Southeast Regional Coastal Monitoring Programme

Dr Thomas Dhoop

Programme Manager

Channel Coastal Observatory

Aims

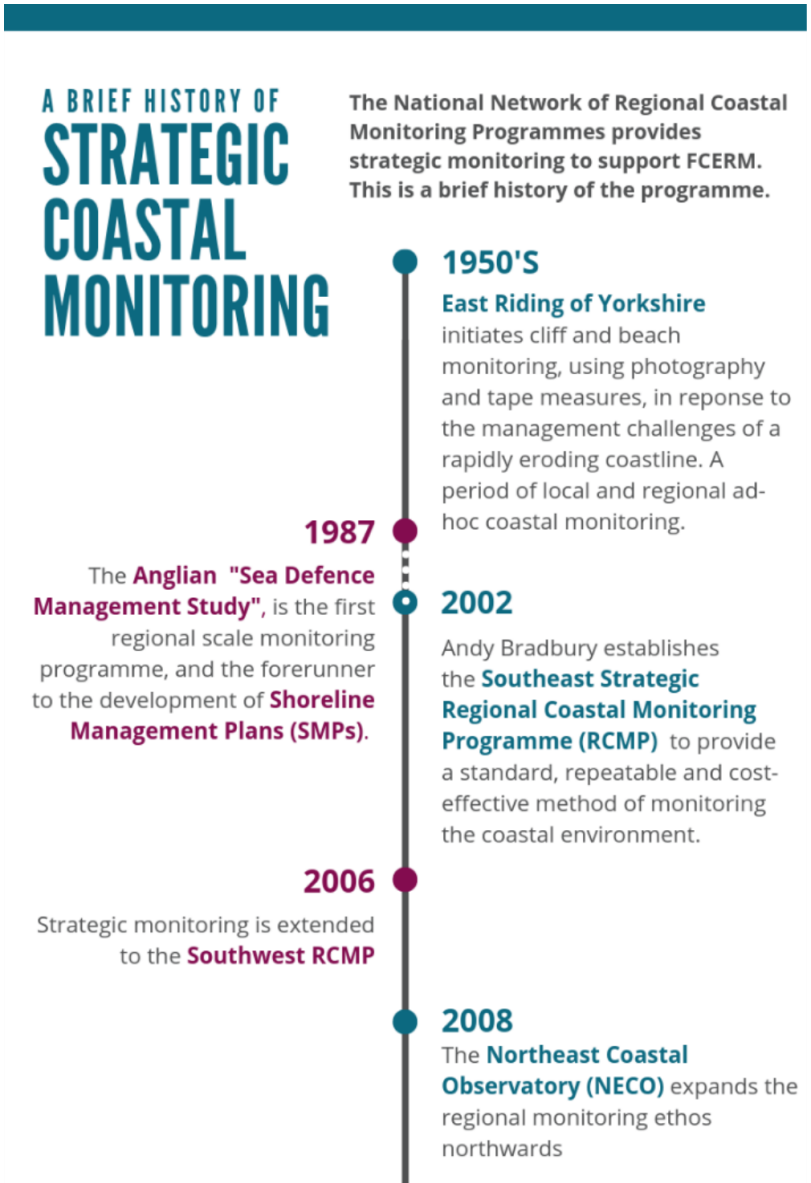
- Provide the evidence base needed for flood and coastal erosion risk management (FCERM)
- Support the Risk Management Authorities (RMA), including the Environment Agency (EA):
  - Plan, design and deliver coastal strategy
  - Coastal capital investment programme
  - Strategic coastal management such as shoreline management planning (SMP)
  - Incident management
- Increased understanding of the effect of climate change, local and national planning, research and education.

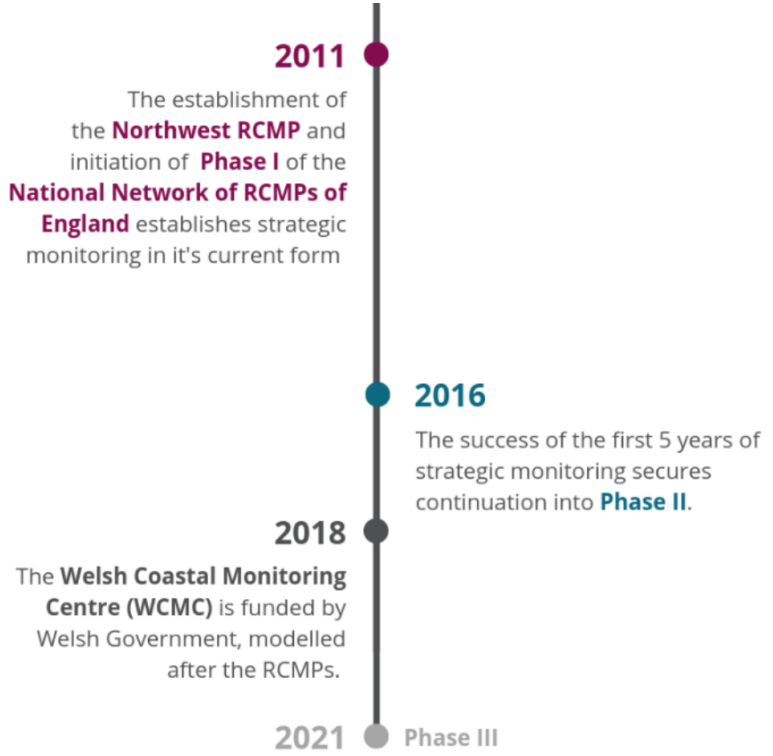
Aims

- In practice, we collect, in a standardised, repeatable and cost-effective way, the following datasets:
  - Wave, tide and meteorological data
  - Topographic data
  - Lidar data
  - Aerial photography
  - Bathymetry
  - Asset register
  - Analysis products:
    - Habitat mapping

  + Make the data freely available

Programme Design





Phase III (2021- 2027):
Data records extend to 20 years in the Southeast and 10 years nation-wide

Programme Design

- Lead local authorities:

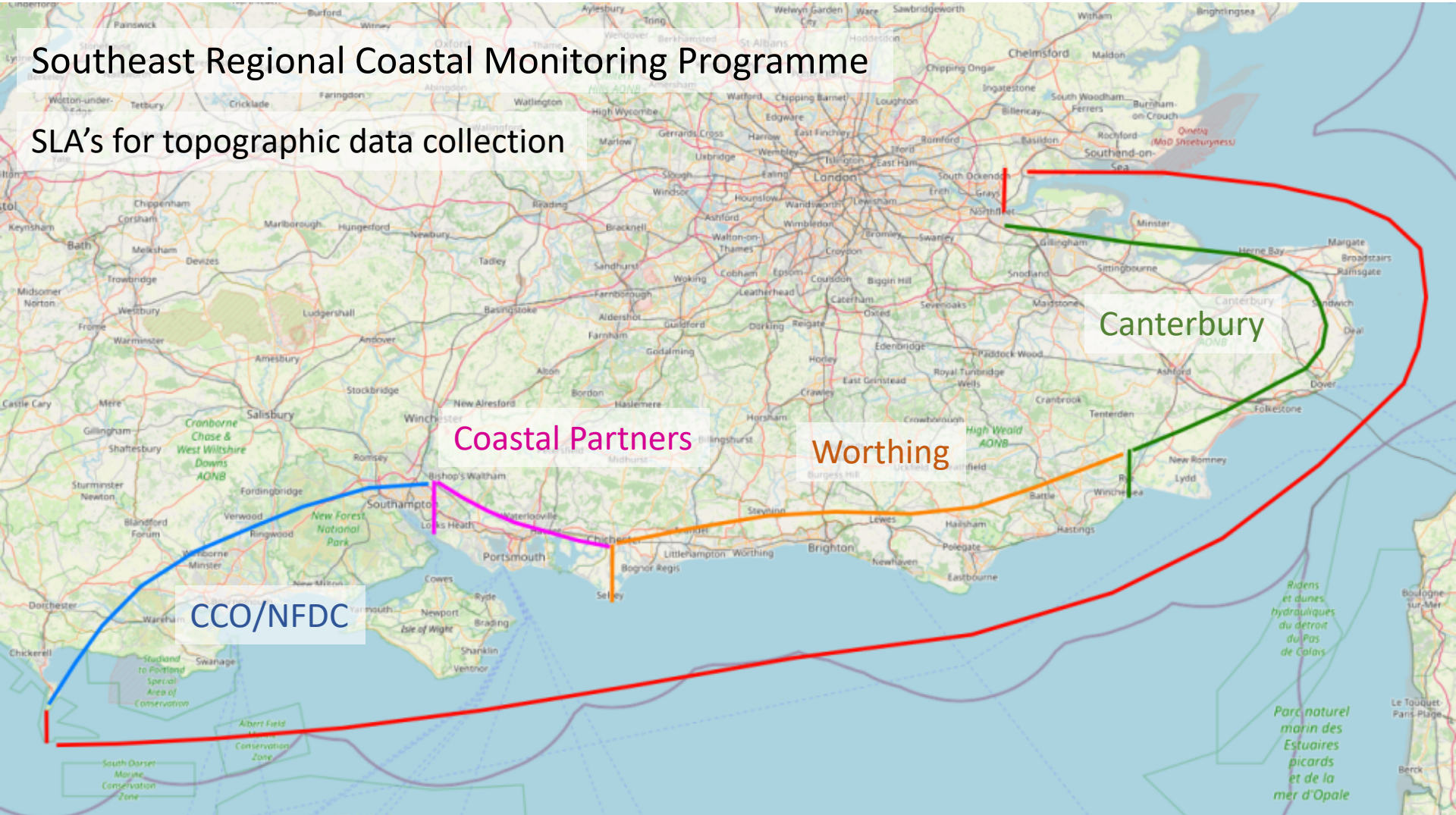
Programme Design

- CCO is the lead representative for the National Network of Regional Coastal Monitoring Programmes

Funding

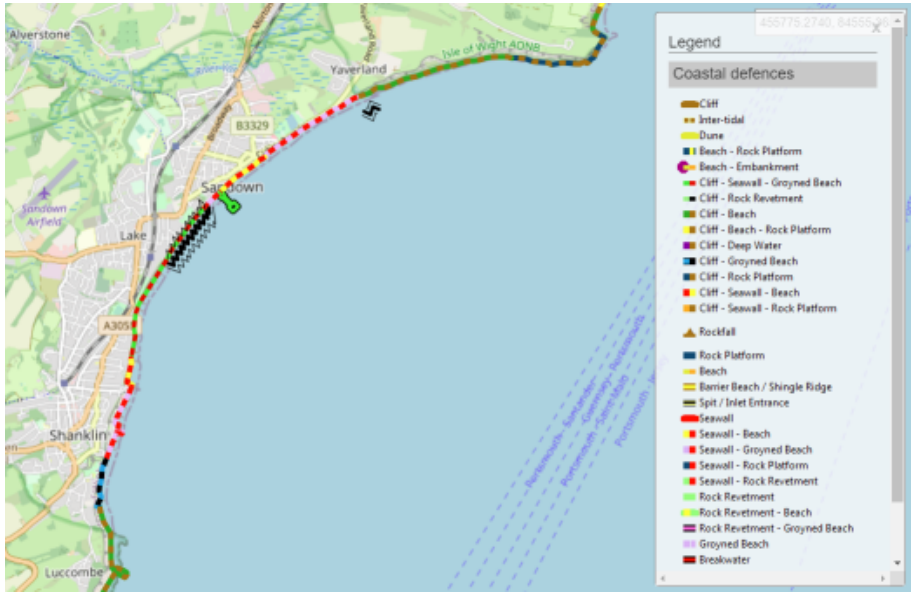
- Fully funded, Flood defence grant-in-aid (FDGiA) from DEFRA, via the Environment Agency
- Phase III: 2021-2027
- Project budget: £12,382,000

CCO, Lead Authority for the Southeast



Risk-Based Monitoring

- Targeted approach
  - Geomorphology
  - Exposure
  - SMP Management Policy
    - Hold the line
    - Do nothing
    - Advance the line
    - Managed re-alignment
  - Beach Management Plan



- Once-per-phase Survey Schedule Review

Data Collection

- Wave, tide and meteorological data
- Topographic data
- Lidar data
- Aerial photography
- Bathymetry
- Asset register
- Analysis product:
  - Habitat mapping
- Incident response
- NFDC Surveying

Hydrodynamic Network

National Network

- 72 Instruments:
  - 37 wave buoys
  - 14 tide gauges
  - 22 met stations

CCO provides a national service:

- Quality Control
- Analysis
- Technical advice

Wave Buoys

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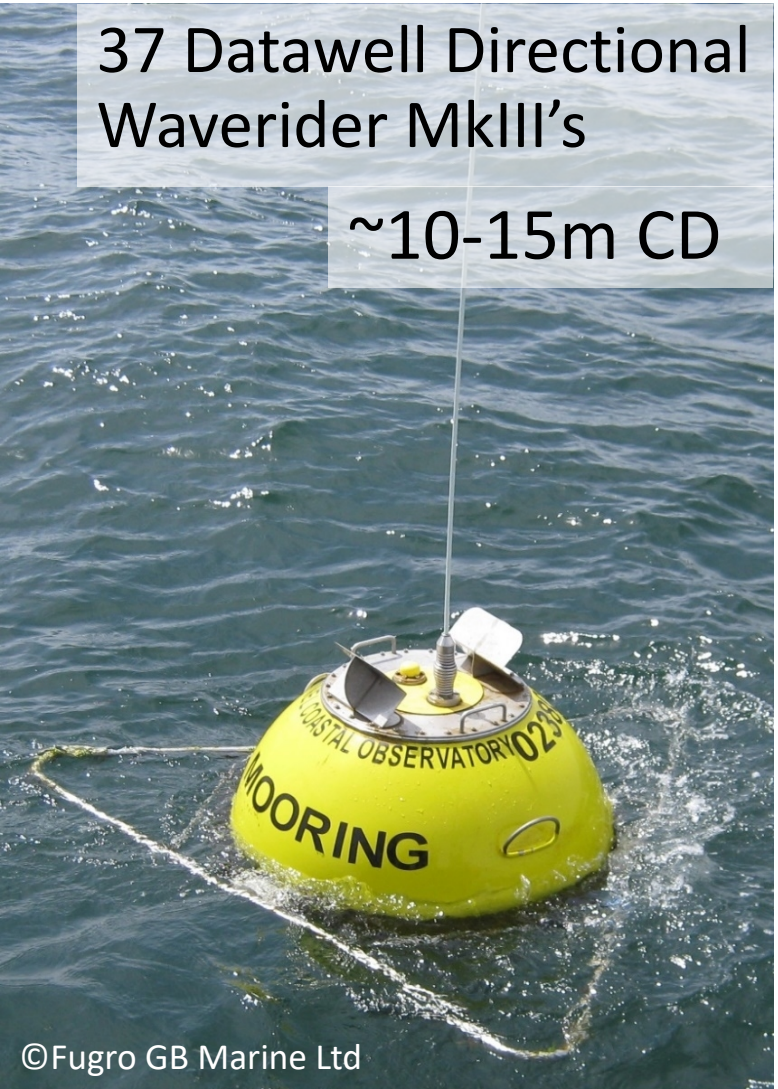
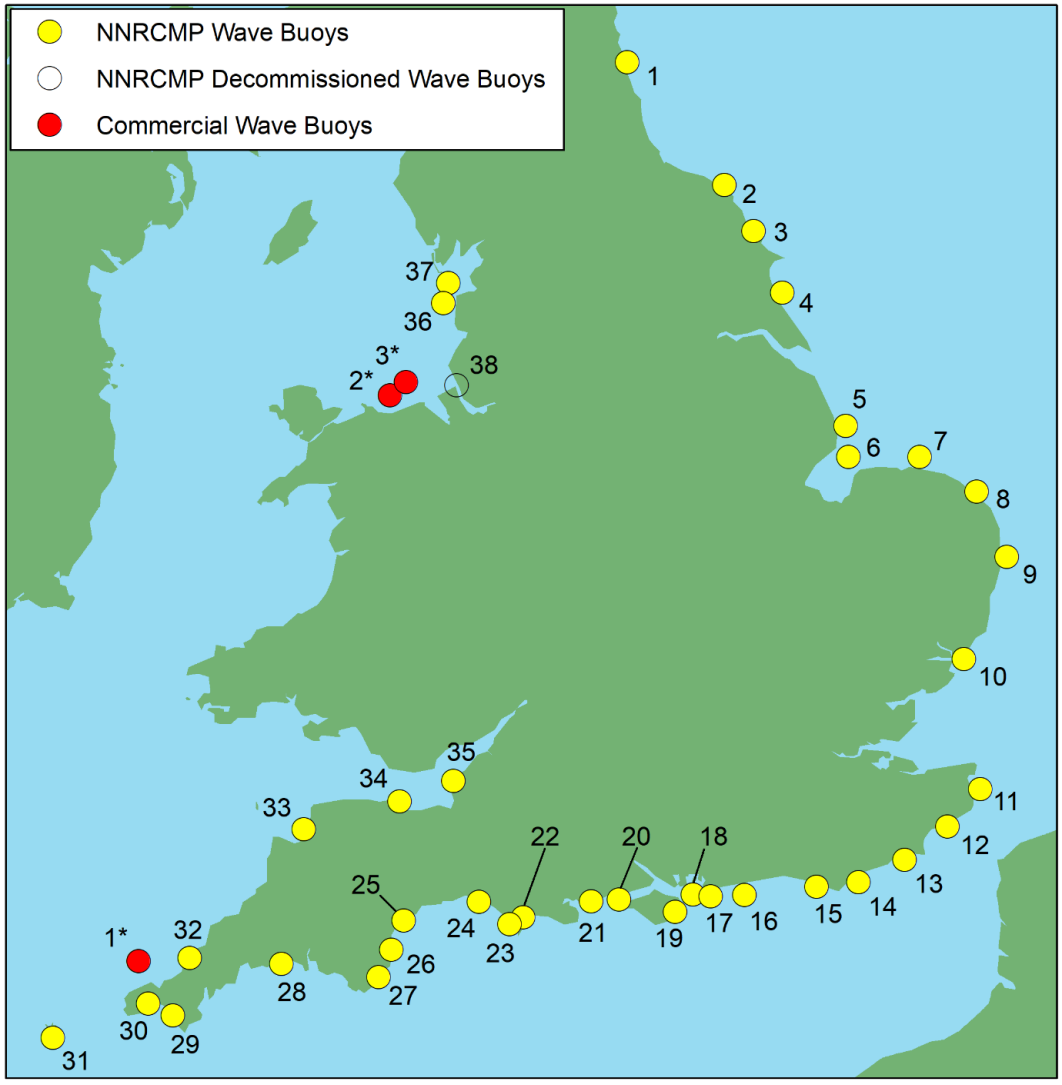
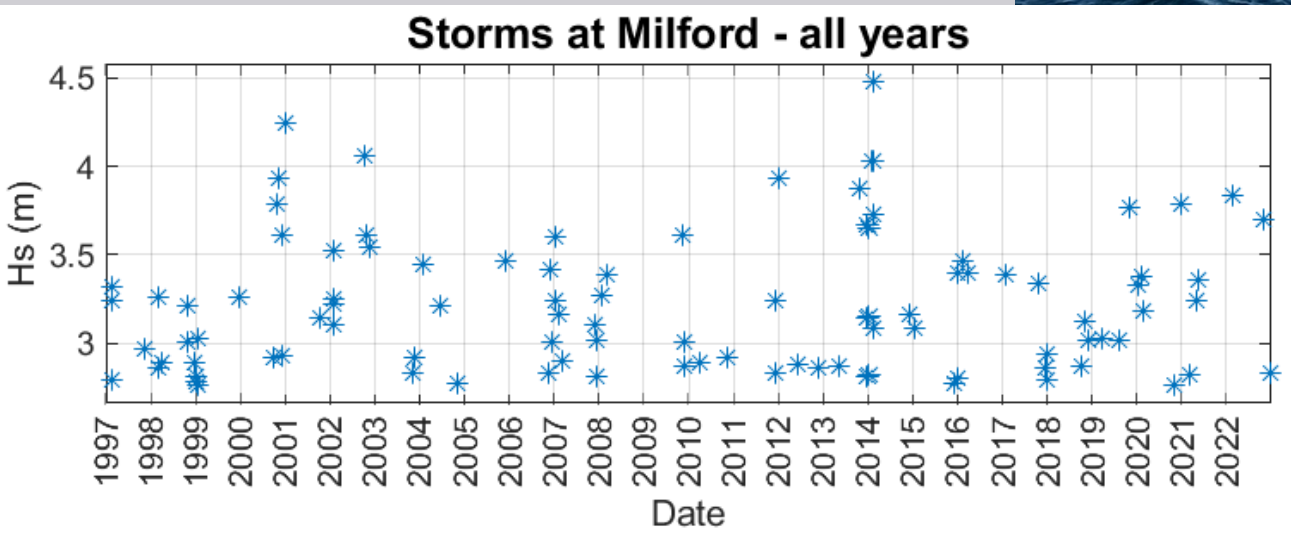




Milford Wave Buoy

Deployed on 20 May 1996,
~27 years of data



Tide Gauges

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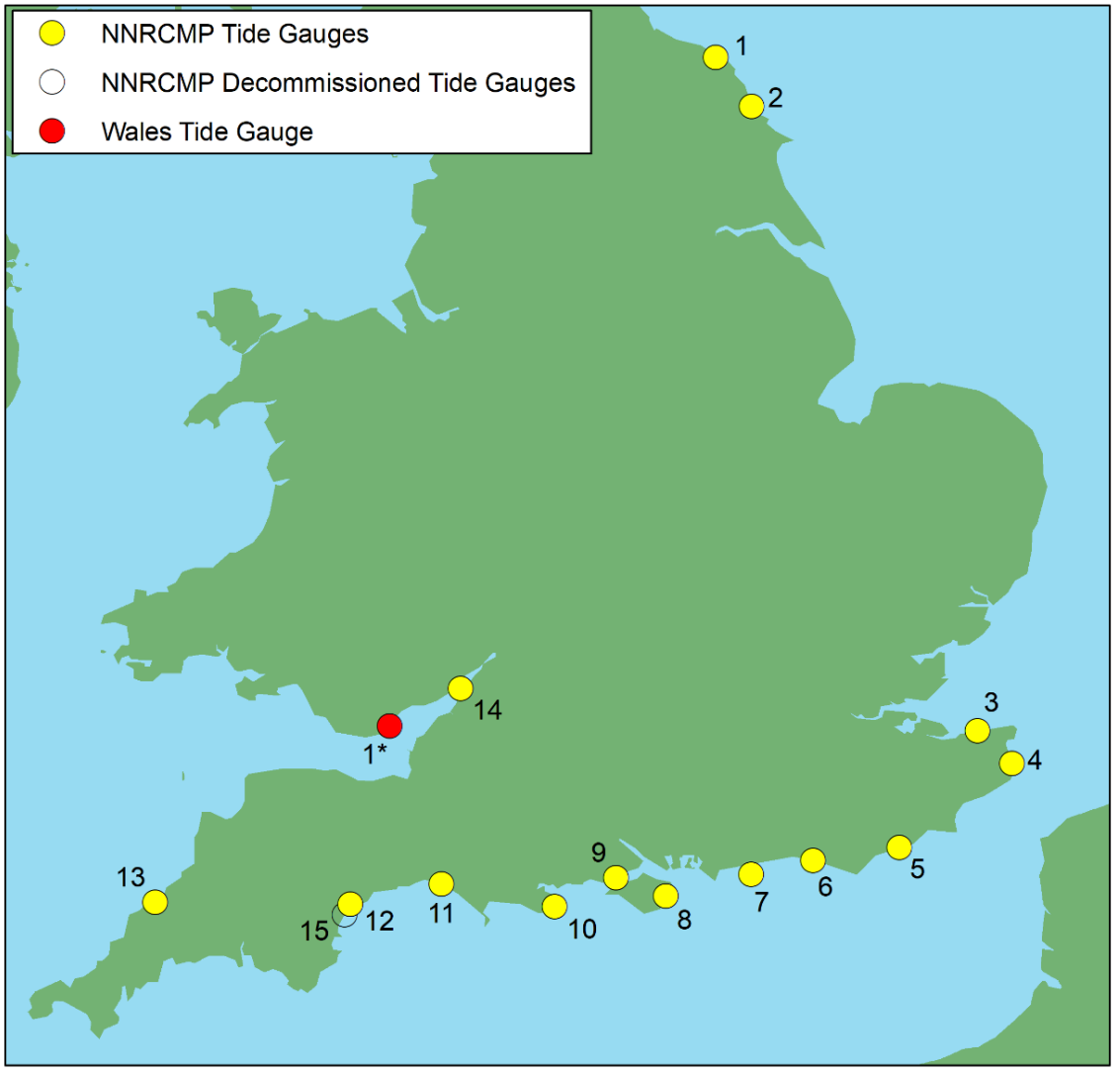
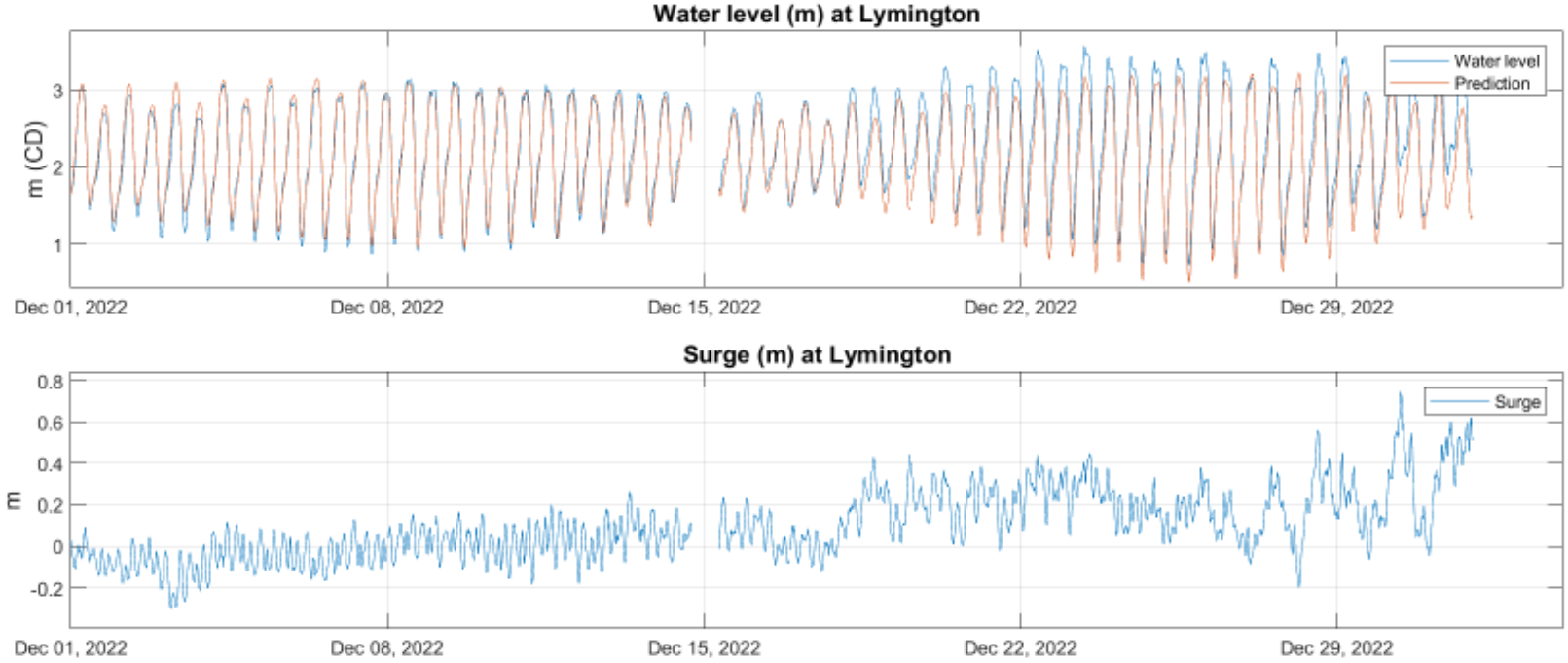
15 tide gauges



Lymington Tide Gauge

Deployed on 19 April 2007,
~16 years of data



Meteorological Stations

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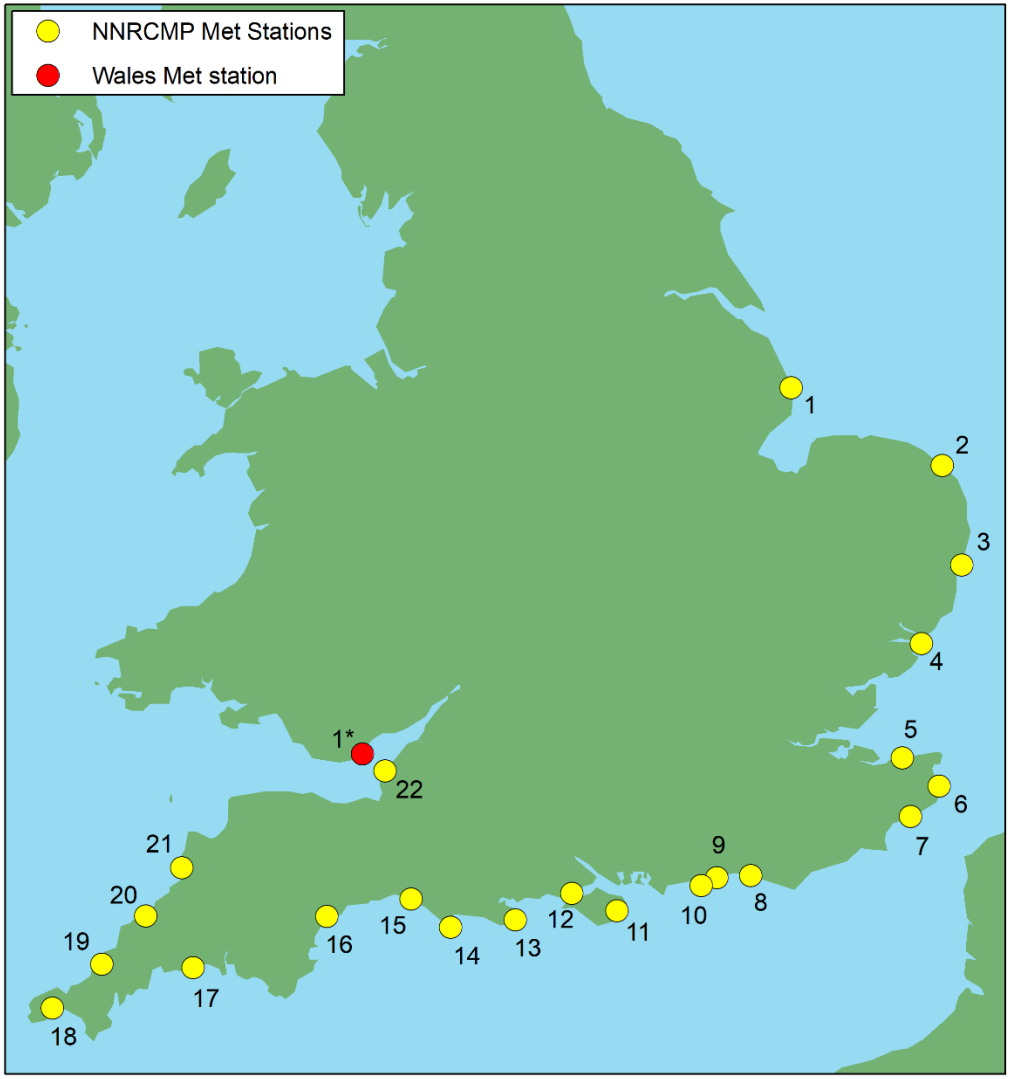
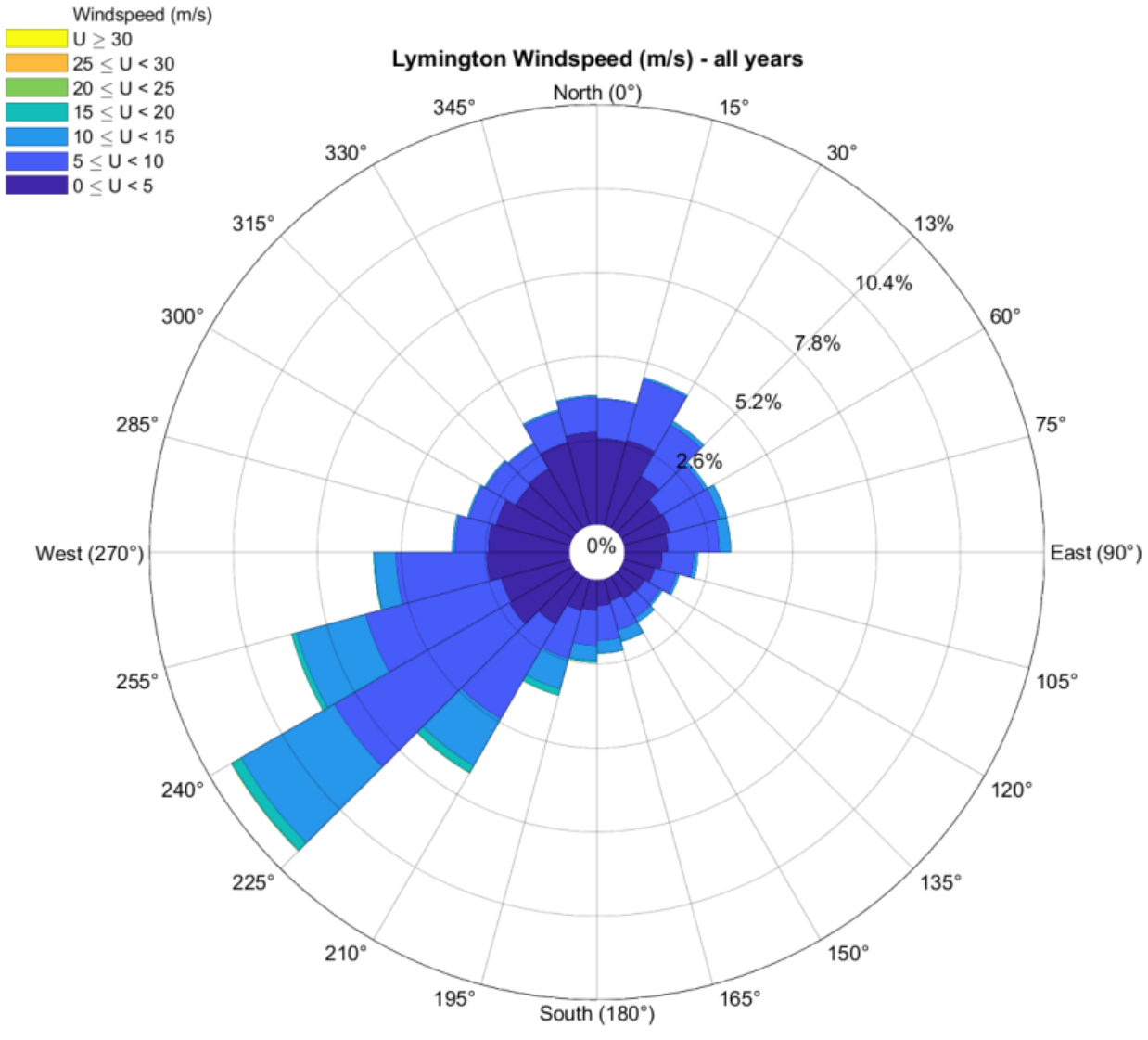
22 meteorological stations



Lymington Met

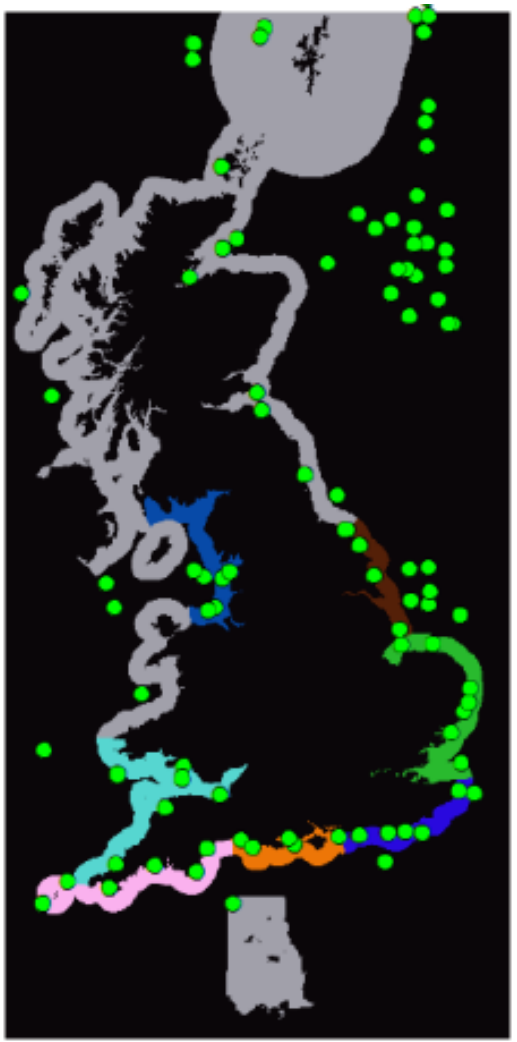


Hydrodynamic Network

- Real-time data
  - Visualised on website in graphs and tables
  - Direct provision to:
    - CEFAS Wavenet
    - National Flood Forecasting Centre
    - Met Office (verification of WWIII model)
    - IOC Sea Level Monitoring Centre (VLIZ)
    - SWEEP OWWL overtopping model
    - …

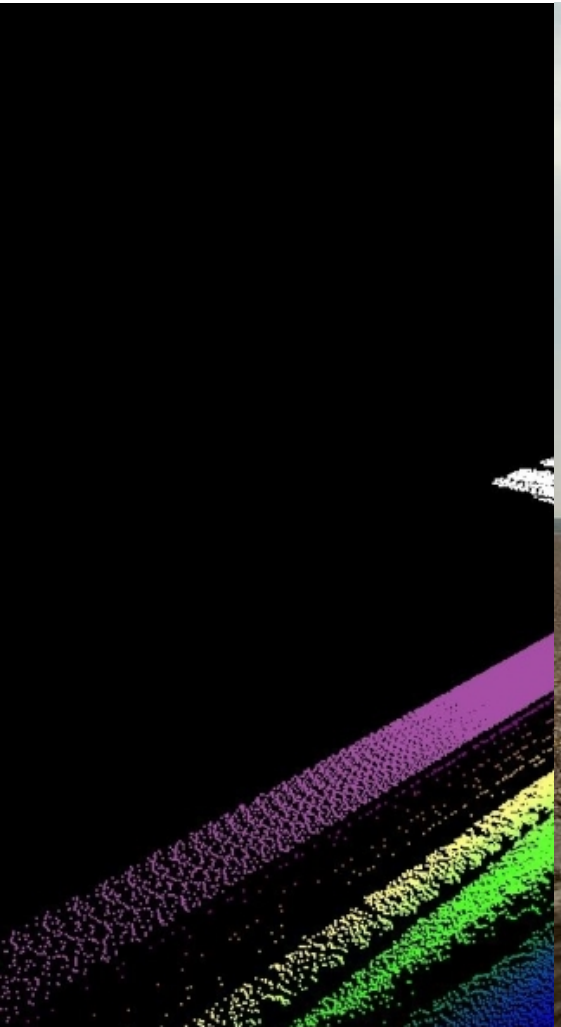
  ➔ Inform post-storm survey work
- QC'd data
- API

Met Office inshore forecast verification



Topographic Data

Baseline surveys: Milford, 14 April 2021

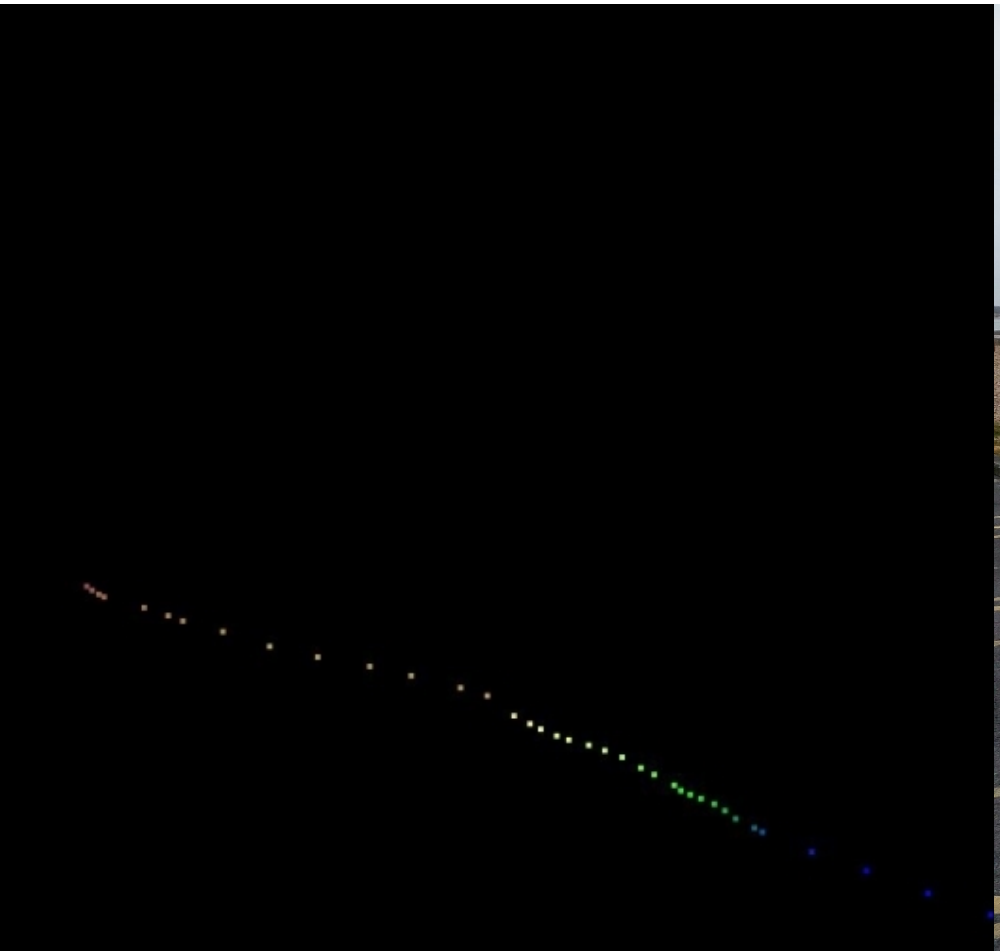


Topographic Data

Baseline UAV surveys: Milford, 28 January 2022

Topographic Data

Profile surveys: Hordle, 23 February 2022



Topographic Data

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Legacy: Profiles through time at Milford

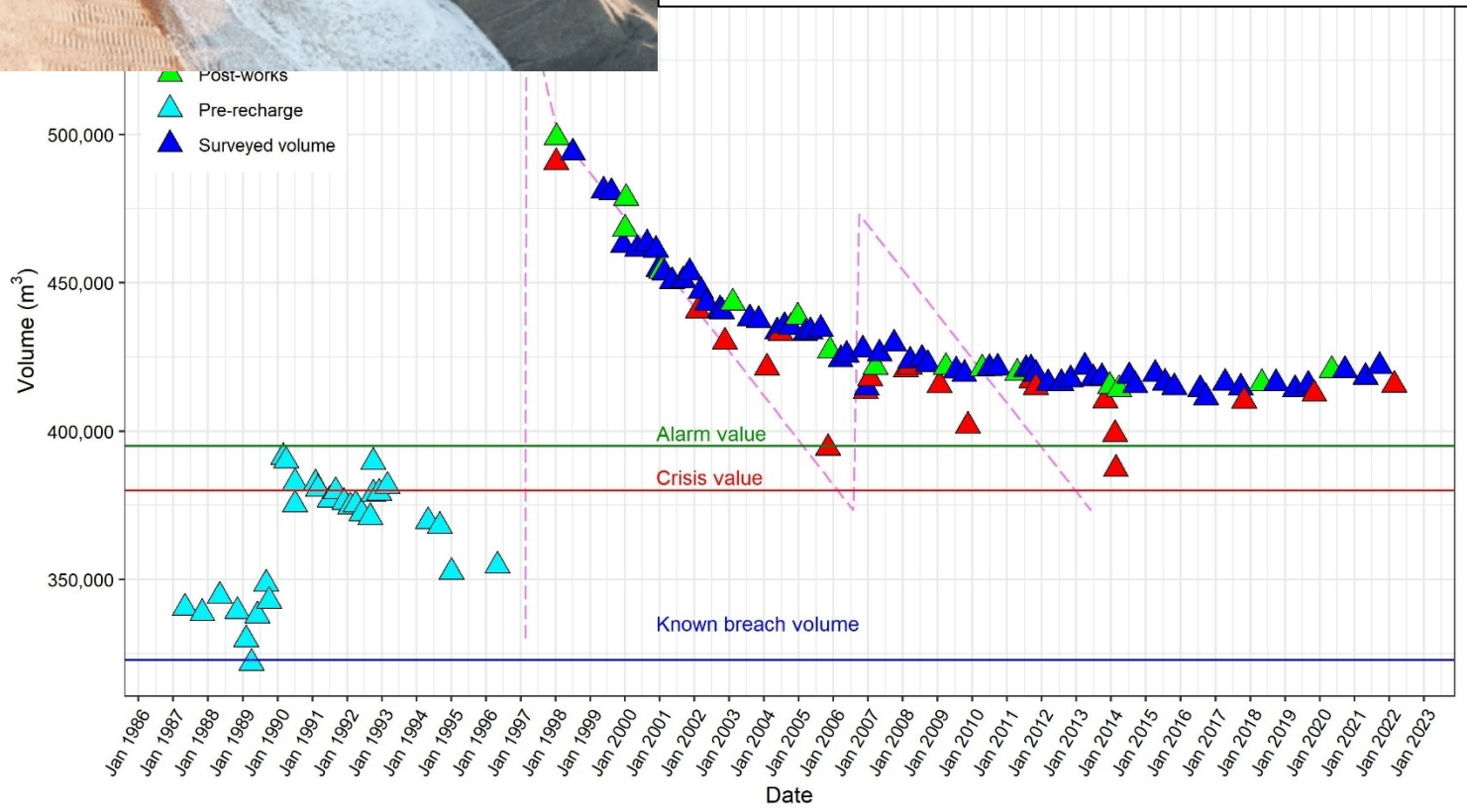
Topographic Data

BMP implemented in 1996

50-year design life scheme with episodic recharge

➔ Monitoring informed a delay in recharge by over 5 years, resulting in large cost-saving

➔ Post-storm inform recovery of barrier after event



Topographic Data

Standard survey regime in NFDC area

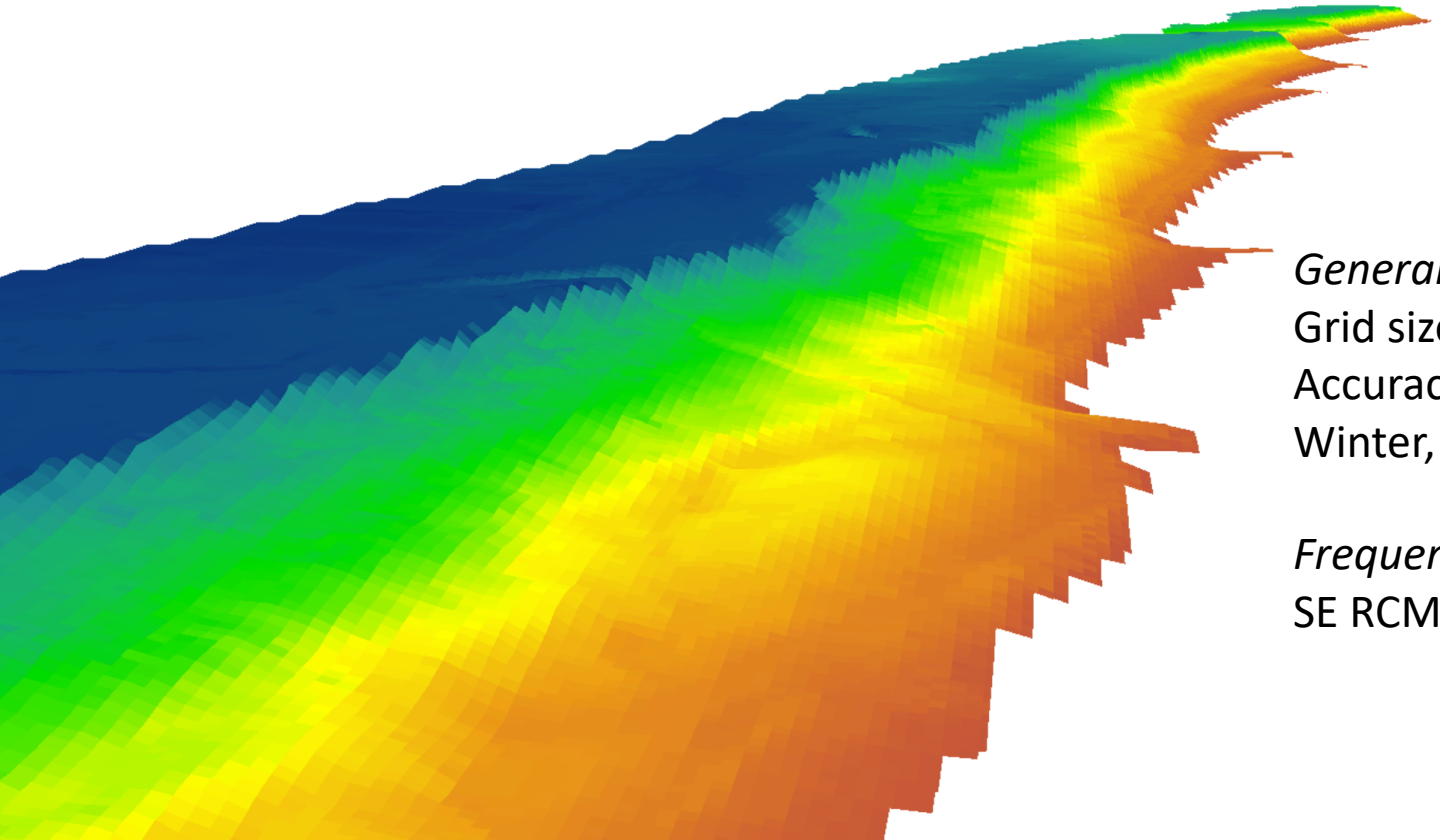
Survey Unit		2021/22	2022/23	2023/24	2024/25	2025/26	2026/27
5cSU10	Calshot Spit	1 Profile	1 Profile	Baseline	1 Profile	1 Profile	1 Profile
5cSU11	Cadland			Baseline			
5cSU12	Lepe			Baseline			
5cSU13	Beaulieu River						
5cSU14	Park Shore/Gull Island			Baseline			
5cSU15	Sowley/Park Shore			Baseline			
5cSU16	Elmer's Court						
5cSU17	Lymington River						
5cSU18	Pennington						
5cSU19	North Point	Baseline, 1 profile	Baseline, 1 profile	Baseline, 1 profile	Baseline, 1 profile	Baseline, 1 profile	Baseline, 1 profile
5fSU01	Hurst Spit	Baseline, 1 profile	Baseline, 1 profile	Baseline, 1 profile	Baseline, 1 profile	Baseline, 1 profile	Baseline, 1 profile
5fSU02	Milford	Baseline, 1 profile	Baseline, 1 profile	Baseline, 1 profile	Baseline, 1 profile	Baseline, 1 profile	Baseline, 1 profile
5fSU03	Hordle	1 Profile	1 Profile	Baseline	1 Profile	1 Profile	1 Profile
5fSU04	Becton to Hordle			Baseline			
5fSU05	Naish to Barton		Baseline				

LiDAR year

Lidar Data

Provided in kind by the EA's Geomatics team

Barton Cliffs in 2017 Lidar capture



General:
Grid size: 1m
Accuracy: +/-0.2m
Winter, leaf off

Frequency:
SE RCMP: Every other year

Lidar Data

Example: National Coastal Erosion Risk Map 2

Lidar data used to assess cliff recession rates

Aerial Photography

General: GSD: 0.1m | MLWS | Summer, leaf on

Frequency: Every two years (2022, 2025)

Barton Cliffs throughout the years: 2008

Aerial Photography

General: GSD: 0.1m | MLWS | Summer, leaf on

Frequency: Every two years (2022, 2025)

Barton Cliffs throughout the years: 2013

Aerial Photography

General: GSD: 0.1m | MLWS | Summer, leaf on

Frequency: Every two years (2022, 2025)

Barton Cliffs throughout the years: 2016

Aerial Photography

General: GSD: 0.1m | MLWS | Summer, leaf on

Frequency: Every two years (2022, 2025)

Barton Cliffs throughout the years: 2019

Bathymetry

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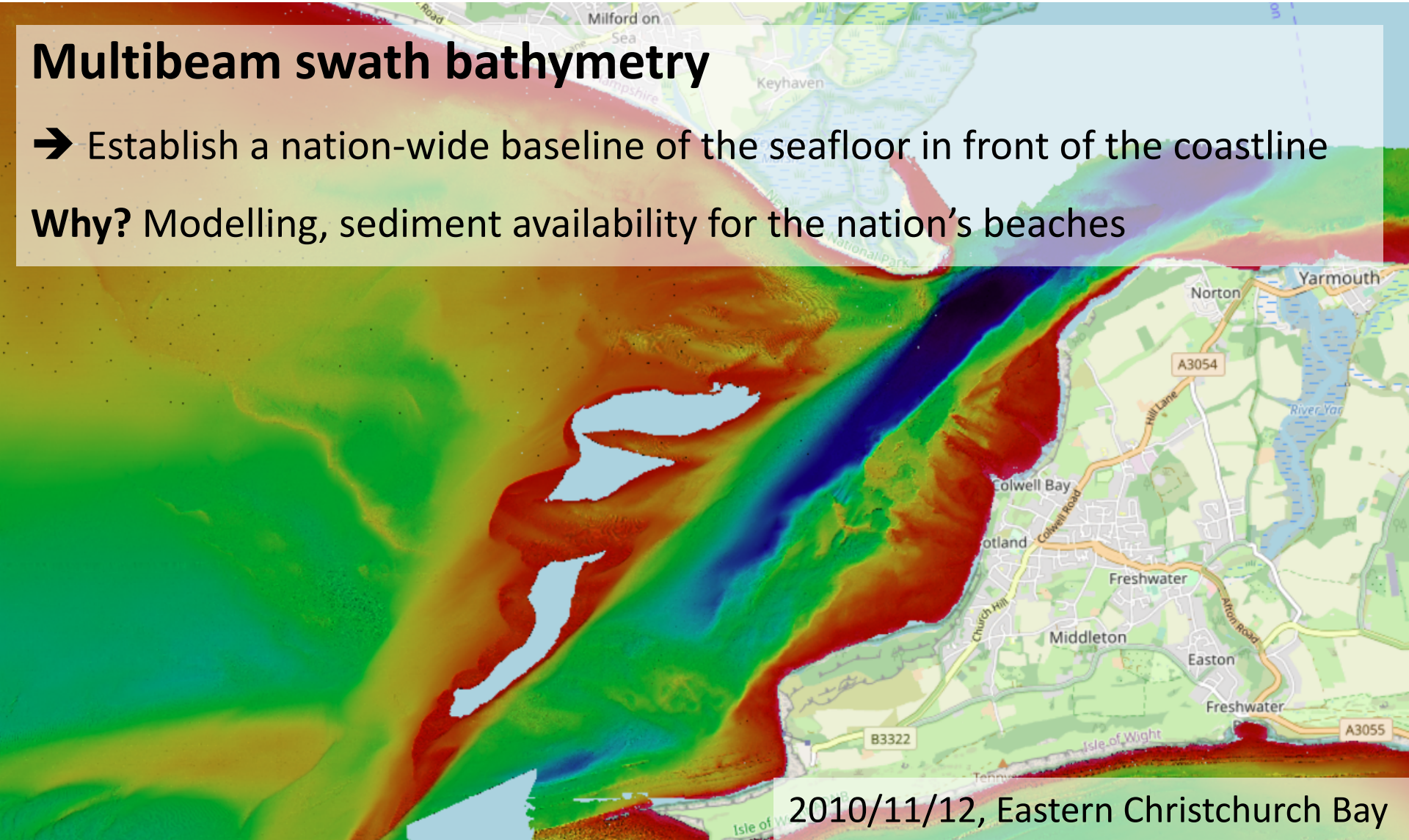
Multibeam swath bathymetry

➔ Establish a nation-wide baseline of the seafloor in front of the coastline

Why? Modelling, sediment availability for the nation's beaches



2010/11/12, Eastern Christchurch Bay

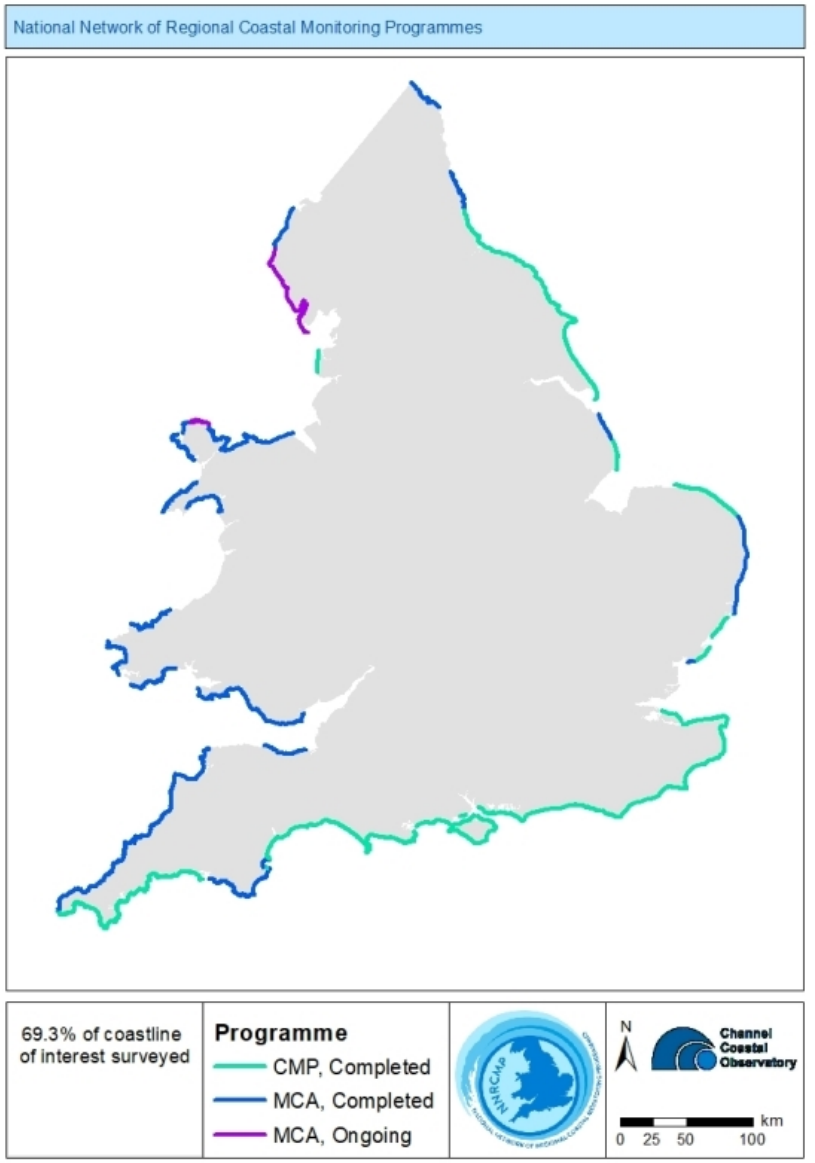
Bathymetry

Filling the ‘white ribbon’

~70% nationwide coverage

90+% coverage in Southeast

➔Collaboration with the MCA and UKHO



Bathymetry

Partnership with MCA and UKHO

Extend CHP surveys ‘inshore’ to include areas of interest to the RMA’s

IHO Order 1a standard data

➔ QA by the UKHO

Share the cost of procurement of swath bathymetry surveys for areas of mutual interest

➔Optimize public expenditure

Data is made freely available via the coastal monitoring website

MEMORANDUM OF AGREEMENT
BETWEEN

New Forest District Council,

Teignbridge District Council,

Metropolitan Borough Council of Sefton,

Scarborough Borough Council,

East Riding of Yorkshire Council

and

Maritime & Coastguard Agency

March 2022

Sefton Council

SCARBOROUGH BOROUGH COUNCIL

Teignbridge .gov.uk

EAST RIDING OF YORKSHIRE COUNCIL

Maritime & Coastguard Agency

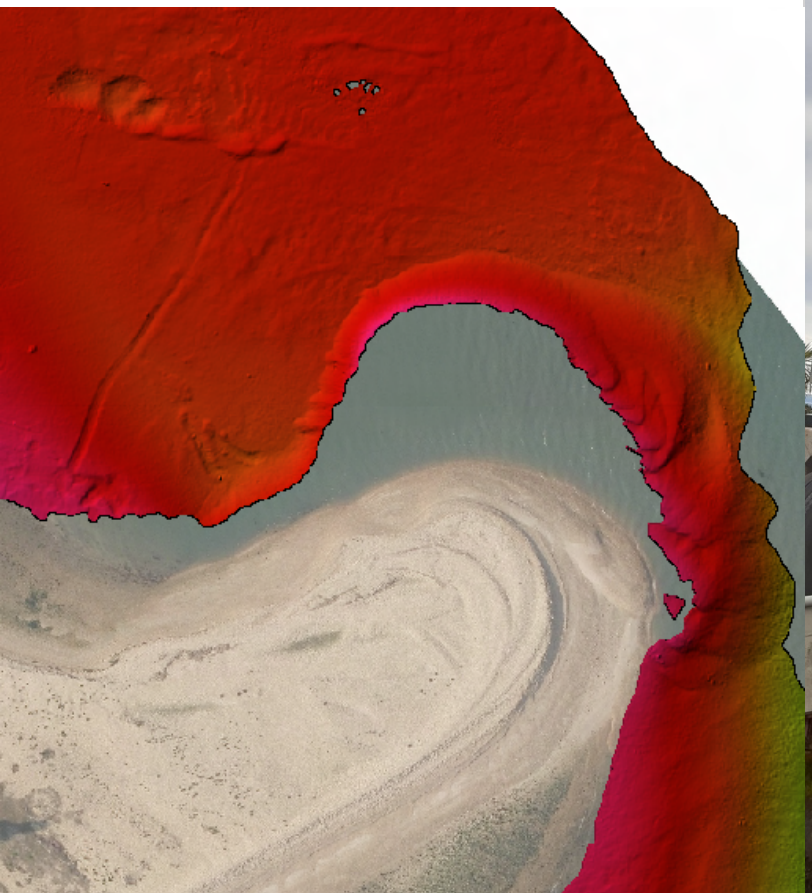
New Forest DISTRICT COUNCIL

Bathymetry

Frequency: Christchurch Bay (2023), West Solent (2023)

In-house multibeam

➔ Norbit iWBMS



Asset Register

Introduced in Phase III (2021-2027)

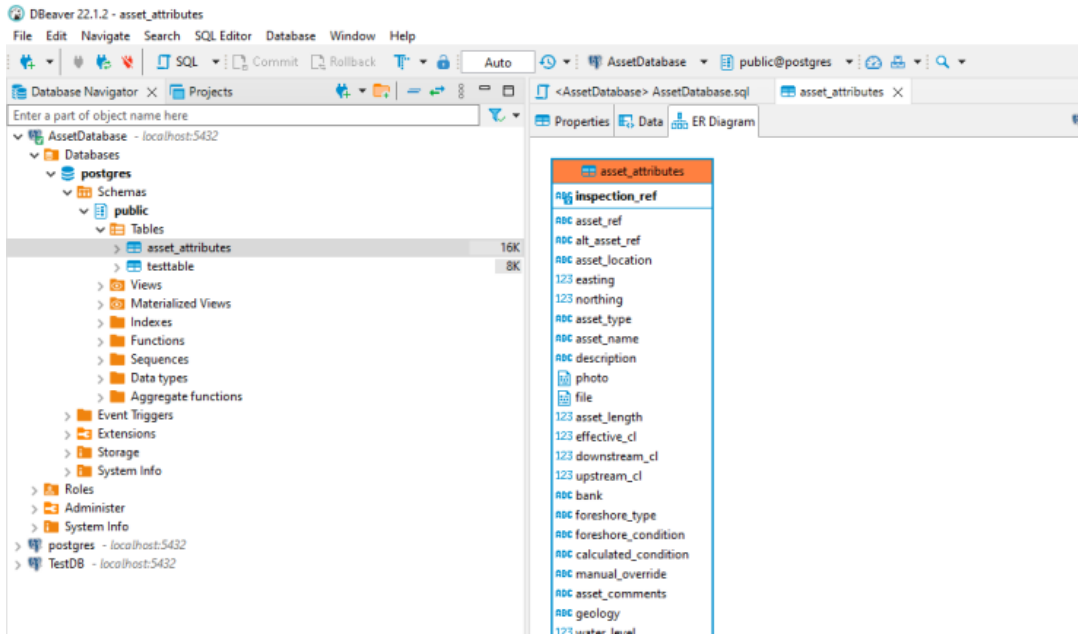
Composition of an asset register

➔ Inform the EA's strategic overview of coastal risk

➔ Gap in current national database provision of asset presence and condition

T98 inspection training provided to 35 delegates across 16 LA's

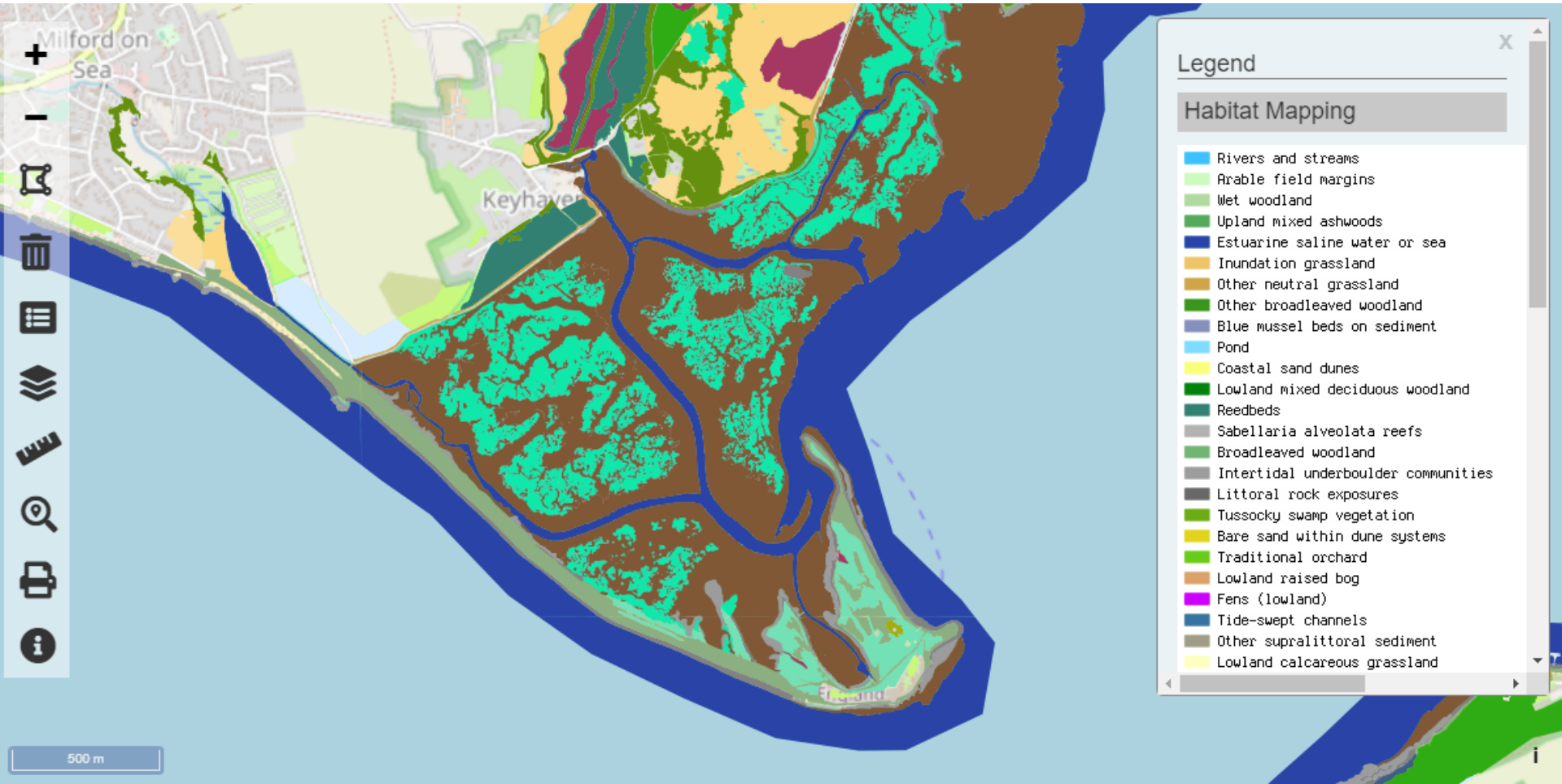
Collation of local asset databases



Habitat Mapping

Frequency: Once per phase (2026)

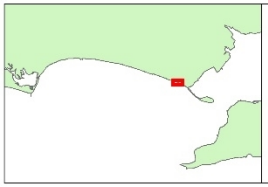
Why? Examples: Habitat compensation, adaptation



Incident Response

Baseline post storm: Milford, 20 August 2019

Southeast Regional Coastal Monitoring Programme



Change in Elevation (m)

>= 3 | 2.5 - 3 | 2 - 2.5 | 1.5 - 2 | 1 - 1.5 | 0.5 - 1 | 0.25 - 0.5 | -0.25 - 0.25 | -0.5 - -0.25 | -1 - -0.5 | -1.5 - -1 | -2 - -1.5 | -2.5 - -2 | -3 - -2.5 | <= -3

Accretion — Erosion

Model Extent

Aerial Photography: 2019

N

Channel Coastal Observatory

0 25 50 100 m

Change in elevation (Topographic Difference Model) - Post-works 08/07/2019 to Post-storm 20/08/2019

Milford-on-Sea: 5fSU02

Incident Response

Asset scan: Hurst Castle, 5 March 2021

Incident Response

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Post-storm UAV survey: Hordle, 25 March 2022

Ortho-photo from UAV

Monitor the positions of the beach huts after storms Eunice and Franklin in February 2022

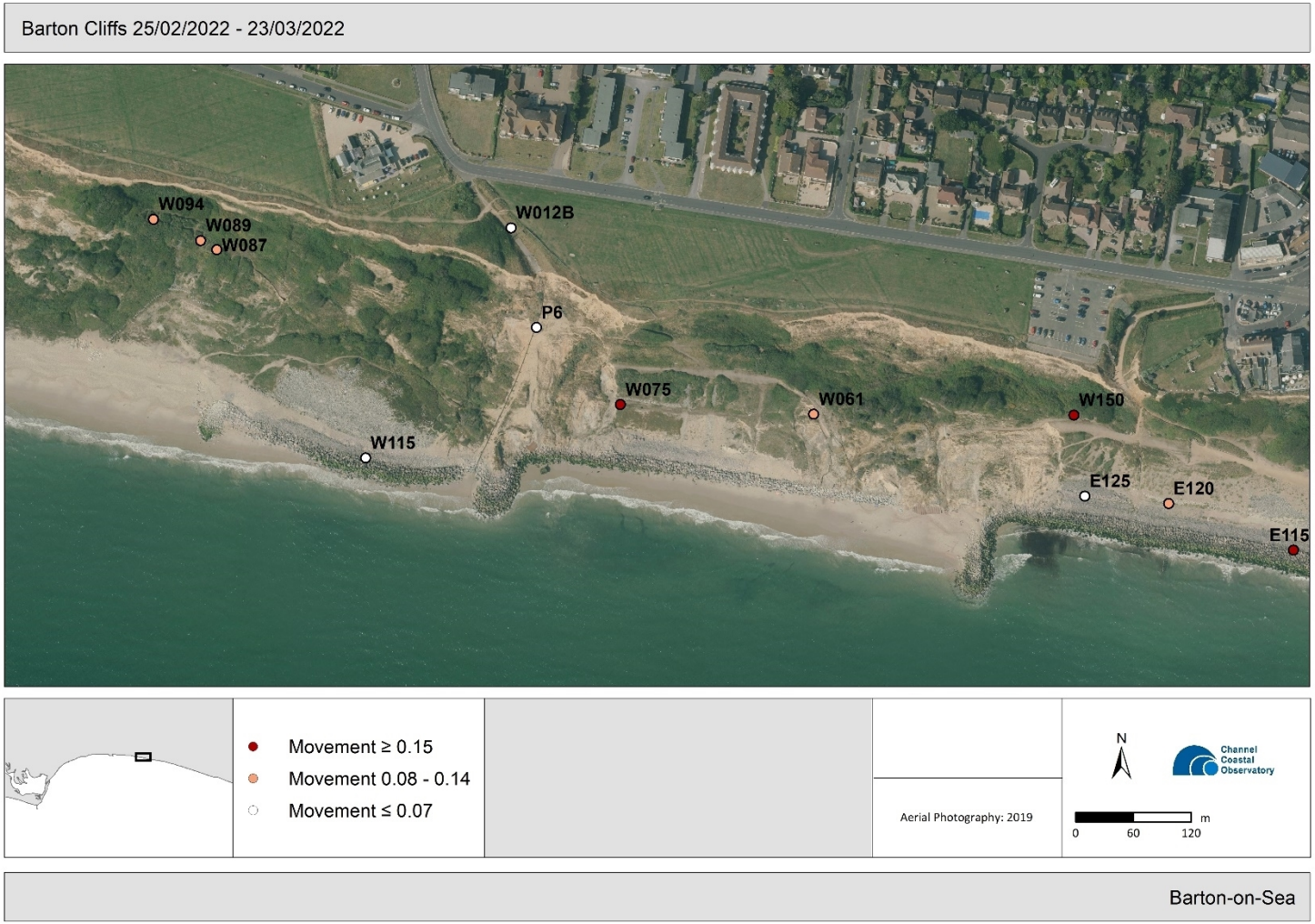
NFDC Surveying

Barton Cliffs Monitoring: 1995 - ongoing *Frequency*: Monthly

NFDC Surveying

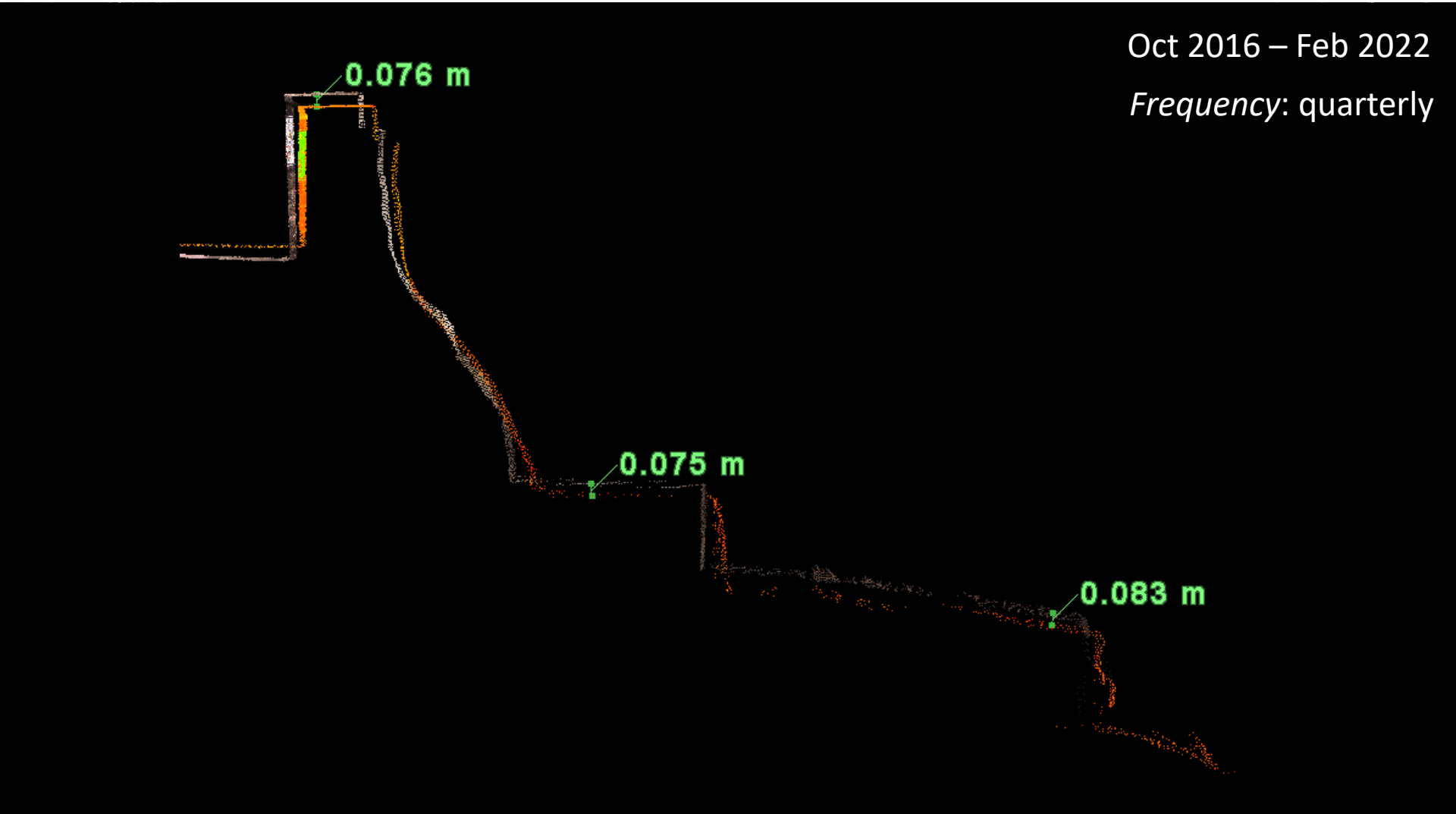
Barton Cliffs Monitoring

Frequency: Monthly



NFDC Surveying

Lymington Seawall monitoring



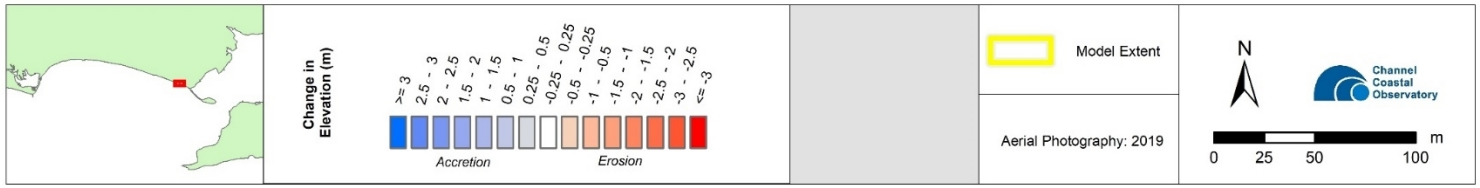
Oct 2016 – Feb 2022

Frequency: quarterly

NFDC Surveying

Pre and post beach nourishment work surveys

Southeast Regional Coastal Monitoring Programme



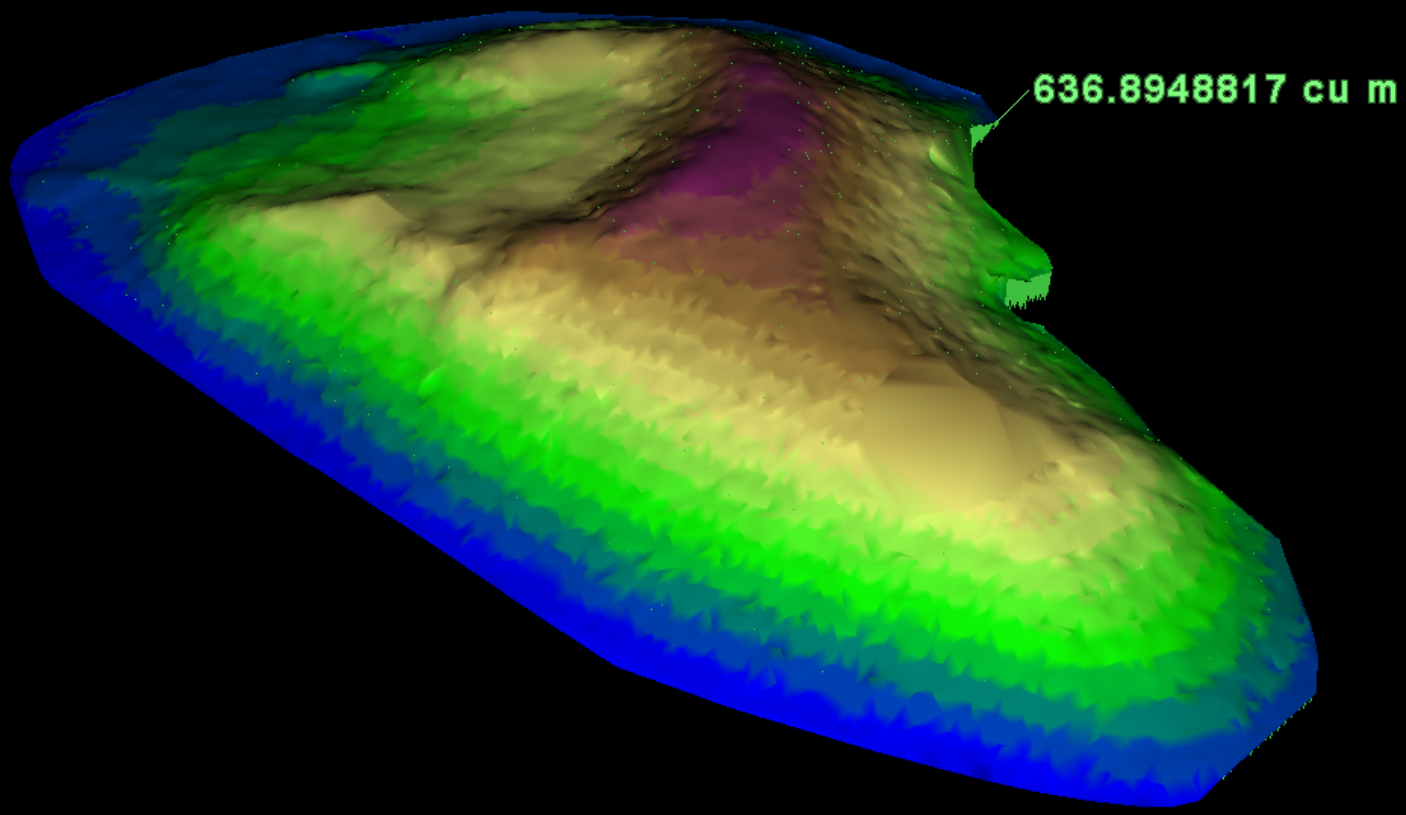
Change in elevation (Topographic Difference Model) - Pre-works 14/09/2022 to Post-works 25/10/2022

Milford-on-Sea: 5fSU02

NFDC Surveying

Calshot stockpile volume measurements

4th January 2023



Innovation

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Trials of new ocean technologies:
Datawell CAT4 temperature
4D Ocean ASV Harry

Southeast RCMP Programme Update Phase III: 2021-2027

Data collected so far:

- 21 years of wave data, 14 years of tide data and 17.5 years of meteorological data
- 101 beach profile surveys, 59 baseline surveys
- Full LiDAR capture (2021/23)
- Full Aerial photography capture (2022)

Planned for 2023-2027:

- Continued wave, tide and met real-time data
- 473 beach profile surveys, 357 baseline surveys
- 2 epoch of full LiDAR capture
- 1 epoch of aerial photography (2025)
- Swath bathymetry programme (incl. Christchurch Bay, West Solent)

Questions

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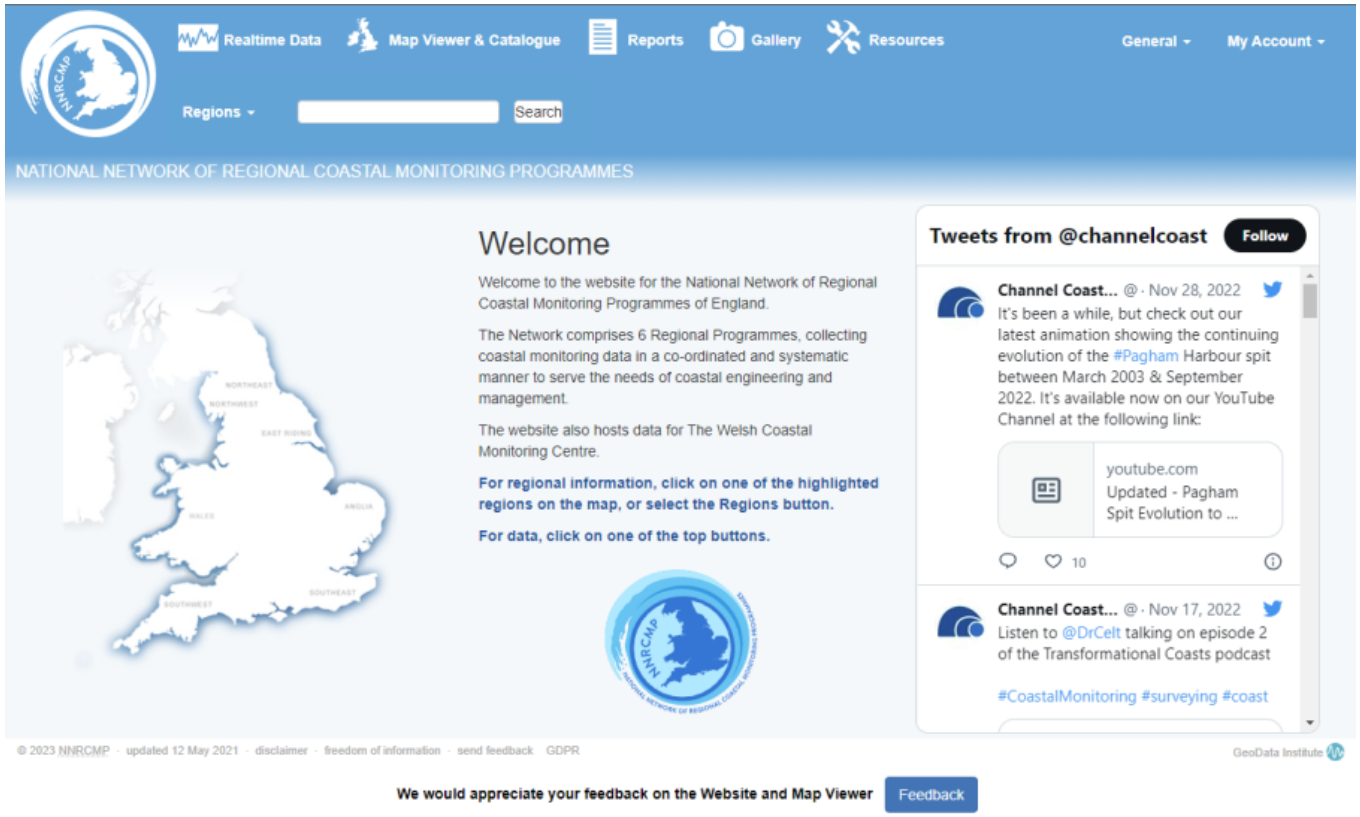
www.coastalmonitoring.org



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