

# Dynamic Coast & Building with Nature

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1 = Scottish Natural Heritage

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## BwN in Europe and Scotland

- Some believe, parts of modern society is on a collision course – BwN is part of the necessary avoidance strategy.
- Climate change matters, not because air temperatures, sea levels or flood frequencies are changing, but because our society is built on the assumption that they wouldn't.
- Growing evidence across our European coast of Climate Change impacts.
- Realization that traditional methods can and must be improved on.
- Growing evidence of how much nature based solutions are providing (BwN, Natural Capital, NFM)
- Growing need to appreciate what we need to do to get BwN beyond the pilot stage.



## BwN in Europe and Scotland

- Some believe, some parts of modern society is on a collision course – BwN is part of the new
- Climate change is increasing flood frequency and the assumption
- Growing evidence of the impacts.
- Realization that traditional
- Growing evidence of how much nature is being lost (BwN, Natural Capital, NFM)
- Growing need to appreciate what we need to do to get BwN beyond the pilot stage.

Sharing our experiences:

- Evidence base, business case, governance, opportunity mapping
- ...
- Where is the sweet-spot to make this happen ... what are the crucial next steps?





# The Dynamic Coast team



## What is Dynamic Coast?

Dynamic Coast is a Scottish Government project, funded by CREW, managed by SNH, delivered by a research team from the University of Glasgow.

It provides a publicly available evidence base of changes to Scotland's erodible coastline, to better inform decision making, to improve the resilience of our coastal infrastructure, assets, businesses and communities.

Prior to 2015 the Scottish Government (and its public sector) had limited knowledge of the precision of our coastal mapping, no national overview of coastal erosion or its impacts on society. **With Dynamic Coast we do now**, with an evidence base to inform national, regional, local & sectoral investigations to improve resilience and adaptation along our coast.

## Why is this important?

A successful, resilient and plan-led economy needs a reliable evidence base in a changing world: nowhere is this more crucial than at the coast.

Climate change is occurring, new risks and coastal impacts are being identified and need a response.

Yet this is occurring at a time of public sector cuts and funding uncertainty.

We had to **collaborate** and **innovate** to **deliver** the improvements required, given Cabinet-level interest in the issue of coastal erosion.





## What did we do?

We compared the positions of 3 epochs of shorelines across all the Scottish coast, focusing on our soft (erodible) coastline, via 1M data points.

1. This identified significant changes whose extents and rates were projected forward to forecast the locations of **coastal risk**;
2. We then overlaid the locations of society's **coastal assets**;
3. We then **monetized** the analysis to allow a projection of present and future costs from the impact of coastal erosion.



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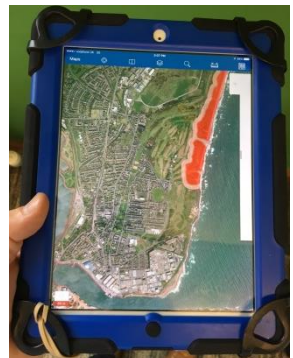
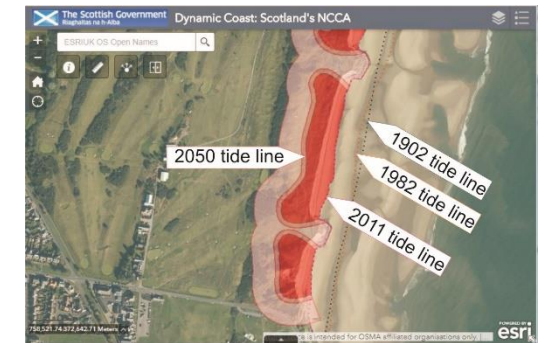
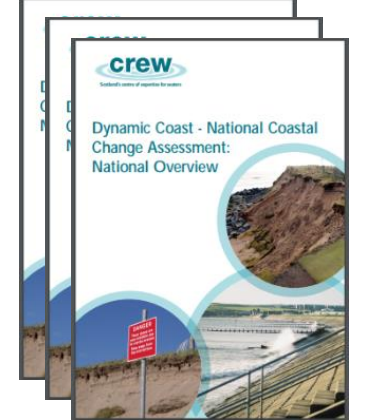
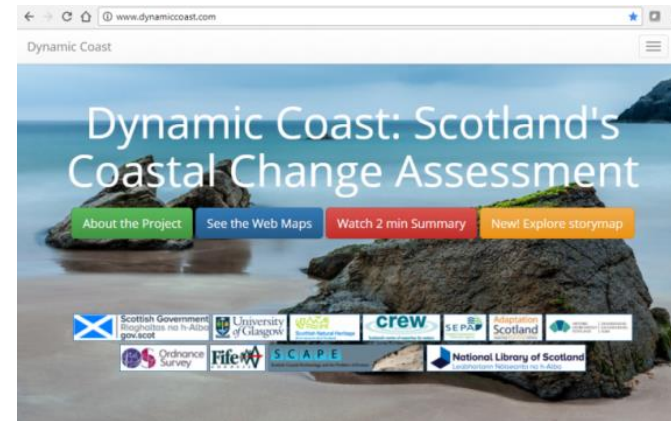
## What did we do?

All of the evidence base was then shared publicly via [www.DynamicCoast.com](http://www.DynamicCoast.com) with interactive maps, reports and videos.

Data is being made available to inform partner's work (OS updates & LA planning).

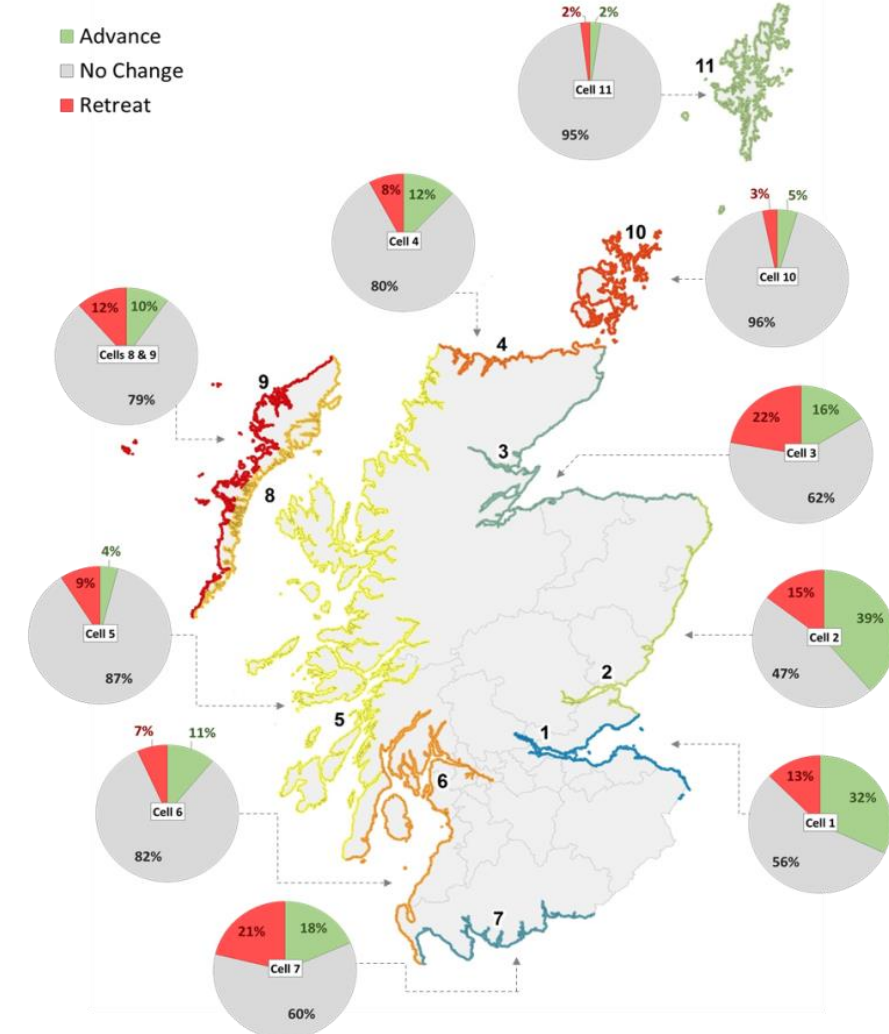
- ✓ Saving the OS money by knowing where & how frequently to update
- ✓ Allowing LA to spend limited money on Policy not map analysis
- ✓ Allowing business to forecast risks and build with nature to safeguard assets
- ✓ Allowing flood strategies to be more accurate

? Is an up to date shoreline important to you & your business?



## What did we establish?

- Our soft shoreline is more dynamic than it used to be.  
(substantial changes were not routinely updated by OS – they are now)
- 19% (3,802km) of Scotland's 21,305km long shoreline is soft and of that soft coast....
  - 11% has accreted since the 1970s (423km)
  - 12% has eroded since 1970s (442 km)
  - 77% stable
  - Strong regional biases exist with erosion higher on Scotland's open east coast (accretion is also higher in the east but is strongly inlet-concentrated).



% of soft coast change since 1970s



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### Since the 1970s ....

- Extent of accretion is reducing (↓ 22%)
- Extent of erosion is increasing (↑ 39%)
- The erosion rate has doubled (now 1m/yr average)
- Consistent with climate change

S. golf course MHWS			MLWS		
Year	change (m)	rate (m/yr)	Year	change (m)	rate (m/yr)
1902 - 1982	-12.4	-0.2	1902 - 1982	-103.2	-1.5
1982 - 2013	-48.2	-1.6	1982 - 2018	-57.8	-1.2
2013 - 2018	-11.6	-2.3			



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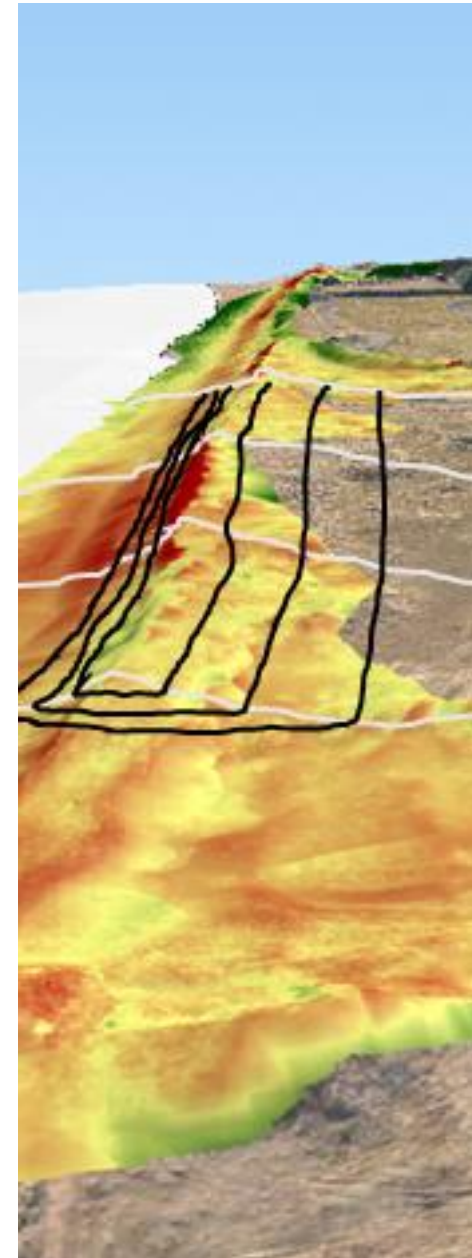
- If recent erosion continues, then over £340m of coastal assets will be impacted by 2050 – **BUT** this underestimates likely costs.  
(all sectors in all cells: rail, road, buildings, infrastructure, tourism, cultural & natural heritage)
- £13bn of assets and infrastructure protected by natural defences.
- £5bn of assets and infrastructure protected by artificial defences.
- Scotland proves the value of BwN now and increasingly so in the future.
- *We must value Scotland's natural defences and natural capital.*  
Roseanna Cunningham  
(Scottish Government Cabinet Secretary)





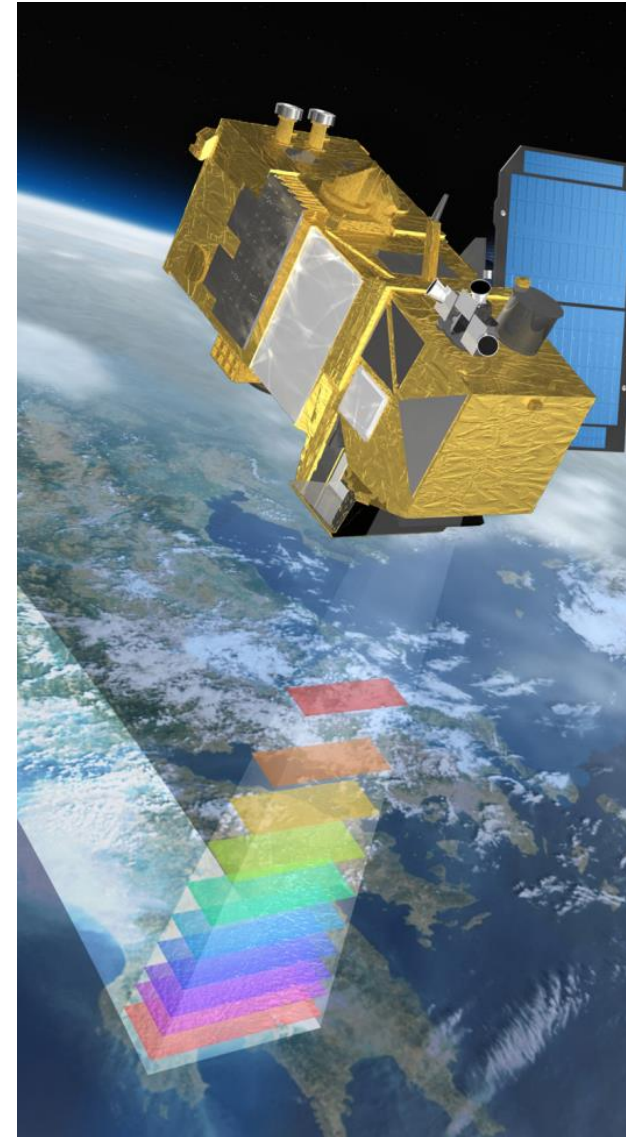
## What are we doing now?

- Continuing to work together to further improve our evidence base.
- Phase 2 of Dynamic Coast is ongoing, includes consideration of future accelerations in erosion and implications for flooding, so we can be better prepared, more resilient and adaptive.



## Greater future need?

- Our world is changing (physically, societally & technologically) and we must act and invest now to understand the implications and, if warranted, deliver early warning.
- Interreg BwN allows the space to explore this and target effort.
- Dynamic Coast has shown that a small team working closely with supportive key partners can deliver a step change in our shared understanding and approach to better manage future risk at the coast. Ongoing collaboration to explore greater efficiencies and options merging EO, LiDAR, Aerial, Drone & Ground Survey data.
- What MHWS has shown us may be the tip of the ice-berg...  
**What about MLWS?** Perhaps EO can deliver change intelligence here... but that's another presentation!



# Questions?

[www.DynamicCoast.com](http://www.DynamicCoast.com)

Special thanks to our funders:



and the University of Glasgow research team:

**Jim Hansom & James Fitton**

**Larisa Naylor, Martin Hurst, Richard Williams, Ria Dunkley.**



## Introduction to Montrose





## Introduction to Montrose

- Holocene peninsula - OK for RSLF ... but now RSLR
- Geological control and marine approach
- RSLR = 3mm/yr
- Sediment deficit both to north & south
- Historical erosion & recent acceleration
- upper & lower foreshore .. Annet Bank & Dredging

S. golf course

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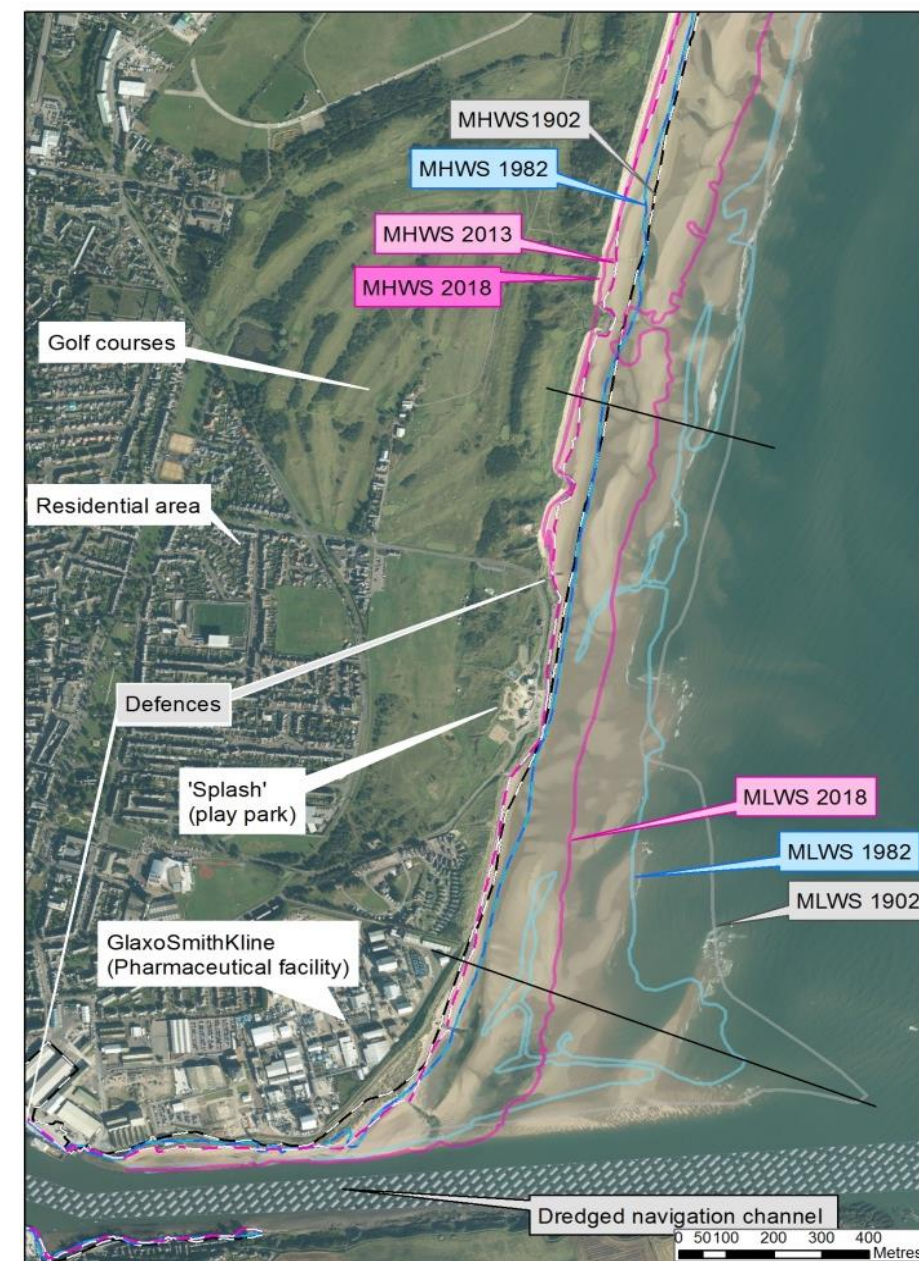
Annet Bank

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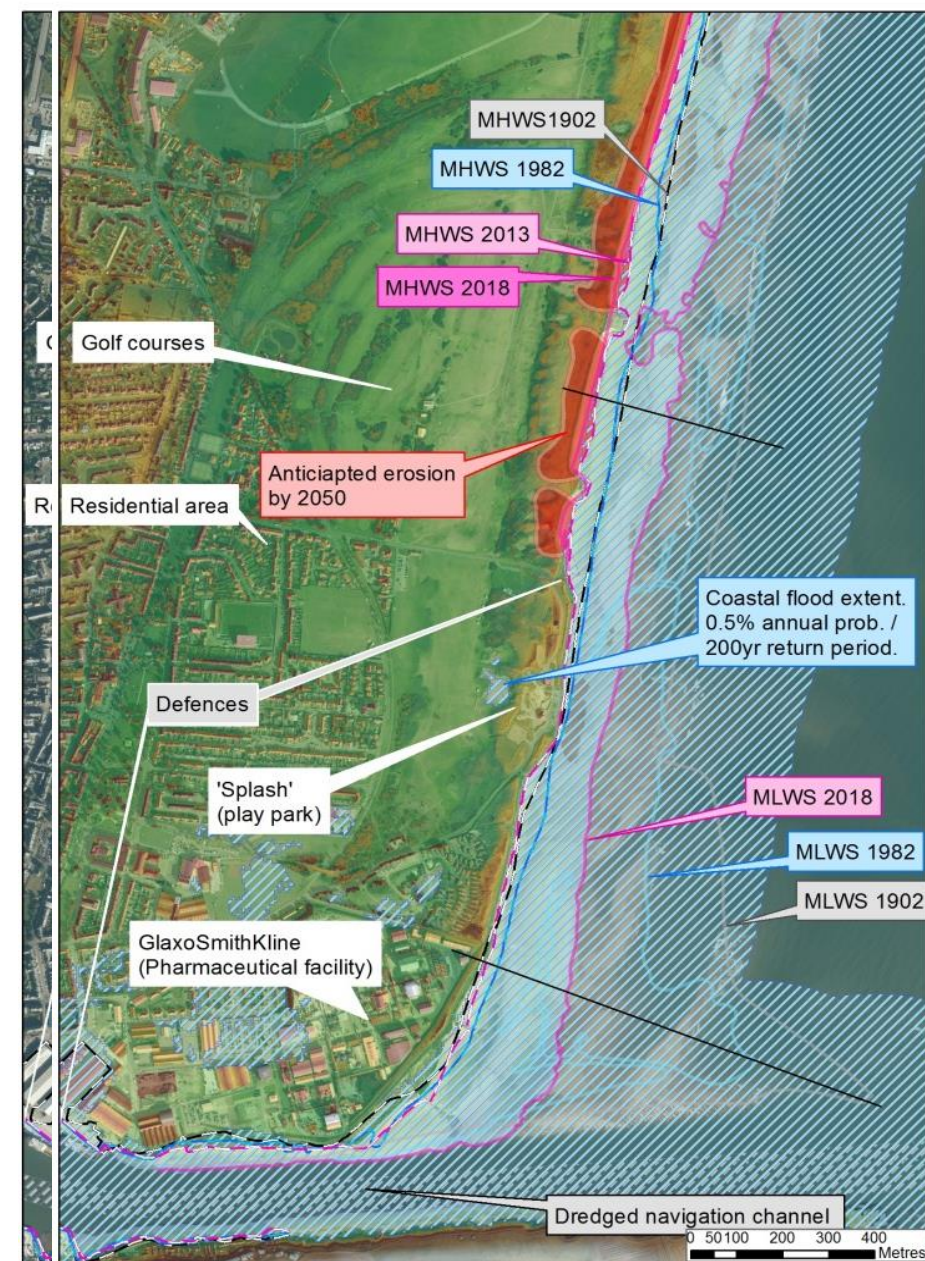
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- Geological control and marine approach
- RSLR = 3mm/yr
- Sediment recycling from Tay (flood & ebb) & artificial feed at weak points.
- Historical accretion & recent erosion

