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

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Iverson, Peters, Prasad, Matthews

	sq. km	sq. mi	FIA Plots
Area of Region	9,412.7	3,634.3	99

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	5
Maple	3
Oak	11
Pine	0
Other	21
	42

Abundance	
Abundant	2
Common	20
Rare	20
Absent	14
	56

	Model Reliability	Adaptability
High	5	19
Medium	21	29
Low	27	7
FIA	3	
	56	**55**

Potential Change in Habitat Suitability	Scenario RCP45	Scenario RCP85
Increase	13	16
No Change	9	7
Decrease	17	16
New	9	10
Unknown	8	7
	56	**56**

Capability to Cope or Persist	Scenario RCP45	Scenario RCP85
Very Good	5	6
Good	12	10
Fair	3	8
Poor	14	10
Very Poor	3	3
FIA Only	2	2
Unknown	5	4
	44	**43**

Migration Potential	SHIFT RCP45	SHIFT RCP85
Likely	0	1
Infill	7	10
Migrate	3	7
	10	**18**

Potential Changes in Climate Variables

Temperature (°F)

	Scenario	2009	2039	2069	2099
Annual Average	CCSM45	51.6	53.6	55.6	56.2
	CCSM85	51.6	54.4	56.9	59.8
	GFDL45	51.6	56.5	56.9	58.0
	GFDL85	51.6	54.6	57.8	62.0
	HAD45	51.6	54.3	57.6	59.3
	HAD85	51.6	54.8	59.5	63.6
Growing Season May—Sep	CCSM45	69.8	72.1	73.7	74.7
	CCSM85	69.8	73.2	75.6	78.9
	GFDL45	69.8	75.9	76.1	77.9
	GFDL85	69.8	73.6	77.2	82.5
	HAD45	69.8	72.6	75.3	77.4
	HAD85	69.8	73.1	78.4	82.3
Coldest Month Average	CCSM45	22.3	24.4	26.5	26.8
	CCSM85	22.3	25.4	26.7	28.4
	GFDL45	22.3	26.3	26.9	27.5
	GFDL85	22.3	25.5	27.1	28.4
	HAD45	22.3	23.6	26.8	26.9
	HAD85	22.3	26.3	29.3	31.7
Warmest Month Average	CCSM45	76.2	78.4	79.8	80.5
	CCSM85	76.2	80.1	81.7	83.3
	GFDL45	76.2	79.9	81.4	82.8
	GFDL85	76.2	80.5	82.0	85.7
	HAD45	76.2	78.9	80.9	81.9
	HAD85	76.2	80.6	83.8	85.9

Precipitation (in)

	Scenario	2009	2039	2069	2099
Annual Total	CCSM45	39.1	37.5	39.5	37.5
	CCSM85	39.1	37.0	38.8	38.4
	GFDL45	39.1	42.1	44.0	43.8
	GFDL85	39.1	42.3	47.1	46.2
	HAD45	39.1	41.8	42.9	42.2
	HAD85	39.1	40.9	40.2	42.5
Growing Season May—Sep	CCSM45	23.2	22.3	23.3	21.1
	CCSM85	23.2	21.2	22.1	21.3
	GFDL45	23.2	24.5	24.5	24.5
	GFDL85	23.2	24.9	26.4	25.0
	HAD45	23.2	23.6	23.2	23.5
	HAD85	23.2	23.2	21.3	21.2

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
white oak	Quercus alba	WDH	Medium	61.2	574.7	15.4	Lg. dec.	Lg. dec.	High	Abundant	Good	Good			1	1
American elm	Ulmus americana	WDH	Medium	85.1	508.7	10.2	No change	No change	Medium	Abundant	Good	Good			1	2
shagbark hickory	Carya ovata	WSL	Medium	70.7	399.5	10.7	Sm. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	3
shingle oak	Quercus imbricaria	NDH	Medium	72.5	360.7	8.8	Sm. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	4
honeylocust	Gleditsia triacanthos	NSH	Low	58.8	326.7	9.2	Sm. dec.	Sm. dec.	High	Common	Fair	Fair			1	5
black walnut	Juglans nigra	WDH	Low	58.2	194.2	6.7	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	6
black oak	Quercus velutina	WDH	High	56.5	161.4	6.9	No change	No change	Medium	Common	Fair	Fair			1	7
pin oak	Quercus palustris	NSH	Low	27.6	153.1	11.7	Sm. dec.	Sm. dec.	Low	Common	Poor	Poor	Infill +	Infill +	0	8
eastern redcedar	Juniperus virginiana	WDH	Medium	39	152.8	9.1	Sm. inc.	Lg. inc.	Medium	Common	Good	Very Good			1	9
Osage-orange	Maclura pomifera	NDH	Medium	17.2	152.1	7.7	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	10
black cherry	Prunus serotina	WDL	Medium	56.1	139.1	5.3	Sm. dec.	Sm. dec.	Low	Common	Poor	Poor			0	11
boxelder	Acer negundo	WSH	Low	16.8	138.4	12.5	Lg. dec.	Lg. dec.	High	Common	Fair	Fair			1	12
northern red oak	Quercus rubra	WDH	Medium	36.3	131.1	5.2	No change	Sm. dec.	High	Common	Good	Fair			1	13
white ash	Fraxinus americana	WDL	Medium	38.9	125.8	6.0	No change	Sm. inc.	Low	Common	Poor	Fair			1	14
bur oak	Quercus macrocarpa	NDH	Medium	37.6	111.4	4.5	No change	No change	High	Common	Good	Good	Infill ++	Infill ++	1	15
bitternut hickory	Carya cordiformis	WSL	Low	41.7	109.9	4.9	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	16
black willow	Salix nigra	NSH	Low	5.9	103.0	12.6	Sm. dec.	No change	Low	Common	Poor	Poor		Infill +	0	17
green ash	Fraxinus pennsylvanica	WSH	Low	27.6	94.9	5.8	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	18
hackberry	Celtis occidentalis	WDH	Medium	44.5	93.2	4.8	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	19
slippery elm	Ulmus rubra	WSL	Low	46.5	75.7	3.2	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	20
swamp white oak	Quercus bicolor	NSL	Low	27.2	74.3	5.0	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	21
silver maple	Acer saccharinum	NSH	Low	12.2	65.1	9.3	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good	Infill ++	Infill ++	1	22
post oak	Quercus stellata	WDH	High	12.7	46.0	7.6	Lg. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	2	23
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	30.3	33.2	2.8	Sm. inc.	No change	High	Rare	Good	Fair			1	24
American basswood	Tilia americana	WSL	Medium	14.3	32.7	4.5	Lg. dec.	Very Lg. dec.	Medium	Rare	Very Poor	Lost			0	25
red mulberry	Morus rubra	NSL	Low	22.8	31.3	2.5	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			1	26
mockernut hickory	Carya alba	WDL	Medium	10.5	25.6	5.2	Lg. dec.	Sm. inc.	High	Rare	Poor	Good	Infill +	Infill ++	1	27
Ohio buckeye	Aesculus glabra	NSL	Low	16.1	21.2	3.4	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	28
white mulberry	Morus alba	NSL	FIA	6.5	18.2	2.0	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	29
river birch	Betula nigra	NSL	Low	6.9	17.9	2.7	Sm. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	30
chinkapin oak	Quercus muehlenbergii	NSL	Medium	4.5	16.9	2.9	No change	No change	Medium	Rare	Poor	Poor		Infill +	2	31
black locust	Robinia pseudoacacia	NDH	Low	2.1	16.5	6.5	No change	Sm. inc.	Medium	Rare	Poor	Fair	Infill +	Infill +	1	32
sycamore	Platanus occidentalis	NSL	Low	1.1	7.6	2.9	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	33
eastern redbud	Cercis canadensis	NSL	Low	7.4	5.1	1.3	No change	No change	Medium	Rare	Poor	Poor		Infill +	1	34
northern pin oak	Quercus ellipsoidalis	NSH	Medium	8.5	5.1	4.2	Lg. dec.	Lg. dec.	High	Rare	Poor	Poor			0	35
eastern cottonwood	Populus deltoides	NSH	Low	3	3.0	1.4	No change	Sm. inc.	Medium	Rare	Poor	Fair	Infill +	Infill +	2	36
shellbark hickory	Carya laciniosa	NSL	Low	9.5	2.9	1.5	Very Lg. dec.	Lg. dec.	Medium	Rare	Lost	Very Poor			0	37
blackjack oak	Quercus marilandica	NSL	Medium	0.9	2.7	2.2	Lg. inc.	Lg. inc.	High	Rare	Good	Good			2	38
wild plum	Prunus americana	NSLX	FIA	0.1	1.9	0.2	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	39
pignut hickory	Carya glabra	WDL	Medium	5.5	1.7	0.6	Very Lg. dec.	Very Lg. dec.	Medium	Rare	Lost	Lost			0	40
black maple	Acer nigrum	NSH	Low	4.2	1.1	4.1	Lg. dec.	Lg. dec.	High	Rare	Poor	Poor			0	41
Kentucky coffeetree	Gymnocladus dioicus	NSLX	FIA	4.2	0.3	1.3	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	42
red pine	Pinus resinosa	NSH	Medium	0	0	0	Unknown	Unknown	Low	Absent	Unknown	Unknown			0	43
sugar maple	Acer saccharum	WDH	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate +	3	44
serviceberry	Amelanchier spp.	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	45
cittamwood/gum bumelia	Sideroxylon lanuginosum ssp.	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate +	3	46
pecan	Carya illinoinensis	NSH	Low	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	47

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black hickory	Carya texana	NDL	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	48
sugarberry	Celtis laevigata	NDH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	49
common persimmon	Diospyros virginiana	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate +	3	50
silverbell	Halesia spp.	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	51
pin cherry	Prunus pensylvanica	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	52
water oak	Quercus nigra	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	53
Shumard oak	Quercus shumardii	NSL	Low	0	0	0	Unknown	New Habitat	High	Absent	Unknown	New Habitat		Likely +	3	54
winged elm	Ulmus alata	WDL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	55
cedar elm	Ulmus crassifolia	NDH	Medium	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat			3	56