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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	80

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	4
Maple	3
Oak	11
Pine	0
Other	23
	43

Abundance	
Abundant	0
Common	18
Rare	25
Absent	9
	52

	Model Reliability	Adaptability
High	4	18
Medium	22	25
Low	23	7
FIA	3	
	52	**50**

Potential Change in Habitat Suitability	Scenario RCP45	Scenario RCP85
Increase	14	16
No Change	12	9
Decrease	14	15
New	8	8
Unknown	4	4
	52	**52**

Capability to Cope or Persist	Scenario RCP45	Scenario RCP85
Very Good	2	3
Good	12	12
Fair	9	8
Poor	9	8
Very Poor	6	6
FIA Only	1	1
Unknown	1	1
	40	**39**

Migration Potential	SHIFT RCP45	SHIFT RCP85
Likely	0	0
Infill	7	11
Migrate	2	7
	9	**18**

Potential Changes in Climate Variables

Temperature (°F)

	Scenario	2009	2039	2069	2099
Annual Average	CCSM45	50.9	52.8	54.9	55.5
	CCSM85	50.9	53.6	56.1	59.0
	GFDL45	50.9	56.4	56.1	57.2
	GFDL85	50.9	53.9	57.0	61.3
	HAD45	50.9	53.5	56.8	58.4
	HAD85	50.9	54.0	58.7	62.8
Growing Season May—Sep	CCSM45	69.3	71.5	73.3	74.3
	CCSM85	69.3	72.6	75.1	78.2
	GFDL45	69.3	76.2	75.5	77.4
	GFDL85	69.3	73.1	76.6	82.0
	HAD45	69.3	71.8	74.4	76.4
	HAD85	69.3	72.4	77.7	81.5
Coldest Month Average	CCSM45	21.6	23.6	25.5	26.0
	CCSM85	21.6	24.4	25.8	27.5
	GFDL45	21.6	25.2	25.8	26.3
	GFDL85	21.6	24.5	26.1	27.5
	HAD45	21.6	22.8	26.1	26.2
	HAD85	21.6	25.6	28.7	31.1
Warmest Month Average	CCSM45	75.9	78.1	79.4	80.1
	CCSM85	75.9	79.8	81.4	83.1
	GFDL45	75.9	79.5	81.0	82.5
	GFDL85	75.9	80.0	81.5	85.4
	HAD45	75.9	78.2	80.2	81.1
	HAD85	75.9	80.0	83.0	85.1

Precipitation (in)

	Scenario	2009	2039	2069	2099
Annual Total	CCSM45	38.8	37.8	39.5	37.0
	CCSM85	38.8	37.4	38.7	38.8
	GFDL45	38.8	42.0	43.5	43.0
	GFDL85	38.8	42.2	46.4	45.2
	HAD45	38.8	42.0	42.9	42.4
	HAD85	38.8	40.5	39.9	42.2
Growing Season May—Sep	CCSM45	23.5	22.8	23.7	21.4
	CCSM85	23.5	21.9	22.5	22.0
	GFDL45	23.5	25.4	24.9	24.7
	GFDL85	23.5	25.6	26.8	25.2
	HAD45	23.5	24.2	24.1	24.4
	HAD85	23.5	23.4	21.7	21.7

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 walnut	Juglans nigra	WDH	Low	59.1	335.8	9.6	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor			0	1
white oak	Quercus alba	WDH	Medium	33.2	239.7	14.6	Lg. dec.	Lg. dec.	High	Common	Fair	Fair			1	2
American elm	Ulmus americana	WDH	Medium	81.4	190.8	8.5	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	3
green ash	Fraxinus pennsylvanica	WSH	Low	31.6	190.0	13.6	No change	No change	Medium	Common	Fair	Fair			1	4
black locust	Robinia pseudoacacia	NDH	Low	11.3	175.5	21.5	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	5
Osage-orange	Maclura pomifera	NDH	Medium	39.6	167.8	9.9	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	6
honeylocust	Gleditsia triacanthos	NSH	Low	49.7	150.9	11.5	No change	No change	High	Common	Good	Good			1	7
shagbark hickory	Carya ovata	WSL	Medium	57.7	139.0	6.5	No change	Sm. dec.	Medium	Common	Fair	Poor			1	8
bur oak	Quercus macrocarpa	NDH	Medium	43.6	138.5	7.8	No change	No change	High	Common	Good	Good	Infill ++	Infill ++	1	9
shingle oak	Quercus imbricaria	NDH	Medium	55.6	118.4	7.8	No change	Sm. dec.	Medium	Common	Fair	Poor			1	10
northern red oak	Quercus rubra	WDH	Medium	44.4	98.6	4.9	No change	Sm. dec.	High	Common	Good	Fair			1	11
eastern redcedar	Juniperus virginiana	WDH	Medium	30.7	94.3	4.6	Sm. inc.	Lg. inc.	Medium	Common	Good	Very Good	Infill ++	Infill ++	1	12
hackberry	Celtis occidentalis	WDH	Medium	53	91.9	5.8	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	13
slippery elm	Ulmus rubra	WSL	Low	46	74.2	4.0	No change	No change	Medium	Common	Fair	Fair			1	14
boxelder	Acer negundo	WSH	Low	35	73.9	4.6	Sm. dec.	No change	High	Common	Fair	Good			1	15
eastern cottonwood	Populus deltoides	NSH	Low	15	61.7	6.5	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor	Infill +	Infill +	0	16
white ash	Fraxinus americana	WDL	Medium	40.1	59.8	4.3	No change	Sm. inc.	Low	Common	Poor	Fair			1	17
black willow	Salix nigra	NSH	Low	8.4	50.2	9.2	No change	No change	Low	Common	Poor	Poor		Infill +	0	18
black cherry	Prunus serotina	WDL	Medium	38.2	41.9	3.0	Sm. inc.	No change	Low	Rare	Poor	Very Poor			1	19
black oak	Quercus velutina	WDH	High	16.7	39.0	2.6	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	1	20
bitternut hickory	Carya cordiformis	WSL	Low	38.6	30.8	3.9	Lg. inc.	Lg. inc.	High	Rare	Good	Good			1	21
red mulberry	Morus rubra	NSL	Low	33.3	30.1	2.7	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			1	22
Siberian elm	Ulmus pumila	NDH	FIA	8.4	25.2	11.3	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	23
American basswood	Tilia americana	WSL	Medium	19.3	23.2	5.0	Lg. dec.	Very Lg. dec.	Medium	Rare	Very Poor	Lost			0	24
swamp white oak	Quercus bicolor	NSL	Low	11.6	20.4	9.4	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	25
pin oak	Quercus palustris	NSH	Low	27.5	19.9	6.0	Lg. inc.	Sm. inc.	Low	Rare	Fair	Poor	Infill +	Infill +	1	26
silver maple	Acer saccharinum	NSH	Low	18	19.6	9.1	Lg. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	1	27
Ohio buckeye	Aesculus glabra	NSL	Low	6.8	14.7	4.8	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	28
chinkapin oak	Quercus muehlenbergii	NSL	Medium	7.1	12.8	3.1	No change	No change	Medium	Rare	Poor	Poor		Infill +	2	29
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	19.9	9.0	1.0	Lg. inc.	Lg. inc.	High	Rare	Good	Good			1	30
sycamore	Platanus occidentalis	NSL	Low	9.1	7.1	8.7	Sm. inc.	Sm. inc.	Medium	Rare	Fair	Fair	Infill +	Infill +	2	31
white mulberry	Morus alba	NSL	FIA	4.4	3.1	0.6	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	32
pignut hickory	Carya glabra	WDL	Medium	5.2	2.8	1.7	Very Lg. dec.	Very Lg. dec.	Medium	Rare	Lost	Lost			0	33
blackjack oak	Quercus marilandica	NSL	Medium	0.1	2.7	0.3	Lg. inc.	Lg. inc.	High	Rare	Good	Good			2	34
wild plum	Prunus americana	NSLX	FIA	5.5	2.4	1.0	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	35
northern pin oak	Quercus ellipsoidalis	NSH	Medium	1.4	1.8	2.3	Very Lg. dec.	Very Lg. dec.	High	Rare	Lost	Lost			0	36
eastern redbud	Cercis canadensis	NSL	Low	1.9	1.4	0.7	No change	Sm. inc.	Medium	Rare	Poor	Fair		Infill +	2	37
post oak	Quercus stellata	WDH	High	1.4	1.1	0.3	Lg. inc.	Lg. inc.	High	Rare	Good	Good			2	38
sugar maple	Acer saccharum	WDH	High	4.2	0.7	2.8	No change	No change	High	Rare	Fair	Fair		Infill +	2	39
mockernut hickory	Carya alba	WDL	Medium	4.1	0.6	2.1	Sm. dec.	Lg. inc.	High	Rare	Poor	Good			2	40
river birch	Betula nigra	NSL	Low	4.2	0.5	1.8	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	41
serviceberry	Amelanchier spp.	NSL	Low	1.1	0.3	0.3	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	42
flowering dogwood	Cornus florida	WDL	Medium	4.2	0.1	0.5	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	43
red pine	Pinus resinosa	NSH	Medium	0	0	0	Unknown	Unknown	Low	Absent	Unknown	Unknown			0	44
cittamwood/gum bumelia	Sideroxylon lanuginosum ssp.	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate +	3	45
pecan	Carya illinoinensis	NSH	Low	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	46
black hickory	Carya texana	NDL	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	47

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sugarberry	Celtis laevigata	NDH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	48
common persimmon	Diospyros virginiana	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate +	3	49
Shumard oak	Quercus shumardii	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate +	3	50
winged elm	Ulmus alata	WDL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate ++	3	51
cedar elm	Ulmus crassifolia	NDH	Medium	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat			3	52