Misconceptions & Maladaptation:
Uncertainty in Northern Infrastructure Expansion

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UArctic Thematic Network
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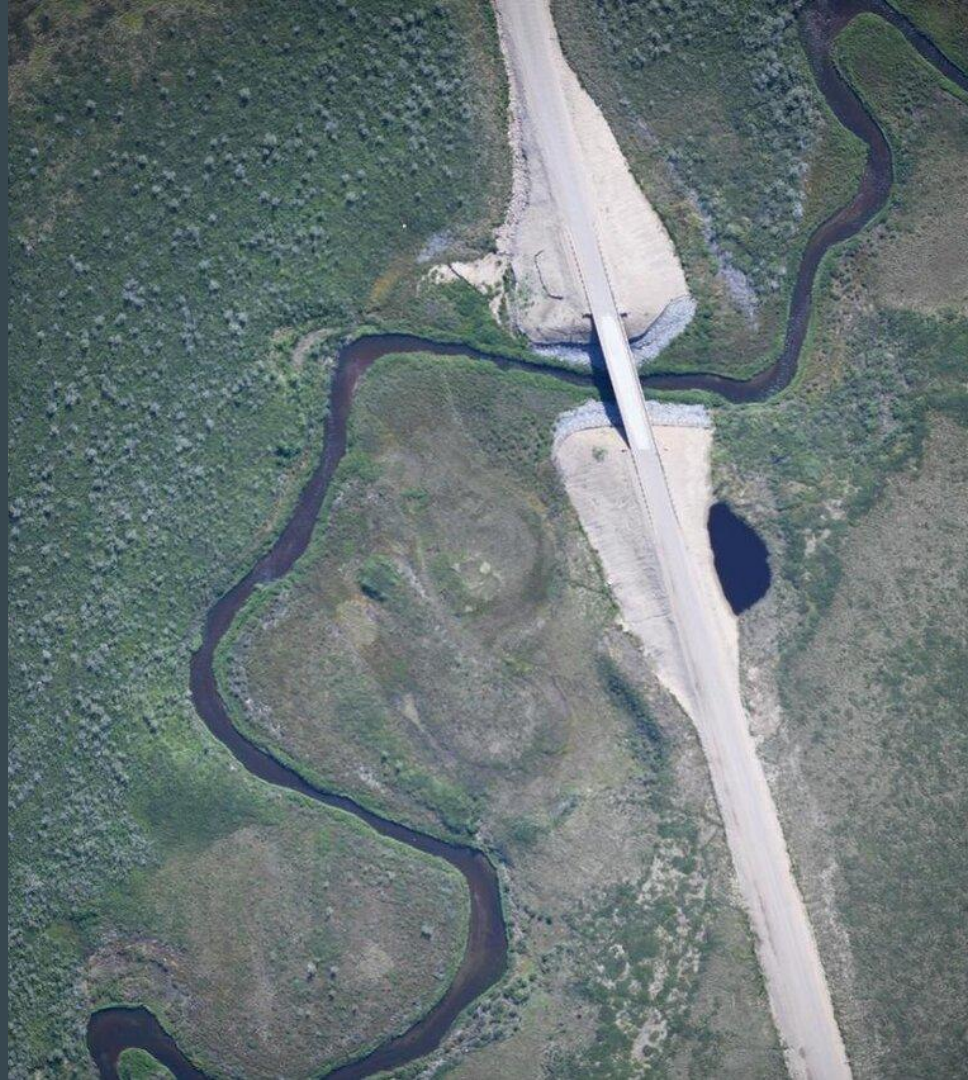
Research

Building off of two recent papers (one published, one in-review), this work introduces current research

1. Kehler, S., & Birchall, S. J. (2021). Social vulnerability and climate change adaptation: The critical importance of moving beyond technocratic policy approaches. Environmental Science & Policy, 124, 471–477. https://doi.org/10.1016/j.envsci.2021.07.025

Outline

1. Context
2. Misconceptions
3. Conclusion

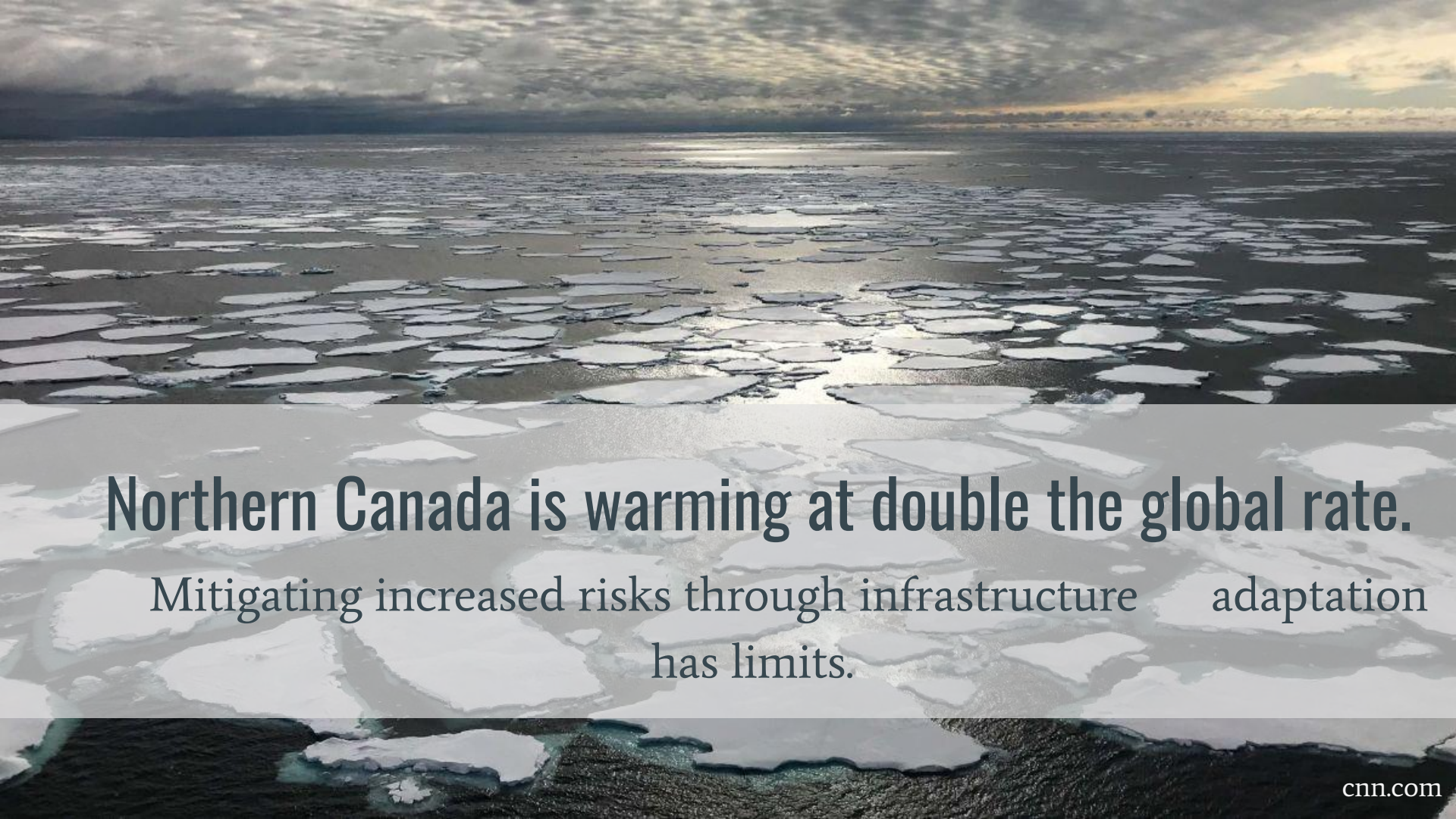


1. Context

Infrastructure, Climate Change & Maladaptation

Perspectives of Northern Infrastructure Expansion

- Sovereignty
- Economic development & resource extraction
- Transportation bottlenecks & delays
- Equitable distribution of prosperity



Northern Canada is warming at double the global rate.

Mitigating increased risks through infrastructure adaptation has limits.

cnn.com

Northern Canadian communities are considerably vulnerable to climate change.

- Amplified warming
- Ecological fragility
- Remoteness
- Lack of access
- Socio-economic stressors
- Economic vulnerability
- Adaptation & maintenance costs

Maladaptation:

when adaptation measures result in unintended negative consequences that further increase risk and vulnerability

interestingengineering.com/

2. Misconceptions

Vulnerability, Adaptation, Access & Development

A Narrative of Misconceptions

"Vulnerability to climate change is strictly a **physical risk** and therefore, **hard adaptation** of infrastructure is the infallible solution to climate change impacts. Our ability to engineer solutions offers an opportunity to take advantage of northern warming because climate change will **allow permanent infrastructure** necessary to access northern resources. This **resource development** will lead to socio-economic benefits for northern communities and foster resilience to climate change."

Misconception:

“Vulnerability to climate change is a strictly a physical risk”

Reality:

Vulnerability to climate change is...

- Dynamic & complex
- Physical, social, economic & political

Misconception:

“Hard adaptation of infrastructure is the solution to climate change impacts”

Reality:

Hard adaptation has limits:

- Capital intensive
- Costly to maintain
- High risk of failure

Maintenance costs & feasibility: permafrost thaw on the Alaska Highway

- Discontinuous permafrost requires frequent rehabilitation [1]
  - ~$20k/year/km
- Climate change is speeding up degradation [2]
  - Cost increase of 40% by 2050

[1] Palko & Lemmen, 2017
[2] Suter et al., 2019

Misconception:

“Climate change will allow permanent infrastructure necessary to access northern resources”

Reality:

Climate change in northern regions means:

- Unprecedented extremes
- Increased frequency & severity of hazardous events

Increasing Disaster Risk: Fort McMurray, Alberta

- Physical vulnerability (2016 wildfire)
  - Displaced over 80,000 people [1]
  - $3.5 billion in damage [1]
  - Event was 6x more likely due to climate change [2]

[1] Government of Alberta, 2016
[2] Kirchmeier-Young et al., 2017

Misconception:

“Resource development leads to socio-economic benefits for northern communities”

Reality:

Resource development can:

- Increase economic vulnerability
- Increase GHG emissions
- Reduce provision of public services

3. Conclusion

Infrastructure, Climate Change & Maladaptation

Misconceptions about the opportunities climate change will bring to Northern Canada hinder effective adaptation.


Resilience of northern infrastructure is dependent on adaptation being done in an equitable way.
tundranorthtours.com

Thank you

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