

Permafrost, buildings and climate change:

Managing Ross River infrastructure in a moving landscape



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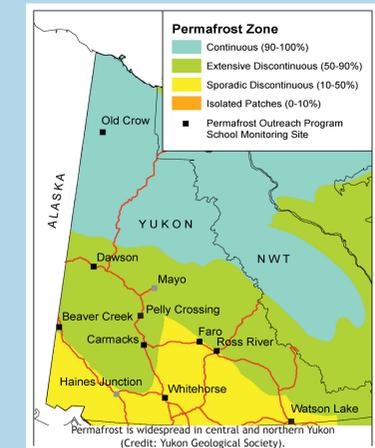
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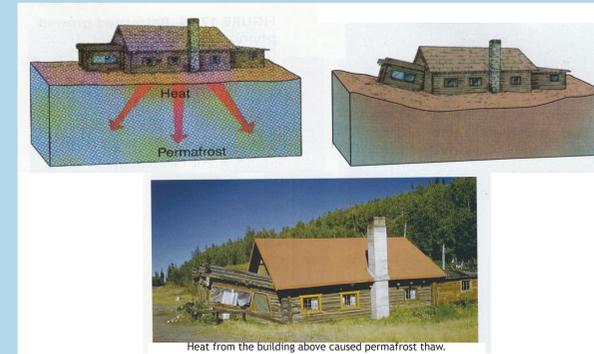
Why does the landscape “shift”?

- Ross River, Yukon is located on permafrost - ground that stays at or below 0°C for two or more years.



- Permafrost can contain pure ice, or a mix of ice and soil.
- The land moves, or changes shape when permafrost thaws in one place and remains frozen in another.
- An area where permafrost has thawed sinks relative to an area where permafrost stays frozen.

How does permafrost thaw affect buildings?



- Buildings can be damaged when permafrost thaws.
- If heat isn't blocked or removed, it can be transferred from buildings into the ground.
- When permafrost under Ross River school thawed,

concrete pilings supporting the foundation shifted and cracked.



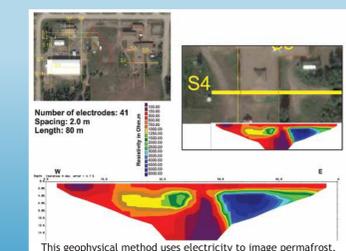
- Building movement can also damage pipes and buried wires.

How do scientists learn more about permafrost?

- Key tools for scientists include permafrost cores, ground temperature records and geophysical information.
- Permafrost cores show ice content and soil type at different depths.
- Ground temperature records in Ross River show that permafrost is warm and responding to climate change and disturbance.

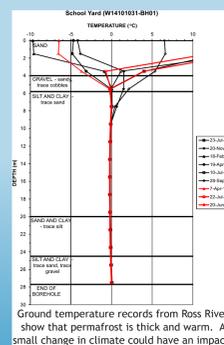


A permafrost core showing segregated ice.



This geophysical method uses electricity to image permafrost.

- Geophysical tools help create “images” of the subsurface.



Ground temperature records from Ross River show that permafrost is thick and warm. A small change in climate could have an impact.

How can people construct and maintain buildings on permafrost?

- There are low-cost and high-cost ways to prevent buildings from being damaged by permafrost thaw.
- During construction, try not to disturb the ground.
- Buildings elevated from the ground stop building heat from entering the ground.



A building above ground and on adjustable pilings is inexpensive and easy to maintain.



There are thermosiphons around and under the school in Ross River.

- Buildings at ground level can use a layer of insulation or thermosiphon cooling systems.
- Once the building is there, keep water and snow away from the building, and use shading plants.