

Coastal erosion and the resulting impacts along the ice-rich permafrost coast of the Yukon Territory



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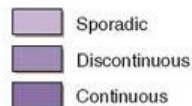
³ Geological Survey of Canada-Atlantic, Dartmouth, Canada

Background

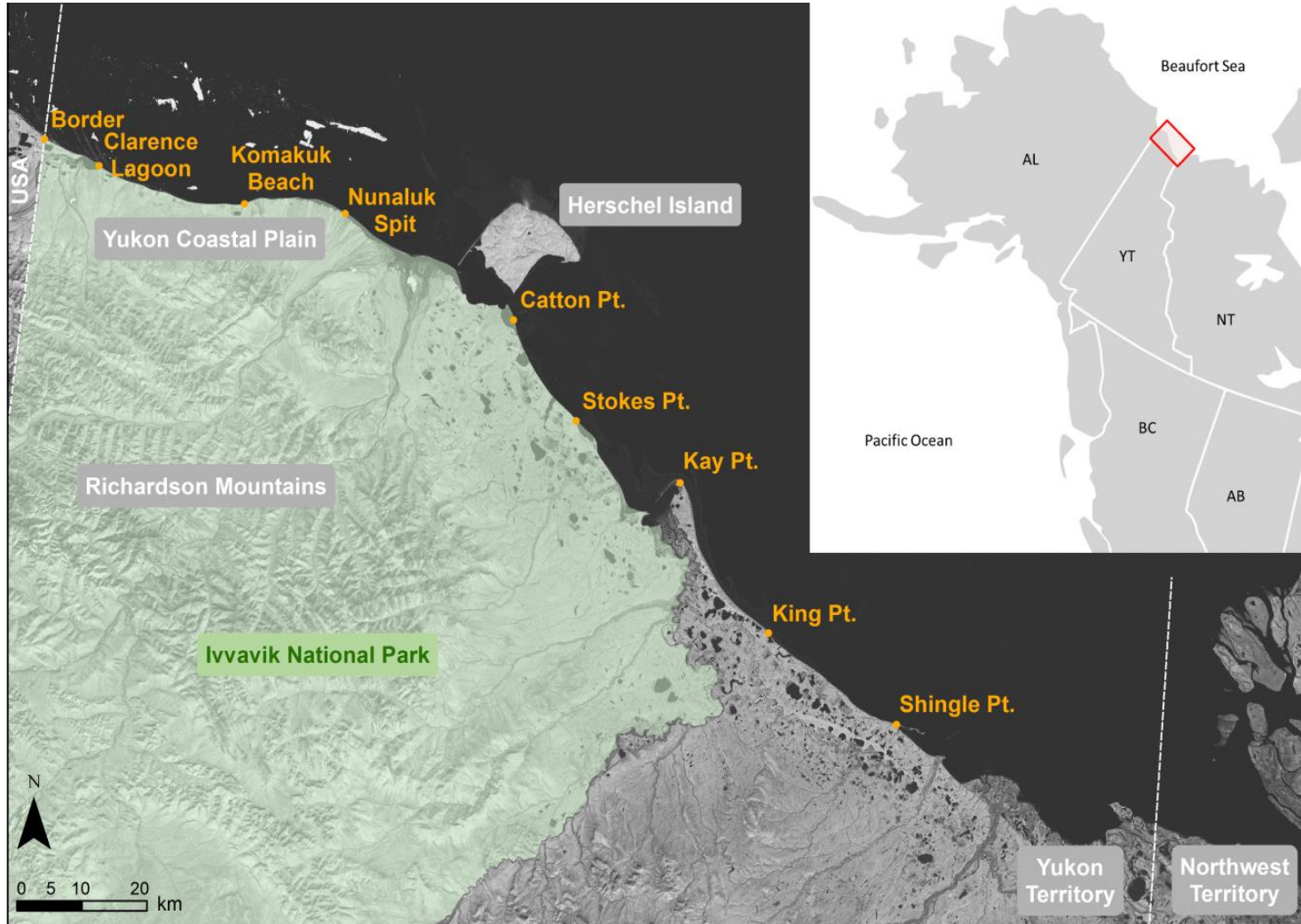


Vilhjálmur Stefánsson
* 03.11.1879, † 26.08.1962

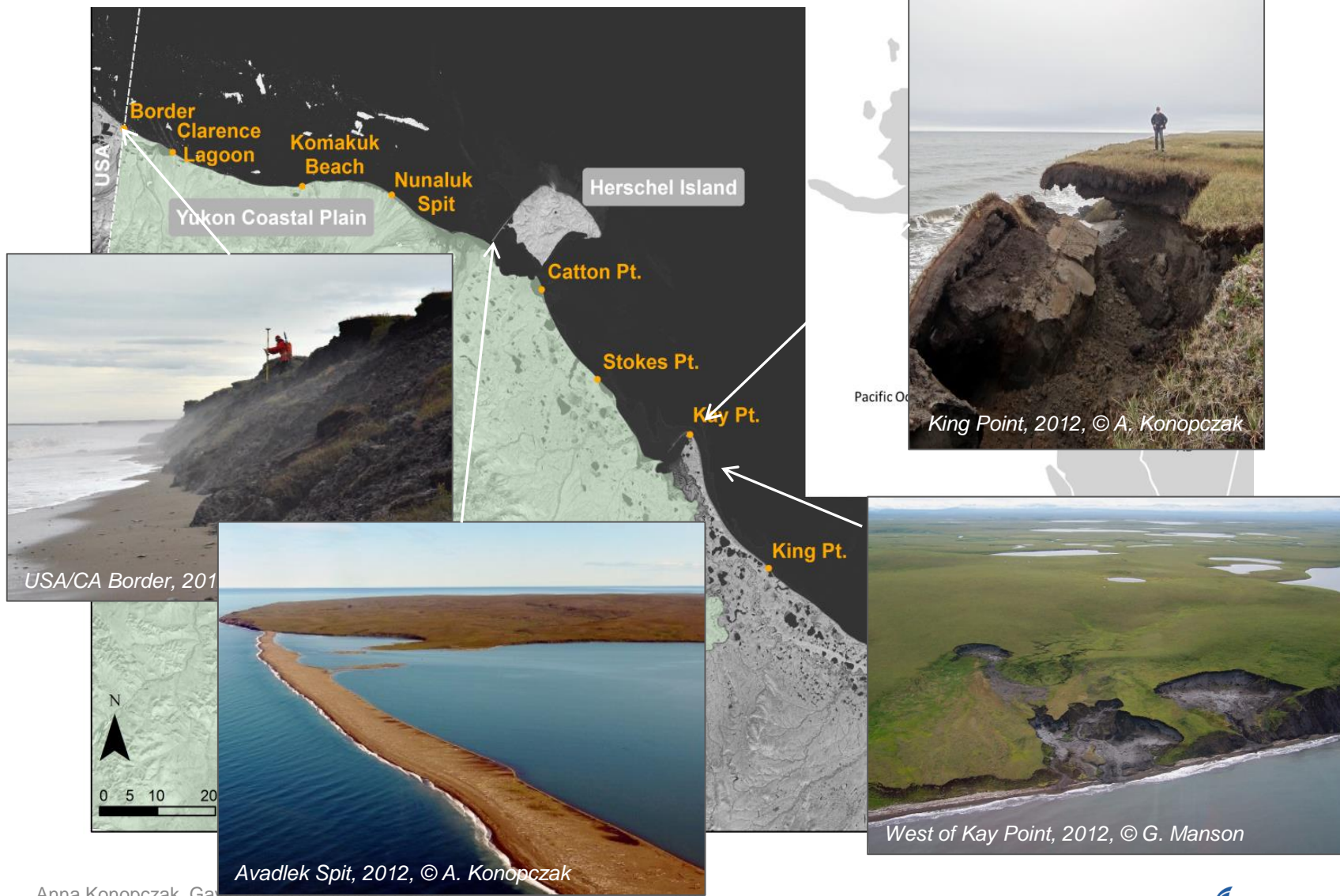
- Permafrost contains **2 x more carbon** as is circulating in our atmosphere
- **1/3 of all coasts worldwide** consist of permafrost
- Arctic coasts erode up to **30 meters per year**



Study Area



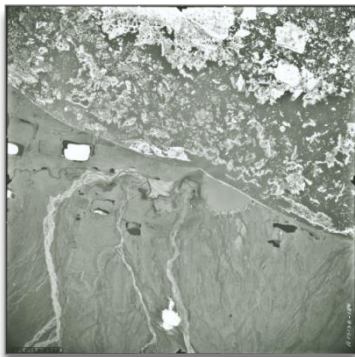
Study Area



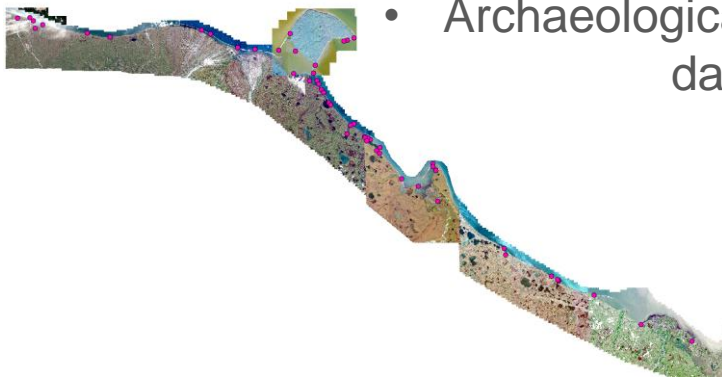
Data & Methods

Data

1952 - 2011



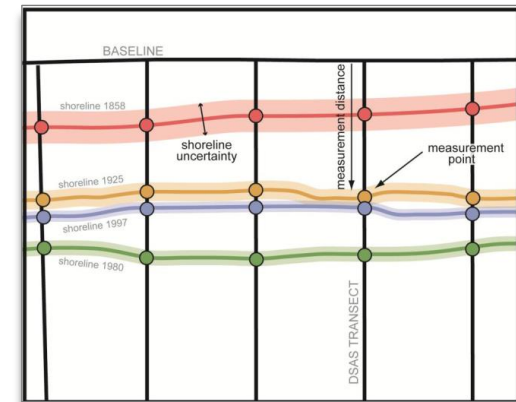
- Aerial imagery
- Satellite imagery
- DEMs



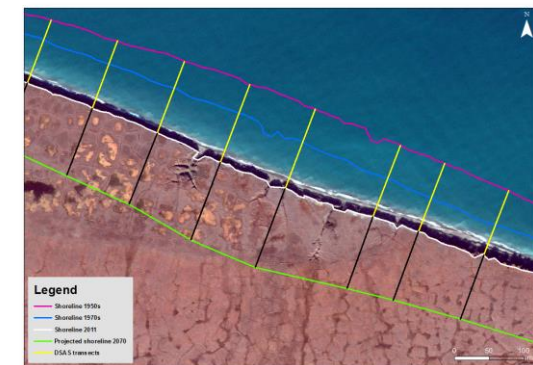
- Archaeological database

Methods

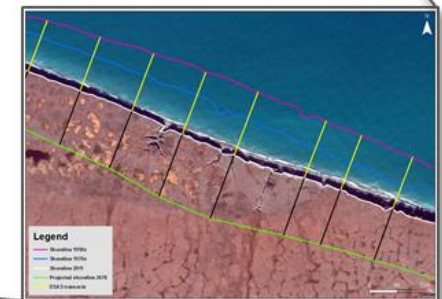
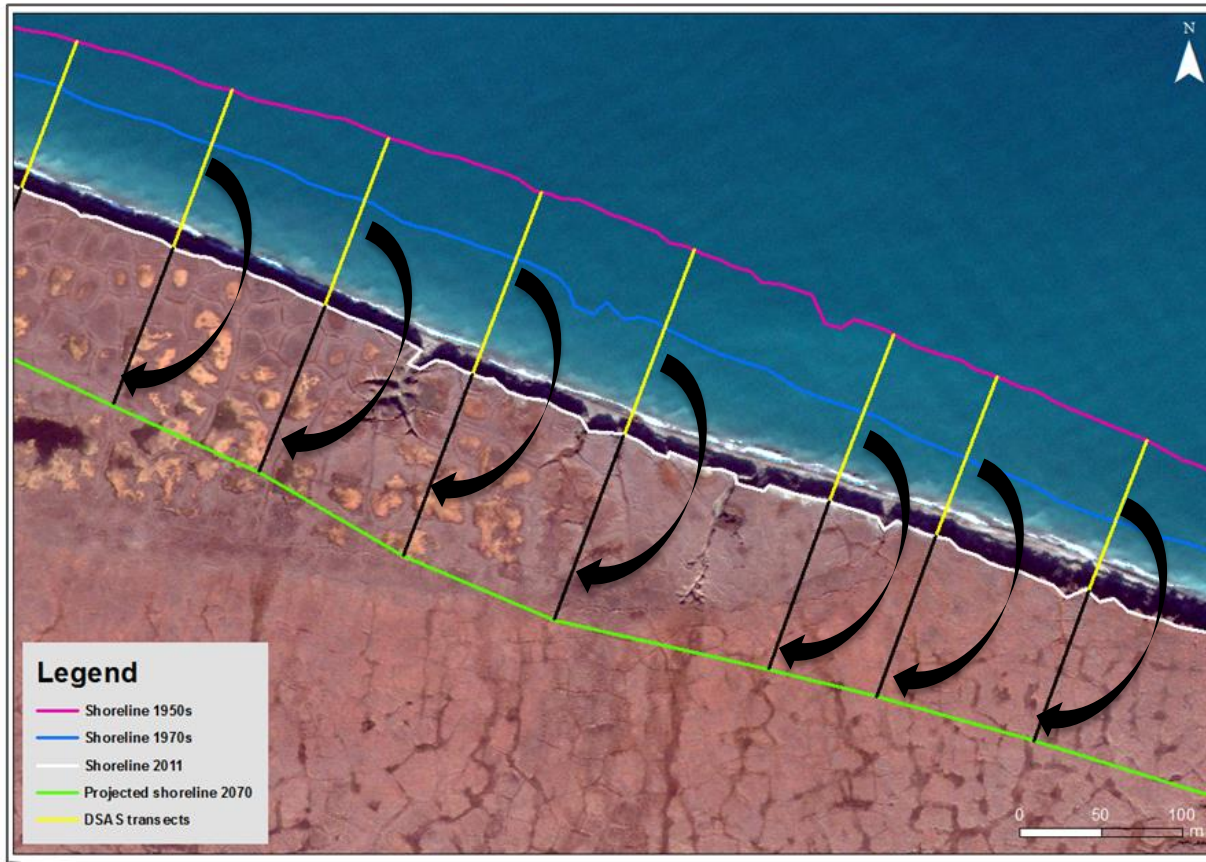
DSAS



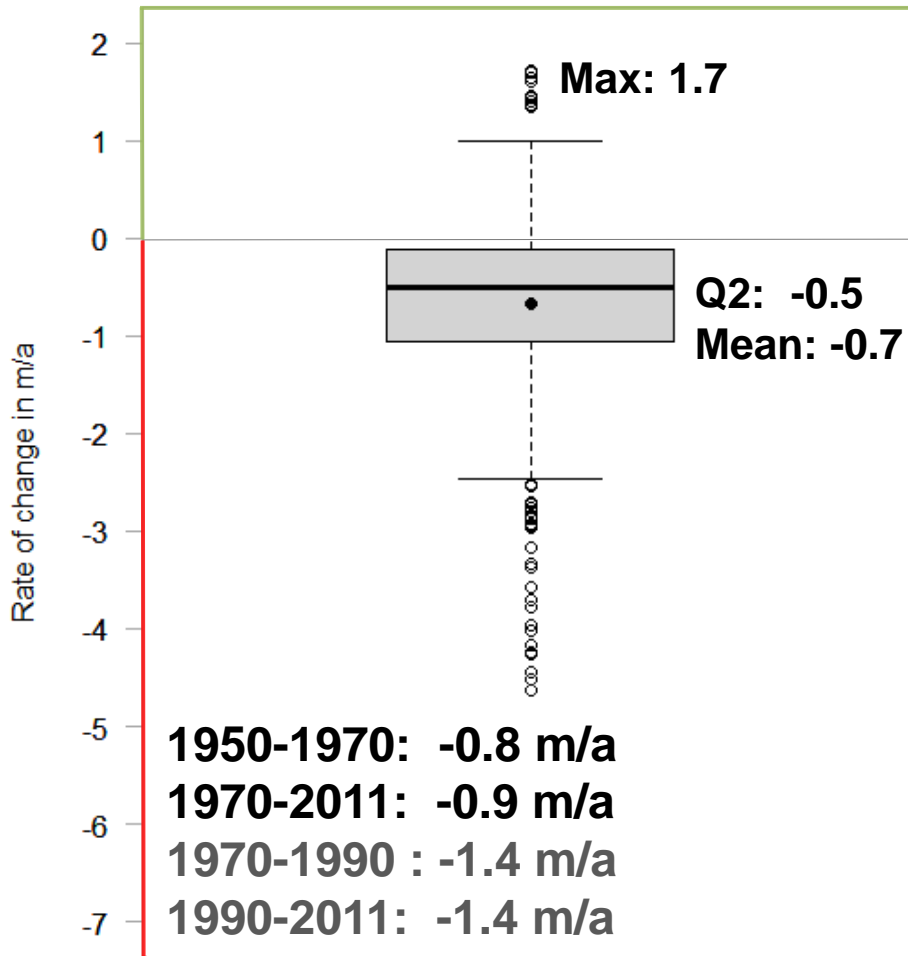
Linear coastline projection



Data & Methods



Coastal dynamics along the Yukon



DSAS statistics show, that during the time period

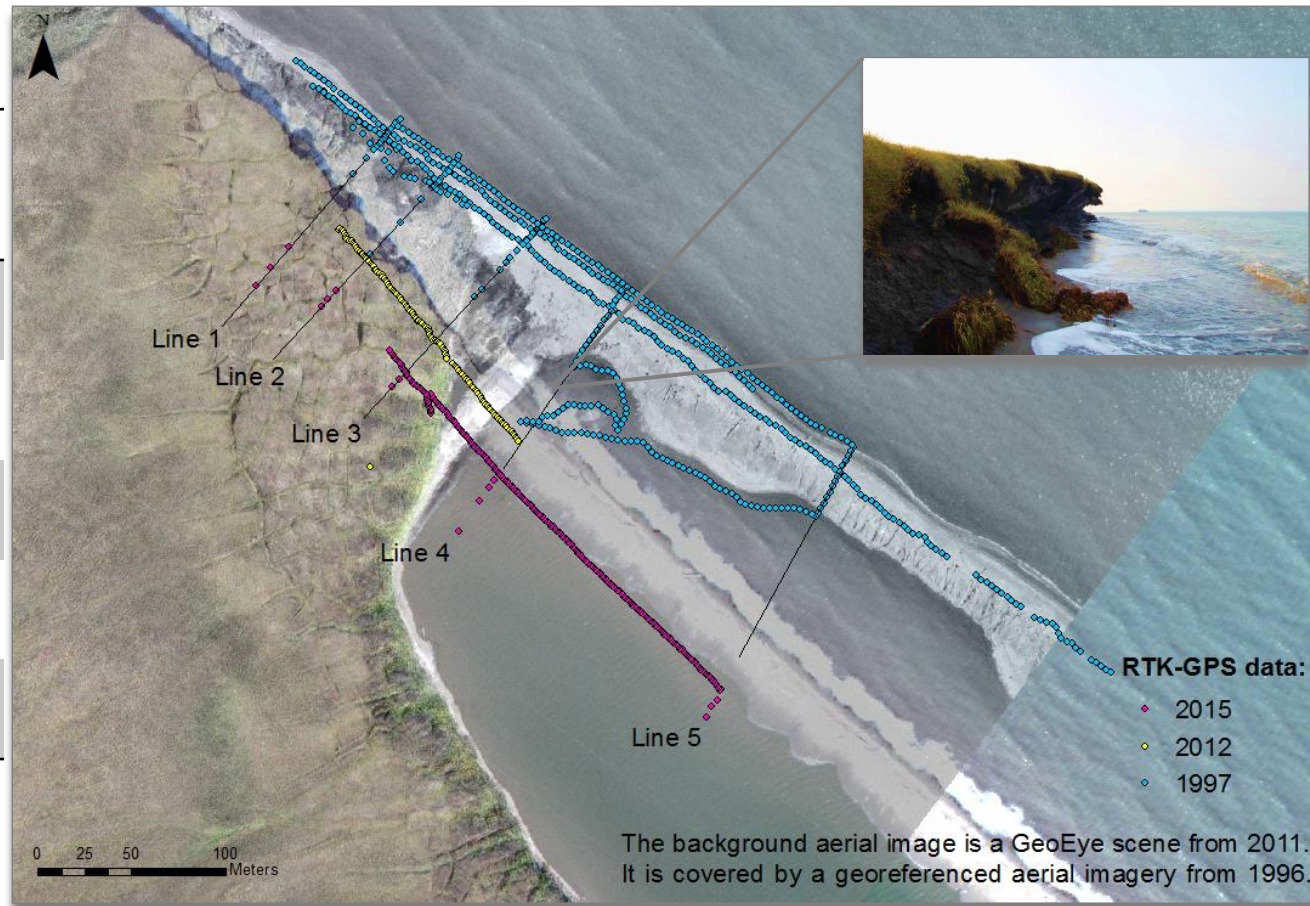
1952 – 2011

13 % of all transects recorded **accumulation** → **0.5 % > 1 m/a**

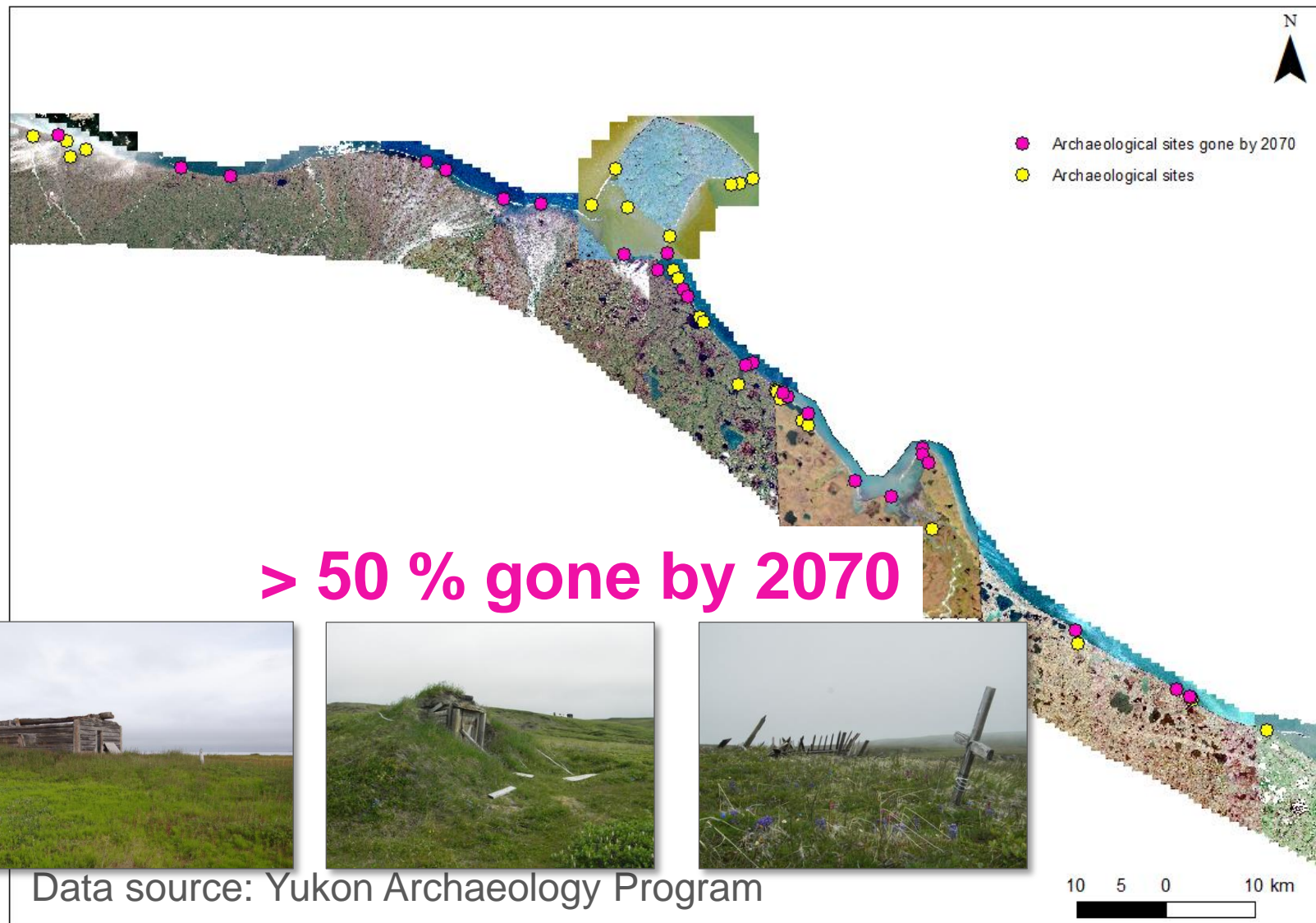
87 % of all transects recorded **erosion** → **28 % > 1 m/a**

Results: Stokes Point west

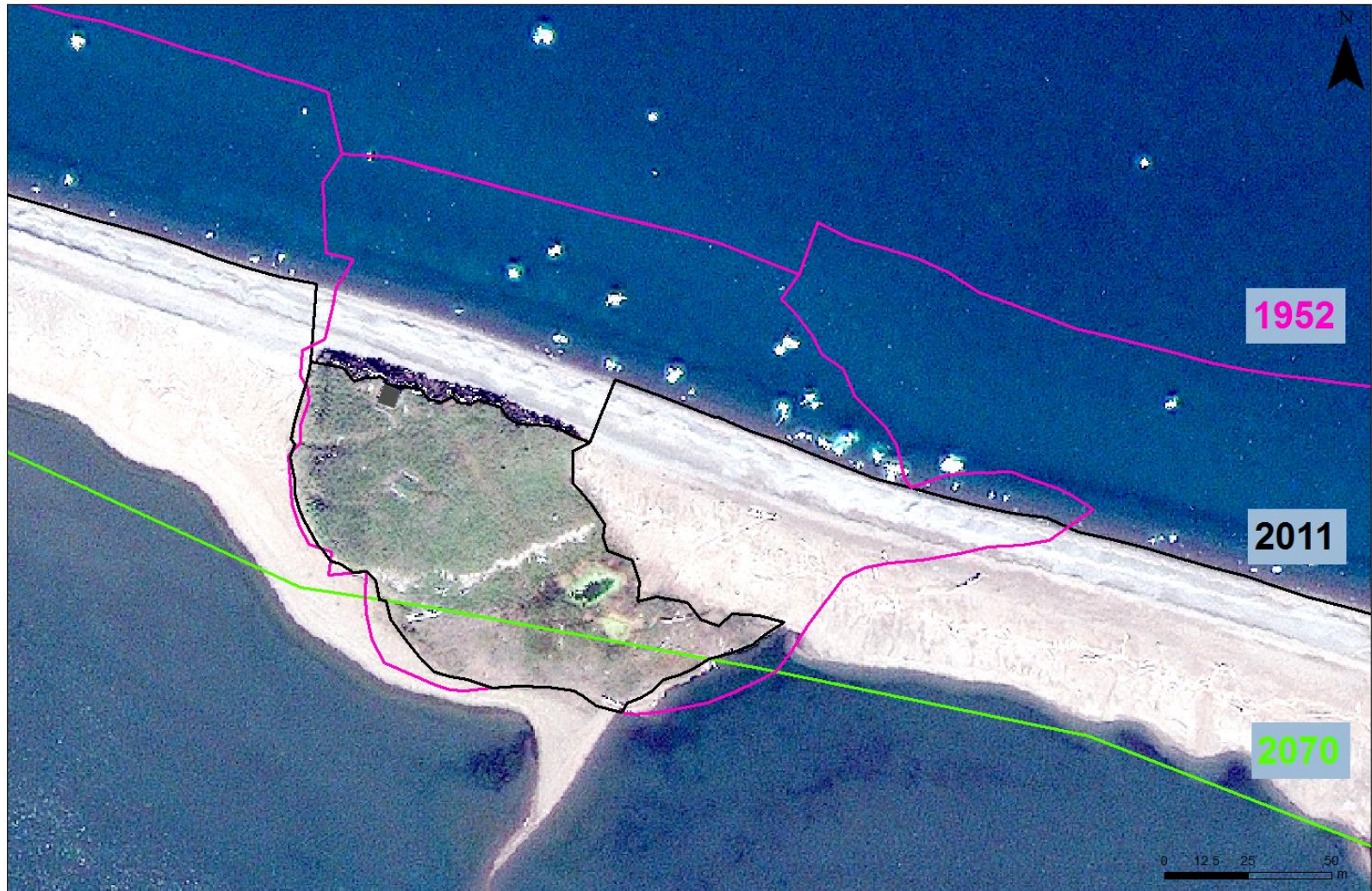
Time period	Change rate [m/a]
2014-2015	- 8.9
2007-2014	- 8.8
2006-2007	- 0.5
1999-2006	- 0.2
1997-1999	- 1.1



Impact on cultural sites



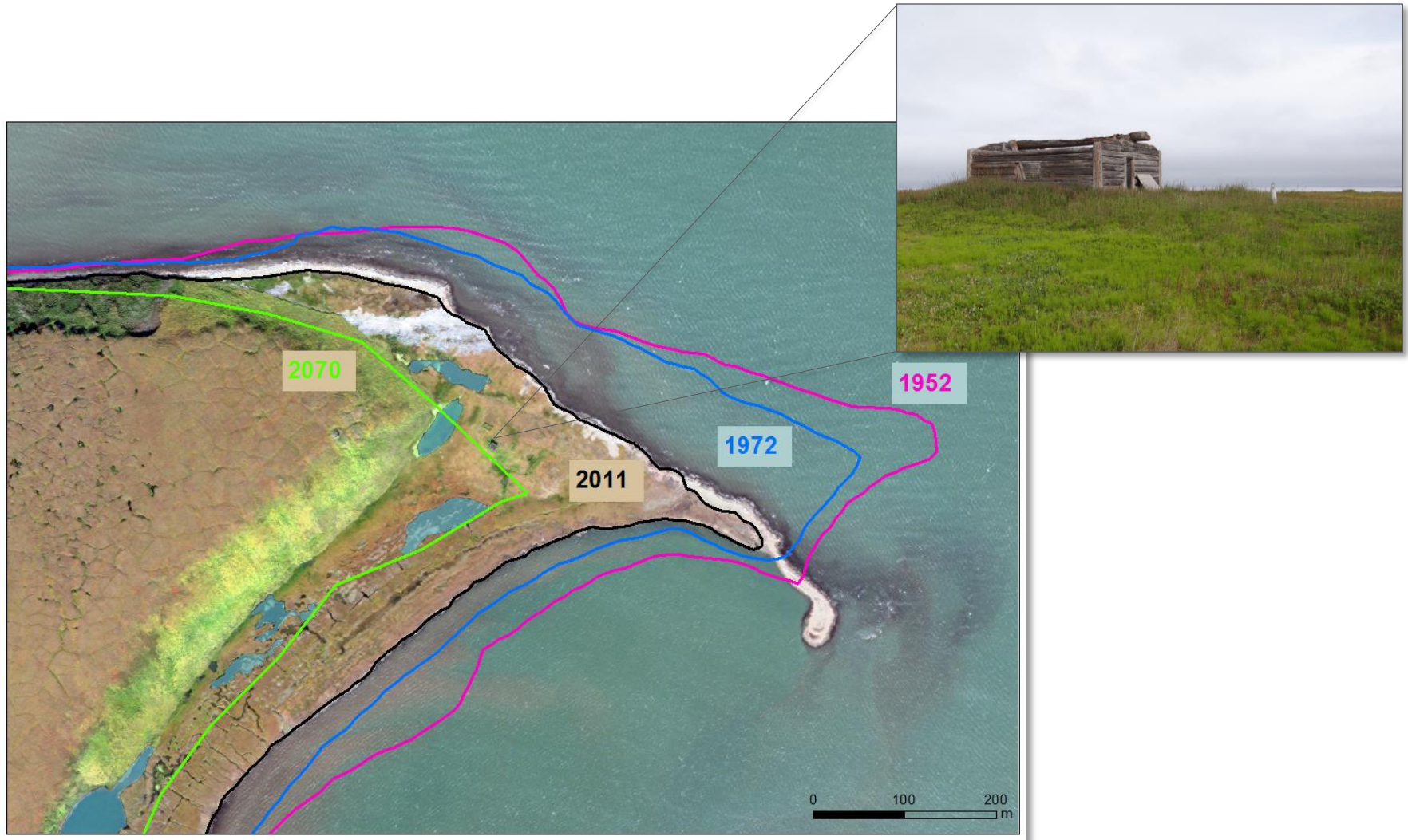
Cultural losses at Nunaluk



Cultural losses at Nunaluk



Cultural losses at Niakolik



Conclusions



- The overall mean erosion within the last 60 years is 1 m/a
- The overall trend goes towards **acceleration of coastal erosion**
- Arctic coastal **cultural sites** are **extremely threatened** by coastal erosion (50 % will be gone by 2070)

Research funding:

