National Trust

Shifting Shores
Wave 2 seminar

Raising awareness of the effects of climate change on Northern Ireland's coastline

National Trust

Scottish Government
Riaghaltas na h-Alba
gov.scot

crew
Scotland's centre of expertise for waters

University of Glasgow

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

Historic Environment Scotland
Àrainneachd Eachdraidheil Alba

SEPA

National Library of Scotland
Leabharlann Nàiseanta na h-Alba

Ordnance Survey

St Andrews Links
the home of golf

Scottish Golf

Fife Council

Adaptation Scotland
supporting climate change resilience

SCAPE

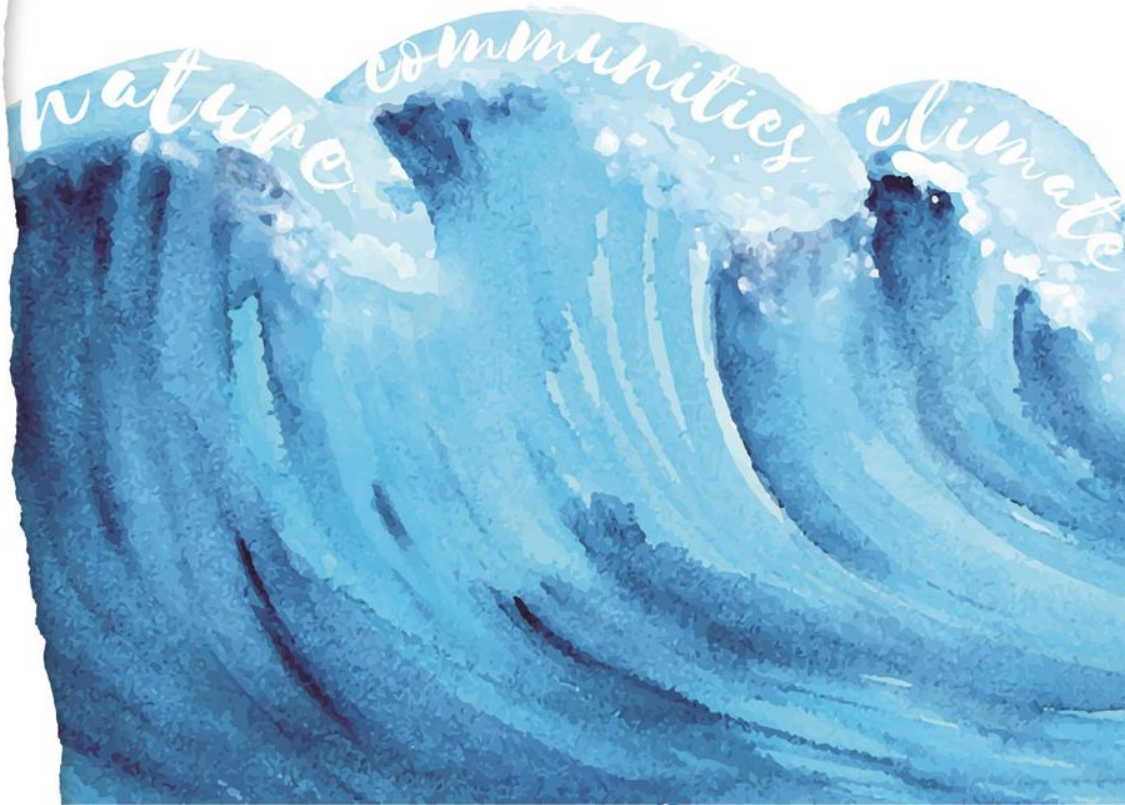
Crown Estate Scotland
Oighreachd a' Chrùin Alba

Dynamic Coast:

Scotland's National Coastal Change Assessment

Perspectives from your near neighbours

Jim Hansom, Alistair Rennie & James Fitton



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

It has compiled a national evidence base of coastal changes over the last 120 years on all of Scotland's soft coast, to support sustainable decision making within National & Local Government, public sector, businesses and communities.

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www.DynamicCoast.com

Headlines:

Dynamic Coast has shown:
Climate change is very likely affecting Scotland's coastline.

National trends: ↑ erosion, ↓ accretion
erosion rates doubling

Regional trends: differing patterns

Compared with the projected near future rates, recent changes to driving processes are modest.

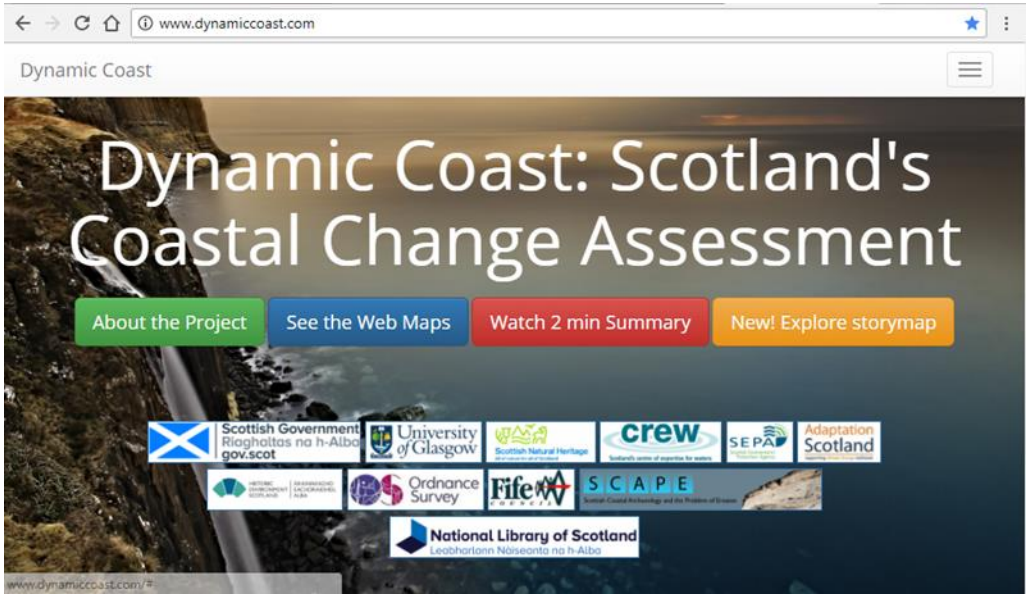
‘Business as usual’ plans will fail.

Dynamic Coast launch, 4 Aug 17

James Fitton, GIS
Jim Hansom, PI Science
Roseanna Cunningham, Cab Sec
Alistair Rennie, Project manager

What is available?

Evidence is available via DynamicCoast.com and should be used to support public sector statutory advice. Inclusion of CC is expected in all sectors.



- Maps
- Reports
- Videos
- Presentations
- Blogs & articles
- Storymap

Website has had over 4k hits in 6 months since launch.

Method:

1. Over 1m data points to analyse the changes in MHWS* on all of Scotland's soft coast, between 1890, 1970 & modern.
2. Projected **recent** rate landward to 2050, and intersected this with all coastal asset database (NFRA).

* MHWS is just a line on the map, could use vegetation edge?

Whole Coast Assessment Results

e.g. 156km of roads lie within 10m of MHWS, 53km on soft

Asset / Receptor	Unit	Within 10m of MHWs					Within 50m of MHWS				
		All	Coastal Type			Erodable (UPSM40+)	All	Coastal Type			Erodable (UPSM40+)
			Hard & Mixed	Soft	Artificial			Hard & Mixed	Soft	Artificial	
Community Services	#	1	1	0	0	0	78	48	20	10	45
Non Residential Property	#	463	197	103	163	245	9,045	4,393	2,309	2,343	5,101
Residential Prop	#	458	107	109	242	332	24,449	9,966	7,194	7,289	15,276
Septic Water Tanks	#	367	219	139	9	181	1,656	954	677	25	769
Utilities	#	25	10	7	8	14	312	137	80	95	184
Rail	km	15	2	9	3	9	104	27	58	18	61
Roads	km	156	87	53	16	68	1,336	733	497	107	590
Clean Water Network	km	87	50	22	16	41	931	507	304	120	452
Cultural Heritage	ha	135	63	55	17	74	1,029	471	438	120	529
Environment	ha	4,204	2,575	1,586	43	1,790	23,430	14,873	8,424	133	8,615
Runway	ha	0	0	0	0	0	3	2	0	1	2

Results available via webmaps on www.DynamicCoast.com

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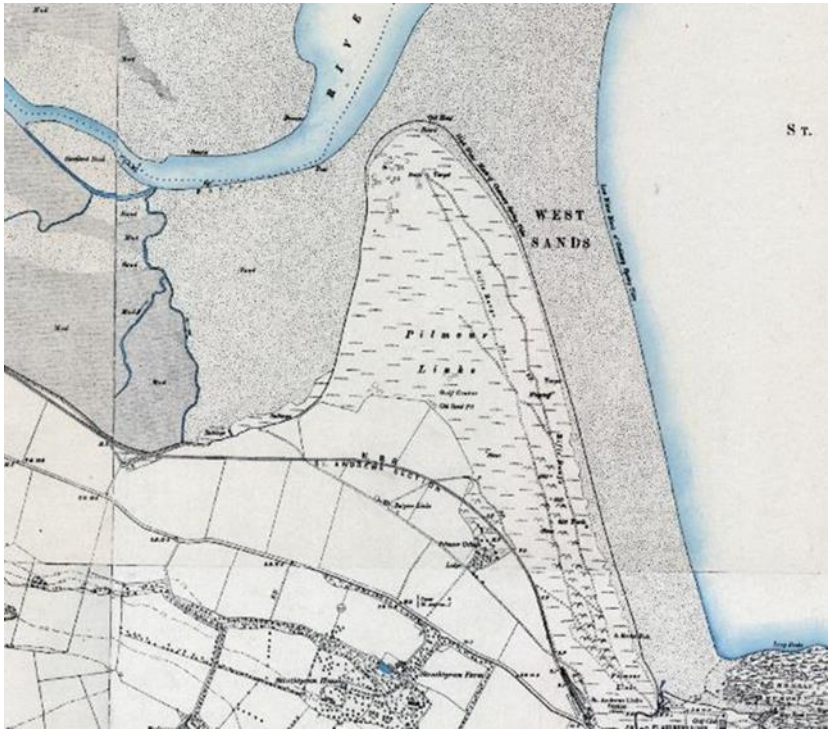

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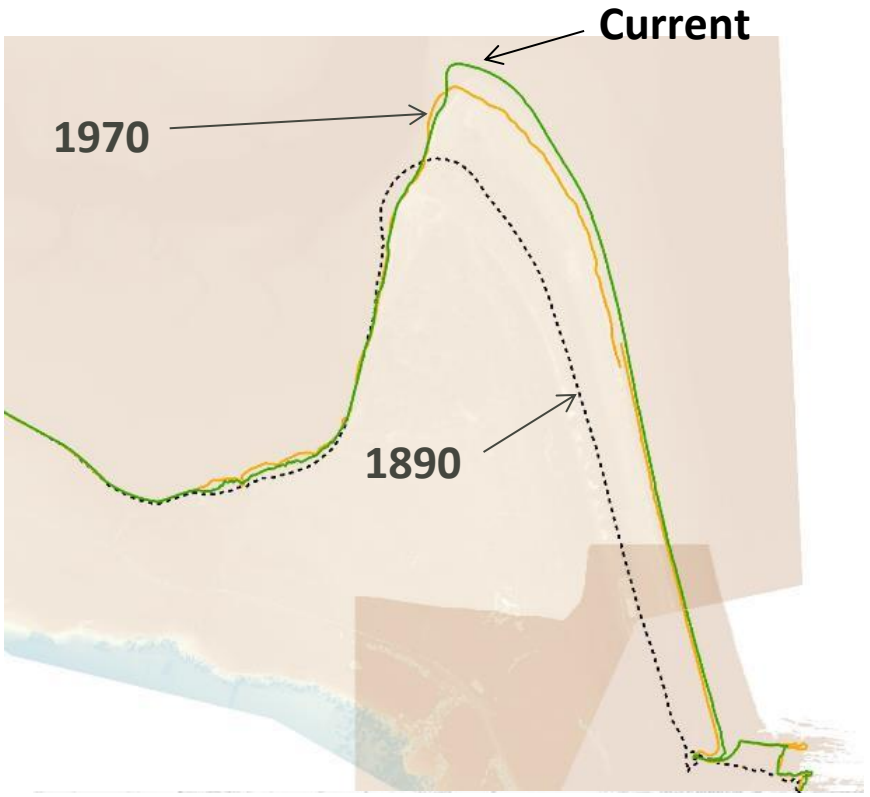

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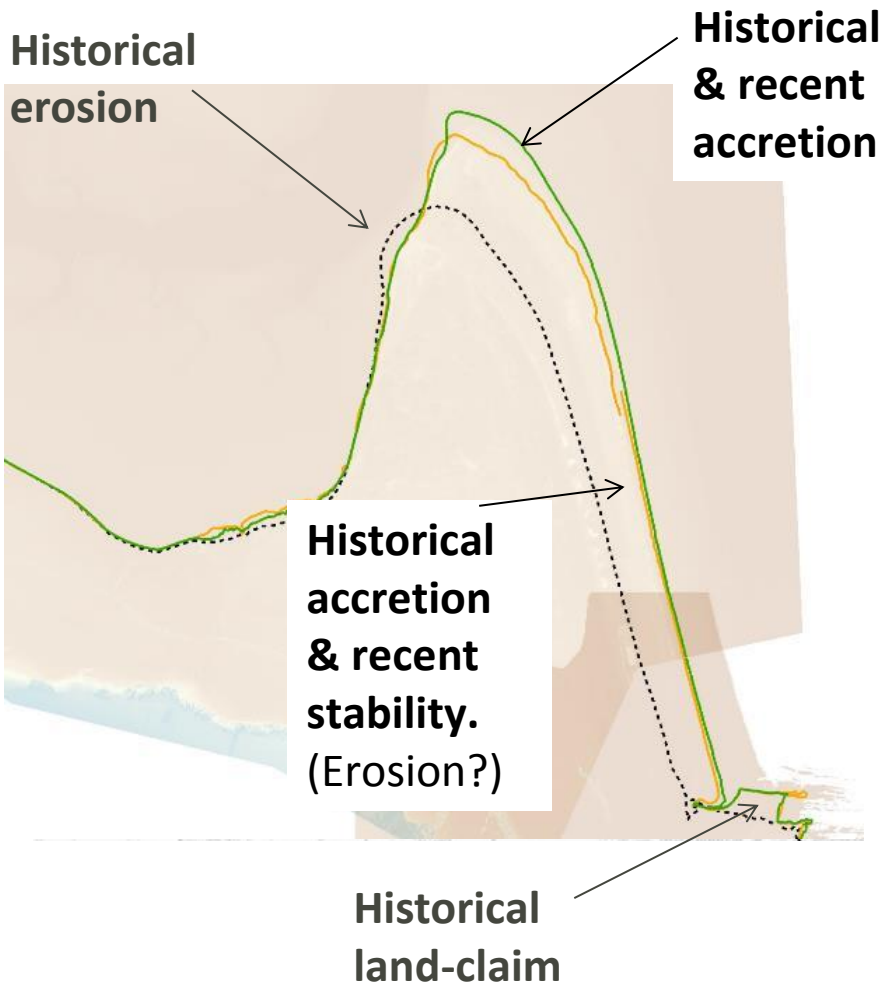

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Results:

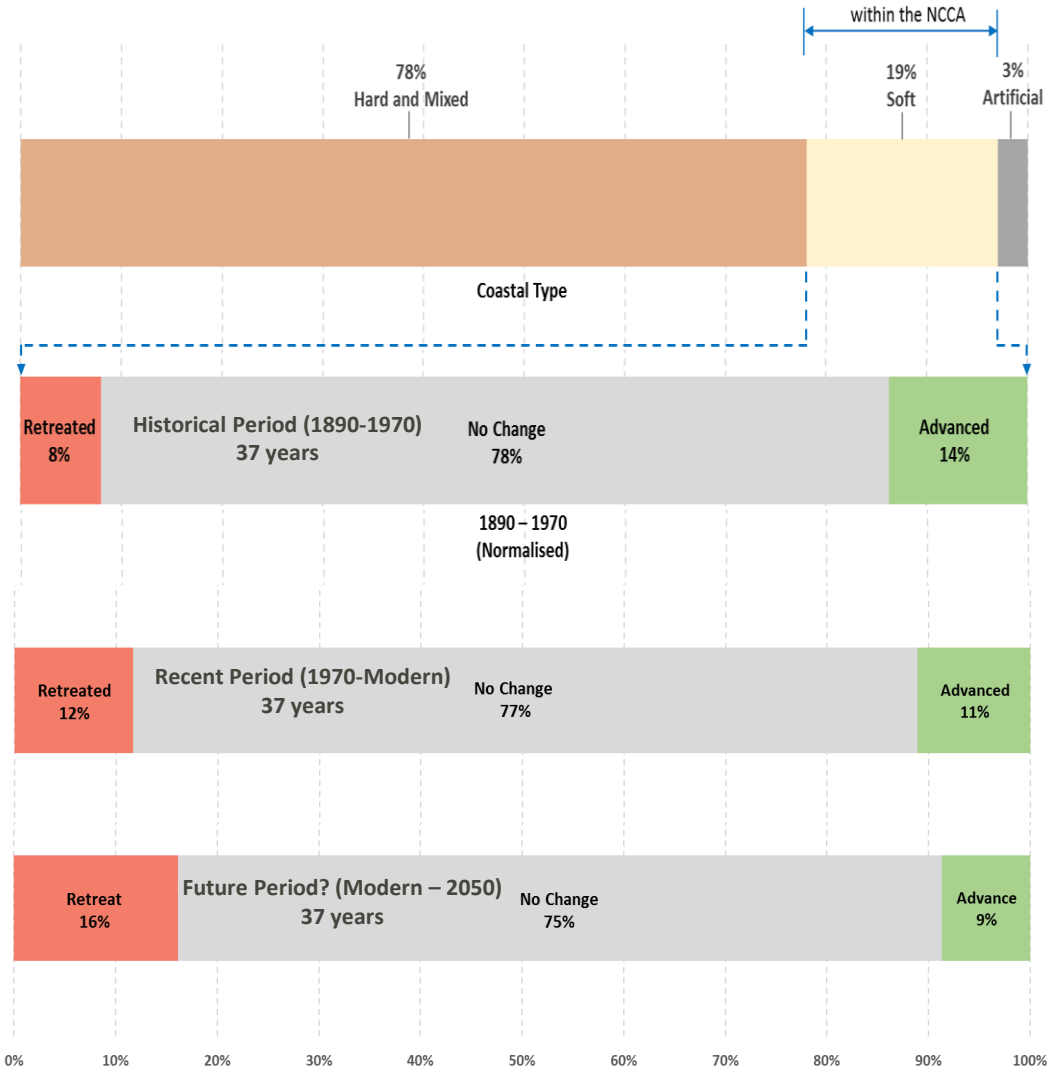
Generally:
75% soft coast dynamic stability
25% directional changes

Before the 1970s:
(normalised for time period)
8% extent of erosion
14% extent of accretion

Since the 1970s:
39% ↑ in extent of erosion
22% ↓ in extent of accretion

+ Doubling of erosion rates to 1m/yr

National picture dilutes more significant changes and regional patterns.



Climate change is a likely driver: (sea level, increasing wave impact & exacerbating storms; added to human factors)

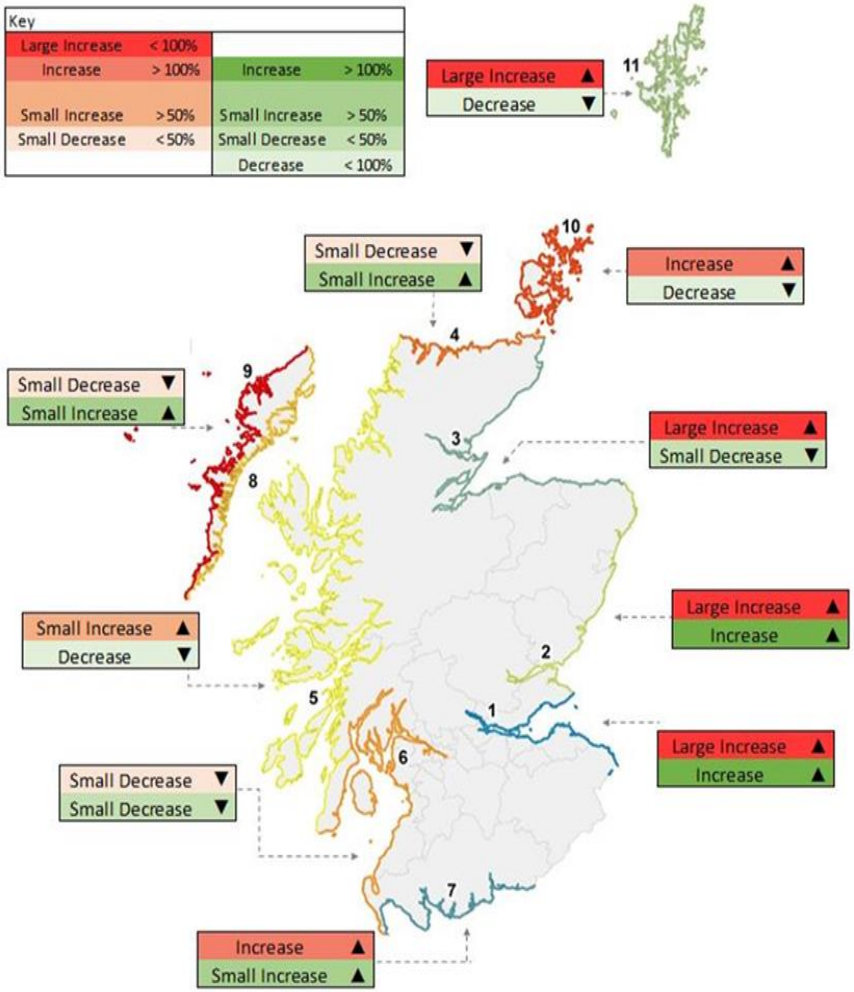
Regional results show geographic bias.

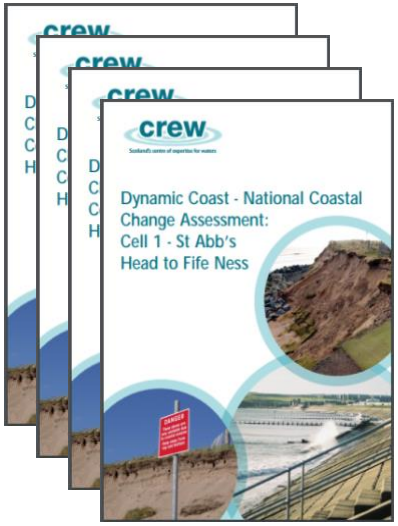
East coast:

- is more susceptible to erosion,
- has seen greatest increase in erosion
- has a large % of assets.

North, West & South coast:

- less susceptible,
- less change from baseline
- has a lower % of assets.





Results:

1. 5km of road is expected to erode in next 30 years if recent rates continue.
2. 37% of coastal roads are on soft shores
3. Natural defences protect almost 5x the length of roads that built defences do.

Total number of assets within 50m of MHWS

	Anticipated (2050) recent rate	Anticipated (2050+) double rate	All	Hard & Mixed	Soft	% in soft coast	Artificial	
	52	150	33,494	14,359	9,503	27%	9,632	Buildings
	5	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)

Results available via webmaps on www.DynamicCoast.com

Results:

19% of the Scottish coast is soft or ‘erodible’ (3,802 km).

Between ½ and ⅓ of all coastal buildings, roads, rail and water network lie in these erodible sections.

A large proportion of our coastal assets are at risk from erosion and erosion-exacerbated flooding.

£13bn protected by natural defences, whilst £5bn by sea walls.

Nature is protecting more valuable assets than we are.

What's at risk if this trend continues to 2050? next 32 years

- at least 50 residential and non-residential buildings,
- 1.6 km of railtrack,
- 5.2 km of roadway,
- 2.4 km of clean water network
- as well as significant areas of runways, cultural and natural heritage sites

… all expected to be affected by coastal erosion.

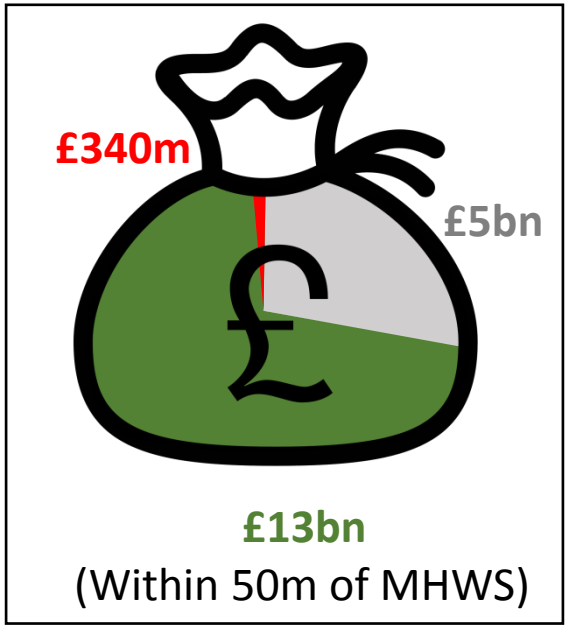
These span all Coastal Cells, all Local Authorities and all asset types.

Of the **£13bn** of coastal assets protected by natural defences, **£340m** are at risk in the next 30 years if recent erosion continues.

.. alongside the **£5bn** behind coastal defences.

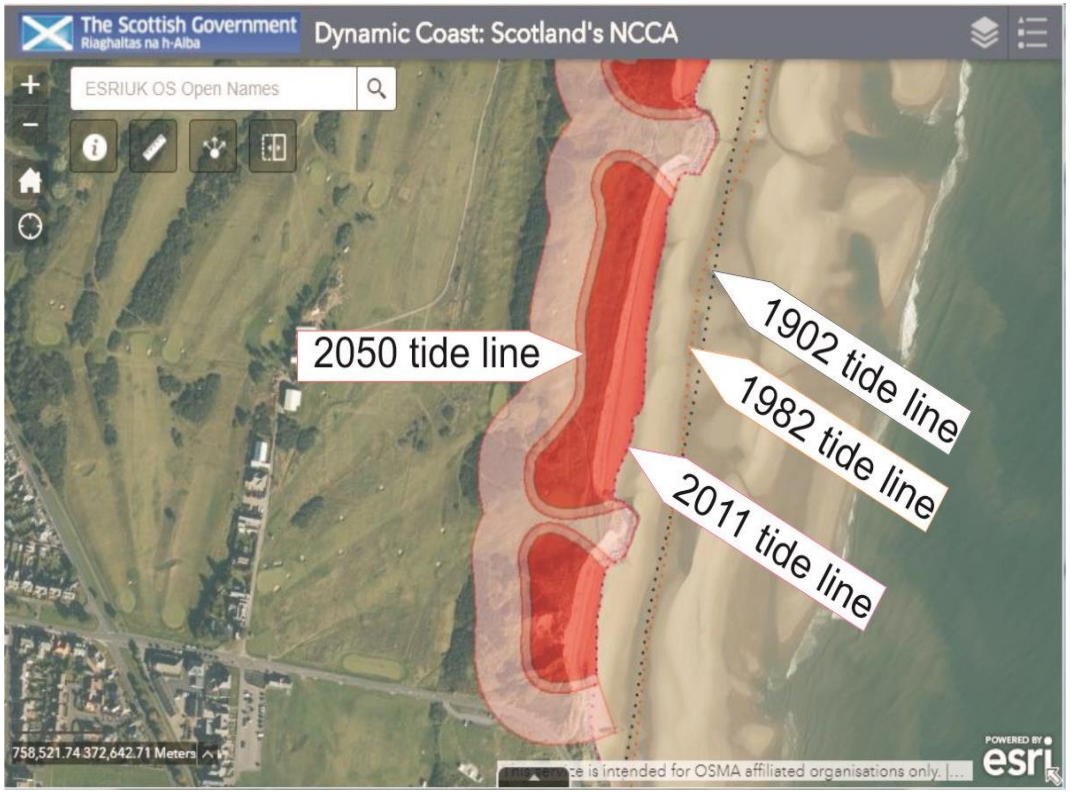
Scotland's society and assets are not immune from erosion.

This is not just about golf courses!



Results show an increase in extent and rate of erosion, so anticipated losses are underestimated. We've used recent rates not future rates nor values.

So Dynamic Coast displays the minimum likely impacts. Business, communities and statutory advisors should plan now.

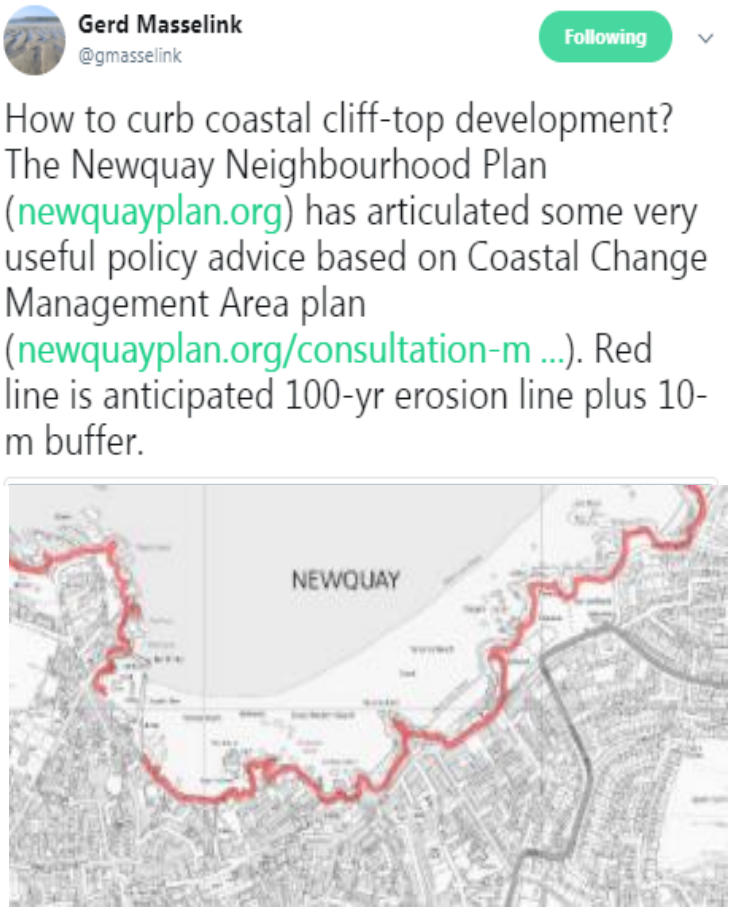


Sea level rise estimates are being uplifted by 20-30% (Met Office)

…. See UKCP18

Accelerating erosion rates
need to be part of routine planning.
E.g. Fife SMP2 or
Newquay Neighborhood Plan

Considered further in next phase of Dynamic Coast research.



Anticipated SLR will have significant impact on flood frequency.

M.E.S. Leith +0.3 m of sea level by 2090 = 1:100 yr event → 1:8 yr.

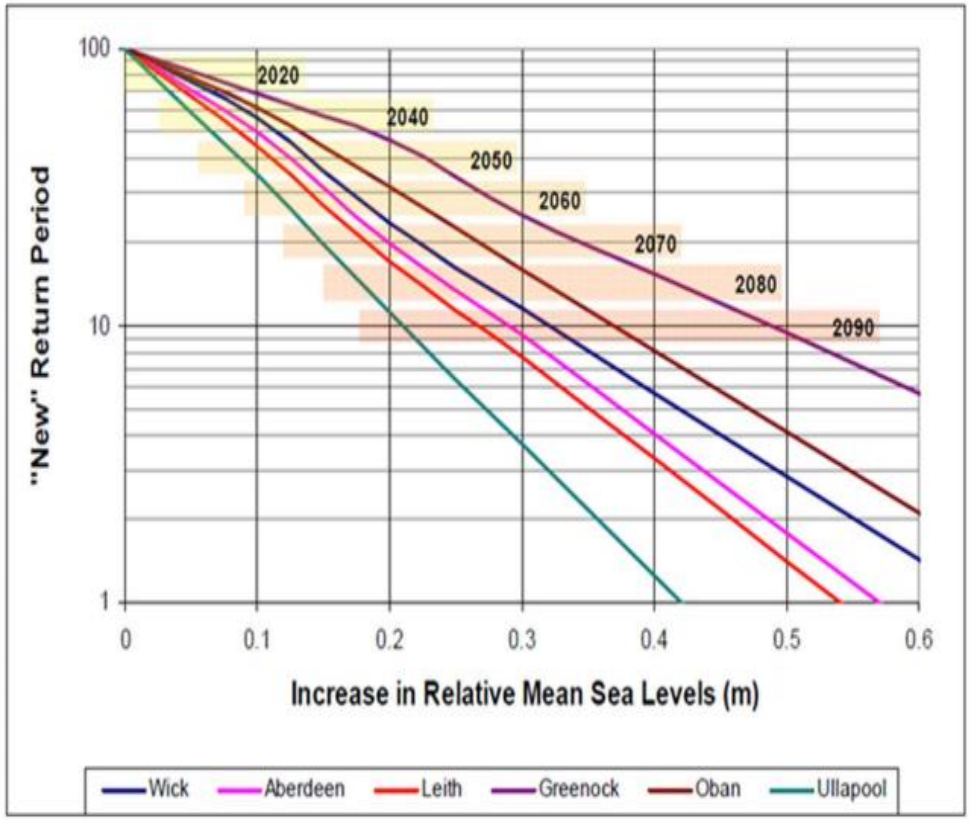
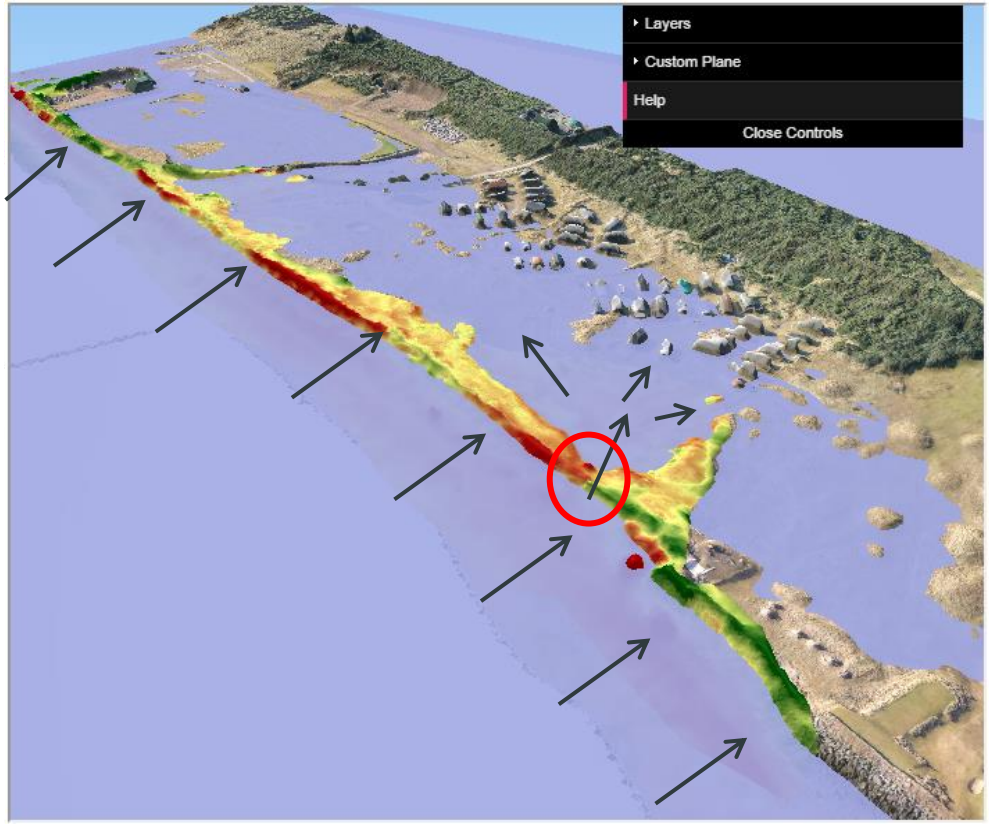


Figure 4.6: Reduction in flood return period given increases in mean sea level (Defra (2012) UKCCRA for Scotland – Technical Report. Fig3.5 p43, based on the central estimate of the Medium Emissions Scenario, locations are approximate)

In Scotland we now have a Window of Opportunity, and the Policies in place, to choose to adapt, mitigate or defend according to the local, regional and national contexts.

Dynamic Coast 2 has just started, using 3-D modelling to:

- Appraise resilience of soft natural defences,
- ID the breach-points for erosion enhanced flooding (this is how cc will impact people),
- consider impact of acceleration in future erosion extents and rates.



2nd phase will also:

- Encourage adaptation (super sites)

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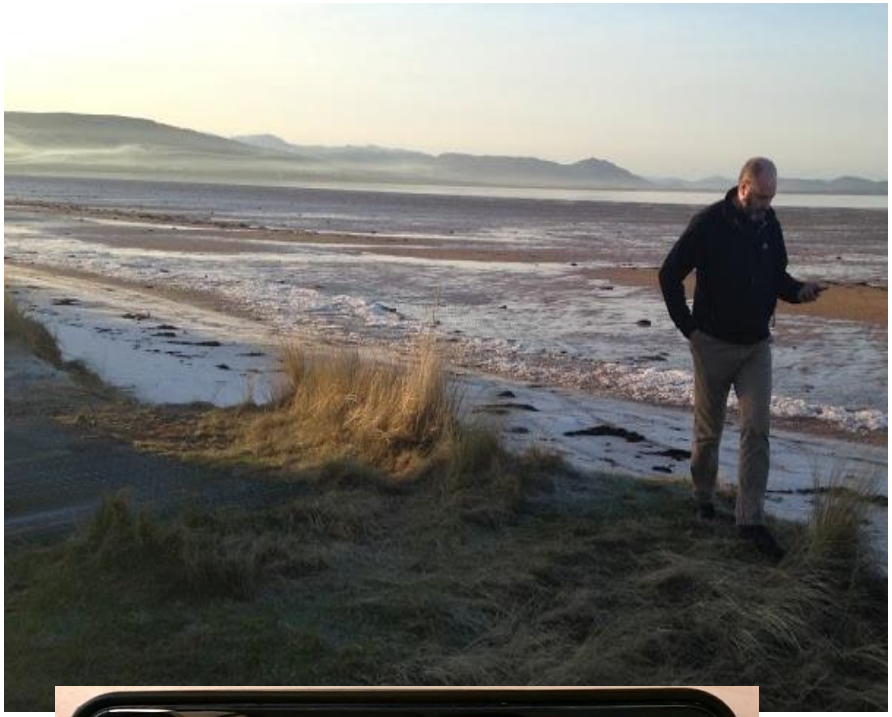
- Encourage adaptation (super sites)
- Incorporate latest smart phone GPS+tech to ID coastal change.. vegetation edge etc.

➢ Veg Edge: May be helpful for NI?

- Use UAV drones for coastal position updates at key sites
- Produce a coastal erosion disadvantage mapping



Watch the video at:

www.DynamicCoast.com/videos

And a final word…

"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)

For more info… www.DynamicCoast.com

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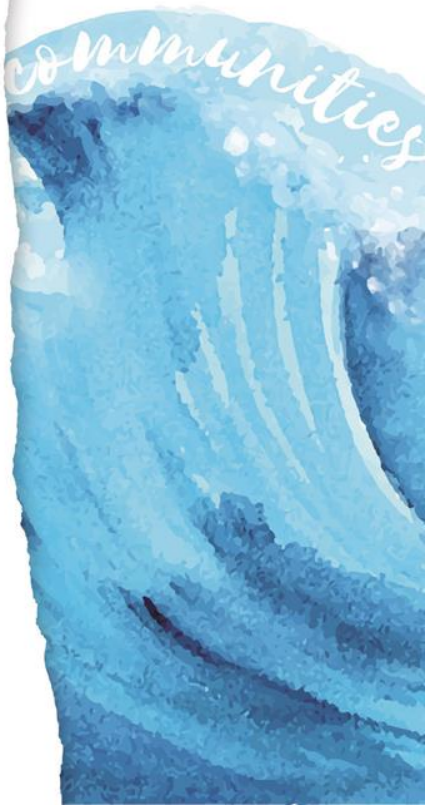
communities


climate