THE GROUND IS SINKING

Effects of Permafrost Changes in the Arctic

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Image Source [2]

WHAT IS PERMAFROST?

Permafrost is the ground, such as soil and rock, that "remains at or below 0°C for at least 2 years."[1]. Ground that contains moisture which freezes is referred to as ice-rich permafrost, however not all permafrost contains moisture [1].

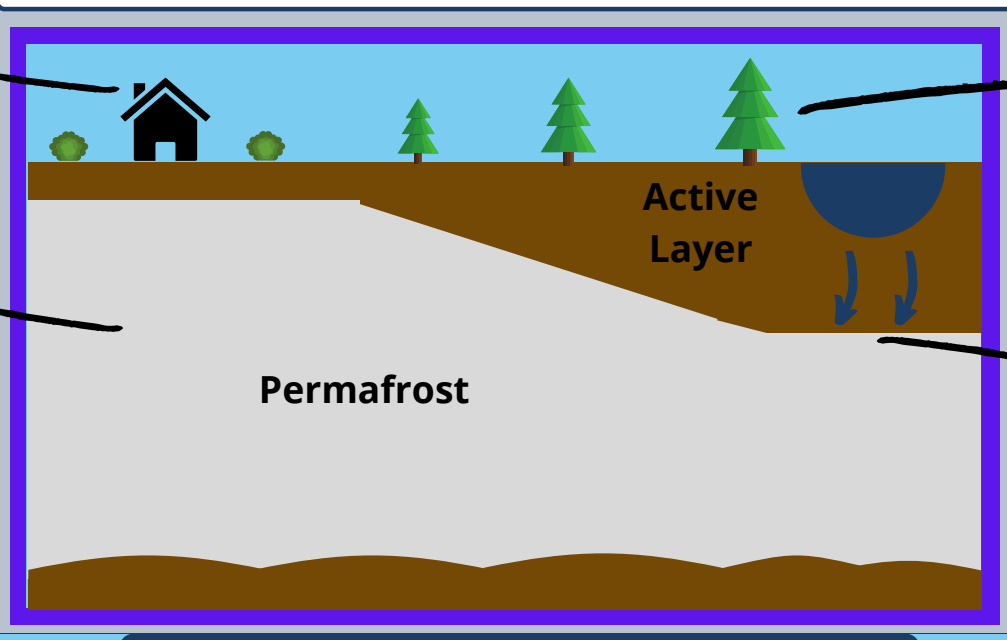
IMPORTANCE OF PERMAFROST

Ground Stability

Stabilizes ground for infrastructure and coastlines [3].

Water and Carbon Storage

Stores water (complete thaw raises sea level by 10 cm) [4] and 1400 gigatons of carbon (almost double that of atmospheric carbon) [5].



Vegetation Change

Permafrost thickness determines active layer thickness. Thicker active layer means more root penetration and more significant plant growth [6].

Hydraulic Barrier

Stops percolating water and prevents lake and wetland drainage responsible for flood prevention [7].

CLIMATE CHANGE AFFECTS PERMAFROST

How?

Permafrost extent and thickness is decreasing in the Arctic [8] [9].

2003

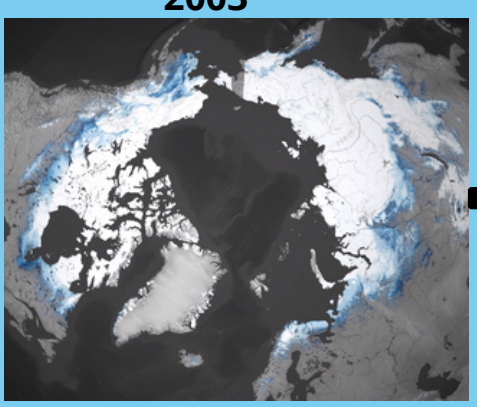


Image Source [10]

2017

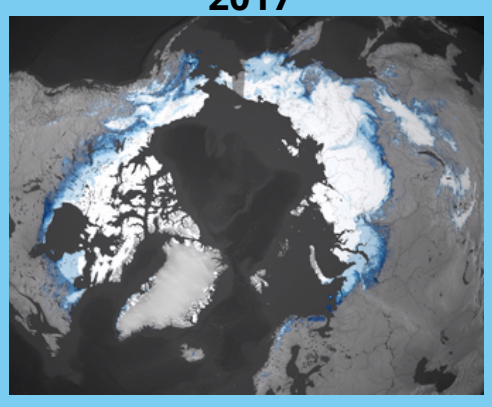


Image Source [10]

Why?

Higher permafrost temperatures due to global warming [11].

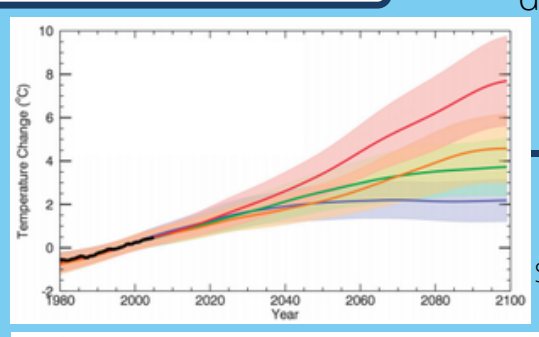


Image Source [12]

Past and potential future trends of atmospheric temperature increase [11].

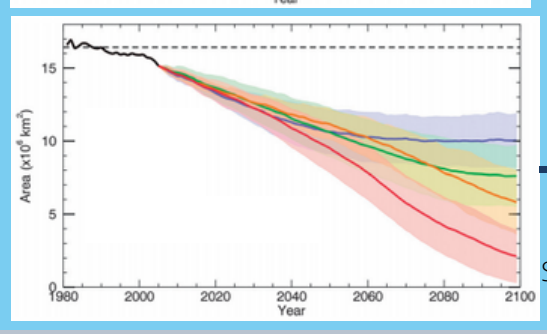


Image Source [13]

Past and potential future permafrost extent. Trend decreases due to increasing temperatures [11].

IMPACT ON CANADIAN COMMUNITIES

Stability for Infrastructure

Costly damages to infrastructure due to absence of stable ground. Damages to public infrastructure in Northwest Territories cost 51 million dollars every year [14][15].

Flooding

Increased additions of water and losses of wetlands increase flooding that damage infrastructure and creates safety hazards in places like the Yukon [16].

Agriculture and Forestry

Thicker active layer, greater crop and tree growth. Both can be harvested for profit, but access is limited due to poor transportation [17][18].

Transportation

Ground instability causes roads to subside and deform, rendering them unusable. This decreases accessibility for purchasing goods, especially in the Yukon Territory [19].

CALL TO ACTION: WE MUST REDUCE OUR CARBON FOOTPRINTS IN ORDER TO PREVENT FURTHER ATMOSPHERIC INPUTS OF GREENHOUSE GAS EMISSIONS, WHICH CAUSES PERMAFROST DEGRADATION.

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