S46 E92

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	8,425.5	3,253.1	500

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	5
Pine	4
Other	24
	42

Abundance	
Abundant	7
Common	15
Rare	20
Absent	18
	60

	Model Reliability	Adaptability
High	15	15
Medium	20	33
Low	21	12
FIA	5	
	61	**60**

Potential Change in Habitat Suitability	Scenario RCP45	Scenario RCP85
Increase	22	21
No Change	2	6
Decrease	13	10
New	14	16
Unknown	10	8
	61	**61**

Capability to Cope or Persist	Scenario RCP45	Scenario RCP85
Very Good	9	8
Good	11	12
Fair	8	10
Poor	4	4
Very Poor	4	1
FIA Only	4	4
Unknown	5	3
	45	**42**

Migration Potential	SHIFT RCP45	SHIFT RCP85
Likely	1	1
Infill	4	6
Migrate	6	9
	11	**16**

Potential Changes in Climate Variables

Temperature (°F)

	Scenario	2009	2039	2069	2099
Annual Average	CCSM45	40.5	42.1	45.2	45.4
	CCSM85	40.5	43.0	46.2	49.9
	GFDL45	40.5	43.5	46.3	47.9
	GFDL85	40.5	43.9	47.5	52.8
	HAD45	40.5	43.6	47.3	49.3
	HAD85	40.5	44.2	48.5	54.3
Growing Season May—Sep	CCSM45	60.6	62.3	64.9	65.2
	CCSM85	60.6	63.3	66.2	70.4
	GFDL45	60.6	64.0	67.6	69.7
	GFDL85	60.6	64.8	68.7	74.7
	HAD45	60.6	63.8	66.8	69.0
	HAD85	60.6	63.8	68.1	74.0
Coldest Month Average	CCSM45	7.9	9.6	12.0	12.3
	CCSM85	7.9	9.5	11.9	14.4
	GFDL45	7.9	11.5	13.4	14.0
	GFDL85	7.9	12.3	14.1	17.4
	HAD45	7.9	9.8	14.1	13.9
	HAD85	7.9	13.5	16.6	20.5
Warmest Month Average	CCSM45	67.2	69.2	70.6	71.1
	CCSM85	67.2	70.4	72.4	75.0
	GFDL45	67.2	70.9	72.4	74.1
	GFDL85	67.2	71.7	73.8	77.2
	HAD45	67.2	70.8	72.3	74.0
	HAD85	67.2	71.2	73.3	77.4

Precipitation (in)

	Scenario	2009	2039	2069	2099
Annual Total	CCSM45	30.3	31.3	31.0	31.1
	CCSM85	30.3	29.8	30.5	30.4
	GFDL45	30.3	33.6	35.0	32.5
	GFDL85	30.3	33.3	36.4	35.4
	HAD45	30.3	32.1	30.6	32.0
	HAD85	30.3	31.9	32.2	33.6
Growing Season May—Sep	CCSM45	19.0	19.2	18.4	18.6
	CCSM85	19.0	18.4	17.8	16.9
	GFDL45	19.0	21.3	21.1	19.5
	GFDL85	19.0	21.0	22.0	19.8
	HAD45	19.0	19.1	17.2	17.7
	HAD85	19.0	18.8	16.9	16.6

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	98.2	3621.6	25.8	Lg. dec.	Lg. dec.	Medium	Abundant	Fair	Fair			0	1
red maple	Acer rubrum	WDH	High	94.5	1070.0	7.9	Sm. inc.	No change	High	Abundant	Very Good	Very Good			1	2
paper birch	Betula papyrifera	WDH	High	95.5	901.0	6.7	Sm. dec.	Sm. dec.	Medium	Abundant	Fair	Fair			0	3
black ash	Fraxinus nigra	WSH	Medium	77.8	858.7	7.9	Sm. dec.	Sm. dec.	Low	Abundant	Fair	Fair			0	4
black spruce	Picea mariana	NSH	High	57.8	702.7	8.5	Lg. dec.	Lg. dec.	Medium	Abundant	Fair	Fair			0	5
balsam fir	Abies balsamea	NDH	High	71	656.2	6.6	Lg. dec.	Sm. dec.	Low	Abundant	Poor	Fair			0	6
tamarack (native)	Larix laricina	NSH	High	52.9	564.9	7.5	Sm. inc.	Sm. inc.	Low	Abundant	Good	Good			1	7
red pine	Pinus resinosa	NSH	Medium	30	436.6	10.3	Sm. inc.	Sm. inc.	Low	Common	Fair	Fair			1	8
sugar maple	Acer saccharum	WDH	High	64.7	413.3	4.8	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	9
northern red oak	Quercus rubra	WDH	Medium	58.4	329.7	4.8	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	10
American basswood	Tilia americana	WSL	Medium	58.1	310.9	3.8	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	11
balsam poplar	Populus balsamifera	NSH	Medium	42.2	295.2	5.0	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	12
bigtooth aspen	Populus grandidentata	NSL	Medium	41.3	253.5	4.3	No change	No change	Medium	Common	Fair	Fair			1	13
bur oak	Quercus macrocarpa	NDH	Medium	32.5	233.7	4.6	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	14
white spruce	Picea glauca	NSL	Medium	44.4	228.9	3.2	Sm. dec.	No change	Medium	Common	Poor	Fair			1	15
jack pine	Pinus banksiana	NSH	Medium	11.2	160.5	9.0	No change	No change	High	Common	Good	Good			1	16
green ash	Fraxinus pennsylvanica	WSH	Low	47.9	137.6	1.8	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	17
eastern white pine	Pinus strobus	WDH	High	28.3	129.1	2.8	Lg. inc.	Lg. inc.	Low	Common	Good	Good			1	18
northern pin oak	Quercus ellipsoidalis	NSH	Medium	9.7	118.0	6.5	Sm. inc.	No change	High	Common	Very Good	Good	Infill ++	Infill ++	1	19
northern white-cedar	Thuja occidentalis	WSH	High	14.4	102.1	4.1	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good	Infill ++	Infill ++	1	20
American elm	Ulmus americana	WDH	Medium	39	93.7	1.5	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	21
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	45.6	52.6	0.9	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	22
yellow birch	Betula alleghaniensis	NDL	High	16.8	41.3	1.5	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			1	23
chokecherry	Prunus virginiana	NSLX	FIA	24.3	33.7	1.3	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	24
black cherry	Prunus serotina	WDL	Medium	20.6	19.7	0.7	Lg. inc.	Lg. inc.	Low	Rare	Fair	Fair			1	25
boxelder	Acer negundo	WSH	Low	5.6	18.7	2.5	Lg. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	1	26
serviceberry	Amelanchier spp.	NSL	Low	22.1	18.5	0.6	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	27
white ash	Fraxinus americana	WDL	Medium	3.3	14.5	1.5	Lg. inc.	Lg. inc.	Low	Rare	Fair	Fair	Infill +	Infill +	2	28
mountain maple	Acer spicatum	NSL	Low	13.7	11.5	0.5	Lg. dec.	Lg. dec.	High	Rare	Poor	Poor			1	29
Scots pine	Pinus sylvestris	NSH	FIA	1.2	10.9	9.2	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	30
black willow	Salix nigra	NSH	Low	6.5	8.9	1.2	Sm. dec.	Sm. inc.	Low	Rare	Very Poor	Poor		Infill +	2	31
white oak	Quercus alba	WDH	Medium	3.7	7.4	1.1	Lg. inc.	Lg. inc.	High	Rare	Good	Good			2	32
peachleaf willow	Salix amygdaloides	NSLX	FIA	2.4	6.5	2.7	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	33
American hornbeam; muscle	Carpinus caroliniana	WSL	Low	9.8	5.5	0.4	Sm. dec.	No change	Medium	Rare	Very Poor	Poor		Infill +	1	34
American mountain-ash	Sorbus americana	NSL	Low	1.2	4.3	1.3	Lg. dec.	Very Lg. dec.	Low	Rare	Very Poor	Lost			0	35
pin cherry	Prunus pensylvanica	NSL	Low	10.8	4.1	0.3	Very Lg. dec.	Very Lg. dec.	Medium	Rare	Lost	Lost			0	36
wild plum	Prunus americana	NSLX	FIA	2.4	2.1	0.9	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	37
butternut	Juglans cinerea	NSLX	FIA	1.5	2.0	0.4	Unknown	Unknown	Low	Rare	FIA Only	FIA Only			0	38
swamp white oak	Quercus bicolor	NSL	Low	1.2	1.7	1.5	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	39
silver maple	Acer saccharinum	NSH	Low	0.7	1.1	0.6	Lg. inc.	Lg. inc.	High	Rare	Good	Good			2	40
bitternut hickory	Carya cordiformis	WSL	Low	0.3	0.6	0.1	Lg. inc.	Lg. inc.	High	Rare	Good	Good			2	41
black walnut	Juglans nigra	WDH	Low	1.2	0.3	0.2	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	42
eastern redcedar	Juniperus virginiana	WDH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	43
eastern hemlock	Tsuga canadensis	NSH	High	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat	Migrate ++	Migrate ++	3	44
striped maple	Acer pensylvanicum	NSL	Medium	0	0	0	Unknown	Unknown	Medium	Modeled	Unknown	Unknown			0	45
Ohio buckeye	Aesculus glabra	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	46
shagbark hickory	Carya ovata	WSL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	47

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mockernut hickory	Carya alba	WDL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			0	48
sugarberry	Celtis laevigata	NDH	Medium	0	0	0	Unknown	New Habitat	Medium	Absent	Unknown	New Habitat			0	49
hackberry	Celtis occidentalis	WDH	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate +	3	50
American beech	Fagus grandifolia	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	51
sweetgum	Liquidambar styraciflua	WDH	High	0	0	0	Unknown	New Habitat	Medium	Absent	Unknown	New Habitat			0	52
bigleaf magnolia	Magnolia macrophylla	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	53
red mulberry	Morus rubra	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	54
sycamore	Platanus occidentalis	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	55
eastern cottonwood	Populus deltoides	NSH	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	56
pin oak	Quercus palustris	NSH	Low	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat			0	57
post oak	Quercus stellata	WDH	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			0	58
black oak	Quercus velutina	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Likely +	Likely +	3	59
black locust	Robinia pseudoacacia	NDH	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	60
slippery elm	Ulmus rubra	WSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate ++	Migrate ++	3	61