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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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	sq. km	sq. mi	FIA Plots
Area of Region	1,757.4	678.5	31

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	4
Pine	2
Other	21
	36

Abundance	
Abundant	7
Common	24
Rare	5
Absent	22
	58

	Model Reliability	Adaptability
High	14	18
Medium	22	31
Low	20	8
FIA	2	
	58	**57**

Potential Change in Habitat Suitability	Scenario RCP45	Scenario RCP85
Increase	13	14
No Change	2	0
Decrease	19	20
New	21	22
Unknown	3	2
	58	**58**

Capability to Cope or Persist	Scenario RCP45	Scenario RCP85
Very Good	9	9
Good	5	6
Fair	8	7
Poor	9	7
Very Poor	3	4
FIA Only	1	1
Unknown	1	0
	36	**34**

Migration Potential	SHIFT RCP45	SHIFT RCP85
Likely	2	2
Infill	24	22
Migrate	12	14
	38	**38**

Potential Changes in Climate Variables

Temperature (°F)

	Scenario	2009	2039	2069	2099
Annual Average	CCSM45	46.3	48.3	51.2	51.2
	CCSM85	46.3	48.9	51.8	55.1
	GFDL45	46.3	50.5	52.0	53.2
	GFDL85	46.3	49.6	53.1	57.8
	HAD45	46.3	49.4	52.8	54.6
	HAD85	46.3	49.7	54.1	59.5
Growing Season May—Sep	CCSM45	64.3	66.2	68.5	68.7
	CCSM85	64.3	66.8	69.2	73.0
	GFDL45	64.3	69.5	71.2	73.1
	GFDL85	64.3	68.4	72.5	77.9
	HAD45	64.3	67.4	69.6	71.8
	HAD85	64.3	67.1	71.4	76.6
Coldest Month Average	CCSM45	18.4	20.0	23.0	23.0
	CCSM85	18.4	21.1	23.4	25.6
	GFDL45	18.4	21.5	23.1	23.4
	GFDL85	18.4	22.3	23.7	25.8
	HAD45	18.4	19.8	23.9	24.1
	HAD85	18.4	22.6	26.2	29.8
Warmest Month Average	CCSM45	70.8	73.2	74.6	75.0
	CCSM85	70.8	74.0	75.6	77.5
	GFDL45	70.8	74.3	76.0	77.3
	GFDL85	70.8	75.4	77.4	80.6
	HAD45	70.8	74.1	75.3	76.8
	HAD85	70.8	74.6	77.0	80.6

Precipitation (in)

	Scenario	2009	2039	2069	2099
Annual Total	CCSM45	32.5	32.0	32.0	32.5
	CCSM85	32.5	33.0	33.4	33.4
	GFDL45	32.5	34.8	38.6	37.6
	GFDL85	32.5	36.3	39.6	40.0
	HAD45	32.5	33.0	34.7	34.6
	HAD85	32.5	34.5	33.4	36.1
Growing Season May—Sep	CCSM45	17.6	17.4	17.1	17.7
	CCSM85	17.6	17.7	17.9	16.8
	GFDL45	17.6	18.0	20.7	19.8
	GFDL85	17.6	19.7	20.1	19.8
	HAD45	17.6	17.1	16.1	16.6
	HAD85	17.6	17.6	14.6	15.3

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	57.1	1632.3	12.4	Sm. dec.	Sm. dec.	Medium	Abundant	Fair	Fair	Infill +	Infill +	0	1
white ash	Fraxinus americana	WDL	Medium	55	1087.7	11.6	Sm. dec.	Sm. dec.	Low	Abundant	Fair	Fair	Infill +	Infill +	0	2
sugar maple	Acer saccharum	WDH	High	67.2	896.0	9.9	No change	Sm. dec.	High	Abundant	Very Good	Good	Infill ++	Infill ++	1	3
American basswood	Tilia americana	WSL	Medium	51.7	658.4	4.2	Sm. dec.	Lg. dec.	Medium	Abundant	Fair	Fair	Infill +	Infill +	0	4
American beech	Fagus grandifolia	WDH	High	35	618.8	14.6	Lg. dec.	Lg. dec.	Medium	Abundant	Fair	Fair	Infill +	Infill +	0	5
red maple	Acer rubrum	WDH	High	50.2	560.4	12.3	Lg. dec.	Lg. dec.	High	Abundant	Good	Good	Infill ++	Infill ++	1	6
northern white-cedar	Thuja occidentalis	WSH	High	18.7	521.3	8.2	Lg. dec.	Lg. dec.	Medium	Abundant	Fair	Fair			0	7
American elm	Ulmus americana	WDH	Medium	61.5	473.7	2.7	Sm. inc.	Lg. inc.	Medium	Common	Good	Very Good	Infill ++	Infill ++	1	8
eastern cottonwood	Populus deltoides	NSH	Low	12.5	397.8	18.8	No change	Sm. inc.	Medium	Common	Fair	Good	Infill +	Infill ++	1	9
eastern white pine	Pinus strobus	WDH	High	23.6	389.8	3.5	Sm. dec.	Lg. dec.	Low	Common	Poor	Very Poor	Infill +		0	10
silver maple	Acer saccharinum	NSH	Low	12.3	385.7	18.3	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good	Infill ++	Infill ++	1	11
black ash	Fraxinus nigra	WSH	Medium	20.5	348.4	6.1	Lg. dec.	Lg. dec.	Low	Common	Very Poor	Very Poor			0	12
quaking aspen	Populus tremuloides	WDH	High	30.7	318.0	6.8	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor	Infill +	Infill +	0	13
northern red oak	Quercus rubra	WDH	Medium	27.7	247.6	7.3	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good	Infill ++	Infill ++	1	14
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	24.9	234.0	2.4	Sm. dec.	Sm. dec.	High	Common	Fair	Fair	Infill +	Infill +	1	15
bigtooth aspen	Populus grandidentata	NSL	Medium	1.8	217.3	1.6	Sm. dec.	Lg. dec.	Medium	Common	Poor	Poor	Infill +		0	16
red pine	Pinus resinosa	NSH	Medium	1	157.3	0.8	Sm. dec.	Sm. dec.	Low	Common	Poor	Poor	Infill +	Infill +	2	17
paper birch	Betula papyrifera	WDH	High	19.2	140.8	2.4	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor	Infill +	Infill +	0	18
bitternut hickory	Carya cordiformis	WSL	Low	15.1	135.6	2.2	Sm. inc.	Lg. inc.	High	Common	Very Good	Very Good	Infill ++	Infill ++	1	19
shagbark hickory	Carya ovata	WSL	Medium	11.1	119.9	3.7	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good	Infill ++	Infill ++	2	20
yellow birch	Betula alleghaniensis	NDL	High	17.6	111.3	2.8	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	21
boxelder	Acer negundo	WSH	Low	20.9	101.9	1.7	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good	Infill ++	Infill ++	1	22
swamp white oak	Quercus bicolor	NSL	Low	17.6	69.9	2.8	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good	Infill ++	Infill ++	1	23
Norway spruce	Picea abies	NSH	FIA	5.7	69.7	12.2	Unknown	Unknown	NA	Common	NNIS	NNIS			0	24
chokecherry	Prunus virginiana	NSLX	FIA	11.3	69.1	6.0	Unknown	Unknown	Medium	Common	FIA Only	FIA Only			0	25
slippery elm	Ulmus rubra	WSL	Low	11.1	64.1	2.2	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good	Infill ++	Infill ++	1	26
bur oak	Quercus macrocarpa	NDH	Medium	19.8	62.9	1.1	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good	Infill ++	Infill ++	2	27
black cherry	Prunus serotina	WDL	Medium	19.1	61.5	1.5	Lg. inc.	Lg. inc.	Low	Common	Good	Good	Infill ++	Infill ++	1	28
tamarack (native)	Larix laricina	NSH	High	7.5	60.2	2.3	Sm. dec.	Sm. dec.	Low	Common	Poor	Poor			0	29
balsam poplar	Populus balsamifera	NSH	Medium	11.4	52.6	4.6	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	30
white spruce	Picea glauca	NSL	Medium	10.9	51.1	4.2	Lg. dec.	Very Lg. dec.	Medium	Common	Poor	Lost			0	31
white oak	Quercus alba	WDH	Medium	0.3	29.0	0.3	Lg. inc.	Lg. inc.	High	Rare	Good	Good			2	32
black willow	Salix nigra	NSH	Low	10.4	22.4	7.2	Lg. inc.	Lg. inc.	Low	Rare	Fair	Fair	Infill +	Infill +	1	33
black spruce	Picea mariana	NSH	High	1.8	17.5	1.0	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	34
black walnut	Juglans nigra	WDH	Low	10.4	13.0	4.2	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	35
American hornbeam; muscle	Carpinus caroliniana	WSL	Low	1.1	2.1	0.1	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	36
eastern redcedar	Juniperus virginiana	WDH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate ++	Migrate ++	3	37
Ohio buckeye	Aesculus glabra	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +		3	38
pignut hickory	Carya glabra	WDL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	39
black hickory	Carya texana	NDL	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	40
mockernut hickory	Carya alba	WDL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	41
hackberry	Celtis occidentalis	WDH	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Likely +	Likely +	3	42
eastern redbud	Cercis canadensis	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	43
common persimmon	Diospyros virginiana	NSL	Low	0	0	0	Unknown	New Habitat	High	Absent	Unknown	New Habitat			3	44
honeylocust	Gleditsia triacanthos	NSH	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	45
yellow-poplar	Liriodendron tulipifera	WDH	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate +	3	46
Osage-orange	Maclura pomifera	NDH	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	47

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Common Name	Scientific Name	Range	MR	%Cell	FIAsum	FIAiv	ChngCl45	ChngCl85	Adap	Abund	Capabil45	Capabil85	SHIFT45	SHIFT85	SSO	N
red mulberry	Morus rubra	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	48
sycamore	Platanus occidentalis	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	49
northern pin oak	Quercus ellipsoidalis	NSH	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	50
shingle oak	Quercus imbricaria	NDH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	51
blackjack oak	Quercus marilandica	NSL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			3	52
chinkapin oak	Quercus muehlenbergii	NSL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	53
pin oak	Quercus palustris	NSH	Low	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat		Migrate +	3	54
post oak	Quercus stellata	WDH	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			3	55
black oak	Quercus velutina	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate ++	Migrate ++	3	56
black locust	Robinia pseudoacacia	NDH	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Likely +	Likely +	3	57
sassafras	Sassafras albidum	WSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	58