

Vulnerability

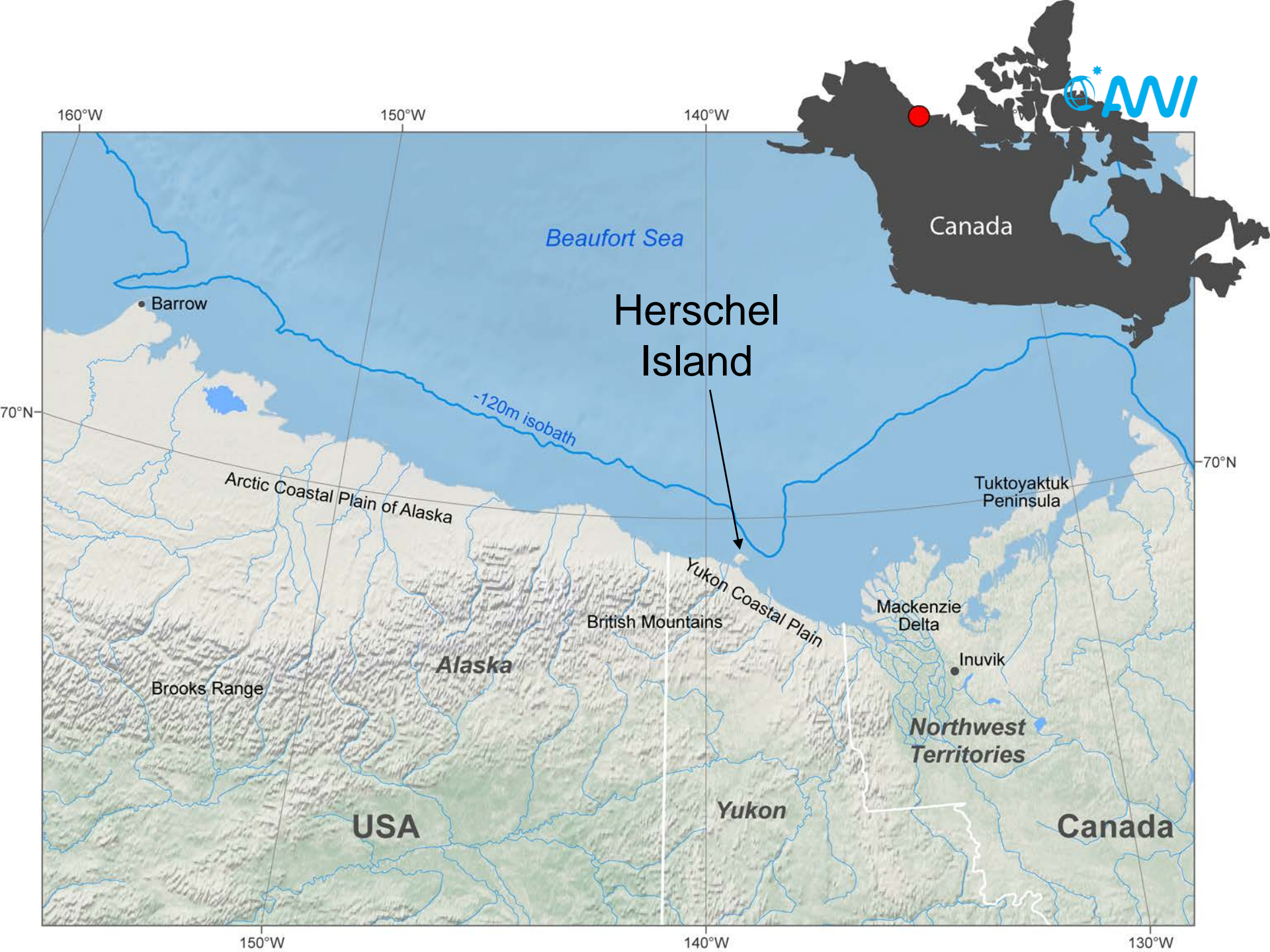


ALFRED-WEGENER-INSTITUT
HELMHOLTZ-ZENTRUM FÜR POLAR-
UND MEERESFORSCHUNG

of Coastal Infrastructure in the Arctic

Simpson Point, Herschel Island

Boris Radosavljevic
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Michael Fritz
Pier Paul Overduin
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From Coastal Processes to Coastal Hazards



Erosion
Washover
Flooding
Sea Level Rise
Storm Surge
Ice Processes

Infrastructure



Coastal Hazards



7/31/08 4:00 PM





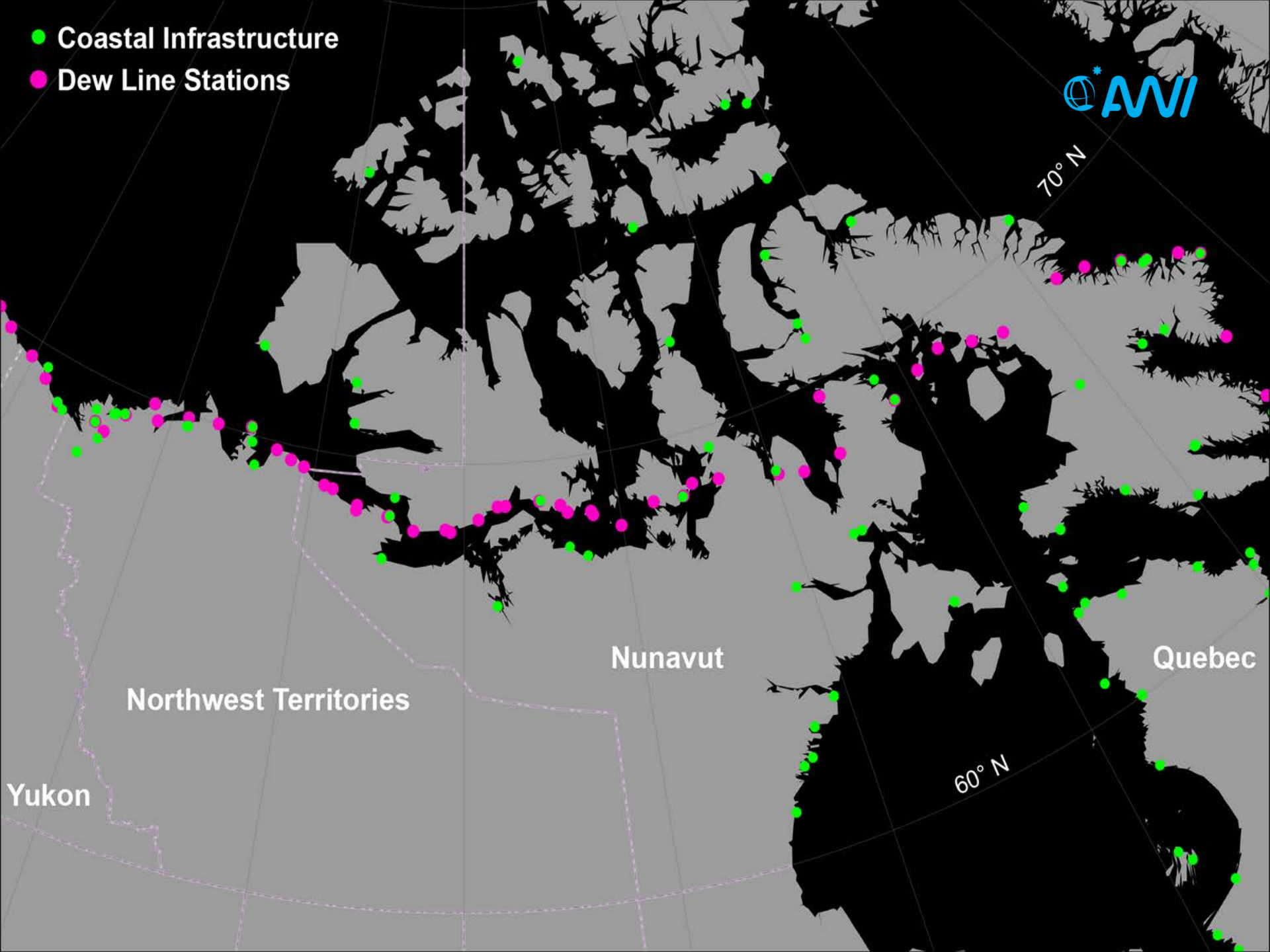
OUTDOOR BARREL CONTAINMENT
CONTAINMENT

7/31/08 9:00 PM



● Coastal Infrastructure

● Dew Line Stations



70° N

Nunavut

Quebec

Northwest Territories

Yukon

60° N



L. Meyook



A. Konopczak

Mitigation Strategies



Hazard Mitigation - Sustained actions taken to reduce or eliminate long-term risk to people and property from hazards and their effects
- FEMA Glossary



- Retreat
- Relocate
- Control
- Abandon ?

Vulnerability Mapping



$$CoastalVulnerabilityIndex = \sqrt{\frac{a * b * c * d * e * f}{6}}$$

a = geomorphology

b = shoreline erosion/accretion rate

c = coastal slope

d = relative sea-level rise rate

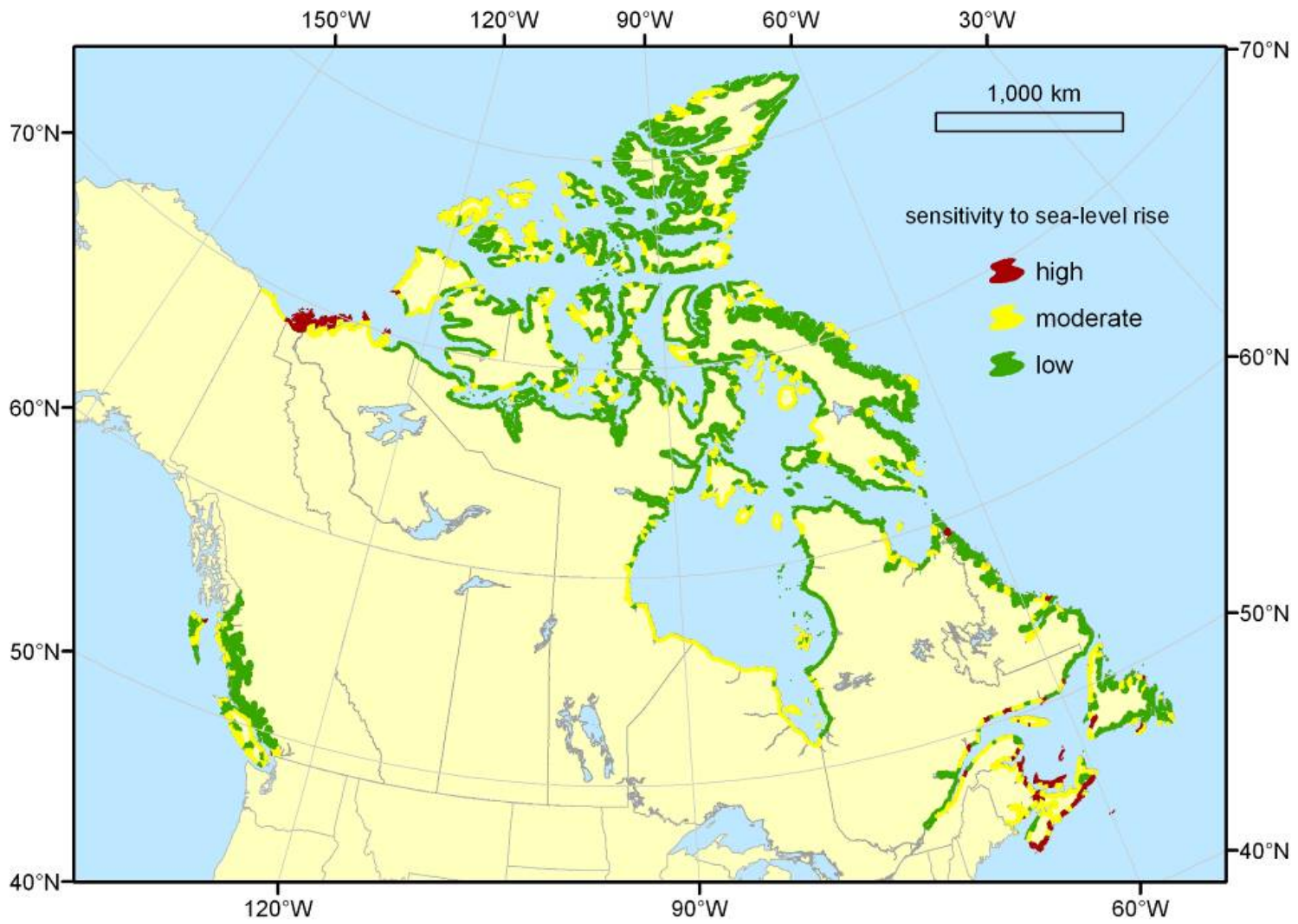
e = mean wave height

f = mean tide range

Shaw et al (1998)

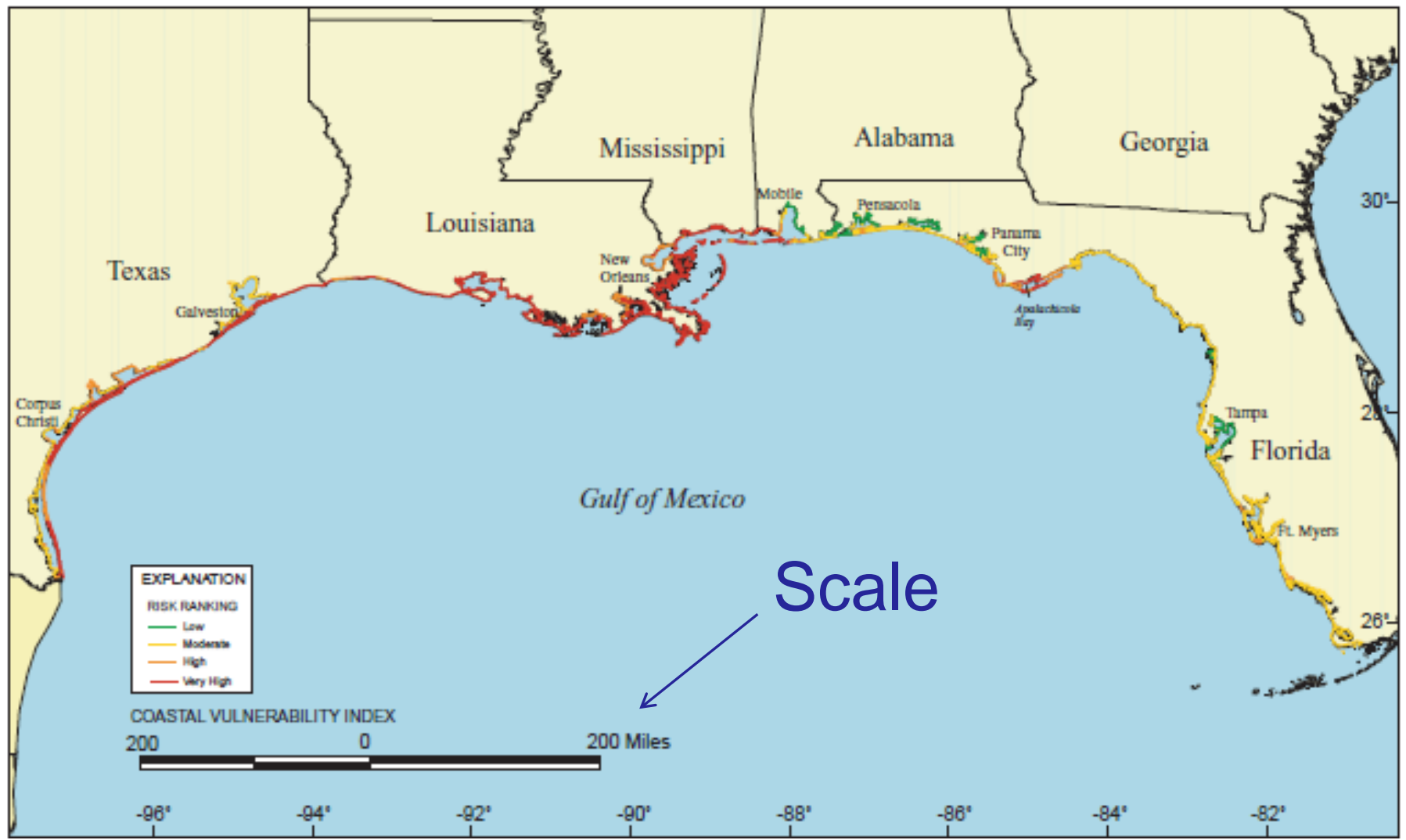
Thieler and Hammar-Klose (1999)

Vulnerability Mapping



Shaw et al (1998)

Vulnerability Mapping



Thieler and Hammar-Klose (1999)

Geohazard Mapping



Data Layers: Overlays: Base Maps: ? HELP

Mustang Island Geohazards Map

70 % Opacity

Carpus Christi Bay

Wilson's

Mustang Island

361

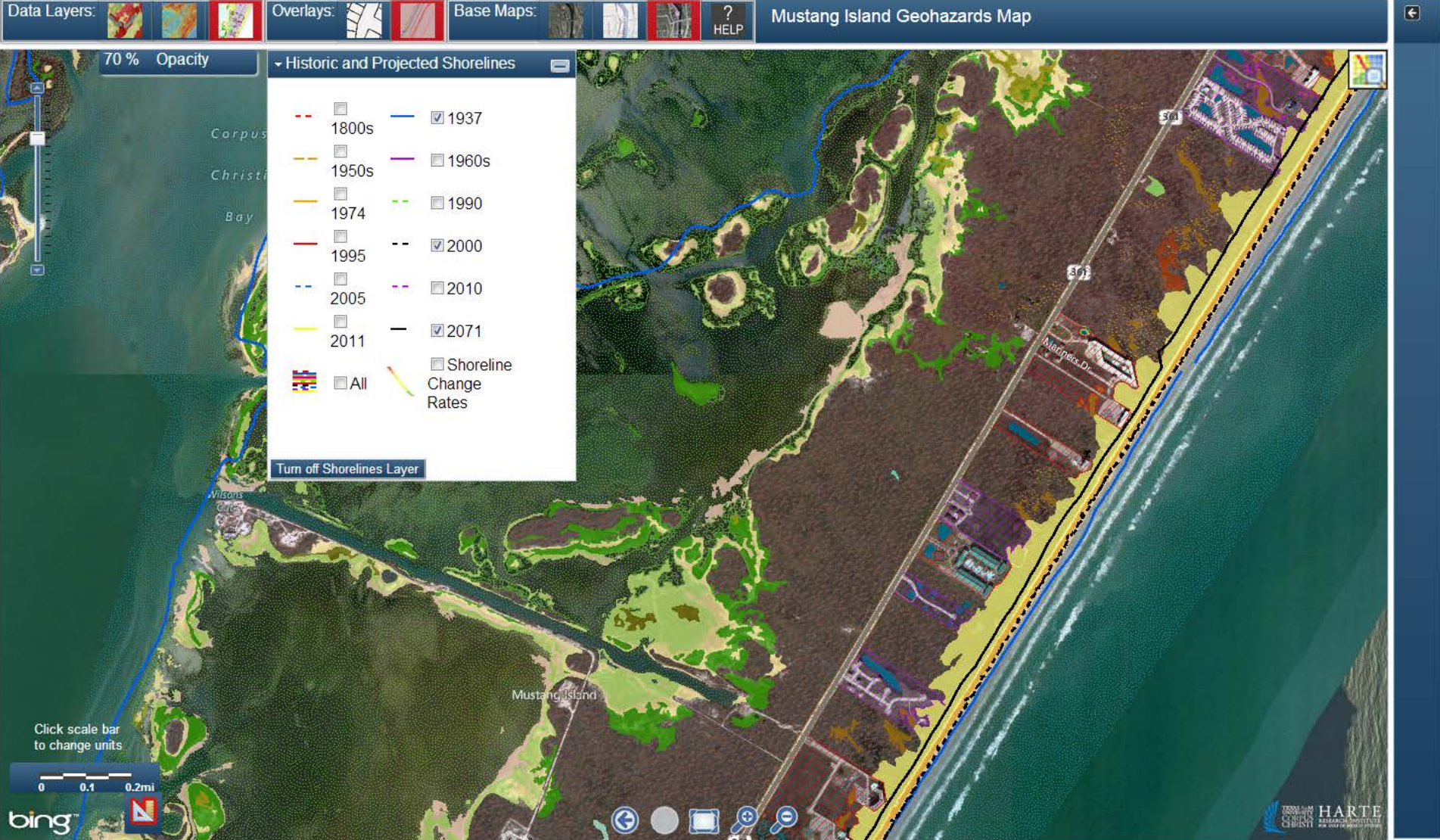
Click scale bar to change units

0 0.1 0.2mi

bing™

HARTE RESEARCH INSTITUTE

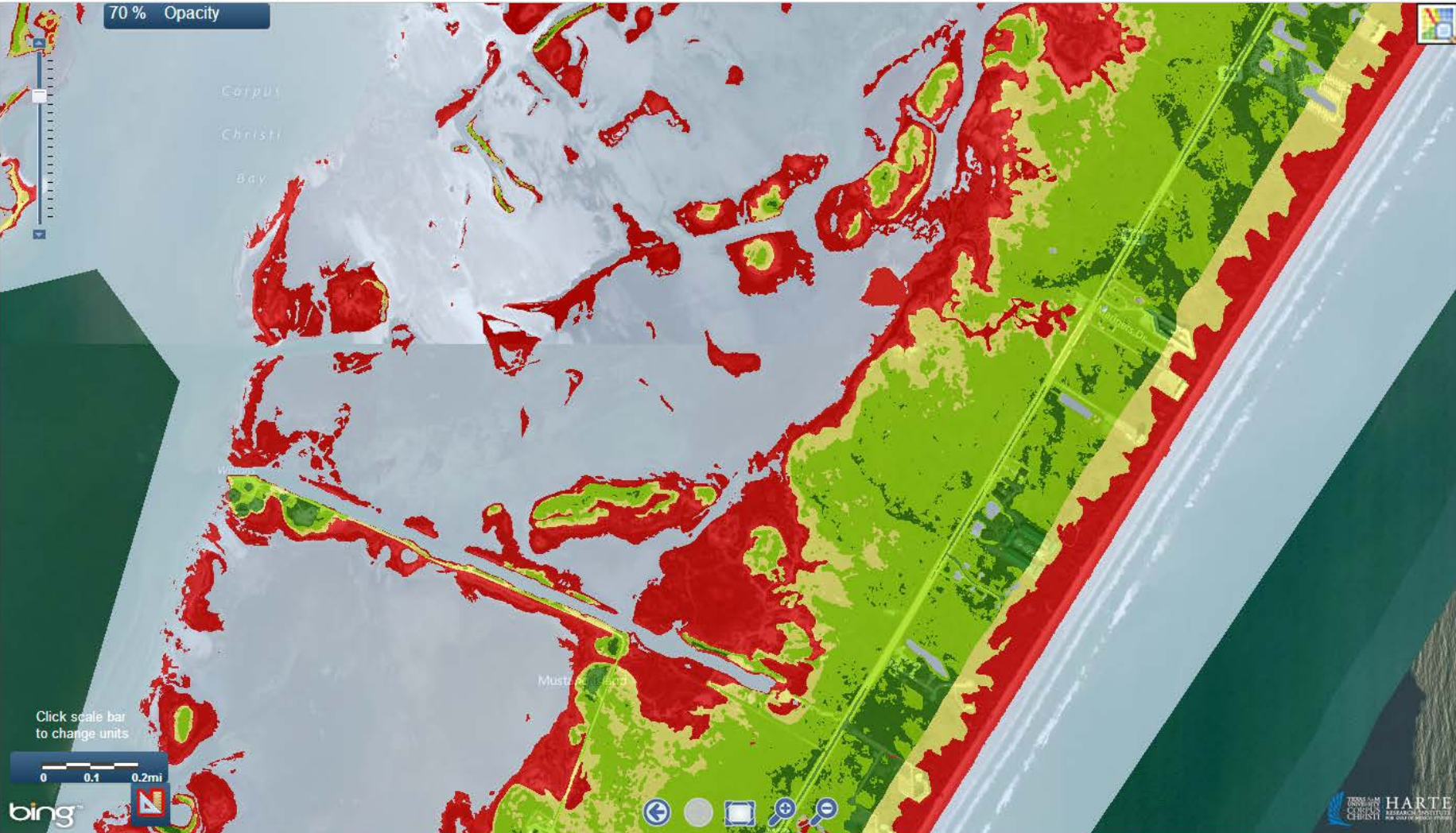
Geohazard Mapping



Geohazard Mapping



Data Layers: Overlays: Base Maps: ? HELP



Requirements for a Herschel Island Coastal Geohazard Map

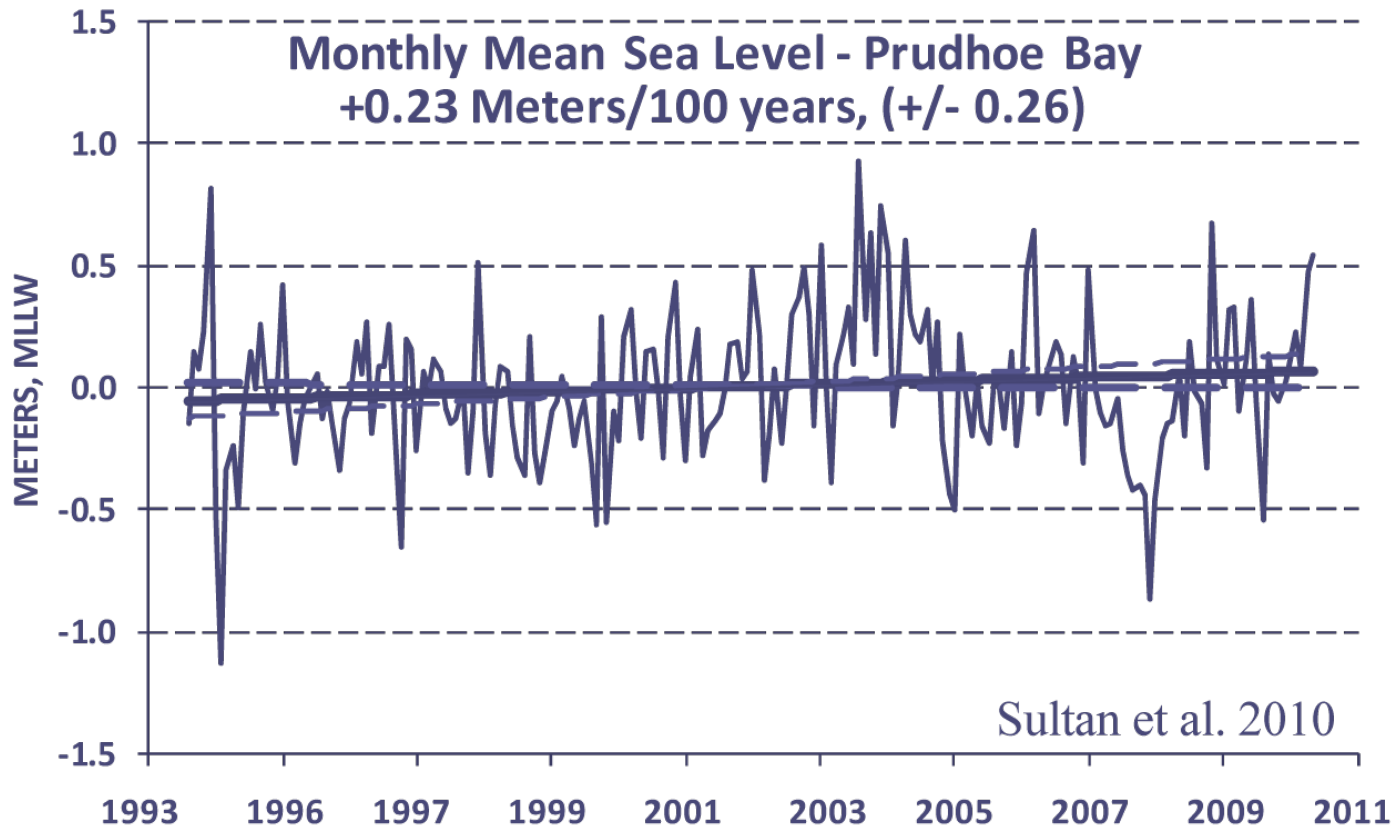


- Rate of Sea Level Rise
- Rates of Shoreline Change
- LiDAR Topography

Requirements for a Herschel Island Coastal Geohazard Map



- Rate of Sea Level Rise



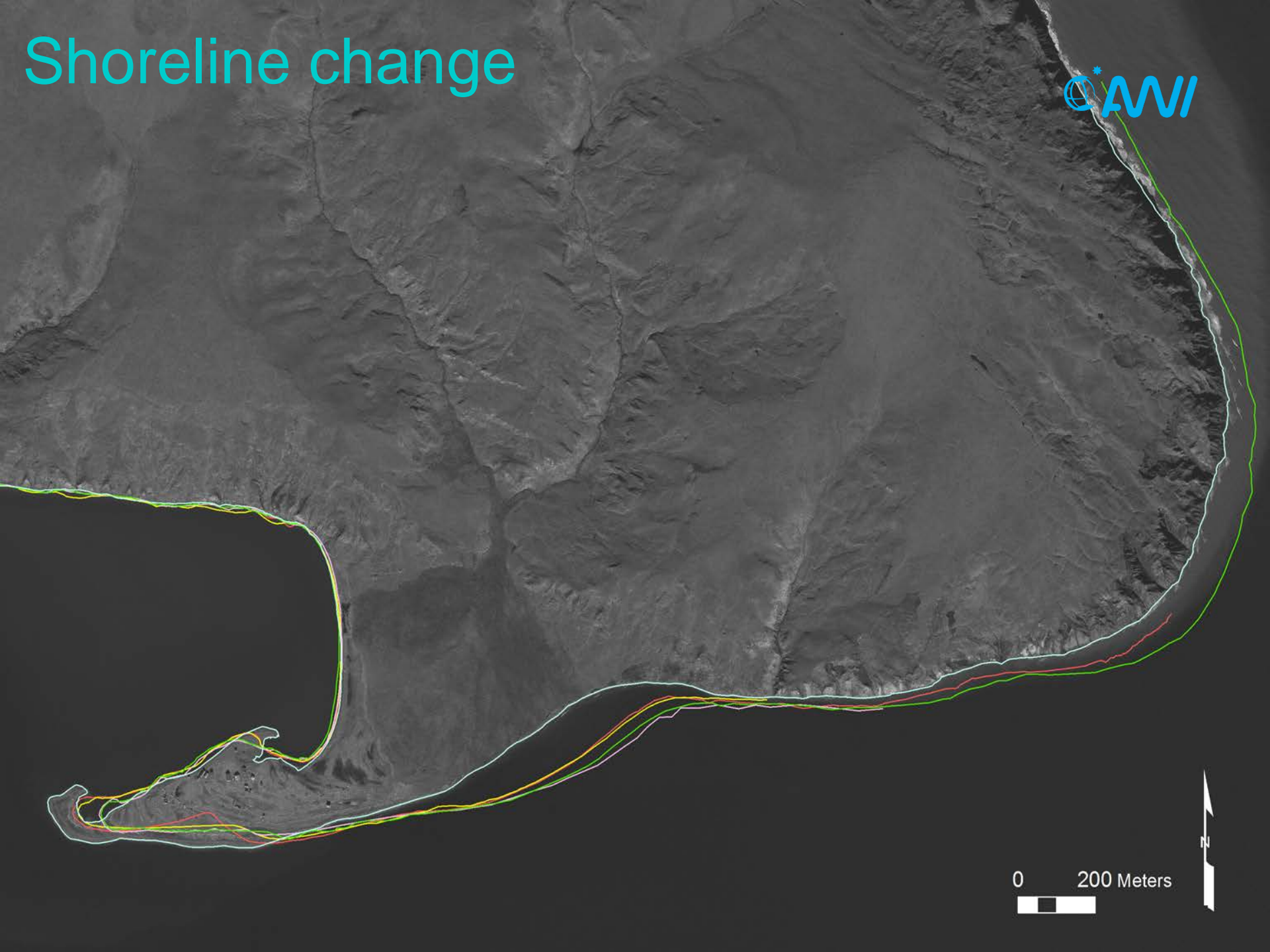
Requirements for a Herschel Island Coastal Geohazard Map



- 2013 LiDAR Topography



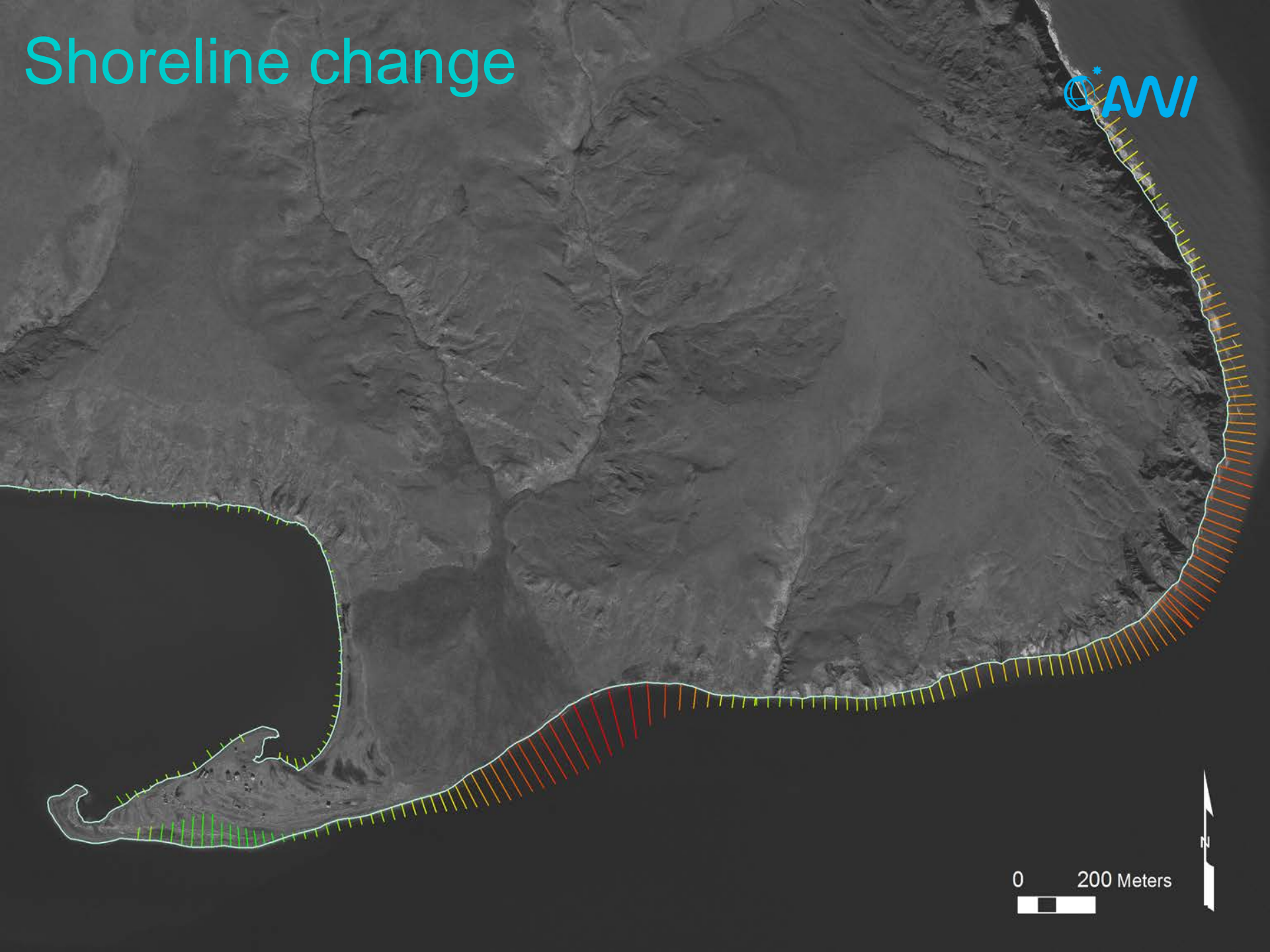
Shoreline change



0 200 Meters



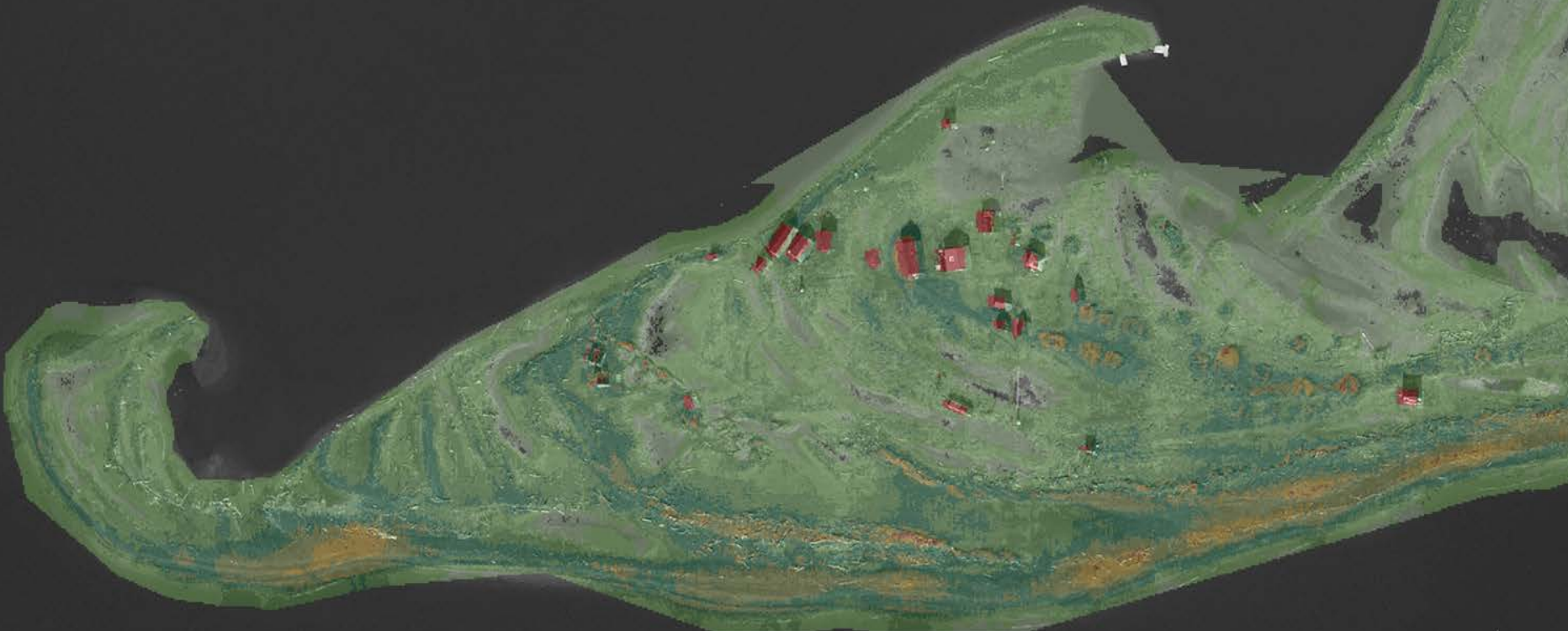
Shoreline change



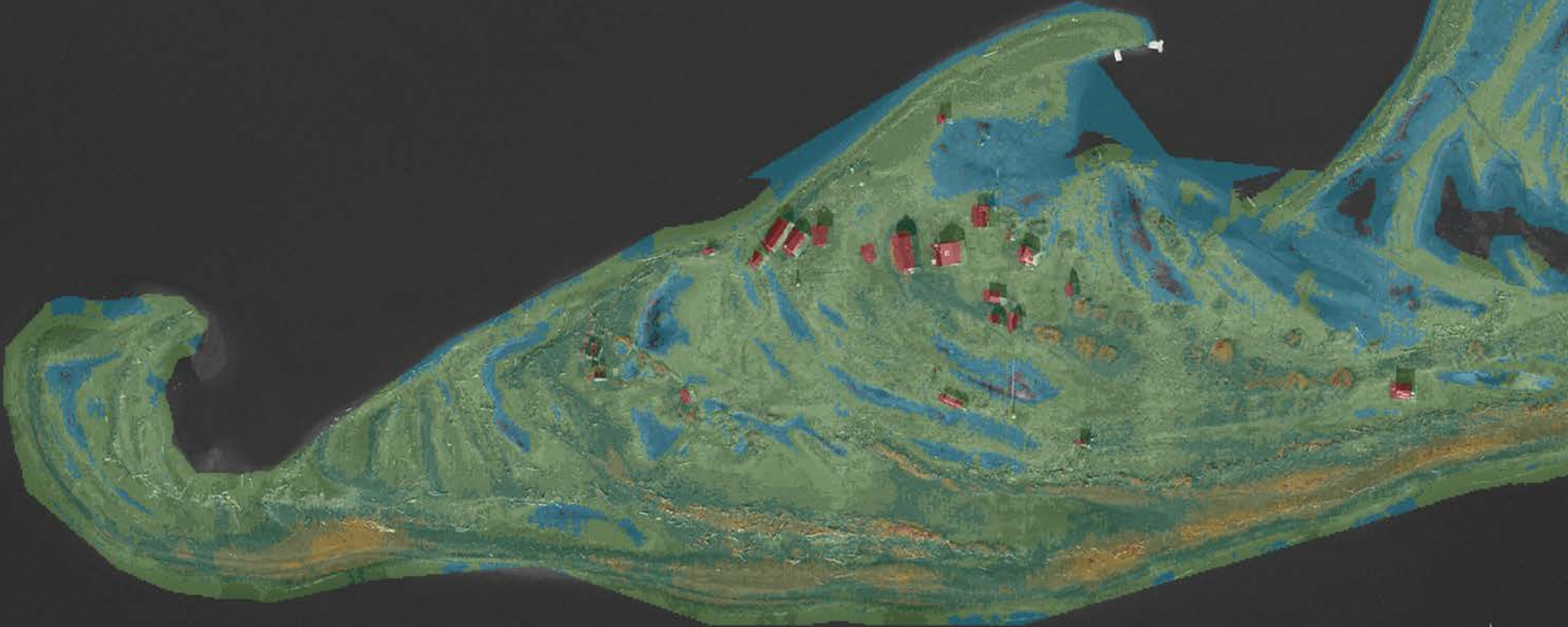
0 200 Meters



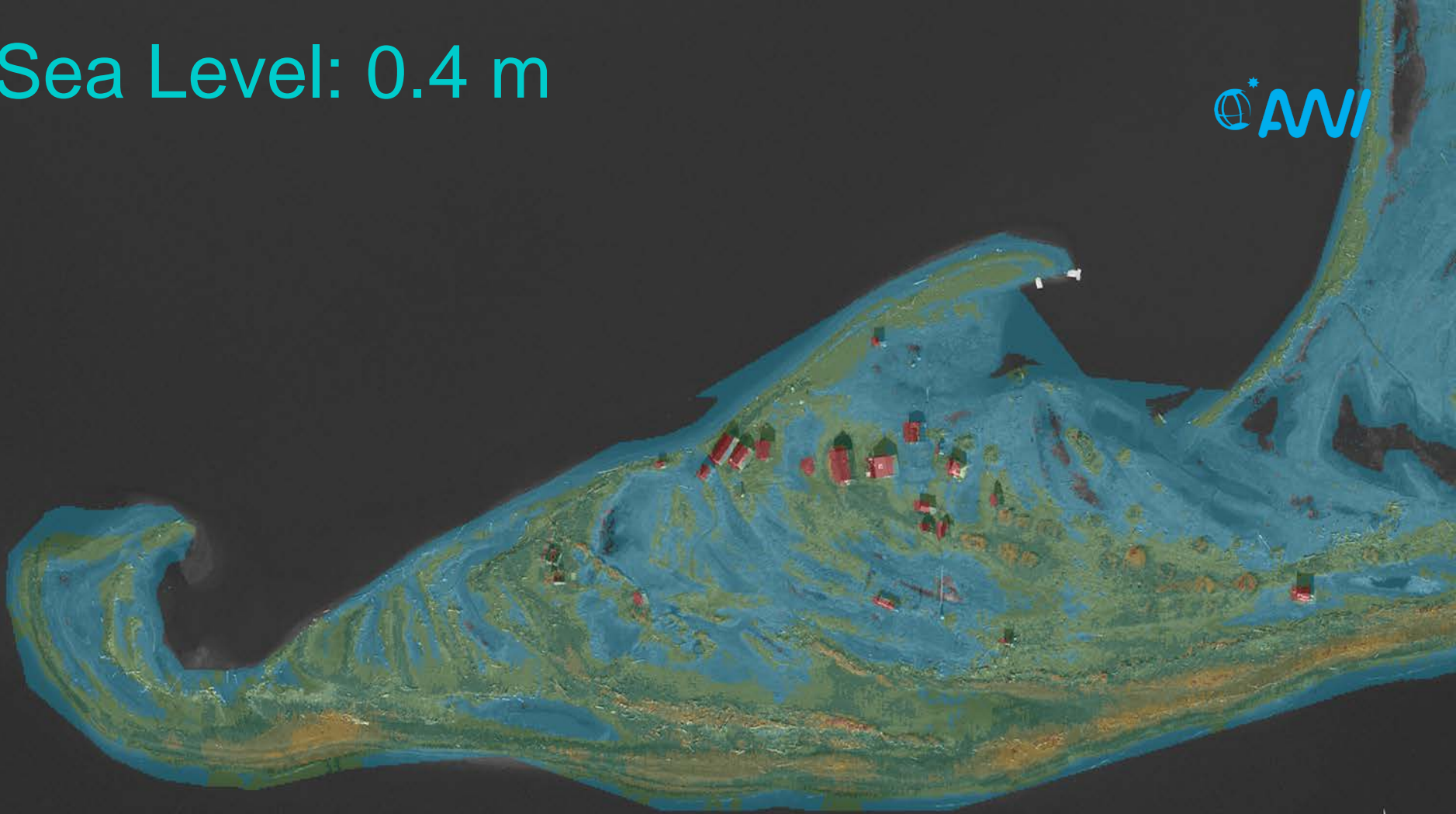
Sea Level: 0 m



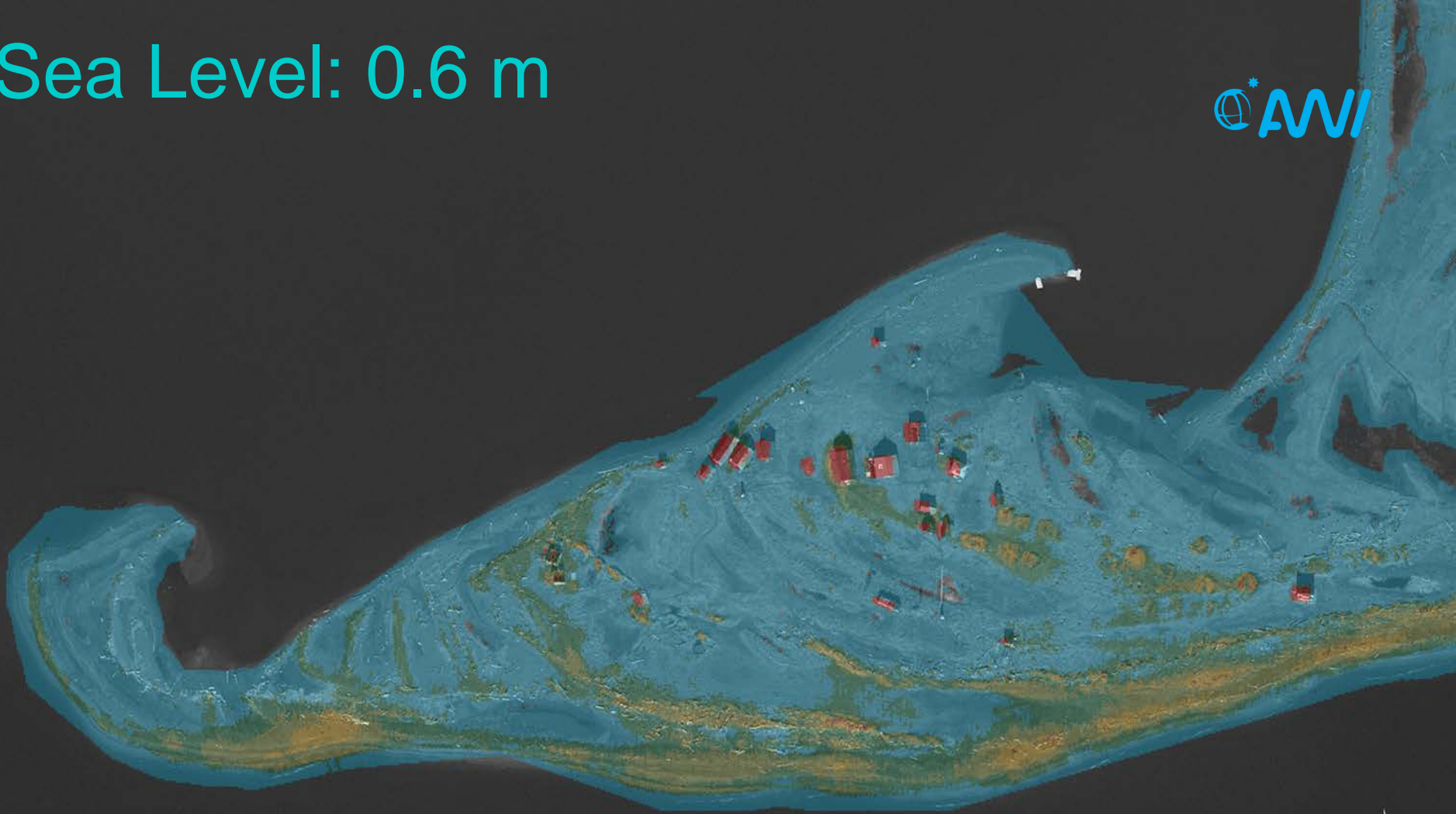
Sea Level: 0.2 m



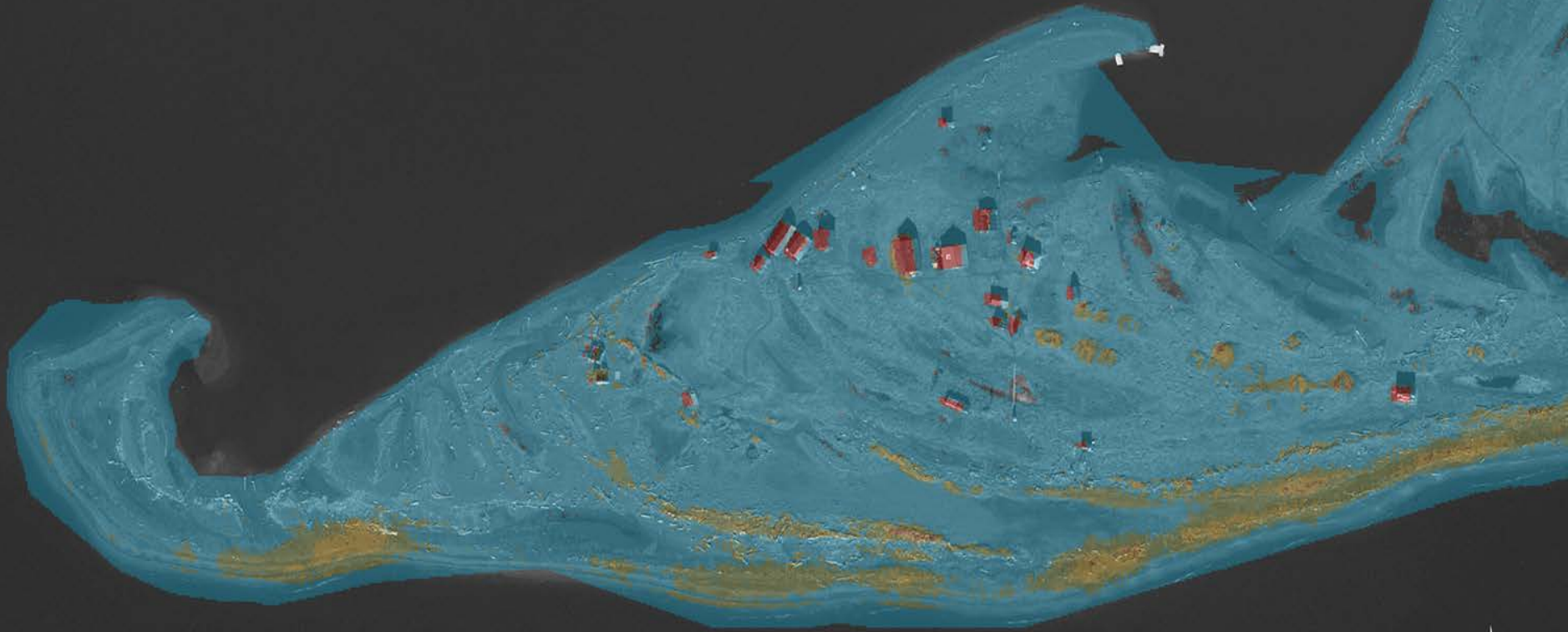
Sea Level: 0.4 m



Sea Level: 0.6 m



Sea Level: 0.8 m



Sea Level: 1 m

