HUC 041501 Northeastern Lake Ontario

HUC 6 Watershed

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	5,758.5	2,223.4	177

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	4
Pine	4
Other	29
	46

Abundance	
Abundant	9
Common	10
Rare	27
Absent	33
	79

	Model Reliability	Adaptability
High	23	24
Medium	26	37
Low	27	16
FIA	3	
	79	**77**

Potential Change in Habitat Suitability	Scenario RCP45	Scenario RCP85
Increase	14	19
No Change	14	9
Decrease	15	15
New	28	31
Unknown	8	5
	79	**79**

Capability to Cope or Persist	Scenario RCP45	Scenario RCP85
Very Good	3	1
Good	10	13
Fair	11	15
Poor	10	5
Very Poor	8	7
FIA Only	1	1
Unknown	5	2
	48	**44**

Migration Potential	SHIFT RCP45	SHIFT RCP85
Likely	2	2
Infill	13	14
Migrate	11	18
	26	**34**

Potential Changes in Climate Variables

Temperature (°F)

	Scenario	2009	2039	2069	2099
Annual Average	CCSM45	38.6	39.8	41.4	41.4
	CCSM85	38.6	40.1	41.9	43.9
	GFDL45	38.6	40.5	42.8	43.7
	GFDL85	38.6	40.9	43.7	46.9
	HAD45	38.6	40.6	42.7	43.9
	HAD85	38.6	40.7	43.3	47.0
Growing Season May—Sep	CCSM45	49.9	51.2	52.4	52.7
	CCSM85	49.9	51.4	53.0	55.5
	GFDL45	49.9	52.0	54.7	55.7
	GFDL85	49.9	52.7	55.6	59.1
	HAD45	49.9	52.0	53.7	55.3
	HAD85	49.9	51.8	54.6	58.6
Coldest Month Average	CCSM45	20.4	21.6	23.1	23.2
	CCSM85	20.4	22.4	23.3	24.8
	GFDL45	20.4	22.5	24.0	24.7
	GFDL85	20.4	23.2	24.5	26.4
	HAD45	20.4	21.9	24.1	24.2
	HAD85	20.4	22.8	24.5	26.9
Warmest Month Average	CCSM45	53.6	55.0	55.9	55.9
	CCSM85	53.6	55.4	56.5	57.9
	GFDL45	53.6	55.7	57.1	57.9
	GFDL85	53.6	56.4	58.2	60.0
	HAD45	53.6	55.9	56.8	57.9
	HAD85	53.6	55.9	57.7	60.6

Precipitation (in)

	Scenario	2009	2039	2069	2099
Annual Total	CCSM45	30.1	29.5	28.8	31.4
	CCSM85	30.1	30.7	30.7	31.1
	GFDL45	30.1	32.9	34.0	33.3
	GFDL85	30.1	31.3	33.2	34.4
	HAD45	30.1	31.5	32.6	32.4
	HAD85	30.1	32.4	31.6	34.5
Growing Season May—Sep	CCSM45	13.1	12.9	11.9	13.2
	CCSM85	13.1	13.1	12.8	11.9
	GFDL45	13.1	13.8	13.1	12.9
	GFDL85	13.1	13.1	12.9	12.1
	HAD45	13.1	13.4	12.6	13.2
	HAD85	13.1	13.3	12.2	13.0

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
red maple	Acer rubrum	WDH	High	79.7	2320.2	16.3	No change	Sm. dec.	High	Abundant	Very Good	Good			1	1
sugar maple	Acer saccharum	WDH	High	74.6	1609.2	10.7	No change	Sm. dec.	High	Abundant	Very Good	Good			1	2
American beech	Fagus grandifolia	WDH	High	65.7	1494.0	11.6	Sm. dec.	Sm. dec.	Medium	Abundant	Fair	Fair			0	3
yellow birch	Betula alleghaniensis	NDL	High	64.3	1144.2	9.4	Sm. dec.	Lg. dec.	Medium	Abundant	Fair	Fair			0	4
red spruce	Picea rubens	NDH	High	61.8	1042.9	9.2	Lg. dec.	Lg. dec.	Low	Abundant	Poor	Poor			0	5
black cherry	Prunus serotina	WDL	Medium	58.9	728.5	5.8	Sm. inc.	No change	Low	Abundant	Good	Fair			1	6
American elm	Ulmus americana	WDH	Medium	27.8	689.2	11.4	Sm. dec.	Sm. dec.	Medium	Abundant	Fair	Fair			0	7
balsam fir	Abies balsamea	NDH	High	55.1	687.5	6.2	Lg. dec.	Lg. dec.	Low	Abundant	Poor	Poor			0	8
eastern white pine	Pinus strobus	WDH	High	33.6	622.1	10.4	Sm. inc.	Sm. inc.	Low	Abundant	Good	Good			1	9
eastern hemlock	Tsuga canadensis	NSH	High	45.4	473.3	6.0	Sm. inc.	Sm. inc.	Low	Common	Fair	Fair			1	10
green ash	Fraxinus pennsylvanica	WSH	Low	9.9	252.6	9.7	No change	No change	Medium	Common	Fair	Fair			1	11
white ash	Fraxinus americana	WDL	Medium	22.5	219.0	4.2	Lg. inc.	Lg. inc.	Low	Common	Good	Good			1	12
tamarack (native)	Larix laricina	NSH	High	13	169.4	6.0	Lg. dec.	Lg. dec.	Low	Common	Very Poor	Very Poor			0	13
eastern redcedar	Juniperus virginiana	WDH	Medium	3.1	157.7	8.5	No change	Sm. inc.	Medium	Rare	Poor	Fair	Infill +	Infill +	2	14
quaking aspen	Populus tremuloides	WDH	High	17.3	128.5	5.0	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	15
striped maple	Acer pensylvanicum	NSL	Medium	35.3	95.0	1.2	Sm. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	16
Scots pine	Pinus sylvestris	NSH	FIA	5.8	92.1	5.8	Unknown	Unknown	NA	Common	NNIS	NNIS			0	17
black locust	Robinia pseudoacacia	NDH	Low	0.2	86.8	5.4	No change	Sm. inc.	Medium	Rare	Poor	Fair	Infill +	Infill +	2	18
northern white-cedar	Thuja occidentalis	WSH	High	4.4	85.7	8.6	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			2	19
American basswood	Tilia americana	WSL	Medium	8.1	66.9	3.1	No change	Sm. inc.	Medium	Common	Fair	Good			1	20
red pine	Pinus resinosa	NSH	Medium	6.2	65.6	7.2	No change	Sm. inc.	Low	Common	Poor	Fair	Infill +	Infill +	1	21
bitternut hickory	Carya cordiformis	WSL	Low	4.9	65.0	4.2	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	1	22
silver maple	Acer saccharinum	NSH	Low	2.7	64.3	6.5	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	1	23
white spruce	Picea glauca	NSL	Medium	6.2	50.1	3.2	Lg. dec.	Very Lg. dec.	Medium	Common	Poor	Lost			0	24
paper birch	Betula papyrifera	WDH	High	11.3	48.8	1.2	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	1	25
gray birch	Betula populifolia	NSL	Low	11.9	47.6	3.0	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	26
swamp white oak	Quercus bicolor	NSL	Low	1.4	47.0	9.6	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	27
black willow	Salix nigra	NSH	Low	4	45.9	7.8	Sm. dec.	No change	Low	Rare	Very Poor	Very Poor			0	28
northern red oak	Quercus rubra	WDH	Medium	6.4	41.7	3.7	Lg. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	1	29
serviceberry	Amelanchier spp.	NSL	Low	15.7	37.8	1.2	Sm. inc.	Sm. inc.	Medium	Rare	Fair	Fair			1	30
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	10.2	35.1	1.8	Lg. inc.	Lg. inc.	High	Rare	Good	Good			1	31
black ash	Fraxinus nigra	WSH	Medium	8.9	33.5	1.3	No change	No change	Low	Rare	Very Poor	Very Poor			0	32
shagbark hickory	Carya ovata	WSL	Medium	1.3	25.8	10.8	Sm. inc.	Sm. inc.	Medium	Rare	Fair	Fair	Infill +	Infill +	2	33
bigtooth aspen	Populus grandidentata	NSL	Medium	4.3	24.0	1.9	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	1	34
eastern cottonwood	Populus deltoides	NSH	Low	1.7	20.3	11.7	No change	Sm. inc.	Medium	Rare	Poor	Fair	Infill +	Infill +	2	35
Norway spruce	Picea abies	NSH	FIA	2.2	15.8	2.3	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	36
pin cherry	Prunus pensylvanica	NSL	Low	2.7	11.2	0.6	Sm. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	37
butternut	Juglans cinerea	NSLX	FIA	1	10.7	3.4	Unknown	Unknown	Low	Rare	FIA Only	FIA Only			0	38
black spruce	Picea mariana	NSH	High	1.3	9.2	3.9	Lg. dec.	Very Lg. dec.	Medium	Rare	Very Poor	Lost			2	39
bur oak	Quercus macrocarpa	NDH	Medium	1.5	8.1	0.8	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	2	40
hackberry	Celtis occidentalis	WDH	Medium	1.7	4.7	2.7	Sm. inc.	Lg. inc.	High	Rare	Good	Good			2	41
American mountain-ash	Sorbus americana	NSL	Low	3.2	4.0	0.5	Lg. dec.	Lg. dec.	Low	Rare	Very Poor	Very Poor			0	42
white oak	Quercus alba	WDH	Medium	0.8	3.6	0.9	Lg. inc.	Lg. inc.	High	Rare	Good	Good			2	43
American hornbeam; muscle	Carpinus caroliniana	WSL	Low	0.8	3.1	0.3	No change	Lg. inc.	Medium	Rare	Poor	Good	Infill +	Infill ++	2	44
pitch pine	Pinus rigida	NSH	High	1.7	3.0	1.7	Very Lg. dec.	No change	Medium	Rare	Lost	Poor		Infill +	2	45
slippery elm	Ulmus rubra	WSL	Low	0.8	2.2	0.6	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	46
jack pine	Pinus banksiana	NSH	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +		3	47

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Virginia pine	Pinus virginiana	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	48
boxelder	Acer negundo	WSH	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Likely +	Likely +	3	49
mountain maple	Acer spicatum	NSL	Low	0	0	0	Unknown	Unknown	High	Absent	Unknown	Unknown			0	50
sweet birch	Betula lenta	NDH	High	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	51
pignut hickory	Carya glabra	WDL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate ++	Migrate ++	3	52
pecan	Carya illinoinensis	NSH	Low	0	0	0	Unknown	New Habitat	Low	Absent	Unknown	New Habitat			0	53
black hickory	Carya texana	NDL	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	54
mockernut hickory	Carya alba	WDL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	55
sugarberry	Celtis laevigata	NDH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	56
eastern redbud	Cercis canadensis	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	57
flowering dogwood	Cornus florida	WDL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	58
common persimmon	Diospyros virginiana	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate +	3	59
honeylocust	Gleditsia triacanthos	NSH	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			3	60
black walnut	Juglans nigra	WDH	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	61
sweetgum	Liquidambar styraciflua	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate ++	3	62
yellow-poplar	Liriodendron tulipifera	WDH	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	63
mountain or Fraser magnolia	Magnolia fraseri	NSL	Low	0	0	0	Unknown	New Habitat	Low	Absent	Unknown	New Habitat			0	64
blackgum	Nyssa sylvatica	WDL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	65
sourwood	Oxydendrum arboreum	NDL	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			3	66
redbay	Persea borbonia	NSL	Low	0	0	0	Unknown	Unknown	High	Absent	Unknown	Unknown			0	67
sycamore	Platanus occidentalis	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Likely +	Likely +	3	68
scarlet oak	Quercus coccinea	WDL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	69
northern pin oak	Quercus ellipsoidalis	NSH	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			3	70
southern red oak	Quercus falcata	WDL	Medium	0	0	0	Unknown	New Habitat	High	Absent	Unknown	New Habitat		Migrate +	3	71
shingle oak	Quercus imbricaria	NDH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	72
chinkapin oak	Quercus muehlenbergii	NSL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	73
pin oak	Quercus palustris	NSH	Low	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	74
chestnut oak	Quercus prinus	NDH	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	75
Shumard oak	Quercus shumardii	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			0	76
post oak	Quercus stellata	WDH	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			3	77
black oak	Quercus velutina	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate ++	Migrate ++	3	78
sassafras	Sassafras albidum	WSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	79