Lower Saint Croix

National Park
Climate Change Atlas Tree Species
Current and Potential Future Habitat, Capability, and Migration

USDA Forest Service
Northern Research Station
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Iverson, Peters, Prasad, Matthews

	sq. km	sq. mi	FIA Plots
Area of Region	8,400.0	3,243.3	234

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	4
Oak	5
Pine	4
Other	28
	45

Abundance	
Abundant	5
Common	22
Rare	18
Absent	14
	59

	Model Reliability	Adaptability
High	12	19
Medium	19	28
Low	22	9
FIA	6	
	59	**56**

Potential Change in Habitat Suitability	Scenario RCP45	Scenario RCP85
Increase	18	17
No Change	8	6
Decrease	13	16
New	14	13
Unknown	6	7
	59	**59**

Capability to Cope or Persist	Scenario RCP45	Scenario RCP85
Very Good	7	5
Good	13	13
Fair	5	9
Poor	9	7
Very Poor	4	4
FIA Only	3	3
Unknown	0	1
	41	**42**

Migration Potential	SHIFT RCP45	SHIFT RCP85
Likely	1	1
Infill	29	29
Migrate	2	4
	32	**34**

Potential Changes in Climate Variables

Temperature (°F)

	Scenario	2009	2039	2069	2099
Annual Average	CCSM45	44.2	46.0	49.1	49.4
	CCSM85	44.2	47.0	50.2	53.7
	GFDL45	44.2	47.9	49.8	51.2
	GFDL85	44.2	47.5	50.9	55.9
	HAD45	44.2	47.3	51.1	53.0
	HAD85	44.2	47.9	52.3	57.8
Growing Season May—Sep	CCSM45	64.8	66.7	69.4	69.8
	CCSM85	64.8	67.7	70.7	74.9
	GFDL45	64.8	69.0	71.3	73.4
	GFDL85	64.8	68.8	72.6	78.3
	HAD45	64.8	67.9	71.0	73.2
	HAD85	64.8	68.1	72.7	78.2
Coldest Month Average	CCSM45	11.2	12.9	15.3	15.8
	CCSM85	11.2	13.3	15.5	18.0
	GFDL45	11.2	14.9	16.5	16.9
	GFDL85	11.2	15.1	16.9	20.0
	HAD45	11.2	12.7	17.1	17.0
	HAD85	11.2	16.6	20.1	23.6
Warmest Month Average	CCSM45	71.2	73.5	75.1	75.6
	CCSM85	71.2	74.8	76.8	79.4
	GFDL45	71.2	74.5	76.1	77.6
	GFDL85	71.2	75.5	77.4	81.0
	HAD45	71.2	74.6	76.3	77.9
	HAD85	71.2	75.7	78.0	81.8

Precipitation (in)

	Scenario	2009	2039	2069	2099
Annual Total	CCSM45	31.5	32.5	32.1	31.7
	CCSM85	31.5	30.9	30.7	31.4
	GFDL45	31.5	34.8	36.6	33.6
	GFDL85	31.5	34.8	37.7	36.0
	HAD45	31.5	33.7	33.1	33.6
	HAD85	31.5	33.0	33.9	35.8
Growing Season May—Sep	CCSM45	19.9	20.0	19.1	19.0
	CCSM85	19.9	19.0	17.8	17.4
	GFDL45	19.9	21.8	22.3	19.7
	GFDL85	19.9	21.9	22.2	19.9
	HAD45	19.9	20.1	18.7	18.9
	HAD85	19.9	19.4	17.8	18.0

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	70.2	790.8	14.7	No change	Sm. dec.	Medium	Abundant	Good	Fair	Infill ++	Infill +	1	1
northern pin oak	Quercus ellipsoidalis	NSH	Medium	58.3	683.5	13.5	Sm. dec.	Lg. dec.	High	Abundant	Good	Good	Infill ++	Infill ++	1	2
red maple	Acer rubrum	WDH	High	56	609.8	10.9	Sm. dec.	Sm. dec.	High	Abundant	Good	Good	Infill ++	Infill ++	1	3
northern red oak	Quercus rubra	WDH	Medium	54.8	520.9	10.4	Sm. dec.	Sm. dec.	High	Abundant	Good	Good	Infill ++	Infill ++	1	4
paper birch	Betula papyrifera	WDH	High	59.5	512.9	9.8	Sm. dec.	Lg. dec.	Medium	Abundant	Fair	Fair	Infill +	Infill +	0	5
red pine	Pinus resinosa	NSH	Medium	28.6	467.6	22.9	No change	Sm. dec.	Low	Common	Poor	Poor	Infill +	Infill +	0	6
bur oak	Quercus macrocarpa	NDH	Medium	57.1	438.1	8.9	Sm. inc.	No change	High	Common	Very Good	Good	Infill ++	Infill ++	1	7
American elm	Ulmus americana	WDH	Medium	64.3	328.3	6.4	Sm. inc.	Sm. inc.	Medium	Common	Good	Good	Infill ++	Infill ++	1	8
boxelder	Acer negundo	WSH	Low	44	310.0	10.0	Sm. inc.	No change	High	Common	Very Good	Good	Infill ++	Infill ++	1	9
white oak	Quercus alba	WDH	Medium	44	292.3	7.4	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good	Infill ++	Infill ++	1	10
American basswood	Tilia americana	WSL	Medium	39.3	264.5	7.4	Sm. inc.	No change	Medium	Common	Good	Fair	Infill ++	Infill +	1	11
green ash	Fraxinus pennsylvanica	WSH	Low	58.3	258.5	6.7	Sm. inc.	Sm. inc.	Medium	Common	Good	Good	Infill ++	Infill ++	1	12
sugar maple	Acer saccharum	WDH	High	27.4	229.6	8.4	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good	Infill ++	Infill ++	1	13
black ash	Fraxinus nigra	WSH	Medium	36.9	228.4	7.3	No change	No change	Low	Common	Poor	Poor	Infill +	Infill +	0	14
eastern white pine	Pinus strobus	WDH	High	31	221.2	8.3	No change	Sm. dec.	Low	Common	Poor	Poor	Infill +	Infill +	0	15
black cherry	Prunus serotina	WDL	Medium	58.3	207.1	4.5	Lg. inc.	Sm. inc.	Low	Common	Good	Fair	Infill ++	Infill +	1	16
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	38.1	195.6	5.8	Sm. dec.	Sm. dec.	High	Common	Fair	Fair	Infill +	Infill +	1	17
jack pine	Pinus banksiana	NSH	Medium	8.3	155.6	18.7	Sm. dec.	Sm. dec.	High	Common	Fair	Fair		Infill +	2	18
bigtooth aspen	Populus grandidentata	NSL	Medium	20.2	132.5	6.6	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor	Infill +	Infill +	0	19
tamarack (native)	Larix laricina	NSH	High	8.3	113.7	13.6	No change	No change	Low	Common	Poor	Poor	Infill +	Infill +	0	20
silver maple	Acer saccharinum	NSH	Low	16.7	109.9	14.4	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good	Infill ++	Infill ++	2	21
white spruce	Picea glauca	NSL	Medium	10.7	93.5	15.8	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor	Infill +	Infill +	0	22
eastern redcedar	Juniperus virginiana	WDH	Medium	19	89.8	8.5	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good	Infill ++	Infill ++	2	23
white ash	Fraxinus americana	WDL	Medium	27.4	68.4	3.0	Lg. inc.	Lg. inc.	Low	Common	Good	Good	Infill ++	Infill ++	1	24
Siberian elm	Ulmus pumila	NDH	FIA	6	68.4	29.8	Unknown	Unknown	NA	Common	NNIS	NNIS			0	25
balsam fir	Abies balsamea	NDH	High	2.4	61.4	25.8	No change	No change	Low	Common	Poor	Poor	Infill +	Infill +	2	26
eastern cottonwood	Populus deltoides	NSH	Low	16.7	59.2	7.4	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good	Infill ++	Infill ++	2	27
slippery elm	Ulmus rubra	WSL	Low	28.6	46.3	2.6	No change	Sm. inc.	Medium	Rare	Poor	Fair	Infill +	Infill +	1	28
black walnut	Juglans nigra	WDH	Low	6	39.7	16.8	Sm. inc.	Sm. inc.	Medium	Rare	Fair	Fair	Infill +	Infill +	2	29
butternut	Juglans cinerea	NSLX	FIA	16.7	36.3	2.8	Unknown	Unknown	Low	Rare	FIA Only	FIA Only			0	30
bitternut hickory	Carya cordiformis	WSL	Low	23.8	34.2	2.0	Sm. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	2	31
Scots pine	Pinus sylvestris	NSH	FIA	8.3	33.7	9.6	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	32
black locust	Robinia pseudoacacia	NDH	Low	6	28.3	14.2	Sm. inc.	Lg. inc.	Medium	Rare	Fair	Good	Infill +		2	33
black oak	Quercus velutina	WDH	High	1.2	22.1	18.6	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	34
serviceberry	Amelanchier spp.	NSL	Low	4.8	19.4	4.1	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	35
yellow birch	Betula alleghaniensis	NDL	High	8.3	16.0	1.9	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			2	36
hackberry	Celtis occidentalis	WDH	Medium	15.5	10.7	1.6	Lg. inc.	Lg. inc.	High	Rare	Good	Good			2	37
Norway spruce	Picea abies	NSH	FIA	1.2	9.2	7.8	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	38
chokecherry	Prunus virginiana	NSLX	FIA	16.7	6.6	0.9	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	39
American hornbeam; muscle	Carpinus caroliniana	WSL	Low	7.1	6.0	0.8	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	40
northern white-cedar	Thuja occidentalis	WSH	High	2.4	5.0	2.1	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	41
pin cherry	Prunus pensylvanica	NSL	Low	1.2	4.9	4.1	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	42
peachleaf willow	Salix amygdaloides	NSLX	FIA	4.8	1.3	4.2	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	43
river birch	Betula nigra	NSL	Low	1.2	1.1	0.9	Very Lg. dec.	Very Lg. dec.	Medium	Rare	Lost	Lost			0	44
red mulberry	Morus rubra	NSL	Low	4.8	0.4	1.4	No change	Sm. inc.	Medium	Rare	Poor	Fair			0	45
mountain maple	Acer spicatum	NSL	Low	0	0	0	New Habitat	Unknown	High	Absent	New Habitat	Unknown			3	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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black hickory	Carya texana	NDL	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	48
mockernut hickory	Carya alba	WDL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			3	49
eastern redbud	Cercis canadensis	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	50
honeylocust	Gleditsia triacanthos	NSH	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			3	51
Osage-orange	Maclura pomifera	NDH	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate +	3	52
sycamore	Platanus occidentalis	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	53
swamp white oak	Quercus bicolor	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	54
blackjack oak	Quercus marilandica	NSL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			0	55
Shumard oak	Quercus shumardii	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			0	56
post oak	Quercus stellata	WDH	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			0	57
black willow	Salix nigra	NSH	Low	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat	Likely +	Likely +	3	58
sassafras	Sassafras albidum	WSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	59