

# Climate Change

## Local Implications Hike

Post Trip - Values Assessment: Answer the following questions again. Reflect on what you have learned. Are your thoughts regarding climate change different? If so, how?

1. What proportion of climate scientists agree that 'human induced' climate change is real? (circle answer)
    1. Less than 10%
    2. 10-30
    3. 30-70
    4. 70-90
    5. Greater than 90%
  2. Do you believe that 'human induced' climate change is real? (Yes / No)
  3. Will climate change impact: (circle all that are true).
    1. North America
    2. Canada
    3. Waterloo
    4. Your family
    5. You
  4. Do you believe that you have (or are) doing anything that contributes to climate change? (Yes / No )
  5. How will your life be different if the planet warms by 2 degrees?
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6. Do you believe we can fix climate change? (Yes / No)

# Climate Change

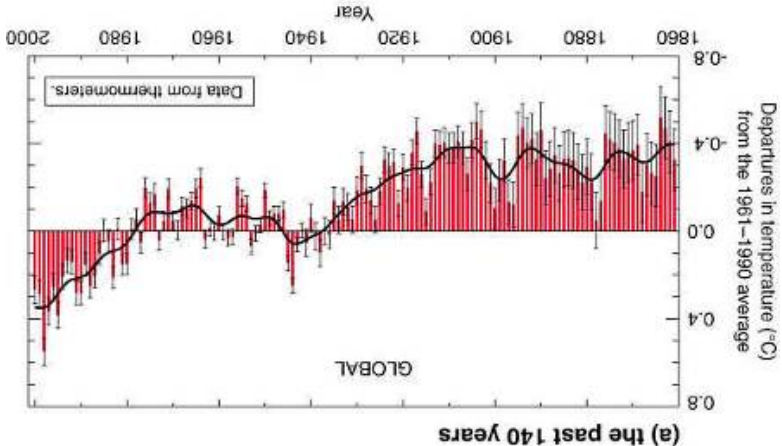
## Local Implications Hike

Pre Trip - Values Assessment: Answer the following questions honestly, you will be asked the following questions again at the end to evaluate how this trip has influenced your perception of climate change.

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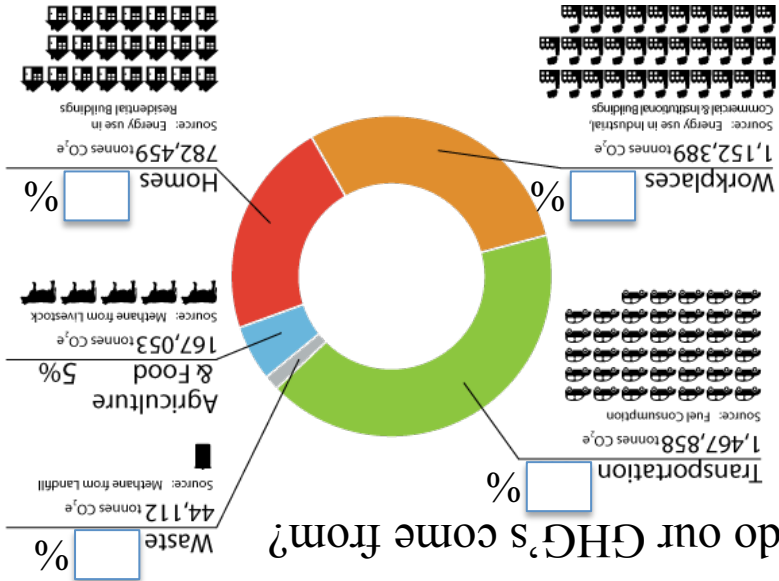
2 In Class - Overview:

How much has the planet warmed in the last 160 years?  
How much will it have warmed by 2050?  
What is happening to the rate of change?



Anthropogenic	Climate Forcing	Sources

Where do our GHG's come from?



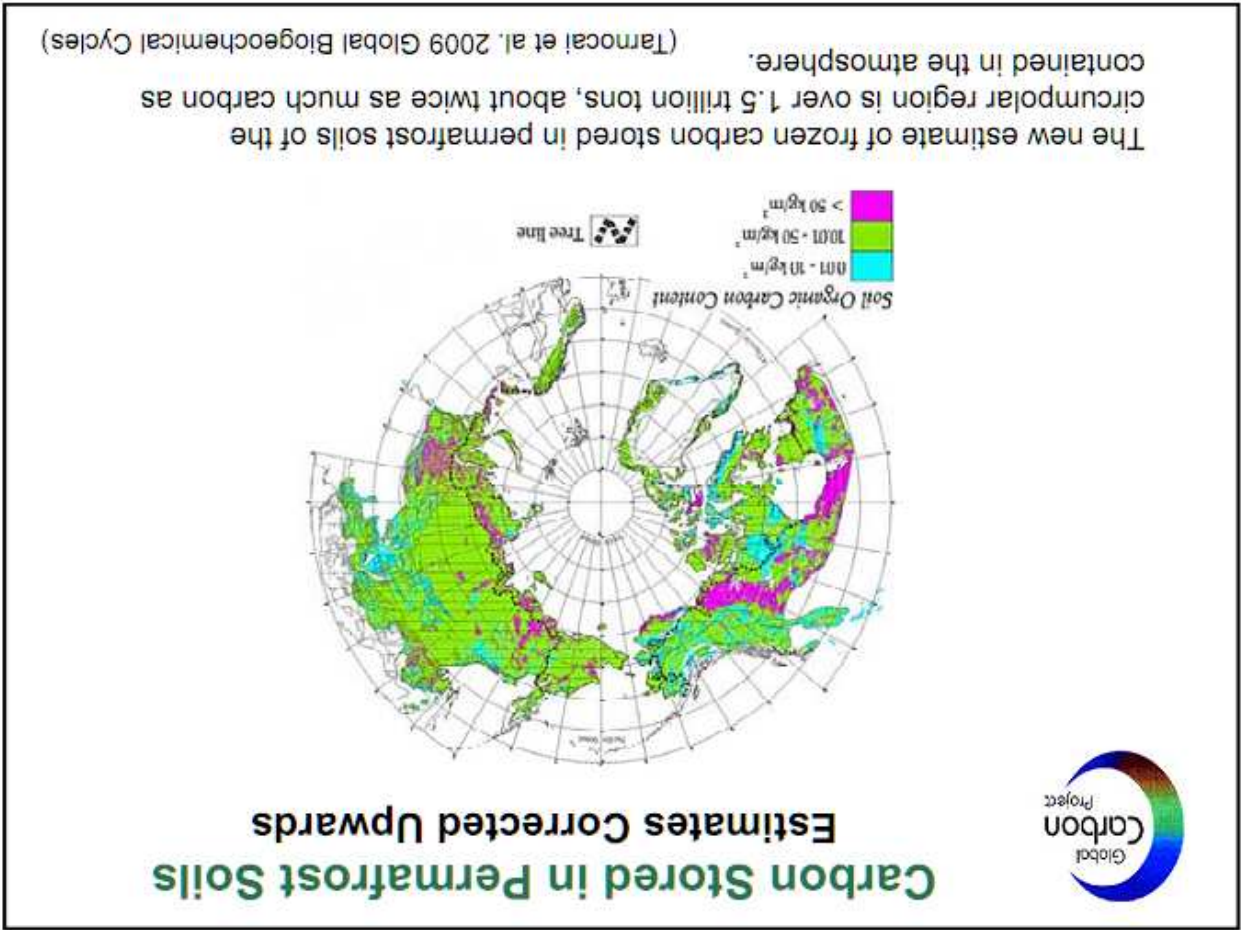
What is our average Carbon Foot print?

What is the Regions Goal?

Climate Change: Waterloo Region

What green house gas will be released as the permafrost melts?

What is a positive feedback loop?



Carbon Stored in Permafrost Soils Estimates Corrected Upwards



The new estimate of frozen carbon stored in permafrost soils of the circumpolar region is over 1.5 trillion tons, about twice as much carbon as contained in the atmosphere.

(Tarnocai et al. 2009 Global Biogeochemical Cycles)

6 Disease: Lyme disease

What is Lyme Disease?

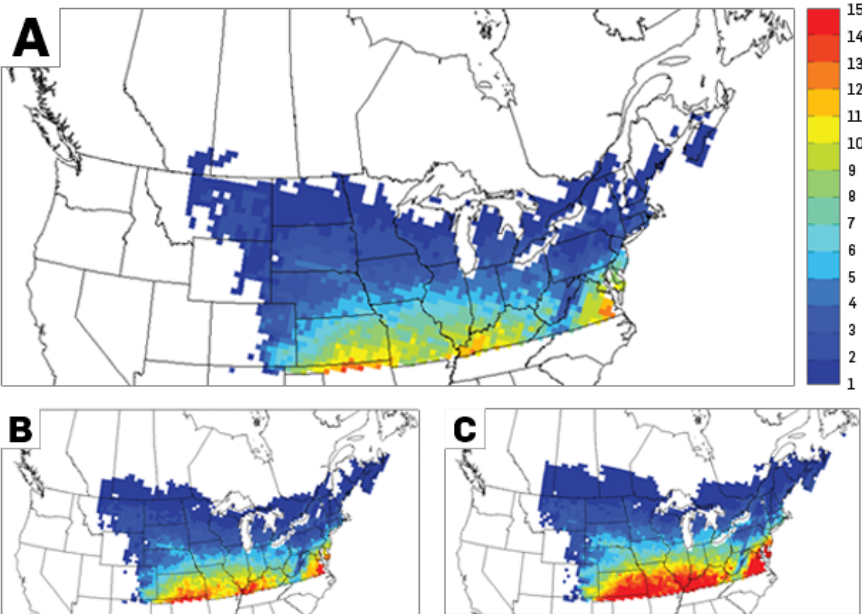
How do you get Lyme Disease?

What are the symptoms?



Female Blacklegged Ticks  
[www.cps.ca](http://www.cps.ca) 2012

**BASIC REPRODUCTIVE VALUE OF TICKS IN NORTH AMERICA**



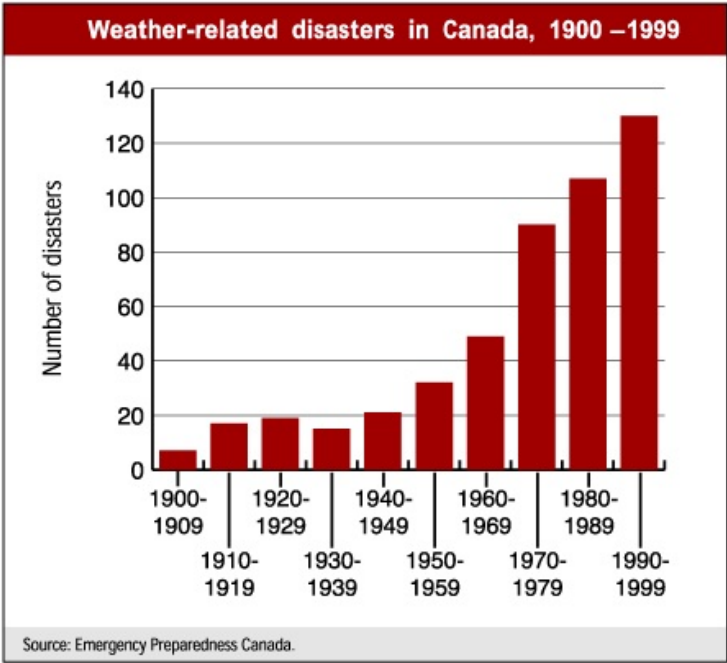
Maps of basic reproductive values of the blacklegged tick from **A** 1971-2000 **B** 2011-2040 **C** 2041-2070. A ratio of "1" means each tick averages one offspring, and indicates a sustained population. Source: Estimated Effects of Projected Climate Change on the Basic Reproductive Number of the Lyme Disease Vector *Ixodes scapularis*, published in *Environmental Health Perspectives*, June 2014.

The Weather:

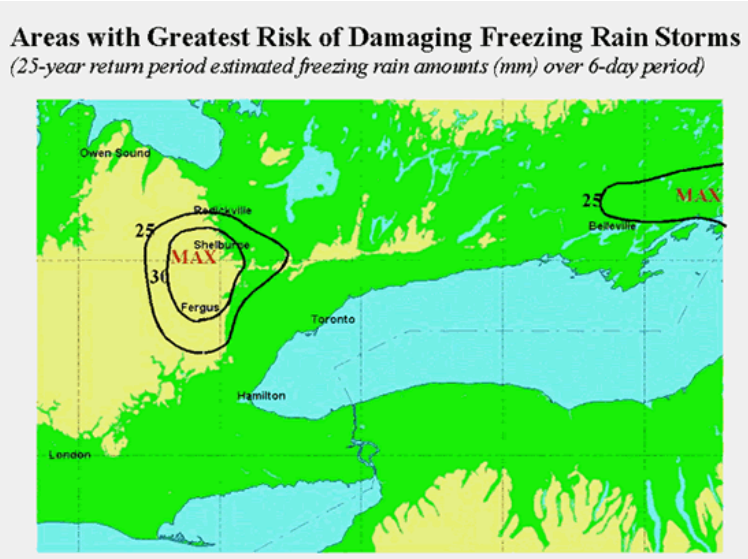
The weather in Waterloo is changing.

How many days a year will we have temperatures above 30 degrees Celsius in 2050?

By 2080?



Precipitation will increase by as much as 12% by 2050, but it likely won't be snow, what will we have instead?

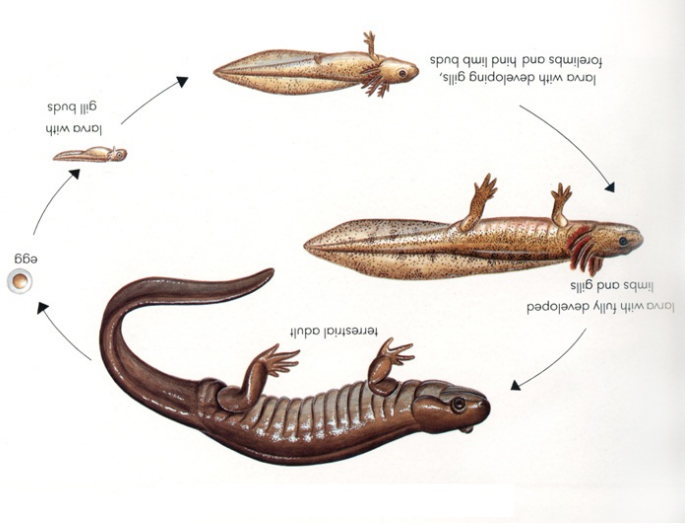
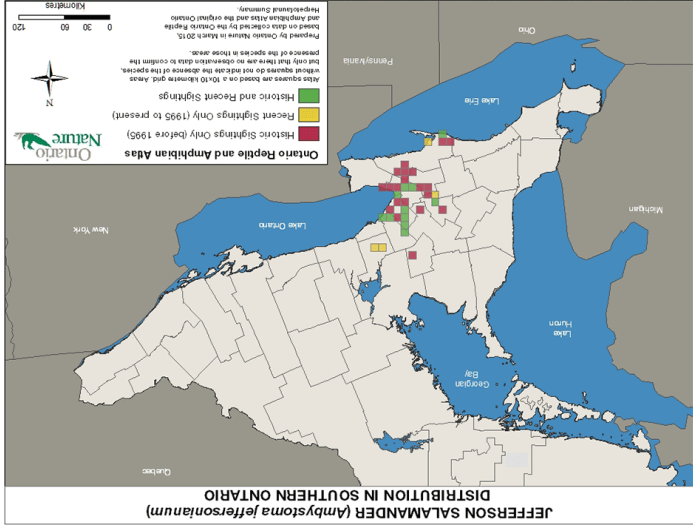




Habitats and changing precipitation patterns

What is a vernal pool?

How will climate change impact these ponds?



What will happen to wildlife that depend on vernal pools to reproduce?

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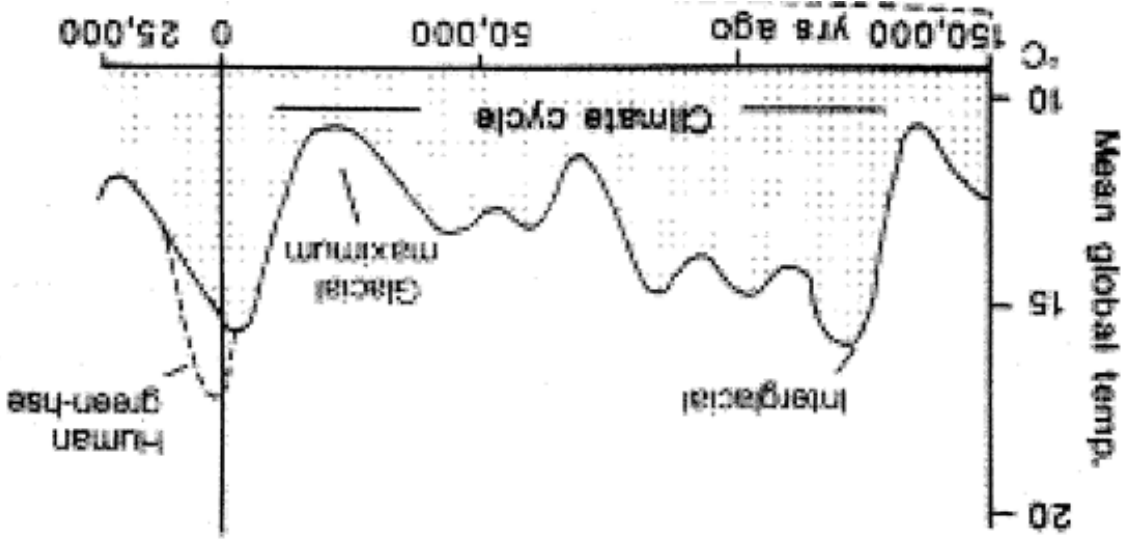
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Moraines and past climatic changes

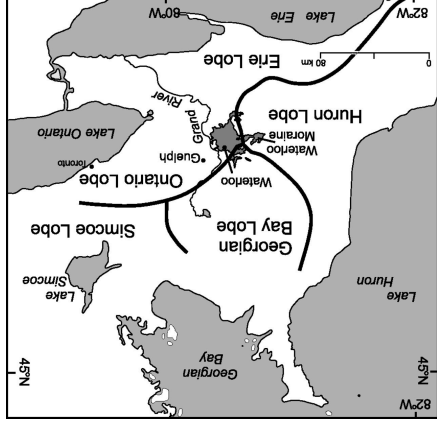
What is a moraine?



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Global warming	
Retreat of glaciers after last ice-age	
How long (in years) to increase the average temperature of the Earth 5 degrees celcius?	