Climate Change in Muskoka: what it means for our environment and our lives

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Mary Lake Association AGM

Welcome to the Anthropocene

The most recent geological epoch; one in which the major changes occurring on the planet are caused by activities of one species... Us. This has never happened before.

Over the last 15 years...

- I've been talking about climate change
- Understanding and acceptance has grown
- But people still do not appreciate the magnitude or the speed of what is happening
- And they don't appreciate it is affecting them

Climate change is already under way in Muskoka ...



Three more weeks of open water on Muskoka lakes since 1975

Climate change is already under way in Muskoka ...



 Hundred year floods seem to be getting more frequent

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Muskoka Watershed Council... Local impacts of climate change

Mid 2014 - MWC subcommittee decided to look at local climate change. Report produced early 2016 www.muskokawatershed.org

We asked three questions:



 What will our climate be like at midcentury?

2. What will be the impacts of that climate?

3. Are there actions we need to take?

Muskoka's mid-century climate methods:

Important to Remember that...

- 1. Climate, not weather
- 2. Used best available climate model projections
- 3. Climate will not stop changing in 2050
- 4. Analysis of average climatic conditions, not extremes of weather

Muskoka's mid-century climate what we found:

Change in Temperature between Now and Mid-Century



Month of the Year

Muskoka's mid-century climate what we found:

Number of days with:	Now	Mid-century
High temperature > 30°C	3.6	27.2
Low temperature < -20°C	28	12.8
Winter days > 0°C	35.8	55.8
Winter nights >0°C	4.2	18.8

More summer heatwaves; more winter freeze/thaw cycles

Muskoka's mid-century climate

Change in Precipitation between Now and Mid-Century



Month of the Year

Wetter in all months except July-October; warmer summer = more evaporation, so dryer summer/fall

Muskoka's mid-century climate

- A very important interaction between -warmer temperature -shifted pattern of precipitation -process of evaporation
- Much more evaporation, mainly in summer + a little more water mainly in winter = far more seasonal flow through our rivers and lakes

Muskoka's mid-century climate

Change in Precipitation between Now and Mid-Century



Month of the Year

Impacts on our lakes & rivers

- Longer ice-free season, earlier spring thaw, longer biologically active period
- Less water flow during late summer, fall
- Greater risk of spring floods, except when there are frequent winter thaws
- More precise projections require detailed monitoring records. Few lakes have thiswe used Harp Lake

Impacts on our lakes & rivers modeling of Harp Lake revealed



No change in outflow because evapotranspiration \uparrow Winter precipitation \uparrow , summer evaporation \uparrow = very strongly seasonal outflow 3X more water flowing in 4 winter months Half as much water flowing rest of the year

Impacts on our lakes & rivers



Lake waters will be warmer in the longer, warmer summers More depletion of nutrients by late summer Greater risk of algal blooms Some risk of loss of fauna due to warmer water - Daphnia, Lake trout Impacts will vary among lakes

Our watershed is mostly forests



Forests are vital to our economy & quality of life Trees more valuable for leaves than for timber How will climate change affect them? Warmer, longer growing season But dryer as well

Our watershed is mostly forests



Impacts of new pests and pathogens Increased fire risk Trees migrating north to follow climate Overall, our forests are going to change in a number of ways over the next few decades



They may deteriorate; they will certainly become different

Forest management will have to adapt to these changes

May have to become more proactive in changing world

What does this all mean for us? Nature will continue to change.....



Winter recreation? New risks to human health? Drought and forest fire? Winter road maintenance? Stormwater management? Electrical & data grid resilience? Environment has less capacity for human activities?

Impacts on our infrastructure and our lives

We <u>must</u> adapt our built infrastructure to the new climatic conditions

We <u>should</u> modify our lifestyles to reduce our carbon footprints

Greater Seasonality in Flow

Current "management" of water levels insufficient Either we tolerate substantial fluctuations, or we develop enhanced infrastructure to manage flow Would require significant investment in hydrological research and new flow control structures (municipal, provincial, academic collaboration)

Our Stressed Environment is Less Resilient

Current impacts of development may become too great to be sustained without degradation of environment. (Refers both to water bodies, and to land and forests) Will need to monitor, and be ready to reduce our impacts. (Grandfathering is not an option in such cases.)

High-value Natural Environment of Muskoka can be Retained

More attention to environmental needs Less salt on our roads Greater protection for wetlands, shallow waters and shorelines More stringent septic tank, sewage rules Less tolerance of non-compliance Rethink property rights vs responsibilities Photo © LK Sonnenberg

Thank you

Questions?

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