S43 E89

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	8,985.5	3,469.3	273

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	6
Pine	4
Other	31
	50

Abundance	
Abundant	5
Common	26
Rare	19
Absent	21
	71

	Model Reliability	Adaptability
High	16	20
Medium	24	36
Low	24	11
FIA	7	
	71	**67**

Potential Change in Habitat Suitability	Scenario RCP45	Scenario RCP85
Increase	13	15
No Change	10	5
Decrease	20	23
New	19	20
Unknown	9	8
	71	**71**

Capability to Cope or Persist	Scenario RCP45	Scenario RCP85
Very Good	7	8
Good	12	10
Fair	6	5
Poor	9	12
Very Poor	8	6
FIA Only	3	3
Unknown	2	1
	47	**45**

Migration Potential	SHIFT RCP45	SHIFT RCP85
Likely	0	0
Infill	10	12
Migrate	8	14
	18	**26**

Potential Changes in Climate Variables

Temperature (°F)

	Scenario	2009	2039	2069	2099
Annual Average	CCSM45	46.0	48.1	51.0	51.1
	CCSM85	46.0	48.8	51.6	55.0
	GFDL45	46.0	49.6	51.7	52.9
	GFDL85	46.0	49.3	52.8	57.5
	HAD45	46.0	49.1	52.6	54.4
	HAD85	46.0	49.5	54.0	59.3
Growing Season May—Sep	CCSM45	65.2	67.4	69.8	70.1
	CCSM85	65.2	68.1	70.6	74.6
	GFDL45	65.2	69.3	71.8	73.8
	GFDL85	65.2	69.2	73.2	78.7
	HAD45	65.2	68.3	70.9	73.1
	HAD85	65.2	68.3	73.0	78.2
Coldest Month Average	CCSM45	15.7	17.5	20.4	20.4
	CCSM85	15.7	18.3	20.5	22.7
	GFDL45	15.7	19.1	20.7	21.1
	GFDL85	15.7	19.6	21.2	23.5
	HAD45	15.7	17.0	21.1	21.2
	HAD85	15.7	20.0	23.5	26.9
Warmest Month Average	CCSM45	71.3	73.9	75.3	76.0
	CCSM85	71.3	75.1	76.9	79.0
	GFDL45	71.3	74.7	76.3	77.8
	GFDL85	71.3	75.7	77.7	81.1
	HAD45	71.3	74.5	76.1	77.5
	HAD85	71.3	75.6	78.3	81.9

Precipitation (in)

	Scenario	2009	2039	2069	2099
Annual Total	CCSM45	34.2	33.9	33.9	34.3
	CCSM85	34.2	34.3	35.1	34.7
	GFDL45	34.2	36.6	40.5	38.7
	GFDL85	34.2	38.0	41.1	40.6
	HAD45	34.2	35.1	36.3	36.4
	HAD85	34.2	35.9	34.8	37.4
Growing Season May—Sep	CCSM45	20.2	19.8	19.6	20.4
	CCSM85	20.2	20.0	20.5	19.2
	GFDL45	20.2	20.7	23.3	21.8
	GFDL85	20.2	22.2	22.5	21.4
	HAD45	20.2	20.0	18.8	19.4
	HAD85	20.2	20.2	17.3	17.8

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 oak	Quercus velutina	WDH	High	57.8	890.6	11.9	No change	Sm. dec.	Medium	Abundant	Good	Fair			1	1
white oak	Quercus alba	WDH	Medium	64.6	715.7	9.5	No change	Sm. dec.	High	Abundant	Very Good	Good			1	2
black cherry	Prunus serotina	WDL	Medium	74.1	710.0	7.9	No change	Sm. dec.	Low	Abundant	Fair	Fair			0	3
red pine	Pinus resinosa	NSH	Medium	28.7	608.0	15.0	Sm. dec.	Lg. dec.	Low	Abundant	Fair	Poor			0	4
red maple	Acer rubrum	WDH	High	48.9	510.8	7.3	Sm. dec.	Sm. dec.	High	Abundant	Good	Good			1	5
eastern white pine	Pinus strobus	WDH	High	34.1	461.9	9.3	Sm. dec.	Lg. dec.	Low	Common	Poor	Very Poor			0	6
American elm	Ulmus americana	WDH	Medium	66.1	459.6	6.0	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	7
northern red oak	Quercus rubra	WDH	Medium	47.4	428.5	7.0	No change	No change	High	Common	Good	Good			1	8
boxelder	Acer negundo	WSH	Low	44.9	426.0	9.2	No change	No change	High	Common	Good	Good			1	9
northern pin oak	Quercus ellipsoidalis	NSH	Medium	44	371.8	6.5	Sm. dec.	Lg. dec.	High	Common	Fair	Fair			1	10
eastern redcedar	Juniperus virginiana	WDH	Medium	32.2	351.6	9.9	Sm. inc.	Lg. inc.	Medium	Common	Good	Very Good			1	11
shagbark hickory	Carya ovata	WSL	Medium	48.4	344.4	7.1	Sm. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	12
jack pine	Pinus banksiana	NSH	Medium	19.6	314.6	11.4	Lg. dec.	Lg. dec.	High	Common	Fair	Fair	Infill +	Infill +	1	13
bur oak	Quercus macrocarpa	NDH	Medium	42.9	285.6	5.6	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	14
black locust	Robinia pseudoacacia	NDH	Low	16.7	266.0	15.1	Sm. dec.	No change	Medium	Common	Poor	Fair			1	15
quaking aspen	Populus tremuloides	WDH	High	43.6	258.0	6.0	No change	Sm. dec.	Medium	Common	Fair	Poor			1	16
tamarack (native)	Larix laricina	NSH	High	8.6	204.4	16.4	Sm. dec.	Sm. dec.	Low	Common	Poor	Poor	Infill +	Infill +	0	17
bigtooth aspen	Populus grandidentata	NSL	Medium	18.6	160.7	4.5	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	18
silver maple	Acer saccharinum	NSH	Low	14.2	137.9	9.1	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	19
green ash	Fraxinus pennsylvanica	WSH	Low	22.9	134.1	5.3	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	20
white ash	Fraxinus americana	WDL	Medium	14.5	108.7	6.2	Lg. inc.	Lg. inc.	Low	Common	Good	Good			1	21
American basswood	Tilia americana	WSL	Medium	18.3	108.5	4.2	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	22
bitternut hickory	Carya cordiformis	WSL	Low	11.9	98.4	4.6	No change	Sm. inc.	High	Common	Good	Very Good	Infill ++	Infill ++	1	23
river birch	Betula nigra	NSL	Low	4.5	97.5	11.6	Sm. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	24
sugar maple	Acer saccharum	WDH	High	10.9	91.7	4.6	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good	Infill ++	Infill ++	1	25
black walnut	Juglans nigra	WDH	Low	14.7	91.3	4.8	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good	Infill ++	Infill ++	1	26
paper birch	Betula papyrifera	WDH	High	17.8	87.0	3.1	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor			0	27
slippery elm	Ulmus rubra	WSL	Low	26.6	76.0	2.3	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	28
red mulberry	Morus rubra	NSL	Low	17	72.7	4.0	No change	Sm. dec.	Medium	Common	Fair	Poor	Infill +	Infill +	1	29
Scots pine	Pinus sylvestris	NSH	FIA	8	72.0	7.6	Unknown	Unknown	NA	Common	NNIS	NNIS			0	30
black ash	Fraxinus nigra	WSH	Medium	8.2	63.9	5.7	Sm. dec.	Sm. dec.	Low	Common	Poor	Poor			0	31
hackberry	Celtis occidentalis	WDH	Medium	15.5	47.4	2.7	Lg. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	1	32
balsam fir	Abies balsamea	NDH	High	1.1	37.1	33.3	Sm. dec.	Sm. dec.	Low	Rare	Very Poor	Very Poor			0	33
white spruce	Picea glauca	NSL	Medium	10.3	36.7	4.5	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	34
butternut	Juglans cinerea	NSLX	FIA	3.1	28.3	8.4	Unknown	Unknown	Low	Rare	FIA Only	FIA Only			0	35
swamp white oak	Quercus bicolor	NSL	Low	7.7	27.6	2.6	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	1	36
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	6.2	19.7	1.8	Sm. inc.	Sm. inc.	High	Rare	Good	Good	Infill ++	Infill ++	1	37
eastern cottonwood	Populus deltoides	NSH	Low	6.7	17.4	3.3	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	2	38
black willow	Salix nigra	NSH	Low	2.4	10.9	2.3	No change	Sm. inc.	Low	Rare	Very Poor	Poor		Infill +	2	39
chokecherry	Prunus virginiana	NSLX	FIA	4.5	7.8	1.8	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	40
yellow birch	Betula alleghaniensis	NDL	High	0.3	7.2	1.6	Sm. dec.	No change	Medium	Rare	Very Poor	Poor		Infill +	2	41
white mulberry	Morus alba	NSL	FIA	2.2	6.3	2.8	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	42
Norway spruce	Picea abies	NSH	FIA	6.5	4.7	6.1	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	43
serviceberry	Amelanchier spp.	NSL	Low	4	4.4	0.9	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	44
Siberian elm	Ulmus pumila	NDH	FIA	3.1	4.3	1.3	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	45
American hornbeam; muscle	Carpinus caroliniana	WSL	Low	4	3.9	0.4	Sm. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	46
northern white-cedar	Thuja occidentalis	WSH	High	2.4	3.4	6.6	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	47

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black spruce	Picea mariana	NSH	High	1.1	2.5	2.2	Sm. dec.	Very Lg. dec.	Medium	Rare	Very Poor	Lost			0	48
pin cherry	Prunus pensylvanica	NSL	Low	4.8	2.3	0.9	Very Lg. dec.	Very Lg. dec.	Medium	Rare	Lost	Lost			0	49
peachleaf willow	Salix amygdaloides	NSLX	FIA	0.2	0.9	0.2	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	50
pignut hickory	Carya glabra	WDL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	51
black hickory	Carya texana	NDL	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	52
mockernut hickory	Carya alba	WDL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	53
sugarberry	Celtis laevigata	NDH	Medium	0	0	0	Unknown	New Habitat	Medium	Absent	Unknown	New Habitat			3	54
eastern redbud	Cercis canadensis	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	55
common persimmon	Diospyros virginiana	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate +	3	56
American beech	Fagus grandifolia	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	57
honeylocust	Gleditsia triacanthos	NSH	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	58
sweetgum	Liquidambar styraciflua	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	59
yellow-poplar	Liriodendron tulipifera	WDH	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate +	3	60
Osage-orange	Maclura pomifera	NDH	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	61
mountain or Fraser magnolia	Magnolia fraseri	NSL	Low	0	0	0	Unknown	Unknown	Low	Absent	Unknown	Unknown			0	62
sycamore	Platanus occidentalis	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	63
shingle oak	Quercus imbricaria	NDH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	64
blackjack oak	Quercus marilandica	NSL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			3	65
chinkapin oak	Quercus muehlenbergii	NSL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	66
pin oak	Quercus palustris	NSH	Low	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat		Migrate +	3	67
Shumard oak	Quercus shumardii	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			3	68
post oak	Quercus stellata	WDH	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate ++	3	69
sassafras	Sassafras albidum	WSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	70
winged elm	Ulmus alata	WDL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	71