Oil Spills on Winter Lakes: Risk of Perception, Detection, and Remediation

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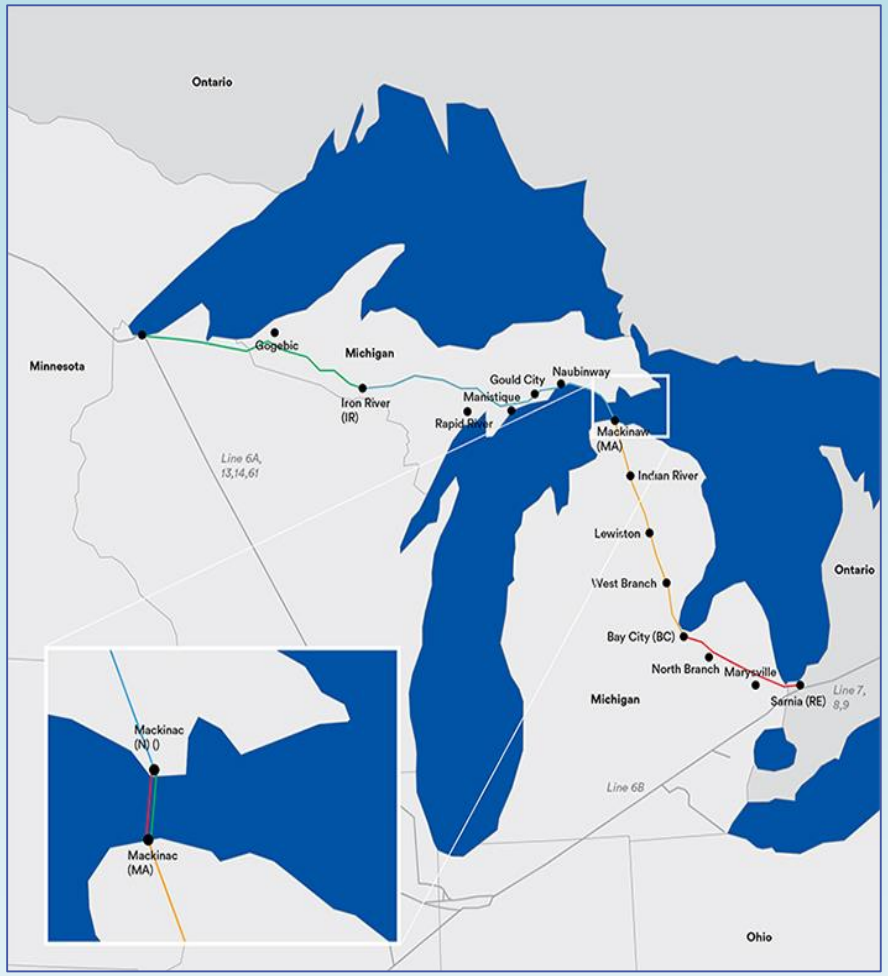
Winter Lake Oil Spills

- Project overview
- Detection and remediation of spills under ice
- Community impacts and risk perceptions
- Estimates of potential economic damages
- Conclusions

Introduction to Line 5

- 540,000 barrels per day (bpd) from Superior, WI, to Sarnia, Ontario.
- Pipeline splits in two at Straits.
- Less than 1% of the pipeline's overall length
- 2,000 bpd propane to the UP; 33,000 bpd crude oil to Marathon Refinery.
  - The rest, ~94%, arrives in Sarnia, Ontario.
- Anchor strikes and old age have raised safety concerns.



Timeline & Controversy

- Oct, 2017. Dynamic Risk completes independent risk analysis
- Apr, 2018. Line 5 damaged by an anchor strike
- Jul, 2018. Michigan Tech submits independent risk analysis
- Oct, 2018. Agreement to build utility corridor beneath the lakebed
- Dec, 2018. Gov Snyder creates authority overseeing tunnel
- Jan, 2019. Gov Whitmer inaugurated; Ray Compressor fire
- Mar, 2019. AG releases opinion arguing Snyder's law unconstitutional
- Mar, 2019. Gov Whitmer bars state depts from actions related to the law.

Despite the controversy, there remains limited research on:

1. Ice modeling and detection of spills under ice;
2. Remediation of oil spills and natural gas liquids in freshwater;
3. MI residents' perceptions of the risk of an oil spill, particularly during winter;
4. The potential economic impacts of an oil spill; and
5. The policy implications.

Our Research Questions & Methods

1. What are the **capabilities** for detecting and remediating oil spills in ice-covered conditions?
2. How does **detection time** depend on the **physical properties** of the ice?
3. How do **residents and decision-makers perceive risks** of pipelines? Are these **risks informed by current capabilities**?
4. How do Michigan residents **evaluate tradeoffs** between a nuanced portfolio of alternatives?
5. Which **tradeoffs** most require policy-makers' attention?

Methods: State of the State Survey (SOSS), Survey of Decision-makers, Ice Modeling, Lab and Field Experiments