





Dynamic Coast @ CXC

Scotland's National Coastal Change Assessment















Scottish Natural Heritage Dualchas Nàdair na h-Alba All of nature for all of Scotland Nàdar air fad airson Alba air fad















What is Dynamic Coast?

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

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

'Dynamic Coast' includes the National Coastal Change Assessment phase 1 & 2.







Climate change is affecting Scotland's erodible coast



Since 1970s: 22% \downarrow extent of accretion, 39% extent of \uparrow erosion, and x2 of erosion rates. Golspie, 2014







Nature's defences protect more than ours do Within 50m of MHWS...



£13bn protected by natural defences





At least £240m of assets are at risk in next 30 years if recent erosion continues





All sectors are at risk within all coastal cells

(buildings, roads, rail, runways, water supply, cultural & natural heritage).







These are likely to be underestimates...



Not just sea level rise: Storm freq., Human factors etc are also relevant.



Vulnerability assessment (ie £240m) based on past rates rather than faster future rates & erosion expanding into adjacent areas. Flooding & erosion expected to increase significantly. In many areas asset damage is not imminent, but we must start to plan now.







We have a window of opportunity to prepare mitigation, adaptation and resilience plans

"Dynamic Coast gives Scotland it's most advanced nationally consistent and locally informed understanding of the causes and consequences of coastal change that it has ever had, so we have to use it and build on it now."

Environment Secretary Roseanna Cunningham

(August 2018)







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Evidence base available to all... www.DynamicCoast.com







Maps of all beaches (past, recent and anticipated change), 21 reports & summaries, guidance and videos



- Geo-rectified historical maps
- Semi-automated extraction of tide lines
- 1 million points on the 3 shorelines
- Semi-automated calculation of distance between points
- Analysis of change
- Future projection where change is real
- Vulnerability Assessment (what is at risk)
- Whole Coast Assessment (what is elsewhere)
- Publish results online via AGOL, website & reports





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Results

- 37% of coastal roads are on soft coast,
- Almost 5x more than defended shores,
- Same number of buildings behind soft coast as defended shore &
- 5km of roads at risk in next 30 years.

Ţ	otal nu	imber	of asset	s wi	thin !	50m of MHWS
icipated)+) double rate	AII	& Mixed	Soft	soft coast	ti fi ci al	

Anticipa (2050) re rate	Anticipa (2050+) do rate	AII	Hard & M	Soft	% in soft c	Artifici	
52	150	33,494	14,359	9,503	27%	9,632	Buildings
	10	1,336	733	497	37%	107	Roads (km)
2	2	104	27	58	56%	18	Rail (km)
1	4	3	2	0	11%	1	Runways (ha)
26	27	1,029	471	438	43%	120	Cultural (ha)
447	670	23,430	14,873	8,424	36%	133	Natural (ha)
	4447	training Cost 1 1 2 2 1 4 2 27 447 670	Image: Section of the section of th	Image: Section of the section of th	\vec{e}_{P}	\vec{e} e	\vec{P} \vec{P} \vec{R} \vec{N} N







Designed for partnership working



Local Authorities (N&S Ayrshire, Montrose, Highland etc) ClimateReadyClyde







Next steps? Dynamic Coast (phase 2)

1.	Where are nature's defences & how	Apply so the topography of our gradible coast to avaluate resilience & find breach points. (National)				
	resilient are they?	Analyse the topography of our erouble coast to evaluate resilience & find breach points. (National)				
2.		Appreciate the implications of climate change on the extent and rate of erosion. How much should				
	Climate change accelerations	we increase the £240m estimate of damage due to climate change? (National)				
3.		Improved understanding of change of vegetation edge monitoring & historical photographic surveys				
	Improved monitoring	(10 sites)				
4.	Develop Mitigation & Adaptation Plans	Understand past 3D change at Super Sites alongside distribution of assets. Project future change and				
	at 7 Super Sites	consider implications, then develop plans to mitigate and or adapt to risks.				
5.	Increase adaptation awareness	Provide bespoke risk summarise for key partners				
6.		Investigate the societal vulnerability to anticipated coastal erosion to produce a Coastal erosion				
	Social vulnerability to coastal erosion	disadvantage map of Scotland.				











Implications for businesses: Sector Summary (Draft) – GOLF



Who will this impact?

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University of Glasgow

- 1/4 of Scotland's golf courses are coastal and together comprise 1/3 of total area of courses in Scotland.
- Directly they generate over $\pm 95 \text{m/yr}$, + millions more indirectly*,
- 10% by area is at risk from coastal flooding (temporary threat),
- 1% by area is at risk from erosion (permanent threat),
- At least £9m/yr turnover at risk from flooding and £1m/yr at risk from erosion.
- Climate change is increasing the risks to golf course assets.



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Questions?

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Special thanks to our funders:



Scottish Government Riaghaltas na h-Alba gov.scot $\mathbf{>}$





Scotland's centre of expertise for waters