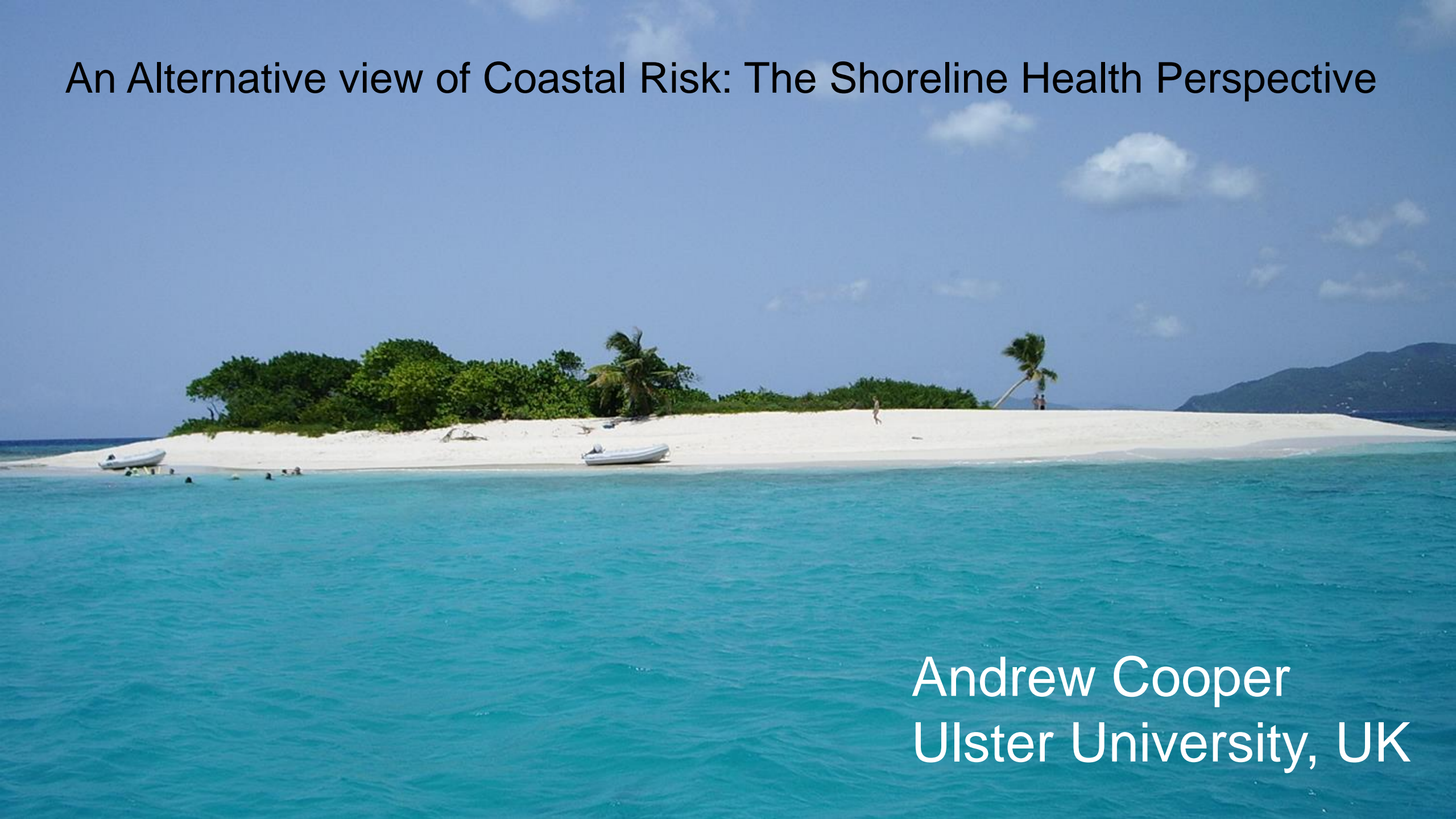
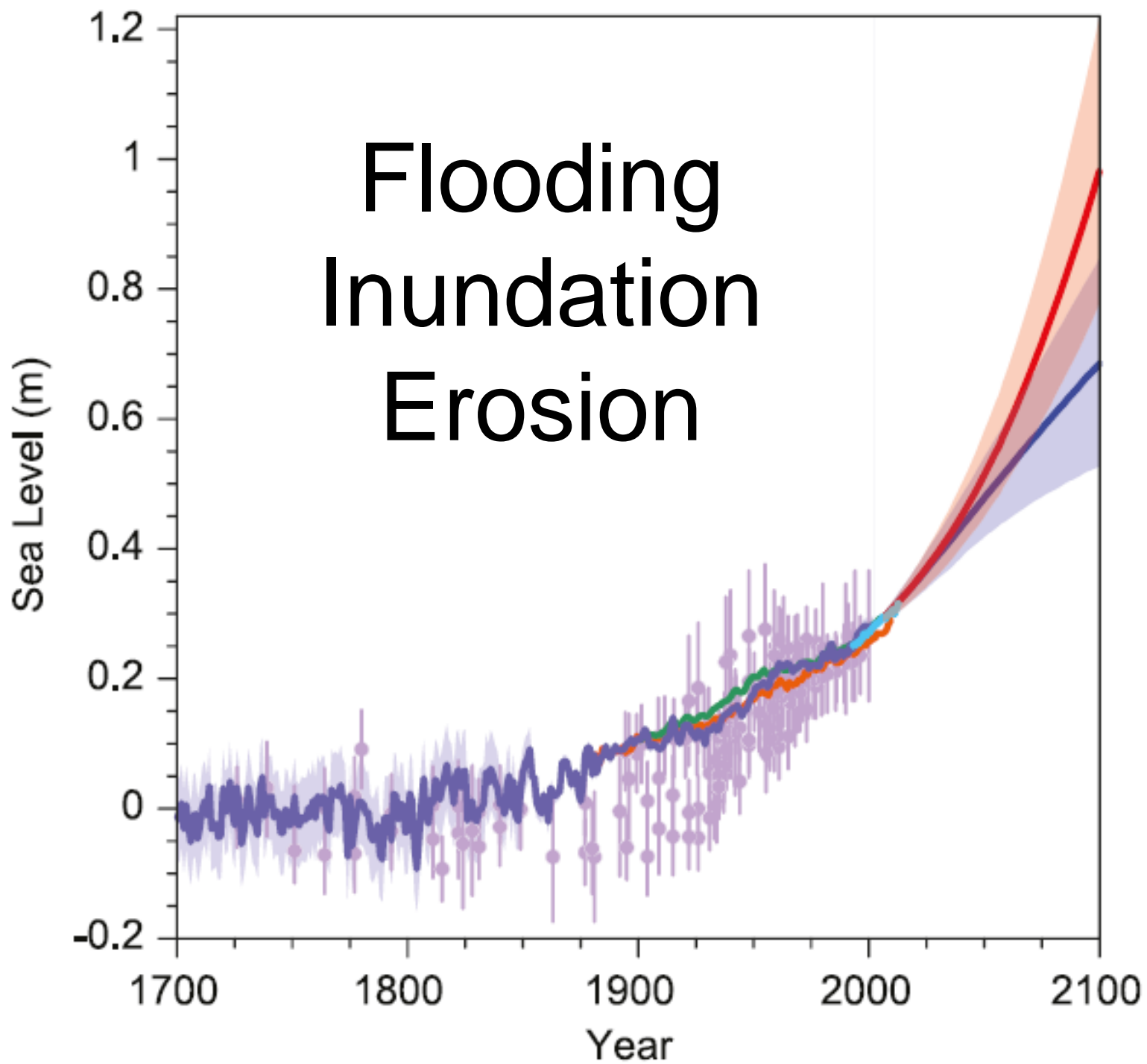


An Alternative view of Coastal Risk: The Shoreline Health Perspective



Andrew Cooper
Ulster University, UK



Virgin Islands



Surges?
Erosion?

Ireland



Surges?
Erosion?

Benidorm



Surges?
Erosion?

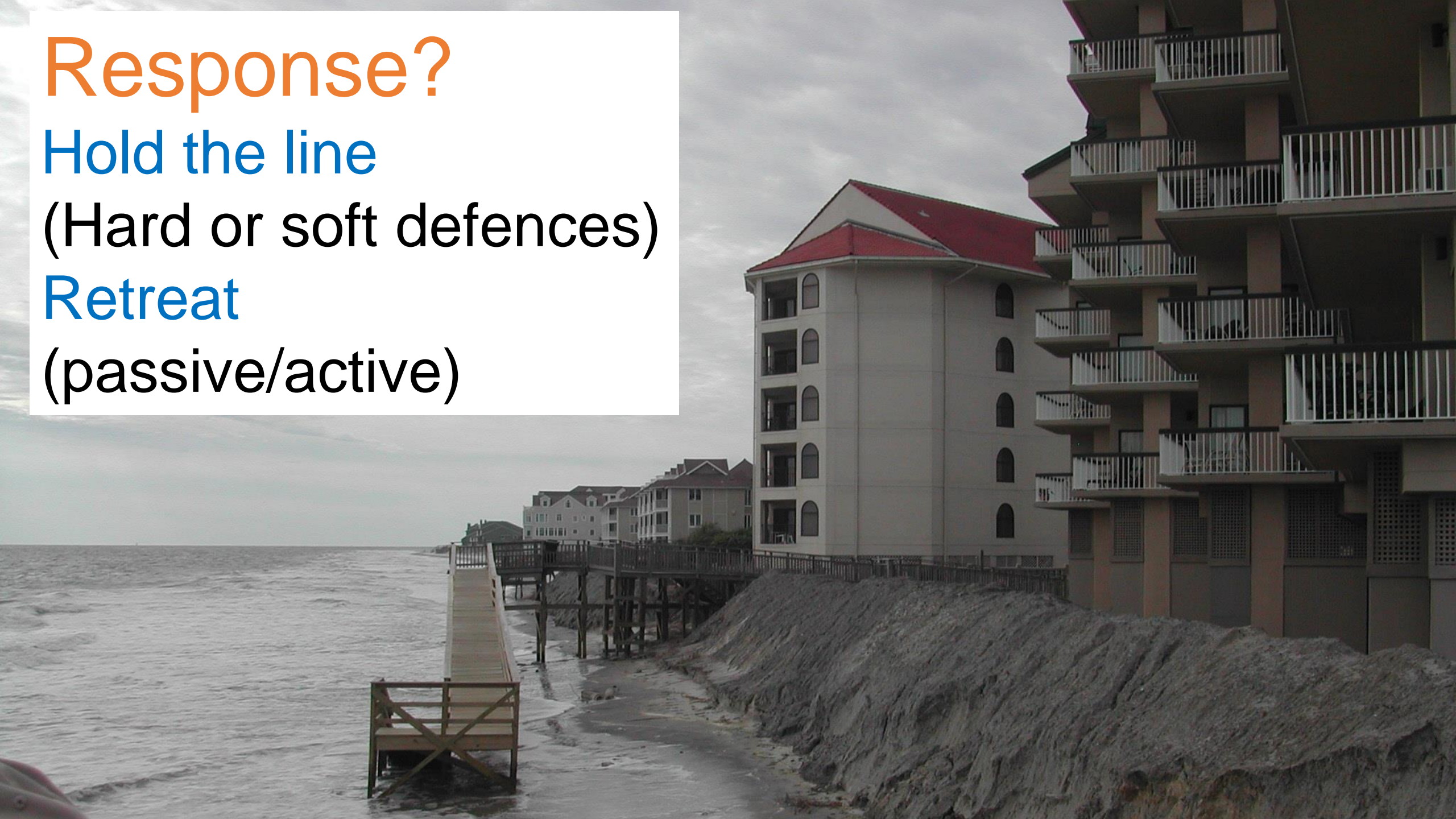
Response?

Hold the line

(Hard or soft defences)

Retreat

(passive/active)





Carnoustie, Scotland





Wales



Japan





British Columbia

North Carolina





“New Jerseyization”



Problems with Hard Defences

Coastal squeeze

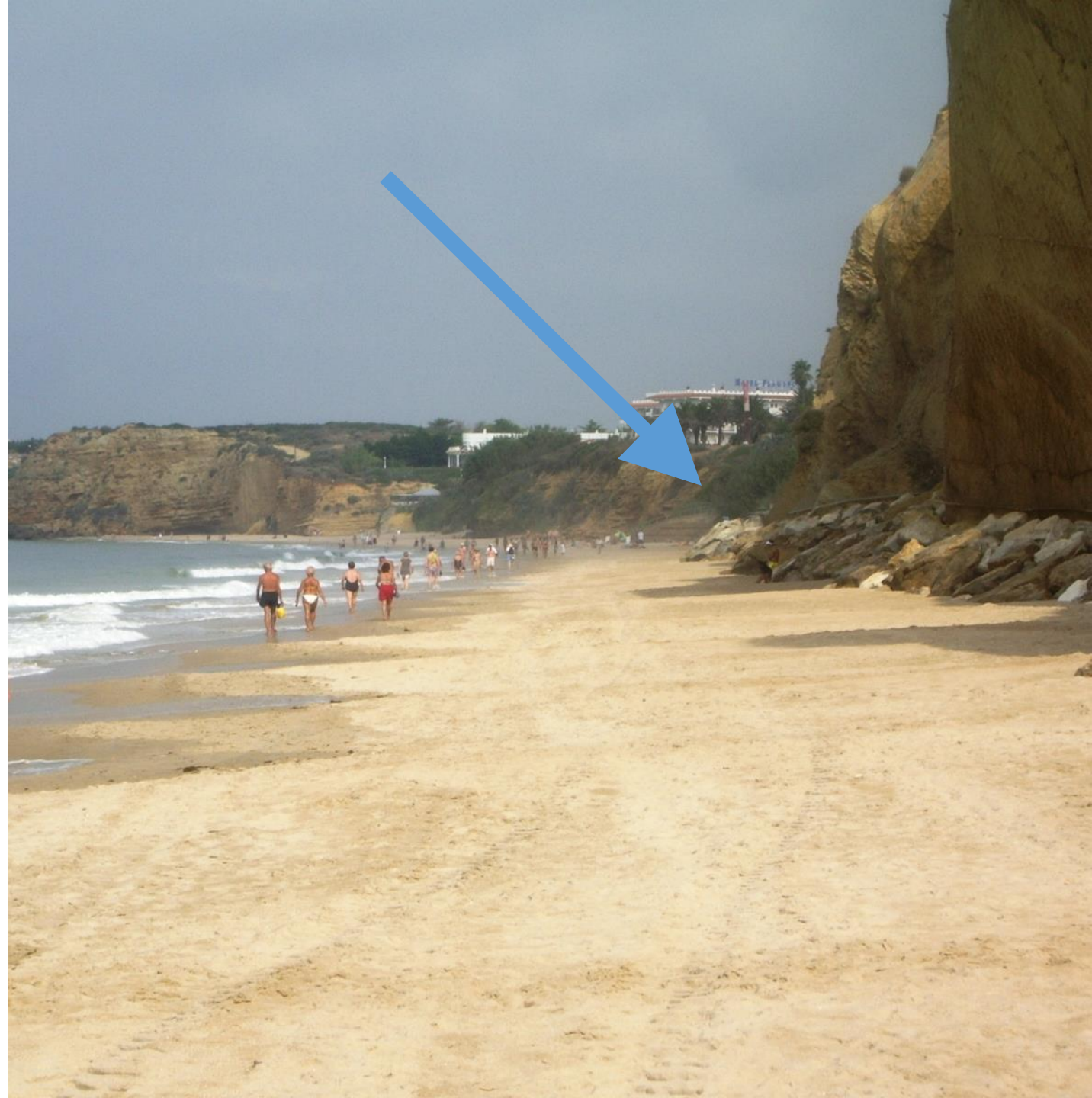
Wave reflection

Change boundary conditions

Environmental damage

Cut sediment supply

Continuous maintenance



The Nourishment Option – ‘soft defence’





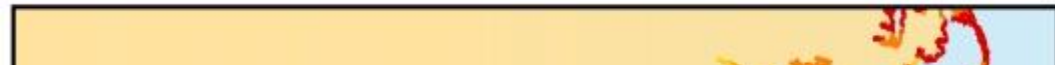
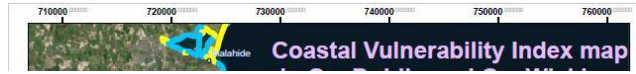
Beach Nourishment schemes France and Italy
(after Hanson et al., 2002)



Problems With Beach Nourishment

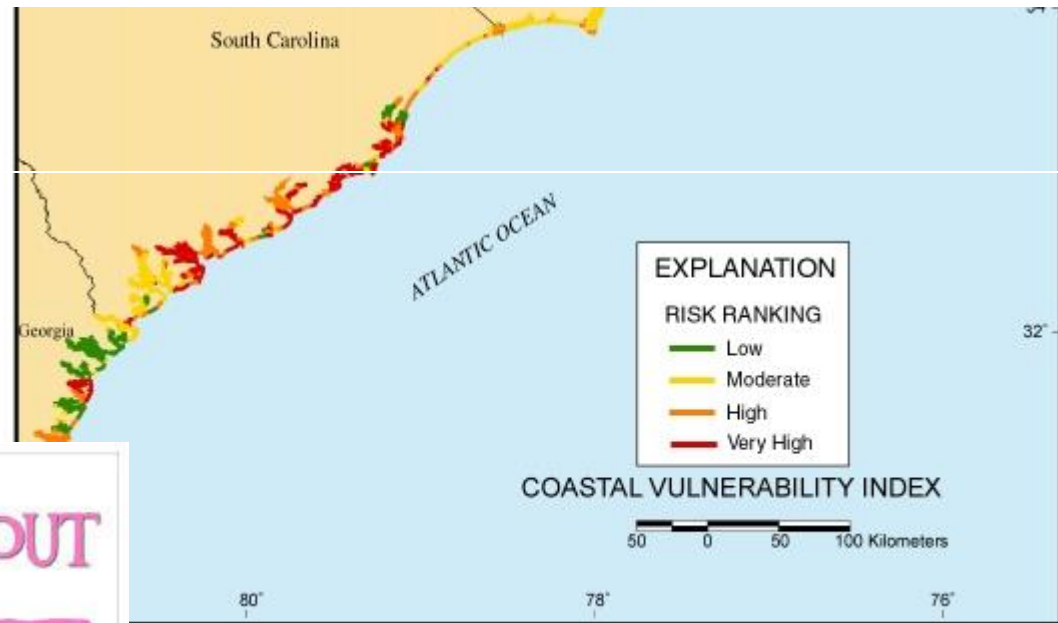
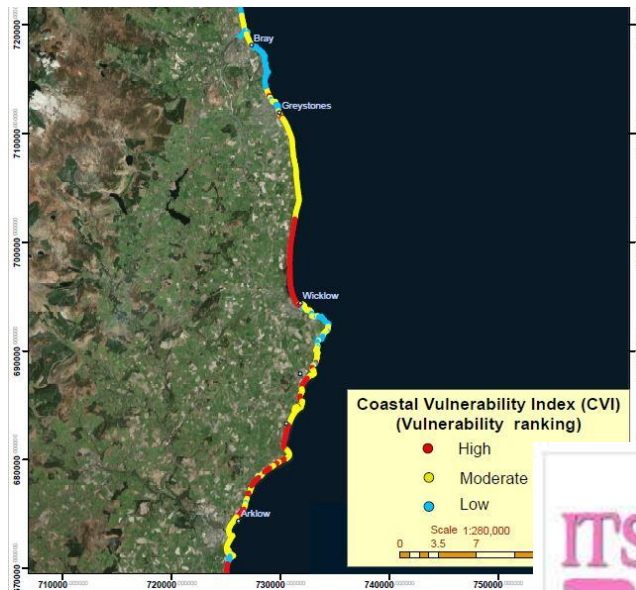
- Costs - and who pays?
- Promotes overdevelopment
- Meaningless design
- Temporary
- Continual maintenance
- Sand source?
- Bad sand
- Bad mining sites
- Environmental destruction

Coastal Vulnerability



=

Vulnerability of Human assets to coastal change



IT'S ALL ABOUT
ME

- ❖ Functioning coastal systems act as a buffer to storm surge and wave impacts
- ❖ Coastal systems respond dynamically to sea level change
- ❖ Coastal systems have survived 120 m of sea level rise since LGM

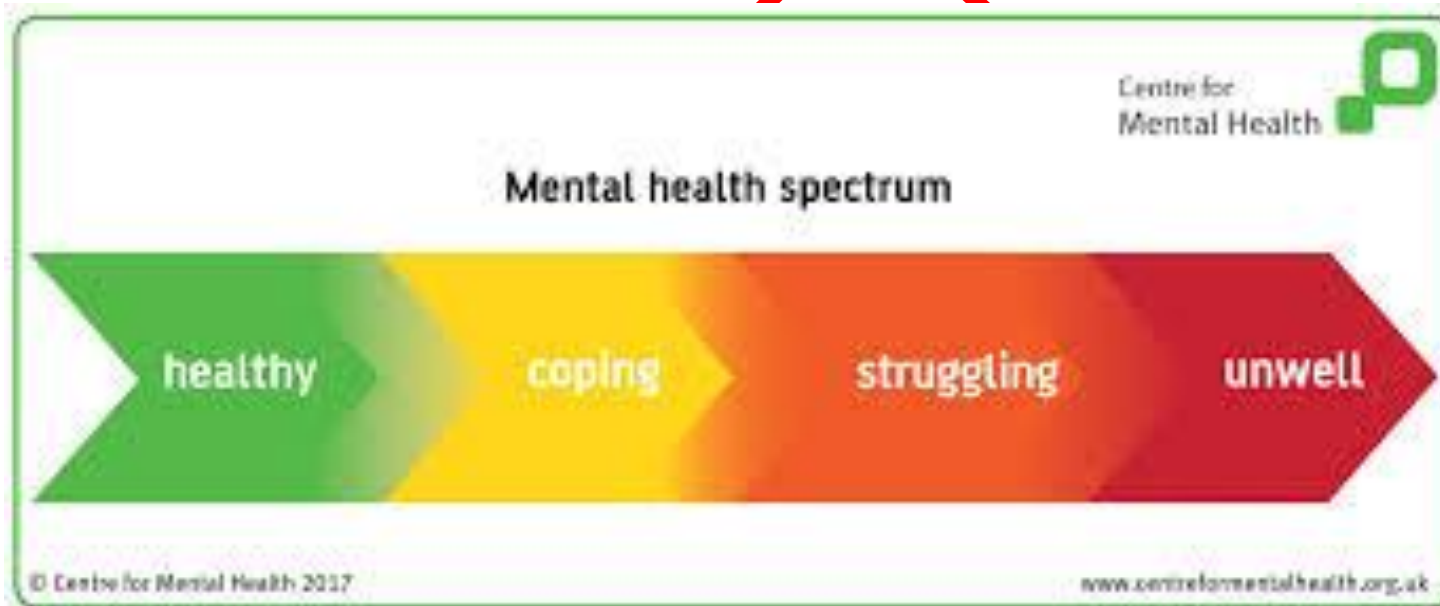


But....

We inflict damage on them by our efforts to protect property



Coastal ~~Risk~~ Health



SPECTRUM OF HEALTH™



How Healthy is the Coast?

1. Good health: No human impediment to shoreline ecosystem functioning now or in the near future

1a. Health Warning: actual or planned human structures or planned activities impede the coast's ability to evolve in the near future. The future impact on the system will depend on human response to perceived threats.

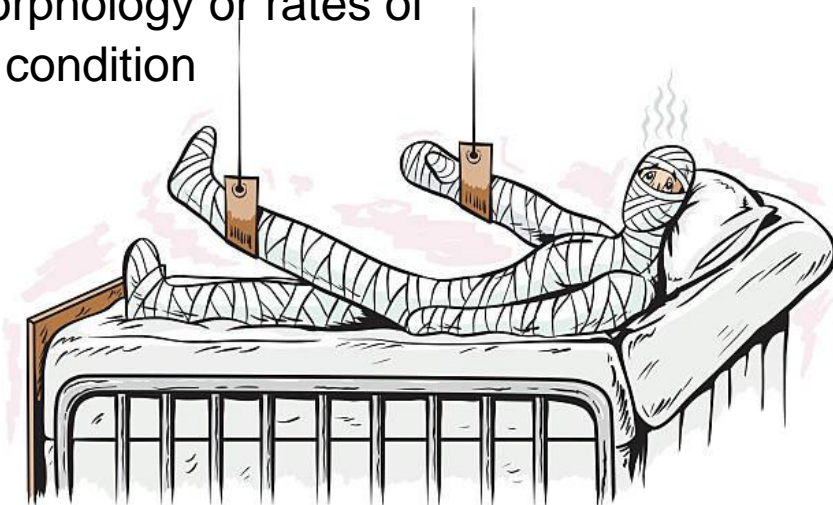
1b. Surface wounds/scar tissue. Actual human intervention is evident but is not creating problems or past human activity has caused damage. These activities have since stopped and the system is continuing to operate.

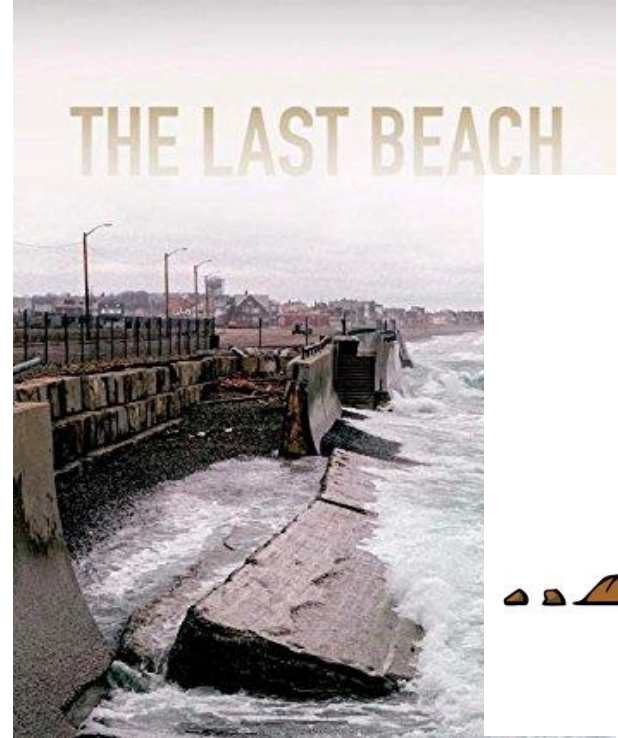
2. Minor Injury (coast can recover) Human intervention modifies the morphology or rates of sediment supply. System continues to operate but differently from its natural condition

3. Major Injury (potentially fatal).

4. On Life Support (maintained only by regular human intervention)

5. Deceased (system has been eliminated- covered/eroded/degraded)





Put Ecosystems first



1a. Health Warning



5. Deceased



Portballintrae

Portrush

Portstewart

5. Deceased



Magilligan



1b. Surface wounds



3. Major Injury

Human response to risk is a
bigger threat to coastal systems
than
climate change and sea-level rise





Coasts in Peril? A Shoreline Health Perspective

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Most assessments of coastal vulnerability are undertaken from the perspective of the risk posed to humans, their property and activities. This anthropocentric view is based on widespread public perception (a) that coastal change is primarily a hazard to property and infrastructure and (b) that sea defenses (whether soft or hard) are required to mitigate and eliminate coastal hazards. From the perspective of coastal ecosystems, such a view is both perverse and damaging. In this paper we present an alternative approach to coastal assessment that centers on the physical integrity of the coast and its associated ecosystems both now and in the near-future. The shoreline health approach represents a new paradigm for coastal management and is intended to provide a much-needed ecosystem perspective. Its premise is to categorize coasts on the degree to which their ability to function morphodynamically has been compromised by human intervention. We present an expert assessment approach involving five categories that range from “Good Health” (with “Health Warning” and “Minor Wounds” sub-divisions), through “Minor Injury,” “Major Injury,” “On Life Support” to “Deceased.” We illustrate the concept using tabulated examples of each category from cliffed, clastic and delta coasts and demonstrate its utility through two applications. This approach has the potential to quantify the degree to which coastal ecosystems have been damaged and to focus attention on the cumulative impact of human activities on coastal ecosystems.

OPEN ACCESS

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