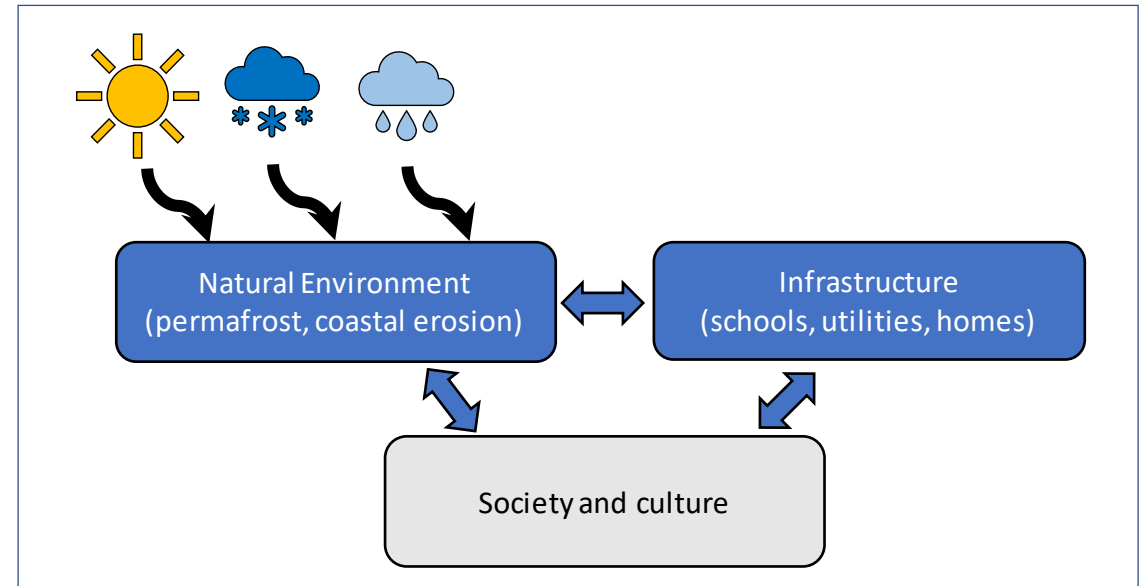


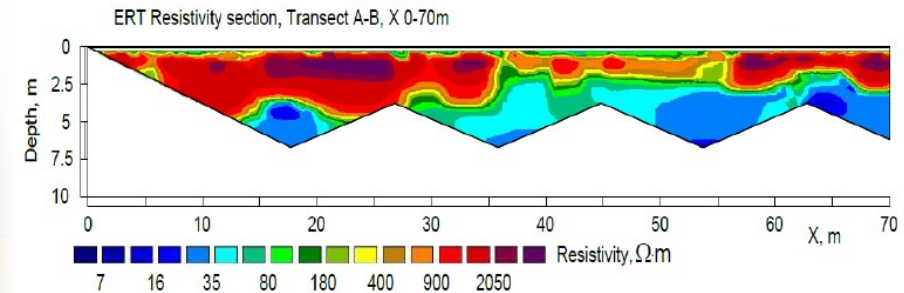
# PIPER Project: Resilience and Adaptation to the Effects of Permafrost Degradation and Coastal Erosion



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- In coordination with the UIC Science, visited the Kali School and talked to students about permafrost
- Downloaded temperature data from some loggers
- Looking for volunteers to visits monitoring sites in June to check on their health
- Finalizing summer plans: visit days July 30-August 5
  - To download ground temperature data,
  - To install some additional sites to monitor ground temperature under snow drifts
  - To conduct an Electrical Resistivity Tomography (ERT)



**Potential line transects:**

- Several short across a coastal bluff
- Single long from the coast towards drained lake



# Permafrost Thaw Remediation Project

## Permafrost Thaw Remediation Project



**Motivations:** The community of Point Lay has been experiencing a rapid ground surface settlement due to melting of massive ice located below the ground surface. The melting ice i) threatens stability of piles, on which residential houses sit, and ii) causes development of deep ponds that create a drowning hazard.

**Standing Recommendation:** Over the last several years, a recommendation was made to fill in permafrost depressions with fine-grained material, e.g., silt, to insulate the buried ice from the summer warmth and thus to stabilize the pile foundations.

**Proposition:** Instead of experimenting on structures occupied by residents, we suggest testing the above-mentioned recommendation on a stand-alone pond and checking how well the permafrost can heal itself. This significantly simplifies the task and lowers a risk of mishap.

In the summer of 2022, we installed several ground temperature sensors around the community (one of the monitoring sites is shown by a yellow dot) and a few sensors at the bottom of ponds. One of the ponds with sensors (163°0'41"W, 69°44'46"N) is marked by the red arrow. The water depth and temperature data are collected six times per day and will help to understand how the pond warms the ground underneath relative to the natural site.

The pond has an irregular shape and is adjacent to the road. We expect that in the future the pond will widen and will require some filling anyway. The current pond area is 540 ft<sup>2</sup> and the volume is estimated at 60 yd<sup>3</sup>.



**Experiment details:** We recommend the following approach:

- drain water from the marked pond;
- install additional temperature probes pond's bottom, side slope and below the pond bottom;
- fill the pond with fine-grained material and install additional temperature probes into the fill;
- monitor temperature dynamics over a few years to determine how well the permafrost heals.

**Help from the community:** First and foremost, we look forward to hearing your thoughts. If you find this experiment useful, we would greatly appreciate your help with locating the silt or other fine-grained sediment and helping to fill the depression. All sensor installations and analysis will be provided by our research team.

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- Over the last several years, a recommendation was made to fill in permafrost depressions with silt, to insulate the buried ice from the summer warmth and thus to stabilize the pile foundations.
- Pump the water out, heavily instrument the cavity, fill with fine-grained sediment.
- Monitor how the permafrost “stabilizes”



## JOIN US FOR A NORTH SLOPE RISKS AND HAZARDS RESEARCH AND ADVISORY GROUP

**Purpose: North Slope Borough** open advisory group to:

- Provide a forum to share updates on research and infrastructure projects,
- Discuss issues related to permafrost thaw, erosion, surges, and flooding,
- Assist with adaptation and mitigation strategies.

### Who:

- **Local and Regional Residents as Advisors, Practitioners, and Researchers**
- Resilience and Adaptation to the Effects of Permafrost Degradation-Induced Coastal Erosion People-Infrastructure-Permafrost-Resilience (PIPER) UAF
- Understanding the Changing Natural-Built Landscape in an Arctic Community: An Integrated Sensor Network in Utqiagvik, Alaska UVA
- Arctic Impacts and Reverberations of Expanding Global Maritime Trade Routes GMU
- Landscape evolution and adapting to change in ice-rich permafrost systems (NNA-IRPS) UAF
- **Other research projects studying risks and hazards to assist local and regional decisions**

**When: Quarterly Forums starting May 2023**

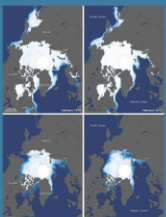
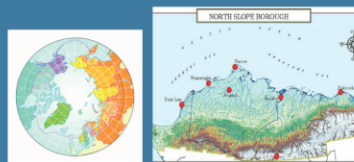
Phone, Virtual, Hybrid, In Person, Social Media

### Contacts for details:

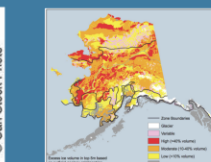
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Hazard Mitigation Plan 2004



*Anne Garland ARIES, Dmitry Nicolsky UAF,  
Howard Epstein & Hannah Bradley UVA*

## Goals:

- Organize a similar Research & Advisory for the North Slope Borough or more focused on Utqiagvik
- Provide a forum to share updates on research and infrastructure projects
- Discuss issues related to permafrost thaw, erosion, surges, and flooding

**When: Quarterly Forums**

At least three known research groups and probably very many others.

**Looking for your thoughts!!**