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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	8,686.5	3,353.9	114

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	0
Maple	4
Oak	4
Pine	4
Other	23
	37

Abundance	
Abundant	1
Common	15
Rare	21
Absent	14
	51

	Model Reliability	Adaptability
High	12	15
Medium	17	25
Low	16	9
FIA	6	
	51	**49**

Potential Change in Habitat Suitability	Scenario RCP45	Scenario RCP85
Increase	11	10
No Change	8	8
Decrease	12	13
New	13	14
Unknown	7	6
	51	**51**

Capability to Cope or Persist	Scenario RCP45	Scenario RCP85
Very Good	2	1
Good	10	10
Fair	7	9
Poor	5	3
Very Poor	5	6
FIA Only	4	4
Unknown	1	0
	34	**33**

Migration Potential	SHIFT RCP45	SHIFT RCP85
Likely	0	0
Infill	20	19
Migrate	7	8
	27	**27**

Potential Changes in Climate Variables

Temperature (°F)

	Scenario	2009	2039	2069	2099
Annual Average	CCSM45	43.7	45.4	48.5	49.0
	CCSM85	43.7	46.4	49.7	53.2
	GFDL45	43.7	49.1	49.0	50.5
	GFDL85	43.7	46.8	50.2	55.1
	HAD45	43.7	46.6	50.4	52.3
	HAD85	43.7	47.2	51.8	57.1
Growing Season May—Sep	CCSM45	64.9	66.8	69.4	70.0
	CCSM85	64.9	67.7	70.9	75.1
	GFDL45	64.9	71.3	71.1	73.1
	GFDL85	64.9	68.6	72.3	77.9
	HAD45	64.9	67.8	70.8	72.9
	HAD85	64.9	67.9	72.3	77.7
Coldest Month Average	CCSM45	9.6	11.4	13.8	14.3
	CCSM85	9.6	11.5	13.8	16.3
	GFDL45	9.6	13.4	14.9	15.3
	GFDL85	9.6	13.5	15.2	18.2
	HAD45	9.6	11.3	15.5	15.4
	HAD85	9.6	15.0	18.8	22.2
Warmest Month Average	CCSM45	71.4	73.8	75.3	75.9
	CCSM85	71.4	75.1	77.1	79.8
	GFDL45	71.4	74.6	76.1	77.6
	GFDL85	71.4	75.4	77.2	80.6
	HAD45	71.4	74.5	76.2	77.7
	HAD85	71.4	75.3	77.6	81.3

Precipitation (in)

	Scenario	2009	2039	2069	2099
Annual Total	CCSM45	28.6	29.7	29.7	28.8
	CCSM85	28.6	28.8	28.1	28.5
	GFDL45	28.6	31.8	33.6	30.8
	GFDL85	28.6	32.0	34.9	33.5
	HAD45	28.6	31.2	29.9	30.8
	HAD85	28.6	30.3	30.4	32.4
Growing Season May—Sep	CCSM45	18.3	18.4	18.0	17.3
	CCSM85	18.3	17.8	16.3	15.8
	GFDL45	18.3	20.4	21.1	18.7
	GFDL85	18.3	20.7	21.1	19.4
	HAD45	18.3	18.8	17.5	17.4
	HAD85	18.3	18.1	16.4	16.3

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
bur oak	Quercus macrocarpa	NDH	Medium	61.9	575.1	13.5	Sm. dec.	Sm. dec.	High	Abundant	Good	Good	Infill ++	Infill ++	1	1
green ash	Fraxinus pennsylvanica	WSH	Low	68.8	432.1	13.7	No change	No change	Medium	Common	Fair	Fair	Infill +	Infill +	1	2
quaking aspen	Populus tremuloides	WDH	High	58.4	425.0	10.8	No change	No change	Medium	Common	Fair	Fair	Infill +	Infill +	1	3
American basswood	Tilia americana	WSL	Medium	54.3	416.3	11.7	Sm. dec.	Lg. dec.	Medium	Common	Poor	Poor	Infill +	Infill +	0	4
northern red oak	Quercus rubra	WDH	Medium	46.6	404.8	11.4	Sm. dec.	Lg. dec.	High	Common	Fair	Fair	Infill +	Infill +	1	5
American elm	Ulmus americana	WDH	Medium	72.8	404.2	9.7	Sm. dec.	No change	Medium	Common	Poor	Fair	Infill +	Infill +	1	6
boxelder	Acer negundo	WSH	Low	67.6	257.8	10.3	No change	Sm. dec.	High	Common	Good	Fair	Infill ++	Infill +	1	7
black ash	Fraxinus nigra	WSH	Medium	31.5	168.9	7.3	No change	Sm. dec.	Low	Common	Poor	Poor	Infill +	Infill +	0	8
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	48.8	162.3	6.5	Sm. dec.	Lg. dec.	High	Common	Fair	Fair	Infill +	Infill +	1	9
paper birch	Betula papyrifera	WDH	High	25.1	120.3	6.4	No change	No change	Medium	Common	Fair	Fair	Infill +	Infill +	1	10
northern pin oak	Quercus ellipsoidalis	NSH	Medium	8.9	117.6	14.1	No change	No change	High	Common	Good	Good	Infill ++	Infill ++	2	11
tamarack (native)	Larix laricina	NSH	High	9.2	113.3	14.0	No change	No change	Low	Common	Poor	Poor	Infill +	Infill +	2	12
eastern redcedar	Juniperus virginiana	WDH	Medium	27.8	93.3	9.7	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good	Infill ++	Infill ++	1	13
eastern white pine	Pinus strobus	WDH	High	6.1	78.9	17.3	No change	Lg. dec.	Low	Common	Poor	Very Poor	Infill +		2	14
sugar maple	Acer saccharum	WDH	High	25.6	74.8	7.0	Sm. inc.	No change	High	Common	Very Good	Good	Infill ++	Infill ++	2	15
black cherry	Prunus serotina	WDL	Medium	27.1	69.8	3.6	Lg. inc.	Lg. inc.	Low	Common	Good	Good	Infill ++	Infill ++	1	16
Scots pine	Pinus sylvestris	NSH	FIA	4	47.9	14.0	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	17
red maple	Acer rubrum	WDH	High	30	40.4	4.2	Lg. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	1	18
black willow	Salix nigra	NSH	Low	14.9	40.3	11.6	Lg. dec.	No change	Low	Rare	Very Poor	Very Poor			2	19
bigtooth aspen	Populus grandidentata	NSL	Medium	14.8	36.0	7.1	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			2	20
slippery elm	Ulmus rubra	WSL	Low	28.2	33.6	3.5	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	21
eastern cottonwood	Populus deltoides	NSH	Low	2.9	29.7	13.4	Sm. inc.	Sm. inc.	Medium	Rare	Fair	Fair	Infill +	Infill +	2	22
white spruce	Picea glauca	NSL	Medium	12	28.4	8.0	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	23
hackberry	Celtis occidentalis	WDH	Medium	16.7	24.8	3.0	Lg. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	2	24
yellow birch	Betula alleghaniensis	NDL	High	8.9	21.0	5.2	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			2	25
silver maple	Acer saccharinum	NSH	Low	10.8	19.0	3.8	Lg. inc.	Lg. inc.	High	Rare	Good	Good			2	26
Siberian elm	Ulmus pumila	NDH	FIA	12.1	11.7	2.5	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	27
butternut	Juglans cinerea	NSLX	FIA	2.3	8.6	3.8	Unknown	Unknown	Low	Rare	FIA Only	FIA Only			0	28
red pine	Pinus resinosa	NSH	Medium	7.8	7.6	3.9	Lg. inc.	Lg. inc.	Low	Rare	Fair	Fair	Infill +	Infill +	2	29
white oak	Quercus alba	WDH	Medium	9.5	7.4	2.2	Lg. inc.	Lg. inc.	High	Rare	Good	Good			2	30
jack pine	Pinus banksiana	NSH	Medium	1.2	2.7	2.4	Sm. inc.	Sm. inc.	High	Rare	Good	Good			2	31
wild plum	Prunus americana	NSLX	FIA	0.6	2.5	1.2	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	32
chokecherry	Prunus virginiana	NSLX	FIA	8	2.2	0.7	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	33
serviceberry	Amelanchier spp.	NSL	Low	2.1	1.2	0.5	Very Lg. dec.	Very Lg. dec.	Medium	Rare	Lost	Lost			0	34
pin cherry	Prunus pensylvanica	NSL	Low	5.7	0.9	0.9	Very Lg. dec.	Very Lg. dec.	Medium	Rare	Lost	Lost			0	35
peachleaf willow	Salix amygdaloides	NSLX	FIA	1.7	0.6	0.8	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	36
black walnut	Juglans nigra	WDH	Low	1.7	0.1	0.1	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	37
balsam fir	Abies balsamea	NDH	High	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	38
northern white-cedar	Thuja occidentalis	WSH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate ++	3	39
bitternut hickory	Carya cordiformis	WSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	40
shagbark hickory	Carya ovata	WSL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	41
black hickory	Carya texana	NDL	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	42
white ash	Fraxinus americana	WDL	Medium	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	43
honeylocust	Gleditsia triacanthos	NSH	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +		3	44
red mulberry	Morus rubra	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	45
sycamore	Platanus occidentalis	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	46
swamp white oak	Quercus bicolor	NSL	Low	0	0	0	Unknown	New Habitat	Medium	Absent	Unknown	New Habitat		Migrate +	3	47

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blackjack oak	Quercus marilandica	NSL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			0	48
post oak	Quercus stellata	WDH	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			0	49
black oak	Quercus velutina	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	50
black locust	Robinia pseudoacacia	NDH	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	51