S45 E89

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	559

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	1
Maple	5
Oak	4
Pine	4
Other	24
	41

Abundance	
Abundant	8
Common	15
Rare	18
Absent	15
	56

	Model Reliability	Adaptability
High	15	16
Medium	20	27
Low	16	11
FIA	5	
	56	**54**

Potential Change in Habitat Suitability	Scenario RCP45	Scenario RCP85
Increase	15	17
No Change	11	10
Decrease	10	9
New	15	15
Unknown	5	5
	56	**56**

Capability to Cope or Persist	Scenario RCP45	Scenario RCP85
Very Good	5	6
Good	11	11
Fair	11	12
Poor	4	3
Very Poor	1	1
FIA Only	3	3
Unknown	0	0
	35	**36**

Migration Potential	SHIFT RCP45	SHIFT RCP85
Likely	1	1
Infill	4	4
Migrate	6	9
	11	**14**

Potential Changes in Climate Variables

Temperature (°F)

	Scenario	2009	2039	2069	2099
Annual Average	CCSM45	40.7	42.4	45.5	45.5
	CCSM85	40.7	43.2	46.3	49.8
	GFDL45	40.7	43.7	46.7	48.1
	GFDL85	40.7	44.2	47.8	53.1
	HAD45	40.7	44.0	47.4	49.3
	HAD85	40.7	44.4	48.5	54.4
Growing Season May—Sep	CCSM45	60.4	62.2	64.9	65.0
	CCSM85	60.4	63.0	65.8	69.9
	GFDL45	60.4	64.1	67.8	70.0
	GFDL85	60.4	64.8	69.2	75.1
	HAD45	60.4	63.7	66.2	68.6
	HAD85	60.4	63.6	67.8	73.6
Coldest Month Average	CCSM45	9.7	11.1	13.8	13.8
	CCSM85	9.7	11.4	13.7	16.2
	GFDL45	9.7	12.8	14.8	15.1
	GFDL85	9.7	13.7	15.4	18.4
	HAD45	9.7	11.5	15.7	15.7
	HAD85	9.7	14.7	17.6	21.7
Warmest Month Average	CCSM45	66.6	68.6	70.2	70.5
	CCSM85	66.6	69.7	71.4	73.9
	GFDL45	66.6	70.5	72.2	73.8
	GFDL85	66.6	71.3	73.7	76.9
	HAD45	66.6	70.1	71.2	73.0
	HAD85	66.6	70.6	72.7	76.8

Precipitation (in)

	Scenario	2009	2039	2069	2099
Annual Total	CCSM45	31.0	32.0	31.2	32.0
	CCSM85	31.0	31.2	31.2	32.0
	GFDL45	31.0	33.6	35.1	34.0
	GFDL85	31.0	33.8	36.5	35.8
	HAD45	31.0	31.9	33.0	33.2
	HAD85	31.0	32.0	33.5	34.6
Growing Season May—Sep	CCSM45	18.4	18.7	17.6	18.5
	CCSM85	18.4	18.6	18.0	17.4
	GFDL45	18.4	19.6	20.0	19.0
	GFDL85	18.4	19.8	20.2	18.8
	HAD45	18.4	18.2	17.5	17.5
	HAD85	18.4	17.9	16.5	16.8

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
quaking aspen	Populus tremuloides	WDH	High	94.8	1851.6	13.8	Sm. dec.	Sm. dec.	Medium	Abundant	Fair	Fair			0	1
red maple	Acer rubrum	WDH	High	97	1441.1	10.4	No change	No change	High	Abundant	Very Good	Very Good			1	2
sugar maple	Acer saccharum	WDH	High	74.8	1345.9	10.8	Sm. dec.	Sm. dec.	High	Abundant	Good	Good			1	3
balsam fir	Abies balsamea	NDH	High	93.4	1076.1	8.0	Lg. dec.	Lg. dec.	Low	Abundant	Poor	Poor			0	4
red pine	Pinus resinosa	NSH	Medium	53.1	718.2	9.7	No change	No change	Low	Abundant	Fair	Fair			0	5
black spruce	Picea mariana	NSH	High	67.5	644.2	7.3	Lg. dec.	Lg. dec.	Medium	Abundant	Fair	Fair			0	6
eastern white pine	Pinus strobus	WDH	High	69	629.1	7.1	No change	No change	Low	Abundant	Fair	Fair			0	7
tamarack (native)	Larix laricina	NSH	High	65.5	593.1	6.7	No change	No change	Low	Abundant	Fair	Fair			0	8
paper birch	Betula papyrifera	WDH	High	82.8	416.9	3.7	Sm. inc.	No change	Medium	Common	Good	Fair			1	9
northern red oak	Quercus rubra	WDH	Medium	58.8	373.4	4.5	Lg. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	10
northern white-cedar	Thuja occidentalis	WSH	High	31	343.5	6.0	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	11
black ash	Fraxinus nigra	WSH	Medium	54.4	277.2	3.8	Sm. inc.	Sm. inc.	Low	Common	Fair	Fair			1	12
American basswood	Tilia americana	WSL	Medium	52.6	263.5	3.4	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	13
bigtooth aspen	Populus grandidentata	NSL	Medium	48.2	245.5	3.5	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	14
eastern hemlock	Tsuga canadensis	NSH	High	46.6	232.6	2.8	No change	No change	Low	Common	Poor	Poor			0	15
yellow birch	Betula alleghaniensis	NDL	High	61.6	221.9	2.4	No change	No change	Medium	Common	Fair	Fair			1	16
black cherry	Prunus serotina	WDL	Medium	68.5	218.8	2.1	Lg. inc.	Lg. inc.	Low	Common	Good	Good			1	17
American elm	Ulmus americana	WDH	Medium	44.2	173.0	2.9	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	18
white ash	Fraxinus americana	WDL	Medium	42.1	170.1	2.5	Sm. inc.	Lg. inc.	Low	Common	Fair	Good			1	19
white spruce	Picea glauca	NSL	Medium	54	159.6	2.1	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	20
jack pine	Pinus banksiana	NSH	Medium	28.3	123.1	4.0	No change	Sm. inc.	High	Common	Good	Very Good			1	21
northern pin oak	Quercus ellipsoidalis	NSH	Medium	24.9	120.3	4.2	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	22
green ash	Fraxinus pennsylvanica	WSH	Low	16.4	53.6	2.8	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	23
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	43.3	48.2	0.6	Lg. inc.	Lg. inc.	High	Rare	Good	Good			1	24
boxelder	Acer negundo	WSH	Low	1.8	36.8	11.4	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	2	25
silver maple	Acer saccharinum	NSH	Low	3.7	34.9	5.8	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	1	26
American hornbeam; muscle	Carpinus caroliniana	WSL	Low	22.8	27.2	0.9	No change	Sm. inc.	Medium	Rare	Poor	Fair			1	27
bitternut hickory	Carya cordiformis	WSL	Low	8.6	22.8	2.0	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	1	28
Scots pine	Pinus sylvestris	NSH	FIA	1.8	19.9	2.7	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	29
bur oak	Quercus macrocarpa	NDH	Medium	8.8	18.0	1.9	Lg. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	2	30
chokecherry	Prunus virginiana	NSLX	FIA	16.9	15.3	0.8	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	31
butternut	Juglans cinerea	NSLX	FIA	3.8	9.3	1.7	Unknown	Unknown	Low	Rare	FIA Only	FIA Only			0	32
pin cherry	Prunus pensylvanica	NSL	Low	14.8	9.2	0.4	Very Lg. dec.	Very Lg. dec.	Medium	Rare	Lost	Lost			0	33
serviceberry	Amelanchier spp.	NSL	Low	25.7	9.2	0.3	Very Lg. dec.	Very Lg. dec.	Medium	Rare	Lost	Lost			0	34
Norway spruce	Picea abies	NSH	FIA	2.3	8.1	3.5	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	35
balsam poplar	Populus balsamifera	NSH	Medium	4.2	3.9	0.5	Very Lg. dec.	Very Lg. dec.	Medium	Rare	Lost	Lost			0	36
rock elm	Ulmus thomasii	NSLX	FIA	1.2	1.5	1.3	Unknown	Unknown	Low	Rare	FIA Only	FIA Only			0	37
slippery elm	Ulmus rubra	WSL	Low	1.3	0.9	0.2	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	38
mountain maple	Acer spicatum	NSL	Low	2.4	0.7	0.2	Sm. dec.	Lg. dec.	High	Rare	Poor	Poor			1	39
swamp white oak	Quercus bicolor	NSL	Low	1.2	0.7	0.6	Very Lg. dec.	Lg. inc.	Medium	Rare	Lost	Good			2	40
American mountain-ash	Sorbus americana	NSL	Low	1.2	0.6	0.5	Lg. dec.	Lg. dec.	Low	Rare	Very Poor	Very Poor			0	41
eastern redcedar	Juniperus virginiana	WDH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate ++	3	42
pignut hickory	Carya glabra	WDL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	43
shagbark hickory	Carya ovata	WSL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	44
mockernut hickory	Carya alba	WDL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			3	45
American beech	Fagus grandifolia	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	46
black walnut	Juglans nigra	WDH	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	47

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yellow-poplar	Liriodendron tulipifera	WDH	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			3	48
blackgum	Nyssa sylvatica	WDL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate +	3	49
sycamore	Platanus occidentalis	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	50
eastern cottonwood	Populus deltoides	NSH	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	51
white oak	Quercus alba	WDH	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Likely +	Likely +	3	52
scarlet oak	Quercus coccinea	WDL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	53
post oak	Quercus stellata	WDH	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			3	54
black oak	Quercus velutina	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate ++	Migrate ++	3	55
black locust	Robinia pseudoacacia	NDH	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	56