The Ask…

- overview of the project
- the datasets and mapping that you now have available
- pose some thought provoking questions – perhaps about what we should now be Corporately considering re our Development/Forward Planning, Development Management, public and private infrastructure and their protection/movement?
- what other authorities may be considering
- any insight into current Scottish Government thinking with this

Once upon a time, there was a small group of people who understood coastal processes and liked making maps… maps of the coast.

They wanted to make society safer, smarter and more resilient to climate change at the coast.

This is their story…

This is how "Dynamic Coast" brought Scotland's mapped coastline into the 21st century.

Dynamic Coast project: collaboration for enhanced coastal resilience

Alistair Rennie, Project Manager[1], Jim Hansom, Principal Investigator [2]

& James Fitton, GIS Jedi and Co-Investigator [3]

1 = Scottish Natural Heritage 2 = University of Glasgow 3 = University of Glasgow & Aalborg University

Presentation to OSMA conference 5th September 2018

Thanks to the Dynamic Coast team

Including:
SG: Alan Corbett, Shona Nicol & Debi Garft
OS: Magda Low, Dom Cuthbert, Duncan Moss & OS colleagues

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.

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

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.

Scottish Government
Riaghaltas na h-Alba
gov.scot

crew
Scotland's centre of expertise for waters

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

University of Glasgow

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.

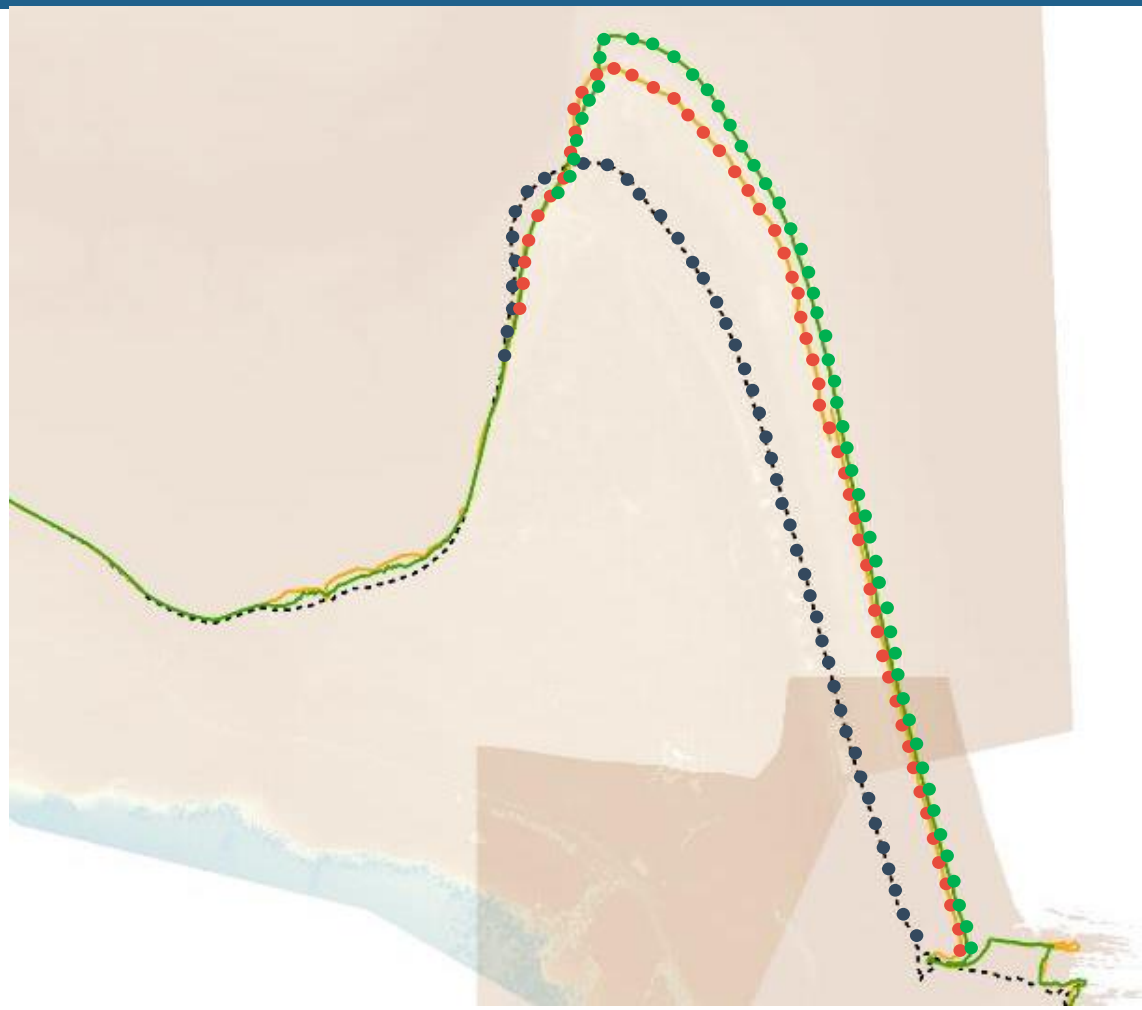
Yet this is occurring at a time of public sector cuts and funding uncertainty.

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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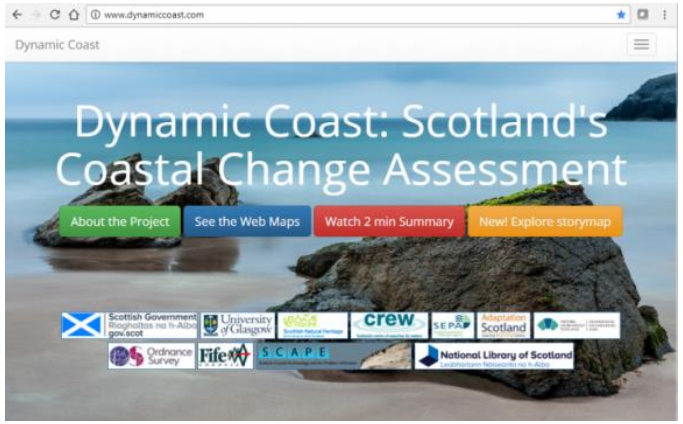
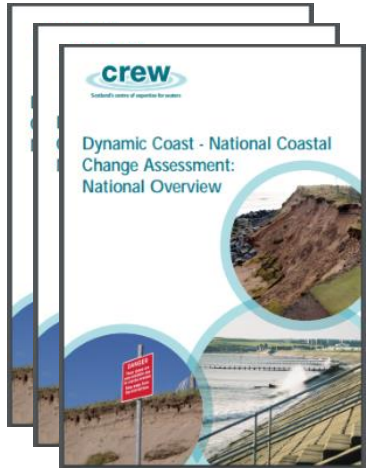
What did we do?

All of the evidence base was then shared publicly via www.DynamicCoast.com with interactive maps, reports and videos.

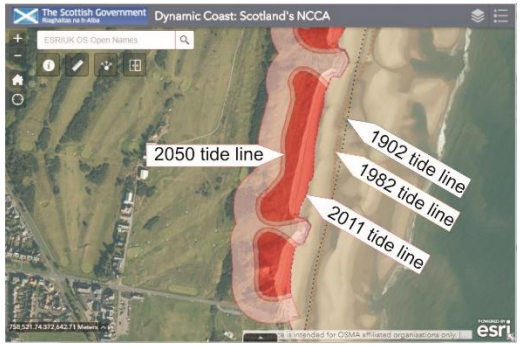




Data is being made available to inform partner's work (OS updates & LA planning).

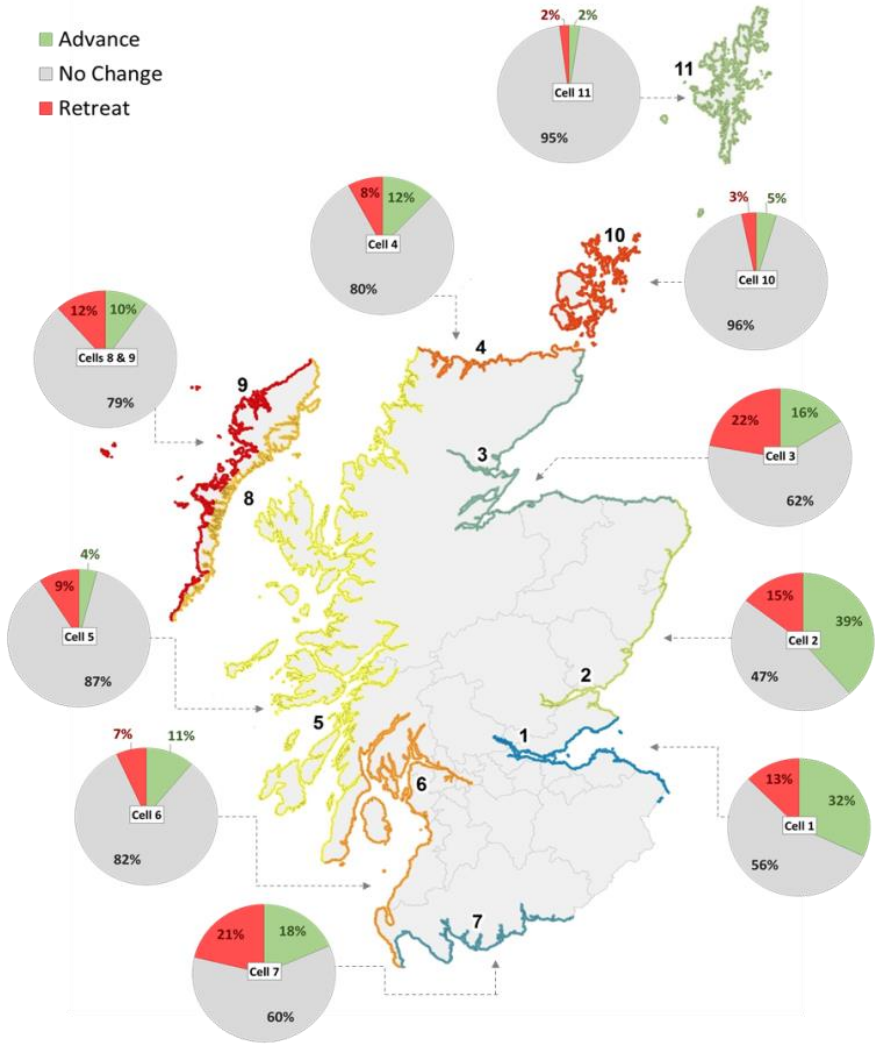
- ✓ Saving the OS money by knowing where & how frequently to update
- ✓ Allowing LA to spend limited money on Policy not map analysis
- ✓ Allowing business to forecast risks and build with nature to safeguard assets
- ✓ Allowing flood strategies to be more accurate

? 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

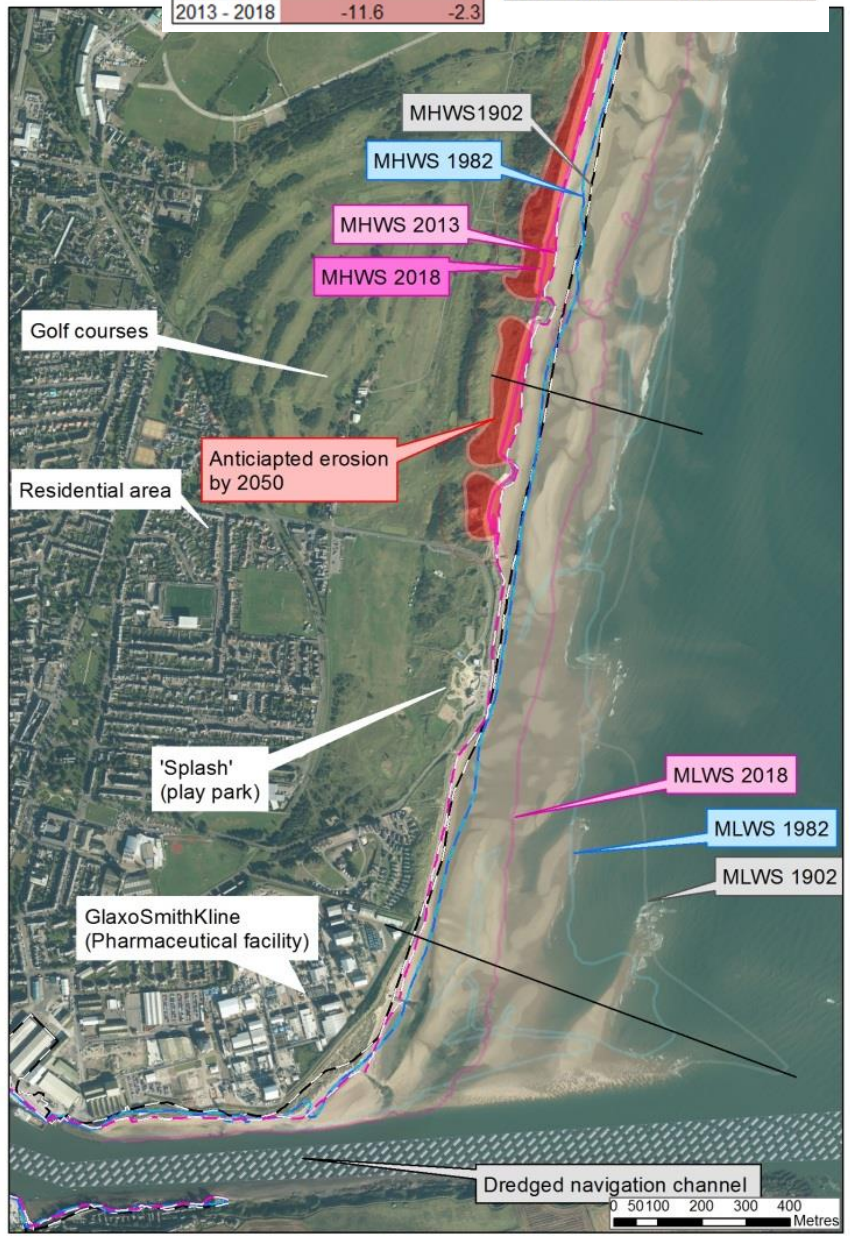
S. golf course

MHWS

Year	change (m)	rate (m/yr)
1902 - 1982	-12.4	-0.2
1982 - 2013	-48.2	-1.6
2013 - 2018	-11.6	-2.3

MLWS

Year	change (m)	rate (m/yr)
1902 - 1982	-103.2	-1.5
1982 - 2018	-57.8	-1.2



What did we establish?

- 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.

- "MAMBA" couldn't be more wrong!

- *We must value Scotland's natural defences and natural capital.*
  Roseanna Cunningham
  (Scottish Government Cabinet Secretary)

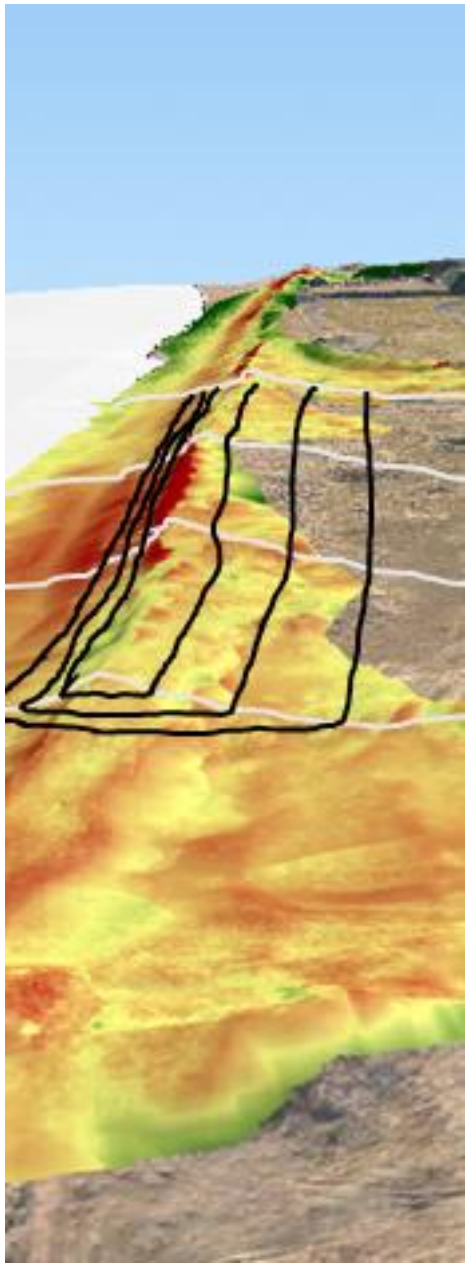
What are we doing now?

- Continuing to work together to further improve our evidence base.

  300 km MHWS identified as out of date – now fixed as part of 2,000km of OS updates to MHWS
  More updates are planned – using Dynamic Coast change intelligence
  LiDAR commissioning being planned between key partners (data available via OGL)
  OS undertaking bespoke tidal surveys for Super Sites (St Andrews & Montrose already done)

- Key aim is to maintain a single reliable shoreline available via OS: essential for all public sector with interests in the coast

- 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.

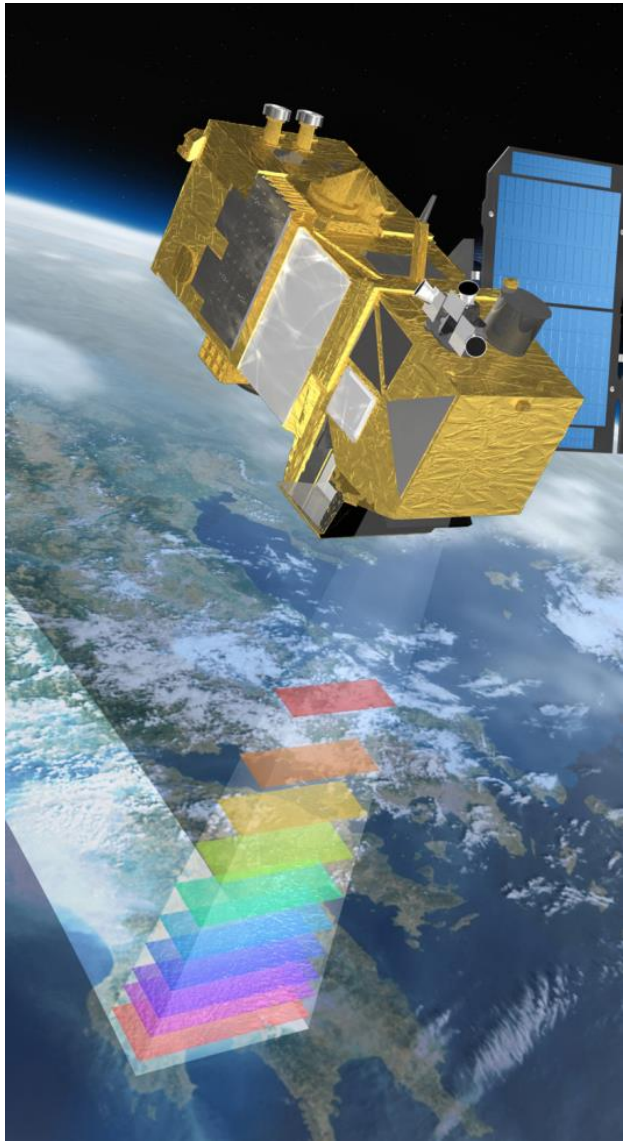


Greater future need?

- Our world is changing (physically, societally & technologically) and we must act and invest now to understand the implications and, if warranted, deliver early warning.

- 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

Special thanks to our funders:

and the University of Glasgow research team:

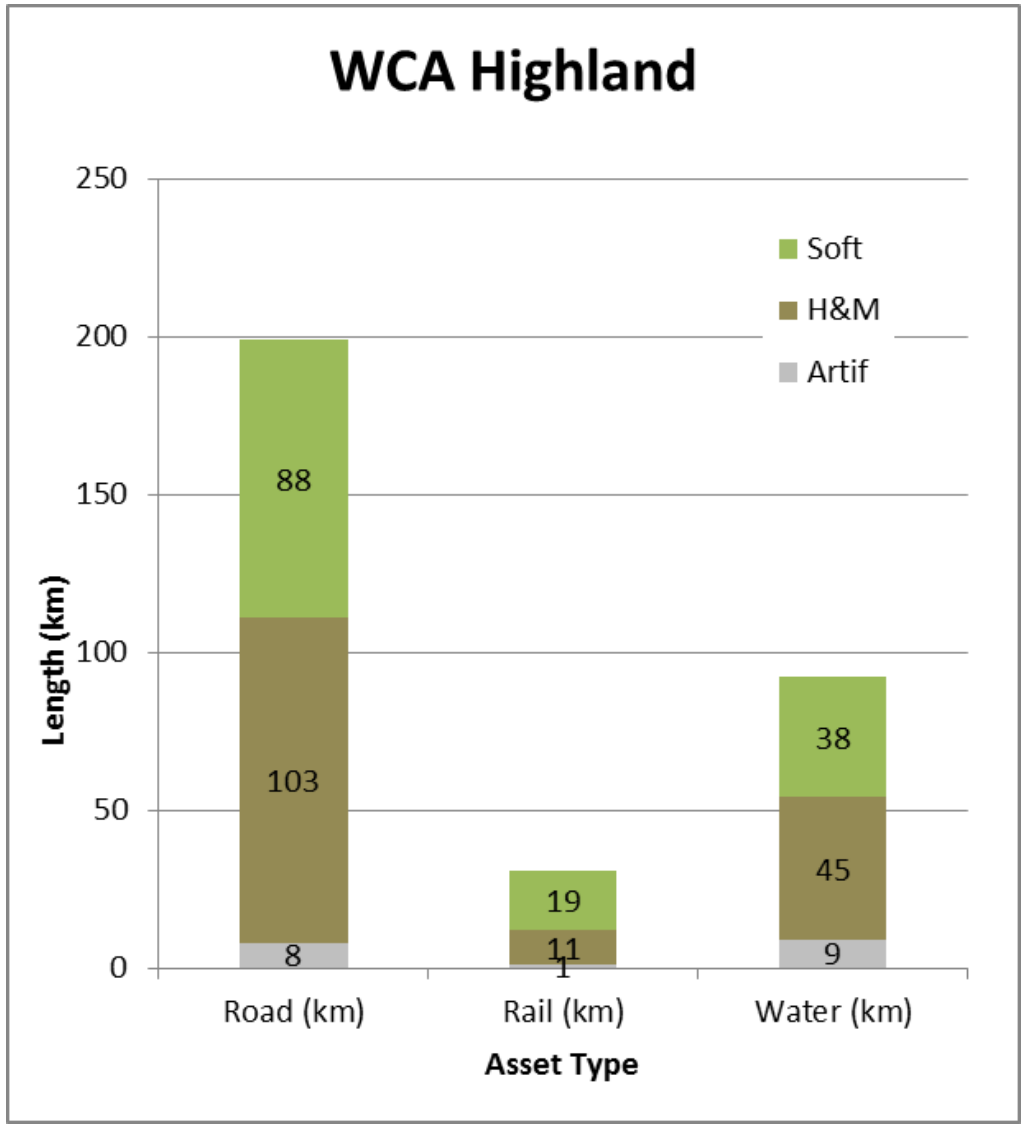
Jim Hansom & James Fitton

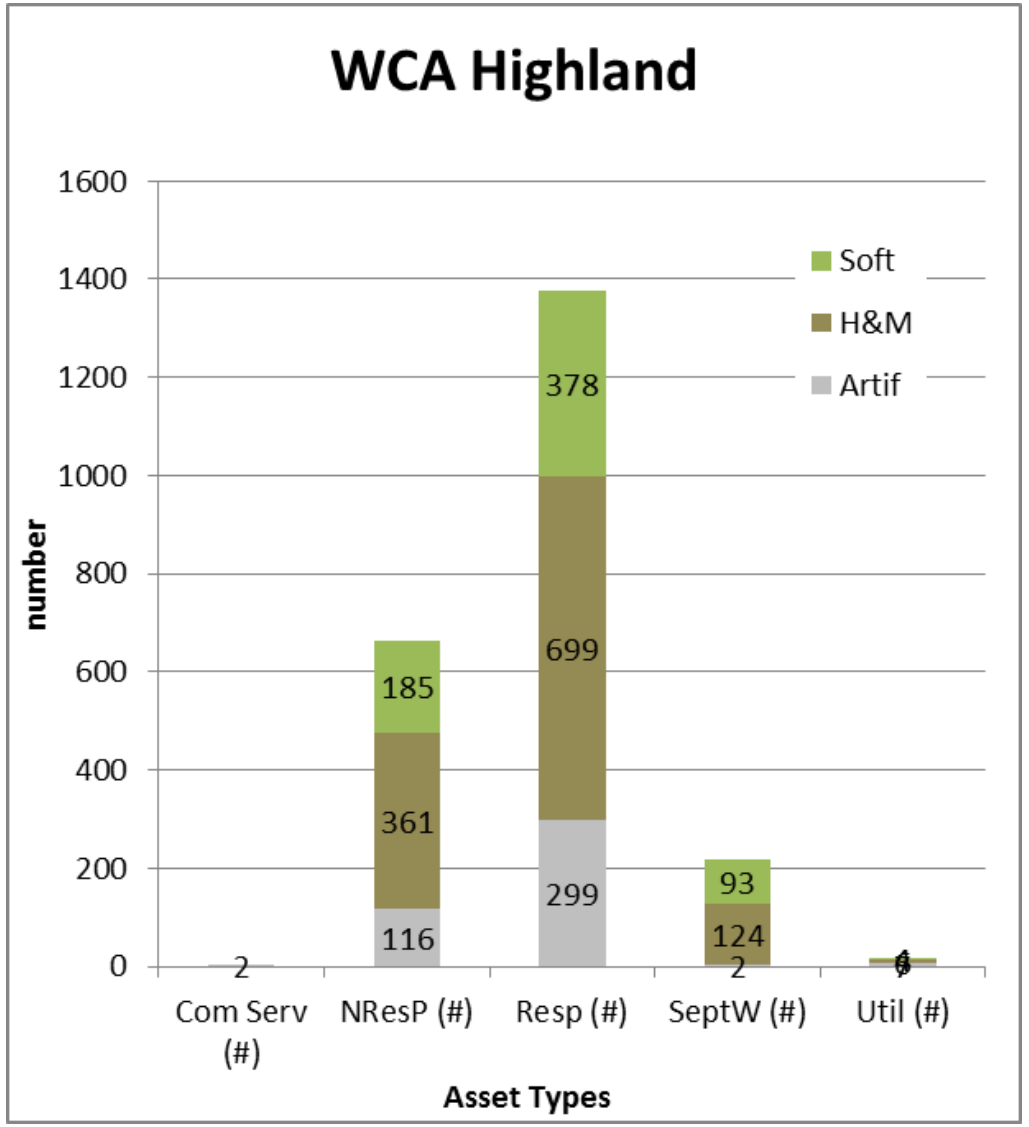
Larisa Naylor, Martin Hurst, Richard Williams, Ria Dunkley.

Whole Coast Assessment & Vulnerability Assessment

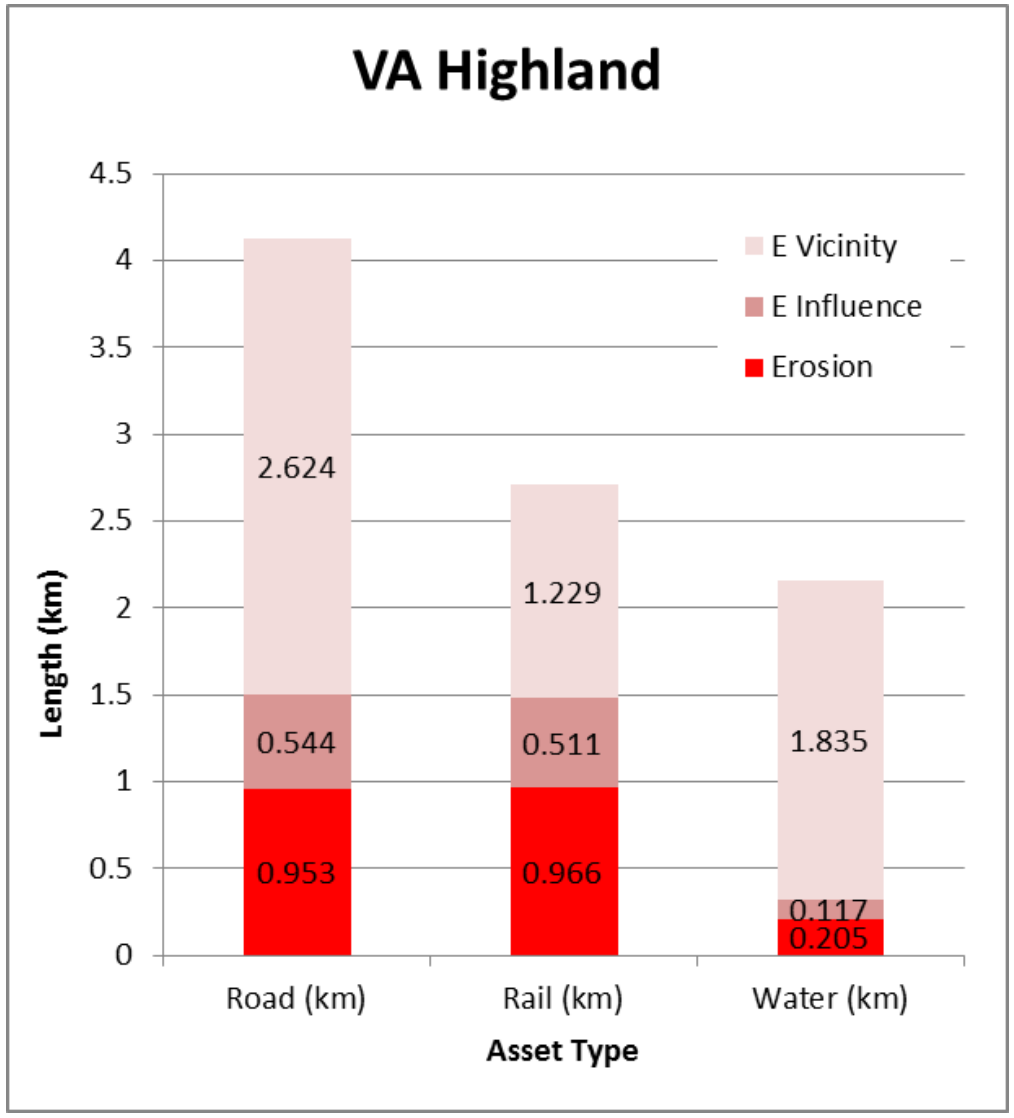
	LA	Highland									
	Whole Coast Assessment								Future Coast		
	prox	25m									
	km	#	Artif	H&M	Soft	A%	H&M%	S%	Erosion	E Influence	E Vicinity
Road (km)	200		8	103	88	4%	52%	44%	0.953	0.544	2.624
Rail (km)	32		1	11	19	3%	34%	59%	0.966	0.511	1.229
Water (km)	94		9	45	38	10%	48%	40%	0.205	0.117	1.835
Com Serv (#)		2	2			100%			0	0	0
NResP (#)		662	116	361	185	18%	55%	28%	1	1	8
Resp (#)		1376	299	699	378	22%	51%	27%	0	1	20
SeptW (#)		219	2	124	93	1%	57%	42%	0	0	8
Util (#)		17	7	6	4	41%	35%	24%	0	0	0

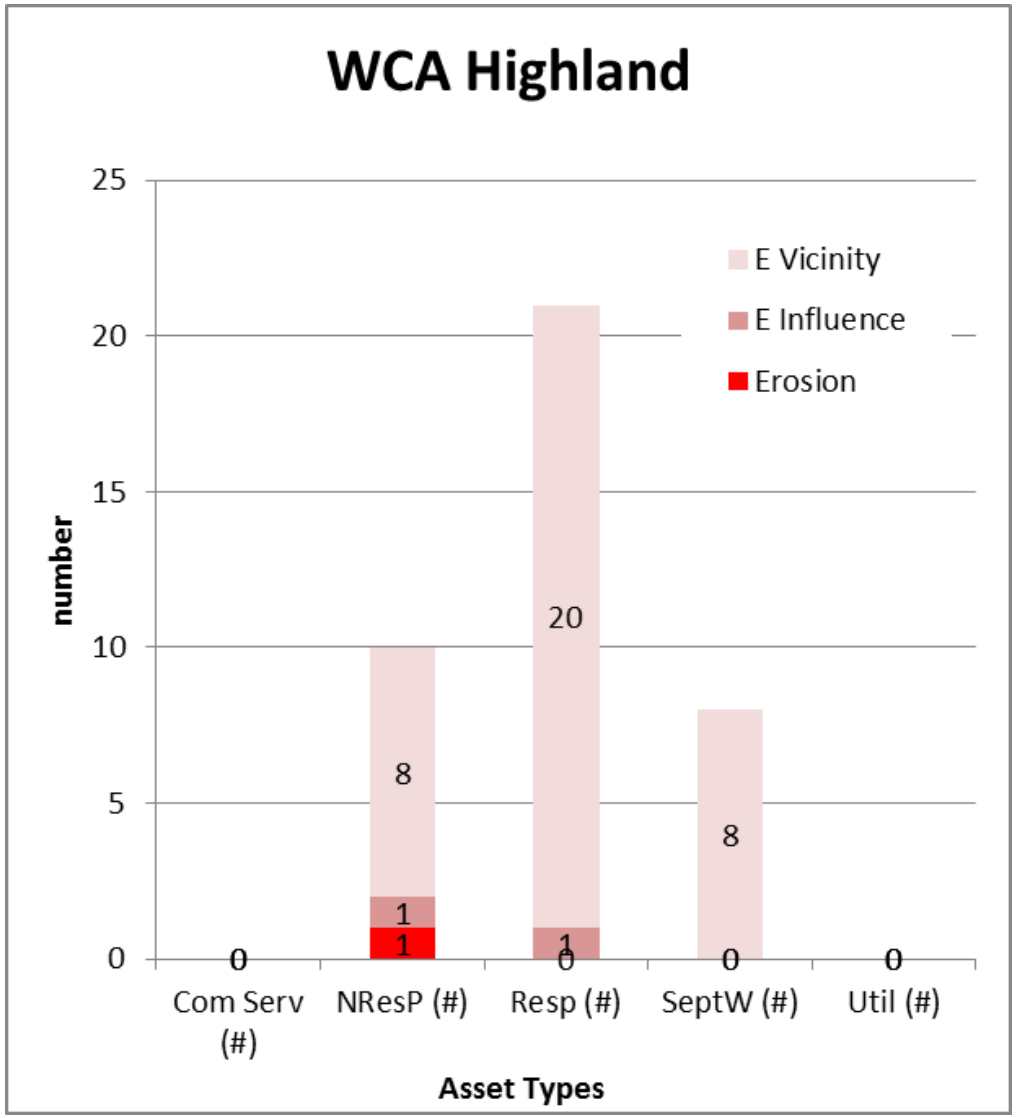
Whole Coast Assessment – Highland





Vulnerability Assessment - Highland





Mapped versions