCP45	Scenario RCP85
Increase	11	12
No Change	14	11
Decrease	7	9
New	14	14
Unknown	3	3
	49	**49**

Capability to Cope or Persist	Scenario RCP45	Scenario RCP85
Very Good	0	0
Good	9	9
Fair	5	4
Poor	10	11
Very Poor	8	7
FIA Only	1	1
Unknown	1	1
	34	**33**

Migration Potential	SHIFT RCP45	SHIFT RCP85
Likely	1	1
Infill	18	17
Migrate	3	10
	22	**28**

Potential Changes in Climate Variables

Temperature (°F)

	Scenario	2009	2039	2069	2099
Annual Average	CCSM45	49.6	51.5	54.0	54.1
	CCSM85	49.6	52.2	54.9	57.8
	GFDL45	49.6	56.1	55.1	56.1
	GFDL85	49.6	52.7	56.1	60.4
	HAD45	49.6	52.5	56.0	57.7
	HAD85	49.6	52.8	57.5	62.3
Growing Season May—Sep	CCSM45	67.9	70.0	72.2	72.7
	CCSM85	67.9	70.9	73.3	76.7
	GFDL45	67.9	75.9	74.2	75.9
	GFDL85	67.9	71.6	75.6	80.7
	HAD45	67.9	71.0	73.7	75.9
	HAD85	67.9	70.9	76.3	81.1
Coldest Month Average	CCSM45	20.1	21.5	24.0	24.0
	CCSM85	20.1	22.8	24.5	26.2
	GFDL45	20.1	24.2	25.3	25.8
	GFDL85	20.1	23.9	25.4	26.9
	HAD45	20.1	21.6	25.4	25.4
	HAD85	20.1	24.0	27.3	30.1
Warmest Month Average	CCSM45	73.7	75.9	77.4	78.1
	CCSM85	73.7	77.4	79.2	80.8
	GFDL45	73.7	76.8	78.4	79.6
	GFDL85	73.7	77.8	79.6	82.7
	HAD45	73.7	77.0	79.0	80.1
	HAD85	73.7	78.1	81.4	84.5

Precipitation (in)

	Scenario	2009	2039	2069	2099
Annual Total	CCSM45	36.5	35.9	35.3	35.5
	CCSM85	36.5	35.9	35.3	36.4
	GFDL45	36.5	39.1	42.8	43.3
	GFDL85	36.5	39.8	45.1	45.2
	HAD45	36.5	38.1	39.6	39.5
	HAD85	36.5	39.6	37.2	40.5
Growing Season May—Sep	CCSM45	19.0	19.2	18.4	17.7
	CCSM85	19.0	17.9	17.3	17.1
	GFDL45	19.0	19.7	21.6	21.8
	GFDL85	19.0	20.6	22.1	21.3
	HAD45	19.0	19.4	18.0	18.9
	HAD85	19.0	19.5	16.2	16.8

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
black cherry	Prunus serotina	WDL	Medium	36.3	37.8	9.7	Sm. dec.	Sm. dec.	Low	Rare	Very Poor	Very Poor			2	1
American basswood	Tilia americana	WSL	Medium	15.8	34.4	23.5	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			2	2
boxelder	Acer negundo	WSH	Low	21.2	33.8	16.3	Lg. dec.	Sm. dec.	High	Rare	Poor	Poor	Infill +	Infill +	2	3
eastern cottonwood	Populus deltoides	NSH	Low	8.1	29.1	22.1	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	4
bur oak	Quercus macrocarpa	NDH	Medium	16.6	28.7	11.7	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	2	5
black walnut	Juglans nigra	WDH	Low	21.4	26.1	9.3	Sm. inc.	Sm. inc.	Medium	Rare	Fair	Fair	Infill +	Infill +	2	6
hackberry	Celtis occidentalis	WDH	Medium	19.6	26.0	14.1	Sm. inc.	Sm. inc.	High	Rare	Good	Good	Infill ++	Infill ++	2	7
honeylocust	Gleditsia triacanthos	NSH	Low	14.6	25.9	15.9	No change	Sm. inc.	High	Rare	Fair	Good	Infill +		2	8
silver maple	Acer saccharinum	NSH	Low	16.5	25.1	16.9	Sm. inc.	Sm. inc.	High	Rare	Good	Good	Infill ++	Infill ++	2	9
green ash	Fraxinus pennsylvanica	WSH	Low	31.1	20.3	7.0	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	2	10
white oak	Quercus alba	WDH	Medium	20.8	20.2	7.4	No change	Sm. dec.	High	Rare	Fair	Poor	Infill +	Infill +	2	11
white ash	Fraxinus americana	WDL	Medium	21.9	15.3	8.9	No change	Sm. inc.	Low	Rare	Very Poor	Poor		Infill +	2	12
black oak	Quercus velutina	WDH	High	13.2	14.1	10.3	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	13
eastern redcedar	Juniperus virginiana	WDH	Medium	4.3	13.5	50.0	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	14
American elm	Ulmus americana	WDH	Medium	24.4	13.1	5.6	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	2	15
shagbark hickory	Carya ovata	WSL	Medium	11.9	12.5	10.1	No change	Sm. dec.	Medium	Rare	Poor	Very Poor	Infill +		2	16
northern red oak	Quercus rubra	WDH	Medium	11.5	10.7	6.1	Sm. inc.	No change	High	Rare	Good	Fair		Infill +	2	17
slippery elm	Ulmus rubra	WSL	Low	15.8	10.4	3.9	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	18
red mulberry	Morus rubra	NSL	Low	8.1	9.1	6.4	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	19
white mulberry	Morus alba	NSL	FIA	15.5	5.4	4.7	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	20
sugar maple	Acer saccharum	WDH	High	2.8	5.3	12.8	Sm. inc.	Sm. inc.	High	Rare	Good	Good			2	21
black locust	Robinia pseudoacacia	NDH	Low	2.1	4.1	7.3	Sm. dec.	No change	Medium	Rare	Very Poor	Poor		Infill +	2	22
black willow	Salix nigra	NSH	Low	4.9	4.0	4.1	No change	No change	Low	Rare	Very Poor	Very Poor			2	23
swamp white oak	Quercus bicolor	NSL	Low	8.6	3.4	6.3	No change	No change	Medium	Rare	Poor	Poor	Infill +		2	24
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	11.5	3.3	2.4	Lg. inc.	Sm. inc.	High	Rare	Good	Good			2	25
black maple	Acer nigrum	NSH	Low	8.6	3.0	5.6	Lg. dec.	Lg. dec.	High	Rare	Poor	Poor			0	26
pin oak	Quercus palustris	NSH	Low	2.1	3.0	5.3	No change	No change	Low	Rare	Very Poor	Very Poor			2	27
sycamore	Platanus occidentalis	NSL	Low	2.8	2.0	4.8	Sm. inc.	Sm. inc.	Medium	Rare	Fair	Fair	Infill +	Infill +	2	28
Osage-orange	Maclura pomifera	NDH	Medium	2.8	1.2	3.0	Lg. inc.	Lg. inc.	High	Rare	Good	Good			2	29
sassafras	Sassafras albidum	WSL	Low	2.1	1.1	2.0	No change	Lg. dec.	Medium	Rare	Poor	Very Poor	Infill +		2	30
bigtooth aspen	Populus grandidentata	NSL	Medium	2.1	1.1	1.9	Lg. dec.	Very Lg. dec.	Medium	Rare	Very Poor	Lost			0	31
bitternut hickory	Carya cordiformis	WSL	Low	2.8	1.0	2.4	Sm. inc.	Sm. inc.	High	Rare	Good	Good			2	32
blue ash	Fraxinus quadrangulata	NSL	Low	4.3	0.5	1.9	Sm. dec.	Sm. dec.	Low	Rare	Very Poor	Very Poor			0	33
chokecherry	Prunus virginiana	NSLX	FIA	2.5	0.4	0.8	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	34
pignut hickory	Carya glabra	WDL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	35
pecan	Carya illinoinensis	NSH	Low	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat			3	36
black hickory	Carya texana	NDL	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	37
mockernut hickory	Carya alba	WDL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate +	3	38
sugarberry	Celtis laevigata	NDH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate ++	3	39
eastern redbud	Cercis canadensis	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Likely +	Likely +	3	40
flowering dogwood	Cornus florida	WDL	Medium	0	0	0	Unknown	Unknown	Medium	Modeled	Unknown	Unknown			0	41
common persimmon	Diospyros virginiana	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate +	3	42
sweetgum	Liquidambar styraciflua	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	43
shingle oak	Quercus imbricaria	NDH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	44
blackjack oak	Quercus marilandica	NSL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate +	3	45
chinkapin oak	Quercus muehlenbergii	NSL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	46
Shumard oak	Quercus shumardii	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate +	3	47

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post oak	Quercus stellata	WDH	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate ++	Migrate ++	3	48
winged elm	Ulmus alata	WDL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	49