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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	77

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	4
Hickory	4
Maple	4
Oak	9
Pine	0
Other	28
	49

Abundance	
Abundant	0
Common	8
Rare	41
Absent	10
	59

	Model Reliability	Adaptability
High	8	21
Medium	24	32
Low	26	7
FIA	3	
	61	**60**

Potential Change in Habitat Suitability	Scenario RCP45	Scenario RCP85
Increase	12	13
No Change	9	7
Decrease	25	26
New	9	9
Unknown	6	6
	61	**61**

Capability to Cope or Persist	Scenario RCP45	Scenario RCP85
Very Good	0	0
Good	10	9
Fair	9	11
Poor	13	10
Very Poor	14	15
FIA Only	2	2
Unknown	3	3
	51	**50**

Migration Potential	SHIFT RCP45	SHIFT RCP85
Likely	0	0
Infill	24	20
Migrate	4	8
	28	**28**

Potential Changes in Climate Variables

Temperature (°F)

	Scenario	2009	2039	2069	2099
Annual Average	CCSM45	50.9	52.7	55.0	55.3
	CCSM85	50.9	53.4	55.9	58.9
	GFDL45	50.9	57.2	56.4	57.3
	GFDL85	50.9	54.0	57.4	61.6
	HAD45	50.9	53.7	57.3	58.9
	HAD85	50.9	54.1	58.8	63.5
Growing Season May—Sep	CCSM45	68.4	70.2	72.2	73.0
	CCSM85	68.4	71.1	73.5	77.1
	GFDL45	68.4	76.2	74.9	76.4
	GFDL85	68.4	72.1	76.2	81.2
	HAD45	68.4	71.6	74.8	76.8
	HAD85	68.4	71.8	77.6	82.4
Coldest Month Average	CCSM45	22.9	24.2	26.1	26.4
	CCSM85	22.9	25.6	27.0	28.5
	GFDL45	22.9	26.9	27.5	28.1
	GFDL85	22.9	26.4	27.6	28.7
	HAD45	22.9	24.3	27.5	27.5
	HAD85	22.9	26.1	28.8	31.3
Warmest Month Average	CCSM45	74.0	75.8	77.1	77.9
	CCSM85	74.0	77.4	79.2	80.9
	GFDL45	74.0	76.9	78.7	79.8
	GFDL85	74.0	77.9	80.1	83.0
	HAD45	74.0	77.6	80.1	81.0
	HAD85	74.0	78.9	82.8	85.9

Precipitation (in)

	Scenario	2009	2039	2069	2099
Annual Total	CCSM45	39.6	38.9	39.8	39.3
	CCSM85	39.6	40.1	39.7	41.0
	GFDL45	39.6	42.8	46.8	47.6
	GFDL85	39.6	42.4	47.7	49.7
	HAD45	39.6	41.1	43.3	43.0
	HAD85	39.6	42.6	40.3	43.3
Growing Season May—Sep	CCSM45	19.7	19.8	19.5	18.3
	CCSM85	19.7	18.6	18.5	18.1
	GFDL45	19.7	20.8	21.7	22.3
	GFDL85	19.7	21.0	22.0	21.9
	HAD45	19.7	20.1	18.6	19.7
	HAD85	19.7	19.7	16.6	16.7

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
sugar maple	Acer saccharum	WDH	High	59.3	202.7	13.3	Lg. dec.	Lg. dec.	High	Common	Fair	Fair	Infill +	Infill +	2	1
black cherry	Prunus serotina	WDL	Medium	78.5	110.2	11.0	Sm. dec.	Lg. dec.	Low	Common	Poor	Very Poor	Infill +		2	2
black walnut	Juglans nigra	WDH	Low	55.2	107.3	7.6	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor	Infill +	Infill +	2	3
hackberry	Celtis occidentalis	WDH	Medium	65.2	92.0	7.9	Sm. dec.	Sm. dec.	High	Common	Fair	Fair	Infill +	Infill +	2	4
white ash	Fraxinus americana	WDL	Medium	65.6	62.3	7.8	No change	No change	Low	Common	Poor	Poor	Infill +	Infill +	2	5
bitternut hickory	Carya cordiformis	WSL	Low	20.5	52.2	10.8	Sm. dec.	Sm. dec.	High	Common	Fair	Fair	Infill +	Infill +	2	6
Osage-orange	Maclura pomifera	NDH	Medium	16	51.6	7.3	Sm. dec.	No change	High	Common	Fair	Good	Infill +		2	7
American elm	Ulmus americana	WDH	Medium	71.3	51.3	4.8	Sm. inc.	Sm. inc.	Medium	Common	Good	Good	Infill ++	Infill ++	2	8
green ash	Fraxinus pennsylvanica	WSH	Low	26.7	40.9	10.0	Sm. inc.	Sm. inc.	Medium	Rare	Fair	Fair	Infill +	Infill +	2	9
pin oak	Quercus palustris	NSH	Low	25.9	38.1	10.2	Sm. dec.	Sm. dec.	Low	Rare	Very Poor	Very Poor			2	10
slippery elm	Ulmus rubra	WSL	Low	42.6	35.7	3.0	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			2	11
white oak	Quercus alba	WDH	Medium	42.1	28.1	3.0	Sm. inc.	Sm. dec.	High	Rare	Good	Poor	Infill ++	Infill +	2	12
black oak	Quercus velutina	WDH	High	17.1	25.3	5.6	Sm. inc.	Sm. inc.	Medium	Rare	Fair	Fair	Infill +	Infill +	2	13
northern red oak	Quercus rubra	WDH	Medium	37.8	24.4	3.6	Sm. inc.	No change	High	Rare	Good	Fair	Infill ++	Infill +	2	14
silver maple	Acer saccharinum	NSH	Low	11.6	23.0	17.0	Lg. inc.	Lg. inc.	High	Rare	Good	Good			2	15
boxelder	Acer negundo	WSH	Low	42.7	23.0	6.5	Sm. inc.	Sm. inc.	High	Rare	Good	Good	Infill ++	Infill ++	2	16
honeylocust	Gleditsia triacanthos	NSH	Low	38.7	22.8	6.2	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	2	17
red mulberry	Morus rubra	NSL	Low	33.4	22.2	4.3	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			2	18
pignut hickory	Carya glabra	WDL	Medium	23.6	21.4	4.2	Sm. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			2	19
sassafras	Sassafras albidum	WSL	Low	30.5	15.4	3.4	No change	Sm. dec.	Medium	Rare	Poor	Very Poor	Infill +		2	20
shagbark hickory	Carya ovata	WSL	Medium	38	14.7	2.5	Lg. inc.	Sm. inc.	Medium	Rare	Good	Fair	Infill ++	Infill +	2	21
red maple	Acer rubrum	WDH	High	22.9	13.8	5.2	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor	Infill +	Infill +	2	22
yellow-poplar	Liriodendron tulipifera	WDH	High	17.5	13.1	1.8	No change	Sm. dec.	High	Rare	Fair	Poor	Infill +	Infill +	2	23
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	25.2	12.5	3.3	Lg. dec.	Lg. dec.	High	Rare	Poor	Poor	Infill +	Infill +	2	24
American basswood	Tilia americana	WSL	Medium	34.8	11.6	3.8	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			2	25
eastern cottonwood	Populus deltoides	NSH	Low	19.6	8.4	3.6	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	26
sycamore	Platanus occidentalis	NSL	Low	10.3	8.2	1.7	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	27
shingle oak	Quercus imbricaria	NDH	Medium	6.8	6.9	10.8	No change	No change	Medium	Rare	Poor	Poor	Infill +		2	28
blackgum	Nyssa sylvatica	WDL	Medium	8.8	5.9	6.6	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor			0	29
black willow	Salix nigra	NSH	Low	11	5.9	6.6	Sm. dec.	Lg. inc.	Low	Rare	Very Poor	Fair		Infill +	2	30
chinkapin oak	Quercus muehlenbergii	NSL	Medium	13.2	5.8	2.1	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	31
bur oak	Quercus macrocarpa	NDH	Medium	10	5.4	3.7	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	2	32
black locust	Robinia pseudoacacia	NDH	Low	4.8	5.2	5.7	No change	Sm. inc.	Medium	Rare	Poor	Fair	Infill +	Infill +	2	33
Ohio buckeye	Aesculus glabra	NSL	Low	13.5	4.0	2.0	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			2	34
mockernut hickory	Carya alba	WDL	Medium	13.3	4.0	2.4	Lg. dec.	Sm. inc.	High	Rare	Poor	Good	Infill +		2	35
American hornbeam; muscle	Carpinus caroliniana	WSL	Low	14.1	2.7	1.1	Lg. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	36
Siberian elm	Ulmus pumila	NDH	FIA	8.5	1.5	2.8	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	37
eastern redbud	Cercis canadensis	NSL	Low	13.3	1.4	0.9	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			2	38
flowering dogwood	Cornus florida	WDL	Medium	6.9	1.1	0.6	Sm. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	39
northern catalpa	Catalpa speciosa	NSHX	FIA	12.4	0.9	1.1	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	40
black ash	Fraxinus nigra	WSH	Medium	2.8	0.7	1.7	Lg. dec.	Very Lg. dec.	Low	Rare	Very Poor	Lost			0	41
American beech	Fagus grandifolia	WDH	High	12.7	0.7	0.8	No change	Sm. dec.	Medium	Rare	Poor	Very Poor			0	42
bigtooth aspen	Populus grandidentata	NSL	Medium	4.2	0.5	1.7	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	43
blue ash	Fraxinus quadrangulata	NSL	Low	3.4	0.4	1.1	Sm. dec.	Sm. dec.	Low	Rare	Very Poor	Very Poor			0	44
northern pin oak	Quercus ellipsoidalis	NSH	Medium	4.2	0.3	1.2	Lg. dec.	Lg. dec.	High	Rare	Poor	Poor			0	45
Kentucky coffeetree	Gymnocladus dioicus	NSLX	FIA	2.3	0.3	0.6	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	46
swamp white oak	Quercus bicolor	NSL	Low	4.2	0.3	1.0	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	47

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Common Name	Scientific Name	Range	MR	%Cell	FIAsum	FIAiv	ChngCl45	ChngCl85	Adap	Abund	Capabil45	Capabil85	SHIFT45	SHIFT85	SSO	N
serviceberry	Amelanchier spp.	NSL	Low	4.2	0.1	0.5	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	48
eastern redcedar	Juniperus virginiana	WDH	Medium	4.2	0.1	0.4	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	49
jack pine	Pinus banksiana	NSH	Medium	0	0	0	Unknown	Unknown	High	Modeled	Unknown	Unknown			0	50
pawpaw	Asimina triloba	NSL	Low	0	0	0	Unknown	Unknown	Medium	Modeled	Unknown	Unknown			0	51
pecan	Carya illinoinensis	NSH	Low	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat		Migrate ++	3	52
black hickory	Carya texana	NDL	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	53
sugarberry	Celtis laevigata	NDH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	54
common persimmon	Diospyros virginiana	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	55
sweetgum	Liquidambar styraciflua	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	56
pin cherry	Prunus pensylvanica	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	57
blackjack oak	Quercus marilandica	NSL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	58
Shumard oak	Quercus shumardii	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate +	3	59
post oak	Quercus stellata	WDH	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate ++	Migrate ++	3	60
winged elm	Ulmus alata	WDL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate ++	3	61