Mining and Transportation Sectors Adapting to Climate Change

Presented by Alison Perrin
Northern Climate ExChange

PROJECT OBJECTIVES

- ❑ Assess existing information regarding permafrost and snow and identify the information needs of the mining and transportation sectors
- ❑ Involve and engage with mining and transportation industry practitioners and decision-makers to determine needs and prioritize knowledge products
- ❑ Develop knowledge product to respond to industry needs and dissemination strategy
- ❑ Document the process

Photo credit: Mike Beauregard

CLIMATE AND INFRASTRUCTURE FORENSIC ANALYSIS SYSTEM

Goal: Identify **adaptation options** for mining/transportation

- Northern infrastructure and climate-related events
- Historical and future climate data
- Engineering and management information, adaptations (e.g. design specifications, maintenance data)
- Automated individual and cross-incidence reports
- Forensic analysis guidance and examples

METHODOLOGY

- ❑ Establish a Project Advisory Committee
- ❑ Identify and characterize information needs
  - o Literature review
  - o Interview mining and transportation industry practitioners
  - o Webinar: discuss results and product ideas
- ❑ Prepare draft knowledge product and dissemination strategy
- ❑ Test and refine knowledge product
  - o Targeted feedback from practitioners
  - o Webinar: feedback on product
- ❑ Present and disseminate knowledge product

INFORMATION NEEDS

- ❑ **Case studies of infrastructure failures and adaptations: "real/practical examples"**
- ❑ Accessible and available climate-related data
- ❑ Guidance on interplay of climate elements (e.g. snow and permafrost, rain on snow, snowmelt and rain)
- ❑ Practical and user-friendly climate change guidance and tools
- ❑ Accessible training for practitioners (e.g. online permafrost course for non-engineers)

Other identified information needs and gaps will provide guidance for future product development prioritization.

CLIMATE AND INFRASTRUCTURE FORENSIC ANALYSIS SYSTEM

Relevance for northern mines: provides valuable information for planning, building and maintaining mine access roads and bridges

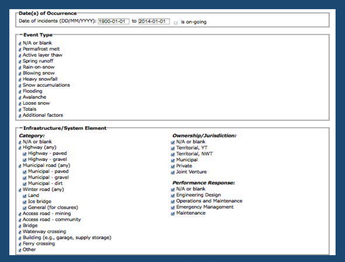
1.

1. System start page

2.

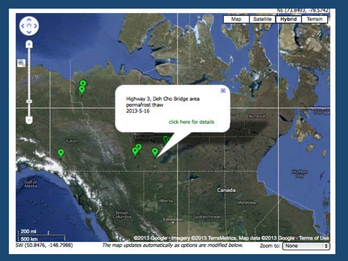
2. Green markers are single events; red are multiple events same location

3.



3. Narrow down events by date, event type, category, ownership or performance response

4.



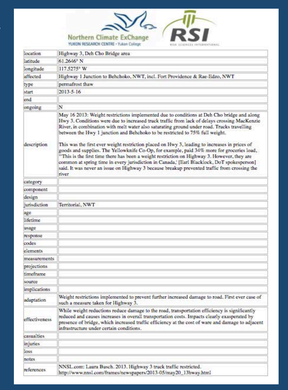
4. Click on an event and go to event details

5.

location	Highway 3, Deh Cho Bridge area
latitude	61.2646° N
longitude	117.5275° W
affected	Highway 1 Junction to Behchoko, NWT, incl. Fort Providence & Rae-Edzo, NWT
type	permafrost thaw
start	2013-5-16
end	
ongoing	N
description	May 16 2013: Weight restrictions implemented due to conditions at Deh Cho bridge and along Hwy 3. Conditions were due to increased track traffic from lack of delays crossing MacKenzie River, in combination with melt water also saturating ground under road. Trucks travelling between the Hwy 1 junction and Behchoko to be restricted to 75% full weight. This was the first ever weight restriction placed on Hwy 3, leading to increases in prices of goods and supplies. The Yellowknife Co-Op, for example, paid 34% more for groceries load. "This is the first time there has been a weight restriction on Highway 3. However, they are common at spring time in every jurisdiction in Canada,' [Earl Blacklock, DoT spokesperson] said. It was never an issue on Highway 3 because breakup prevented traffic from crossing the river

5. Event details include location, event type, event dates, and a description of the event

6.



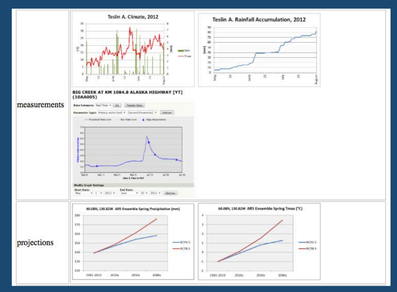
6. Full event details list

7.

adaptation	Weight restrictions implemented to prevent further increased damage to road. First ever case of such a measure taken for Highway 3.
effectiveness	While weight reductions reduce damage to the road, transportation efficiency is significantly reduced and causes increases in overall transportation costs. Impacts clearly exasperated by presence of bridge, which increased traffic efficiency at the cost of ware and damage to adjacent infrastructure under certain conditions.

7. Details include a description of any adaptations used and their effectiveness

8.



8. Event details include relevant historical climate data and climate projections, when available, including yearly and/or monthly temperature and precipitation.

Partners:

Natural Resources Canada / Ressources naturelles Canada
Canada
Northwest Territories Transportation
uOttawa
OCCIAR Ontario Centre for Climate Impacts and Adaptation Resources
Mirarco MINING INNOVATION

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