Adaptation Learning Network
INSPIRING CLIMATE ACTION

Royal Roads UNIVERSITY

Financial Impact of Climate Change

Case Study 1: Whitehorse Grocery, Whitehorse, Yukon[A]

Hazard:	Geophysical/Mass Movement (Dry)/Subsidence
Contributing Climate Factors:	Monthly temperature (Change) *Land subsidence in permafrost areas can be cause be melting of ice in the permafrost layer*
Exposure:	Any site that could affect transportation of goods by road (especially, via the Alaska Highway and Richardson highways, connecting Whitehorse with Dawson Creek to the south and Fairbanks, Alaska to the west)
Vulnerability:	Approximately 70% of non-perishable and dry goods sold at the store arrive via ground transport from distribution centres in Edmonton, Fort St. John, Dawson Creek and Anchorage, Alaska. Inventories are sufficient to meet 2 – 4 weeks demand (depending on the product)
Loss potential:	Loss in sales (temporary?) due to stockout/out-of-stock (OOS) event

About us [Website]. (2021). Riverside Grocery. https://www.riversidegrocery.ca/about-us

Whitehorse Grocery in Whitehorse, Yukon, is a family-run specialty grocery and health-food store offering 24-hour services to Whitehorse residents. It offers a broad range of grocery items from specialty foods to personal hygiene goods.

Though Whitehorse Grocery procures seasonally available produce from local producers, and supplements these with fresh meat and produce shipped in via air cargo, it is heavily reliant on road transportation for its non-perishable goods and dry goods. As such, it is reliant on the highway

[A] Some details have been estimated or fictionalized for educational purposes

transportation infrastructure—particularly the Alaska highway (for shipments from southern Canada via Dawson Creek), and the Richardson Highway (for shipments from Fairbanks, Alaska, with connections to the Port of Anchorage).

Kostalas, A. (2013). *Alaska Highway: Road trip through the wilds.* The Guardian. https://www.theguardian.com/travel/2013/may/17/canada-alaska-highway-road-trip

Road transport in the north is particular susceptible to land subsidence arising from permafrost thaw. Permafrost thaw results in ground instability that can lead to land subsidence.

Packaged foods, dry goods, non-food household items (hygiene, cleaning, etc.) and other grocery items comprise 76% of final sales at the store. While Whitehorse Grocery holds 2 – 4 week inventories for most non-perishable product categories, it is reliant on road transport to regularly replenish its stocks. Frequency of stockouts increases with each day's delay in shipments. At 50% of normal inventory, Whitehorse Grocery will lose 35% of its normal sales. At 75% of normal inventory, more than 50% of sales will be lost.

Case problem: Given Whitehorse Grocery's exposure and vulnerability, how will climate-induced changes in hazard levels affect its bottom line.

Analytical approach: What changes are anticipated to climate factors contributing to permafrost thaw, and how might those changes alter: (1) the frequency and intensity of hazard; and (2) probable losses for the grocery store?