Flood and Coastal Management Risk
Dawlish Warren and the Exe Estuary

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Environment Agency Coastal Advisor

Exe Estuary Strategy 2014 identified and planned for risk

High spring tide in 2014

.. Impact if 700mm higher?

2025 Update … impact if 1m higher?

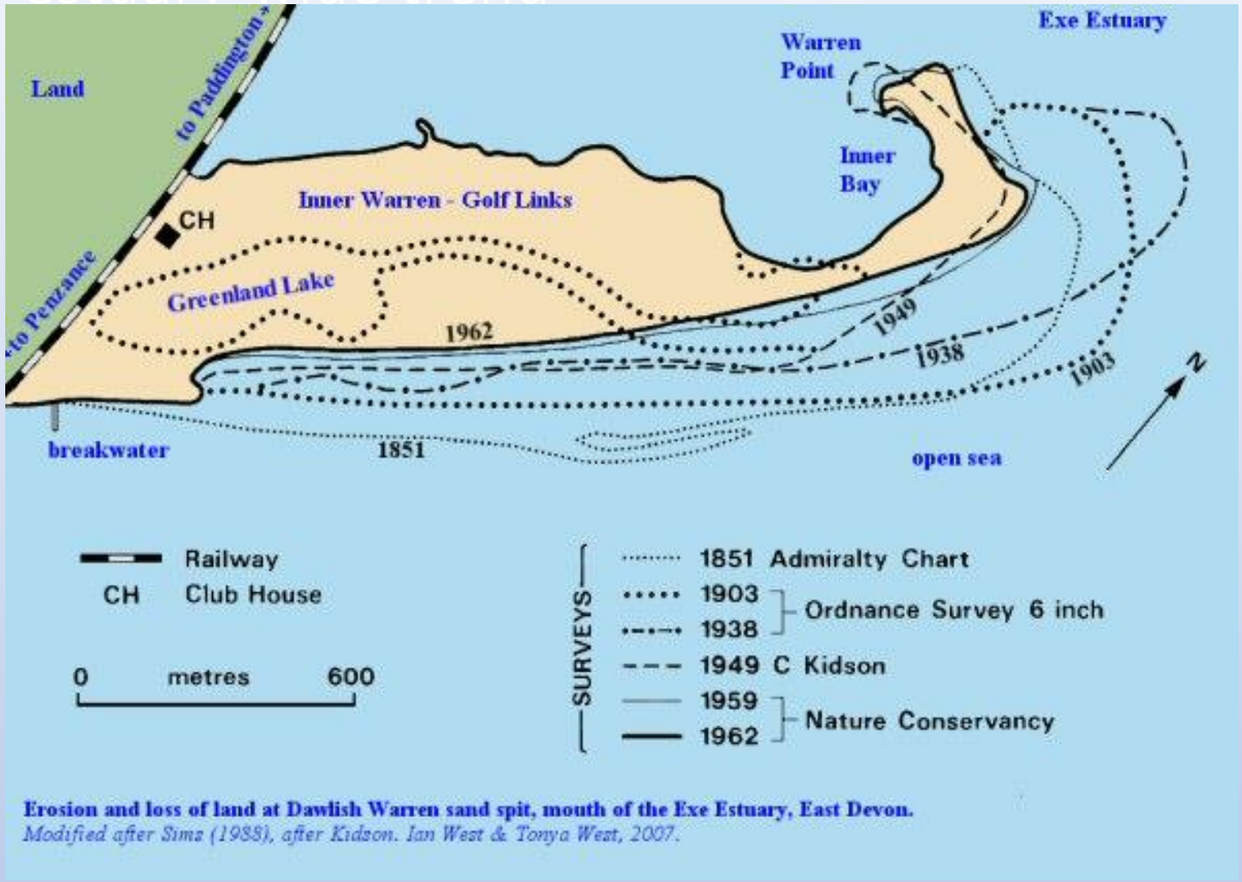
2014 Strategy identified defence improvements by 2030

- Exmouth - delivered
- Topsham – not delivered
- Starcross & Cockwood - delivered
- Clyst St Mary (fluvial driven) - delivered
- Powderham Banks – ongoing maintenance and liaison for adaptation with NR
- Open coast railway resilience – delivered by NR

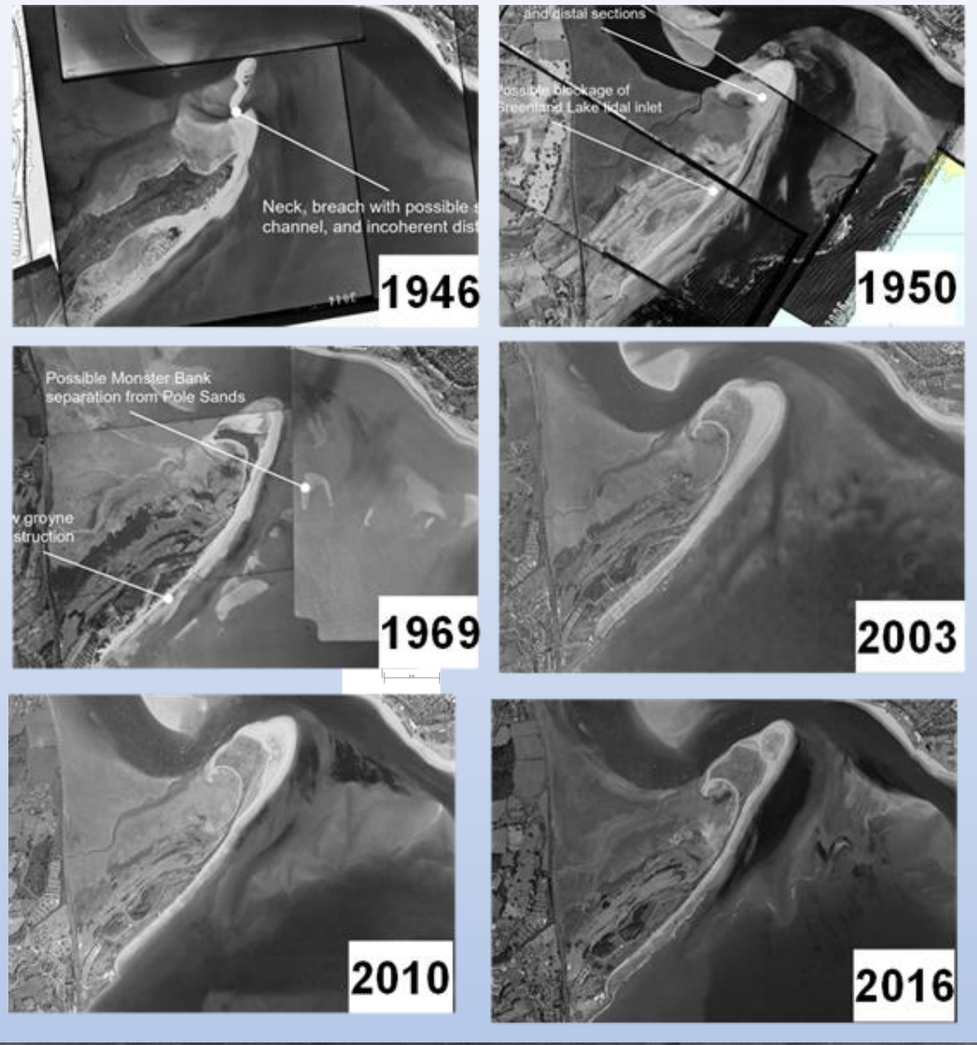
Identified ‘change’ sites

- Lower Clyst Valley – not acceptable. LORP
- Kenn Valley – not preferred
- Dawlish Warren spit – 2017 scheme; adaptation ongoing

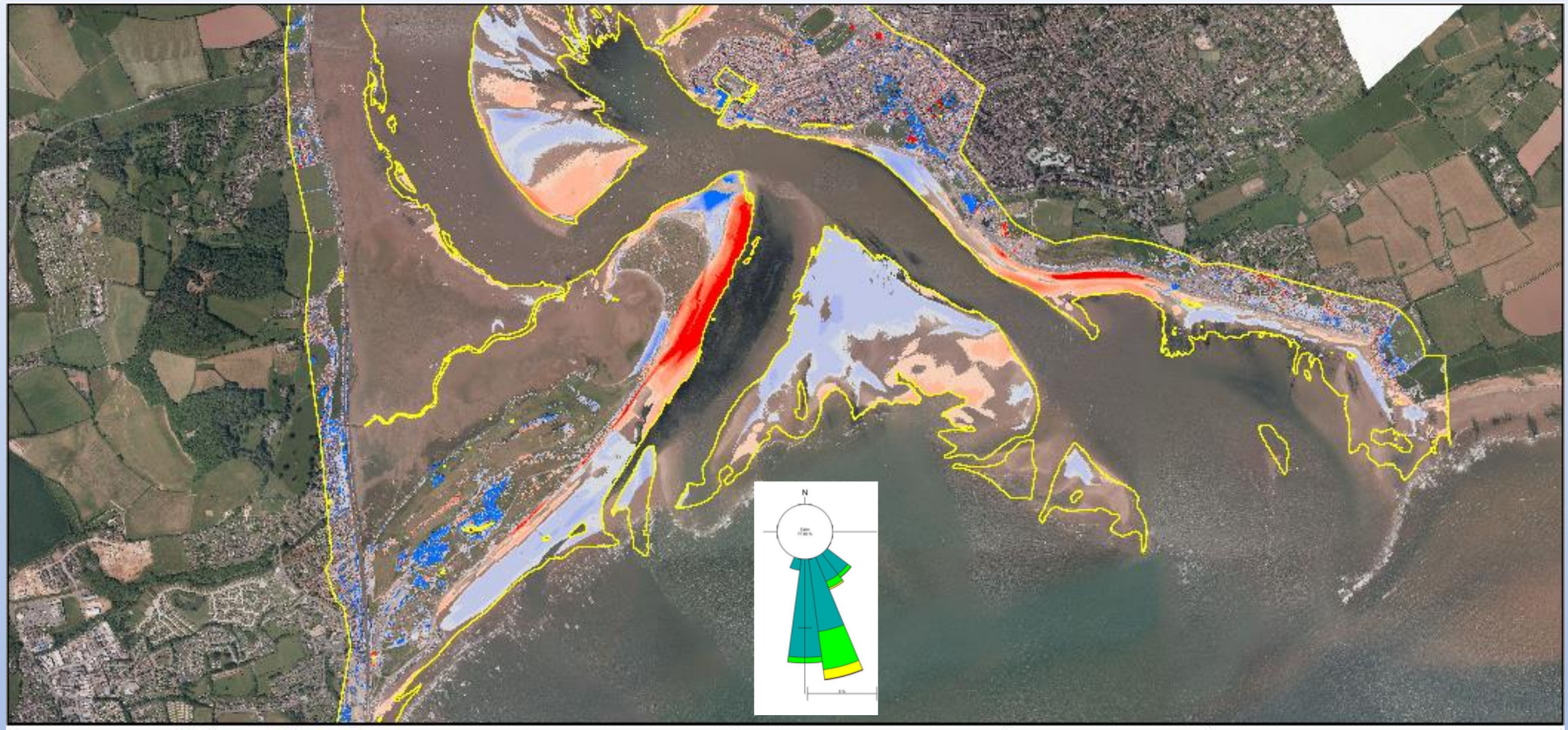
Historic change – awareness of long term, larger scale trend that will continue term estuary-wide trend

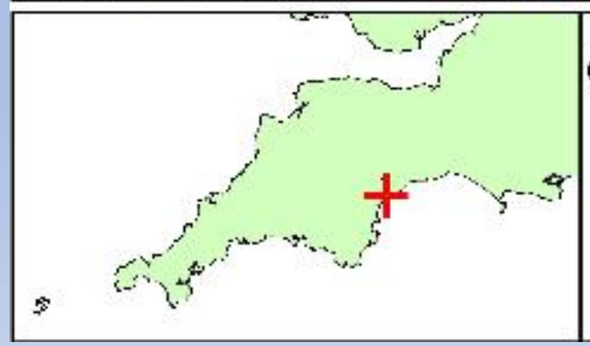


Erosion and loss of land at Dawlish Warren sand spit, mouth of the Exe Estuary, East Devon.
Modified after Sima (1988), after Kidson. Ian West & Tonya West, 2007.



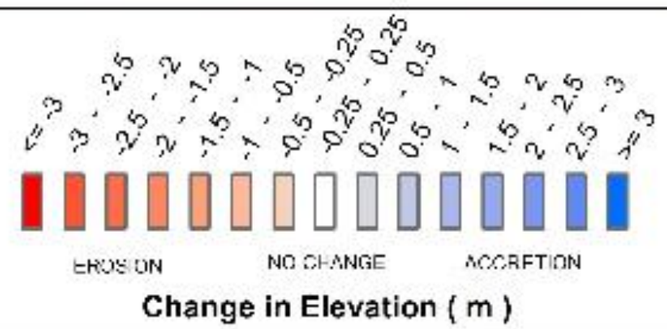
..that is ongoing and will continue





Change in Elevation (m) Between April 2007 and October 2018

Model Extent



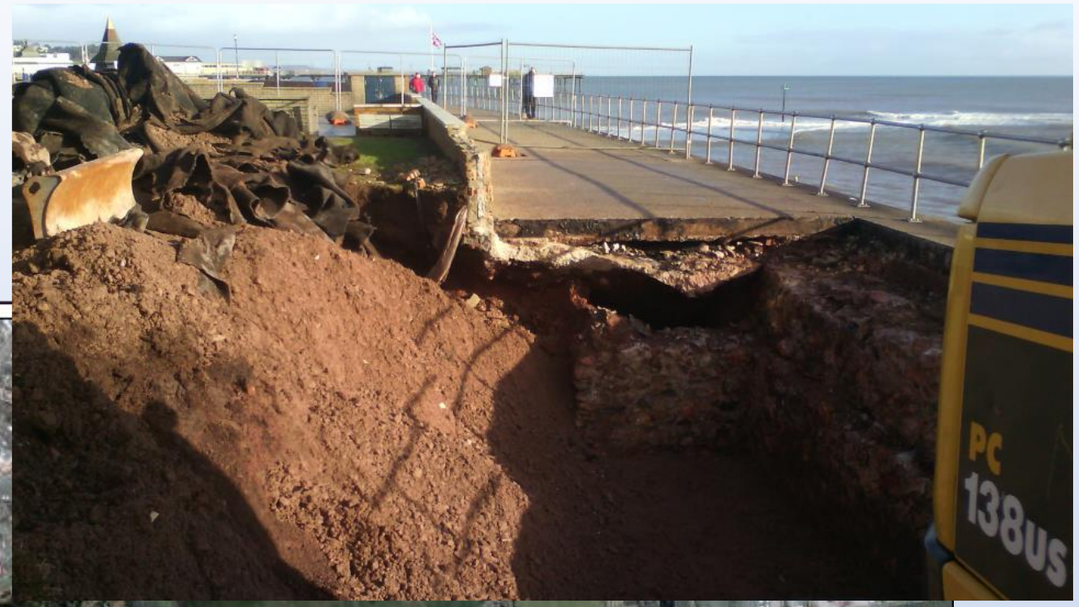
PLYMOUTH COASTAL OBSERVATORY

N

Aerial Photography from 2017

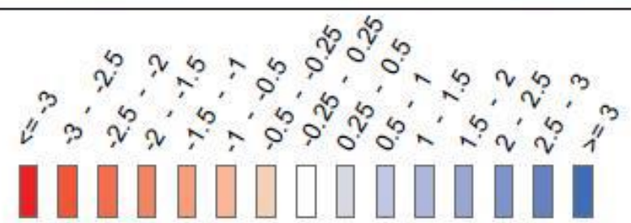
0 530 1,060 m

Not just Dawlish Warren



Change in Elevation (m) Between May 1998 and March 2016

Model Extent

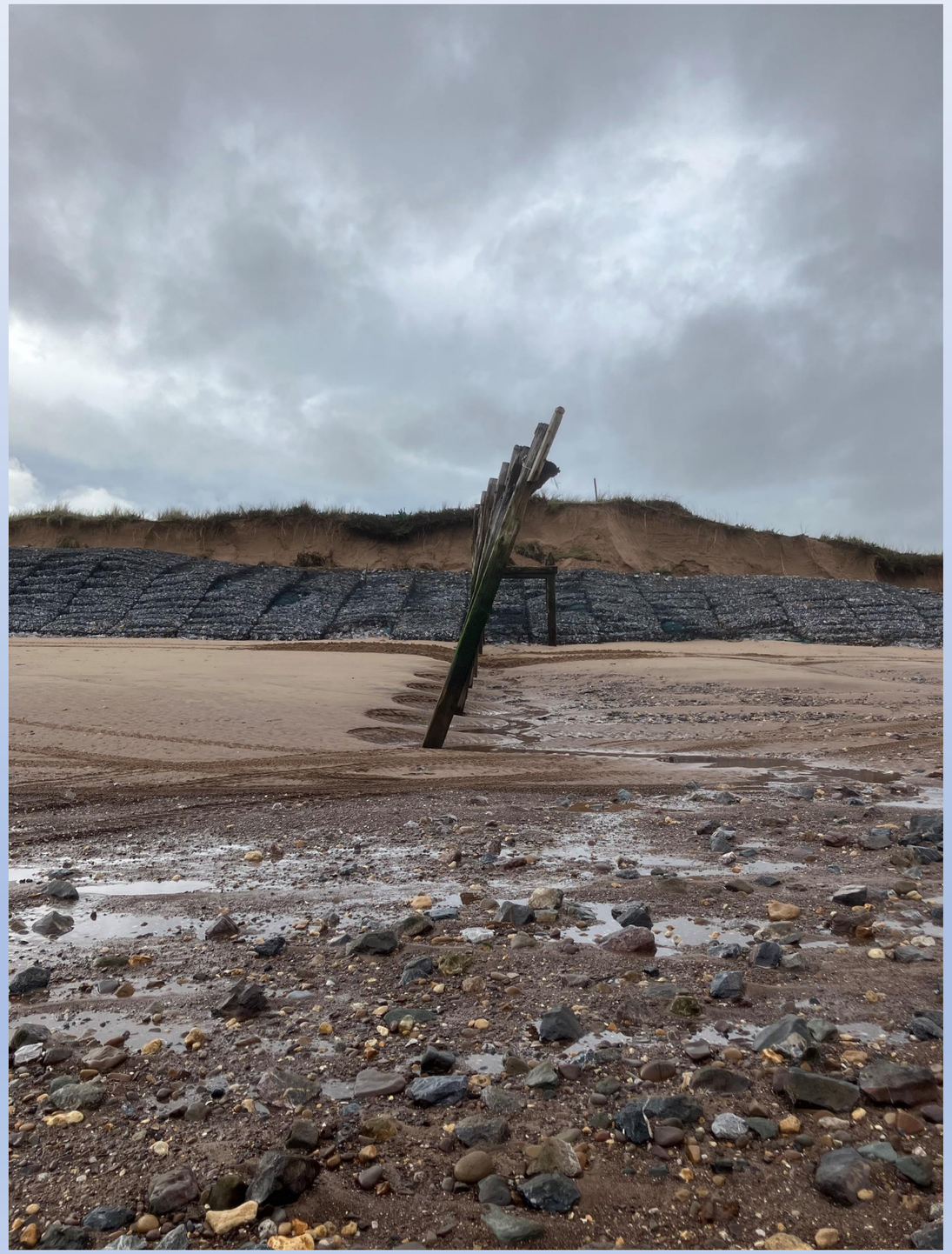


PLYMOUTH COASTAL OBSERVATORY

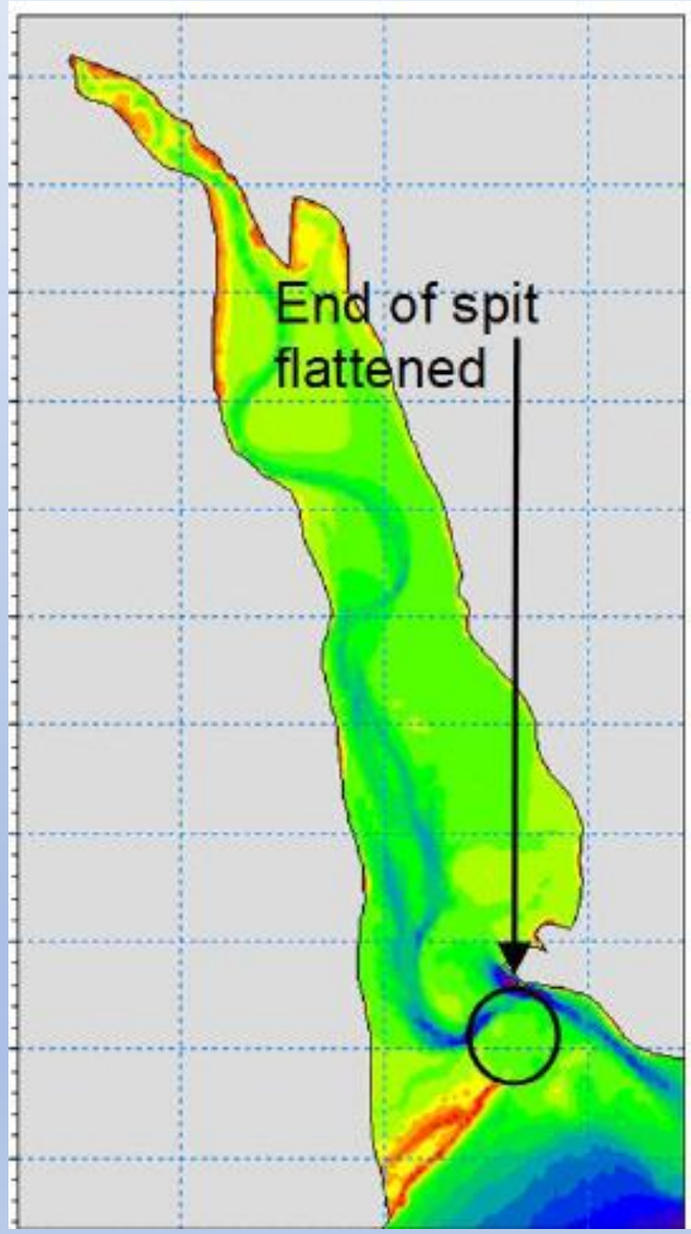
Aerial Photography from 2012

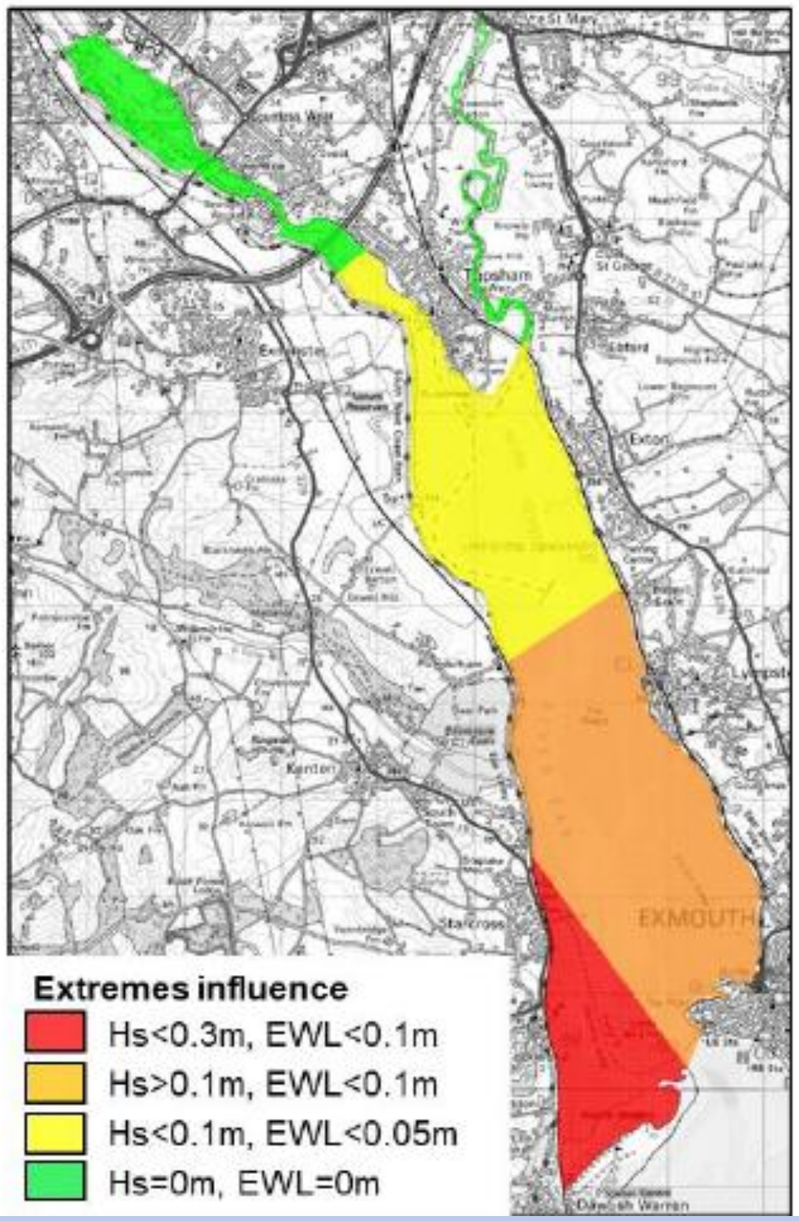
m
0 90 180

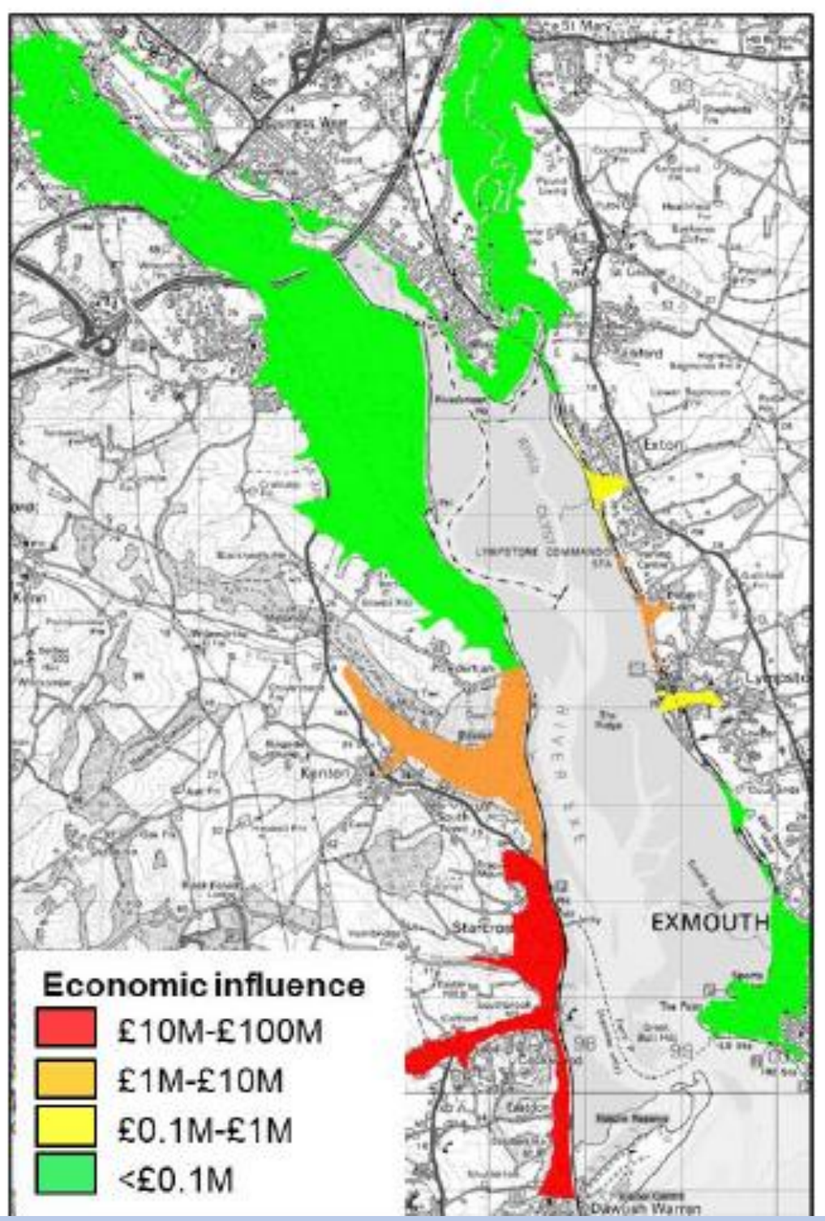
Local impact of change



Estuary-wide impact of distal end flattening - waves, water level and economics

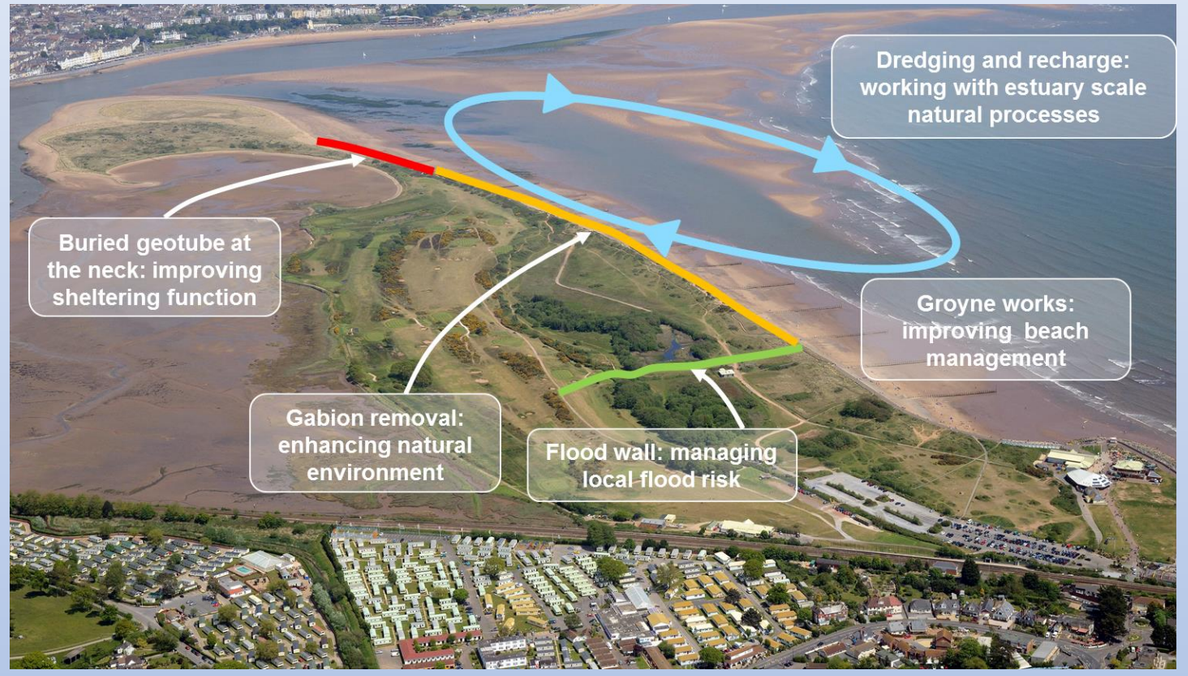






Dawlish Warren post-scheme Review

2017 Scheme



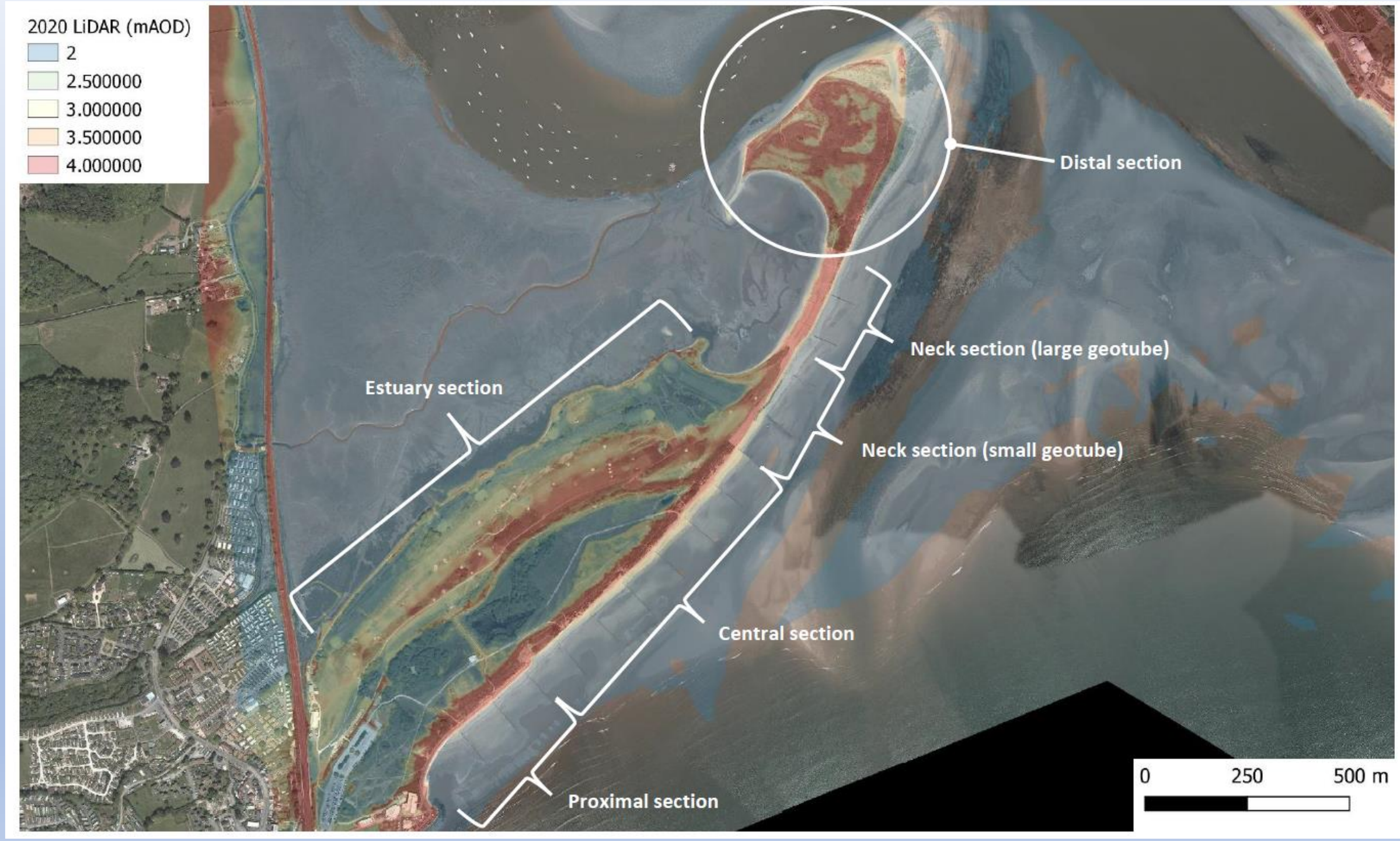
- Post-scheme beach level change happened at a rate earlier than predicted
- Investigation in-light of change
- Identify changes and propose any update to site management going forward
- Follows stakeholder engagement meetings during 2021 and 2022
- Proposals will be the ‘baseline’ to take forward into Exe Estuary FCERM Strategy update
- Future managementto be confirmed by 2027/28

Scheme objectives and planning conditions

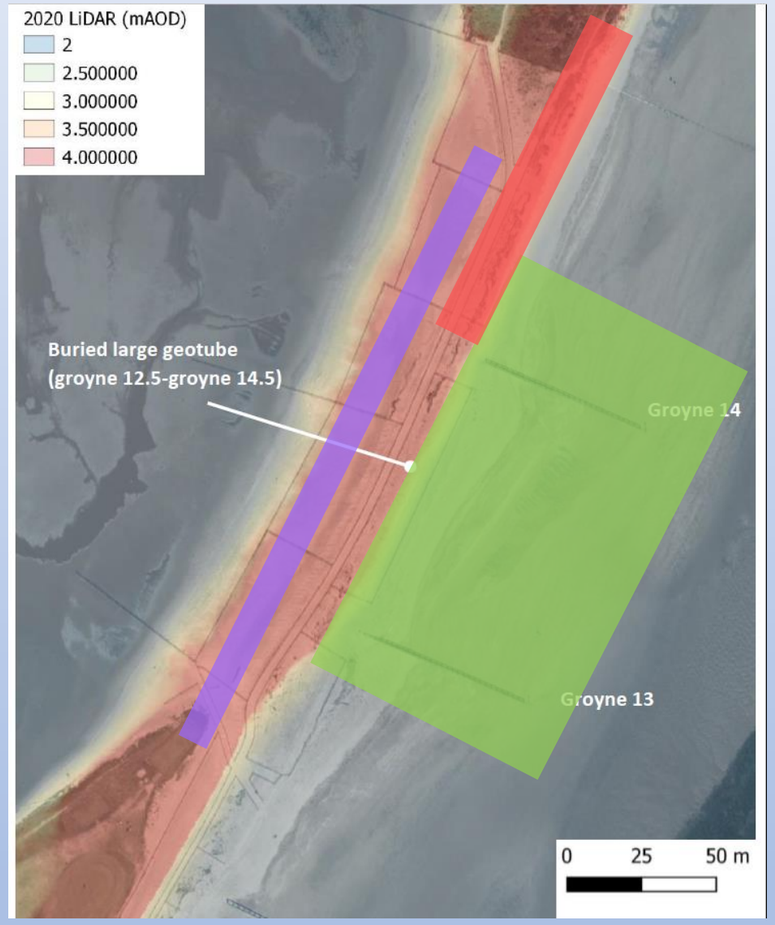
Primary Objectives – FCERM and Environmental drivers

No.	Dawlish Warren BMS objectives	Status – achieved / not met / partially met
1	Reduce risk of erosion and flooding to people, property, infrastructure and commercial assets and activities, locally at Dawlish Warren village.	Achieved through the new flood defence at the Visitor Centre
2	Continue estuary-wide storm sheltering function through to 2040s for people, property, infrastructure and commercial assets and activities.	Currently achieved. Geotubes at the Neck are key to meeting this objective. There is a question mark over the relative importance of the small and large geotubes in meeting this objective; if they function separately or together to achieve this; and if the large geotube alone would still achieve this objective.
3	Achieve SSSI favourable condition by 2030.	Not being met. NE advice is that this will not be met with exposed geotube in place.
4	Achieve SAC condition favourable/unfavourable recovering by 2030 to comply with Habitat Regulations.	Not being met. NE advice is that this will not be met with exposed geotube in place.
5	No adverse impact on the Exe Estuary SPA conservation objectives to comply with Habitat Regulations.	Achieved.
6	Delivery to meet the accelerated programme requirements.	Achieved – EA objective

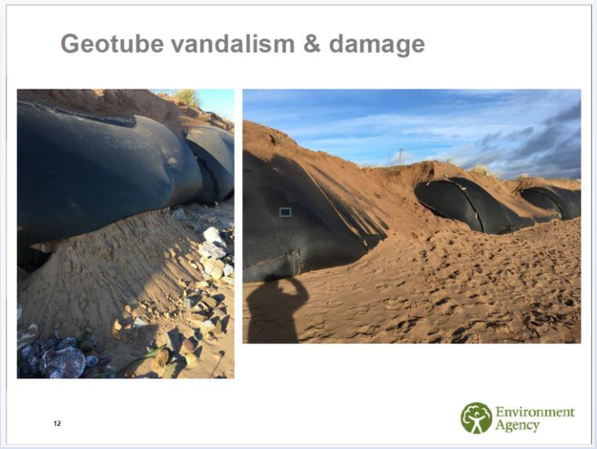
Dawlish Warren Post Scheme Review - Sections



Neck section: geotubes



Small geotube



Proposed management going forward:

- **Do Minimum 'patch repair' prior to removal by 2049**
- **Ongoing discussion re H&S and impact/management of wind-blown sand on to golf course**

Feedback:

- **<u>Potential conflict</u> – No improvement to Dawlish Warren SAC or SSSI**

Large geotube

Proposed management going forward:

- **Do Nothing - Large geotube ensures estuary-wide sheltering function is maintained until 2040s**
- **Emphasise need to upgrade in-estuary defences prior to removal**

Feedback:

- **<u>Potential conflict – once exposed</u> No improvement to Dawlish Warren SAC or SSSI unless removed**

Relic gabion baskets & mattressing

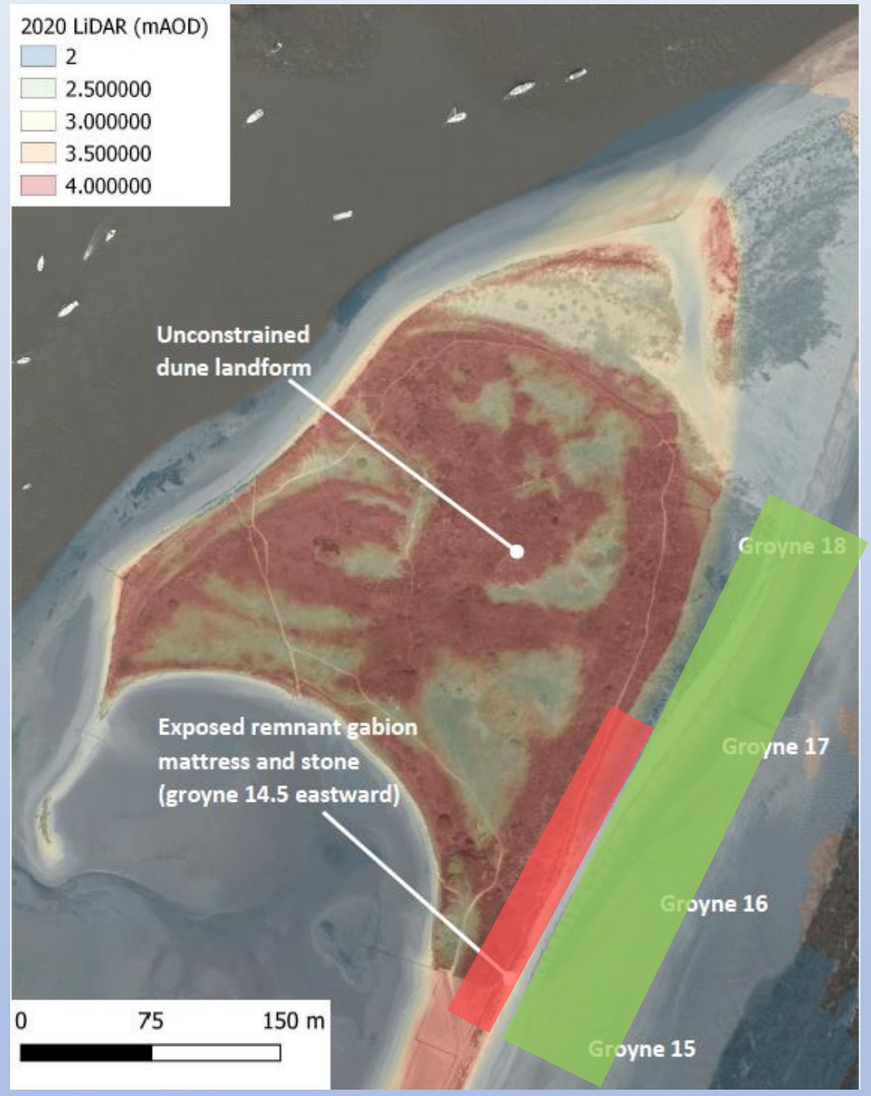
Proposed management going forward:

- **Do Nothing - No proposal for maintenance or removal prior to 2049**
- Monitoring and management of exposed and damaged gabions for H&S and pollution prevention only

Feedback:

- **<u>Potential conflict</u> - no improvement to SAC or SSSI unless removed**

Distal section



Relic groynes 16 - 18

Proposed management going forward:

- **Removal of remnant groynes 16 to 18 by end 2023/24**

Feedback:

- **Authority consensus on removal of relic groynes**

Relic gabion baskets & mattressing

Proposed management going forward:

- **'Do Nothing' - No proposal for maintenance or active removal but ongoing removal following failure**
- **Emphasise need to upgrade in-estuary defences as gabions degrade**

Feedback:

- **<u>Potential conflict</u> – Active removal of mattresses may impact a range of estuary interests including flood risk, navigation and fisheries and therefore not proposed**
- **Gabions continue to deteriorate but FCERM benefits to wider-estuary continues unless actively removed**
- **No improvement to Dawlish Warren SSSI or SAC unless actively removed**

Feedback from Partnership engagement event

Groynes	remove	remove in phases	remove relic groynes only	retain	unsure
	0	10%	5%	60%	25%
Dune notch 'trials'	yes	no	Unsure		
	0	80%	20%		
Geotube removal	yes	yes - but build revetment instead	No	unsure	
	0	20%	50%	30%	
Relic gabion removal	yes	repair/ replace	No	unsure	
	15%	25%	50%	10%	

Potential further ‘change’ sites

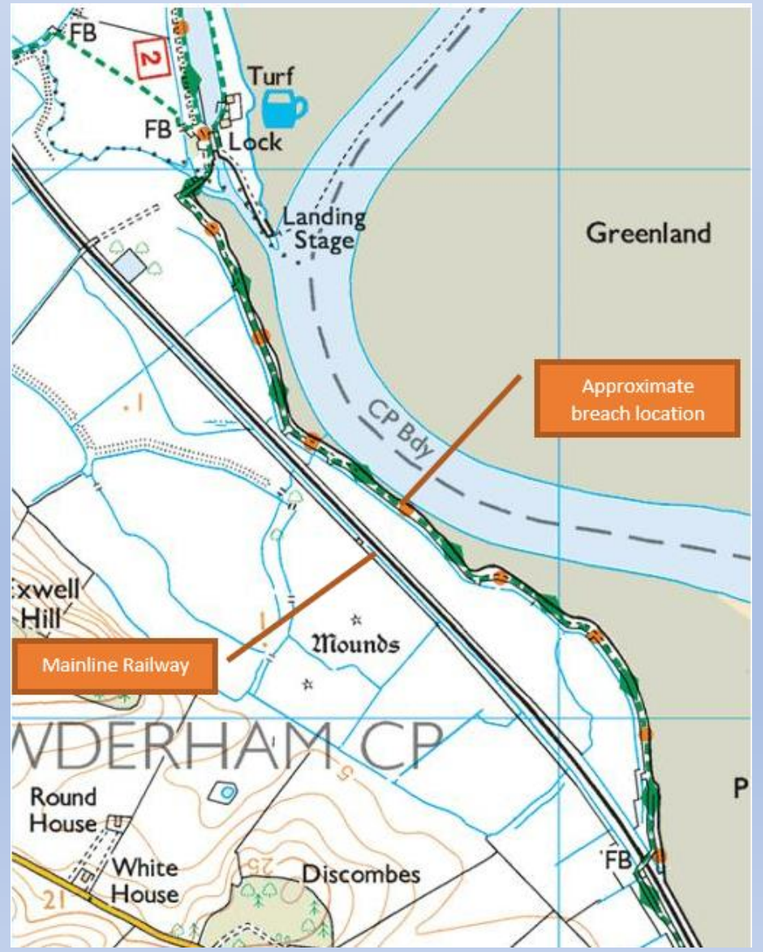
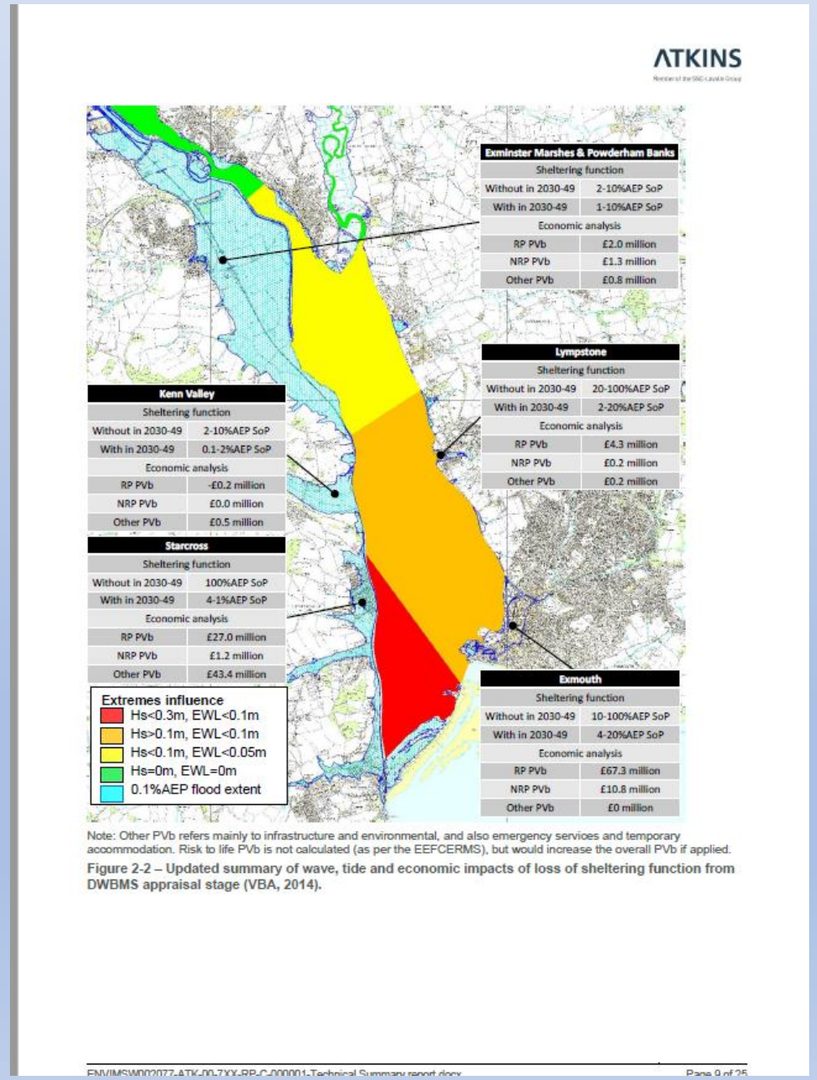


Figure 3: Photo of typical flood bank condition

Figure 4: Photo of 2014 Breach of flood bank

Strategy update to confirm projects and future needs

Dawlish Warren



ATKINS

Exminster Marshes & Powderham Banks	
Sheltering function	
Without in 2030-49	2-10%AEP SoP
With in 2030-49	1-10%AEP SoP
Economic analysis	
RP PVb	£2.0 million
NRP PVb	£1.3 million
Other PVb	£0.8 million

Lympstone	
Sheltering function	
Without in 2030-49	20-100%AEP SoP
With in 2030-49	2-20%AEP SoP
Economic analysis	
RP PVb	£4.3 million
NRP PVb	£0.2 million
Other PVb	£0.2 million

Kenn Valley	
Sheltering function	
Without in 2030-49	2-10%AEP SoP
With in 2030-49	0.1-2%AEP SoP
Economic analysis	
RP PVb	-£0.2 million
NRP PVb	£0.0 million
Other PVb	£0.5 million

Starcross	
Sheltering function	
Without in 2030-49	100%AEP SoP
With in 2030-49	4-1%AEP SoP
Economic analysis	
RP PVb	£27.0 million
NRP PVb	£1.2 million
Other PVb	£43.4 million

Exmouth	
Sheltering function	
Without in 2030-49	10-100%AEP SoP
With in 2030-49	4-20%AEP SoP
Economic analysis	
RP PVb	£67.3 million
NRP PVb	£10.8 million
Other PVb	£0 million

Extremes influence
- Hs<0.3m, EWL<0.1m
- Hs>0.1m, EWL<0.1m
- Hs<0.1m, EWL<0.05m
- Hs=0m, EWL=0m
- 0.1%AEP flood extent

Note: Other PVb refers mainly to infrastructure and environmental, and also emergency services and temporary accommodation. Risk to life PVb is not calculated (as per the EEFCERMS), but would increase the overall PVb if applied.

Figure 2-2 – Updated summary of wave, tide and economic impacts of loss of sheltering function from DWBMS appraisal stage (VBA, 2014).

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- Topsham
- Powderham Banks adaptation
- Bowling Green Marsh adaptation
- Shutterton Brook tide-lock
- ‘what if?’ breach scenarios Dawlish Warren, Powderham Banks, Exeter canal, Bowling Green Marsh
- Exminster Marshes WLMP?
- Habitat creation and BNG opportunities
- Flood Resilience
- LNRS ‘connectivity’ to coastal schemes
- Long-term change monitoring
- ?
- Engagement in 2026 for delivery by 2027/28