

CHASM The Story So Far

Physical Observations and Changes

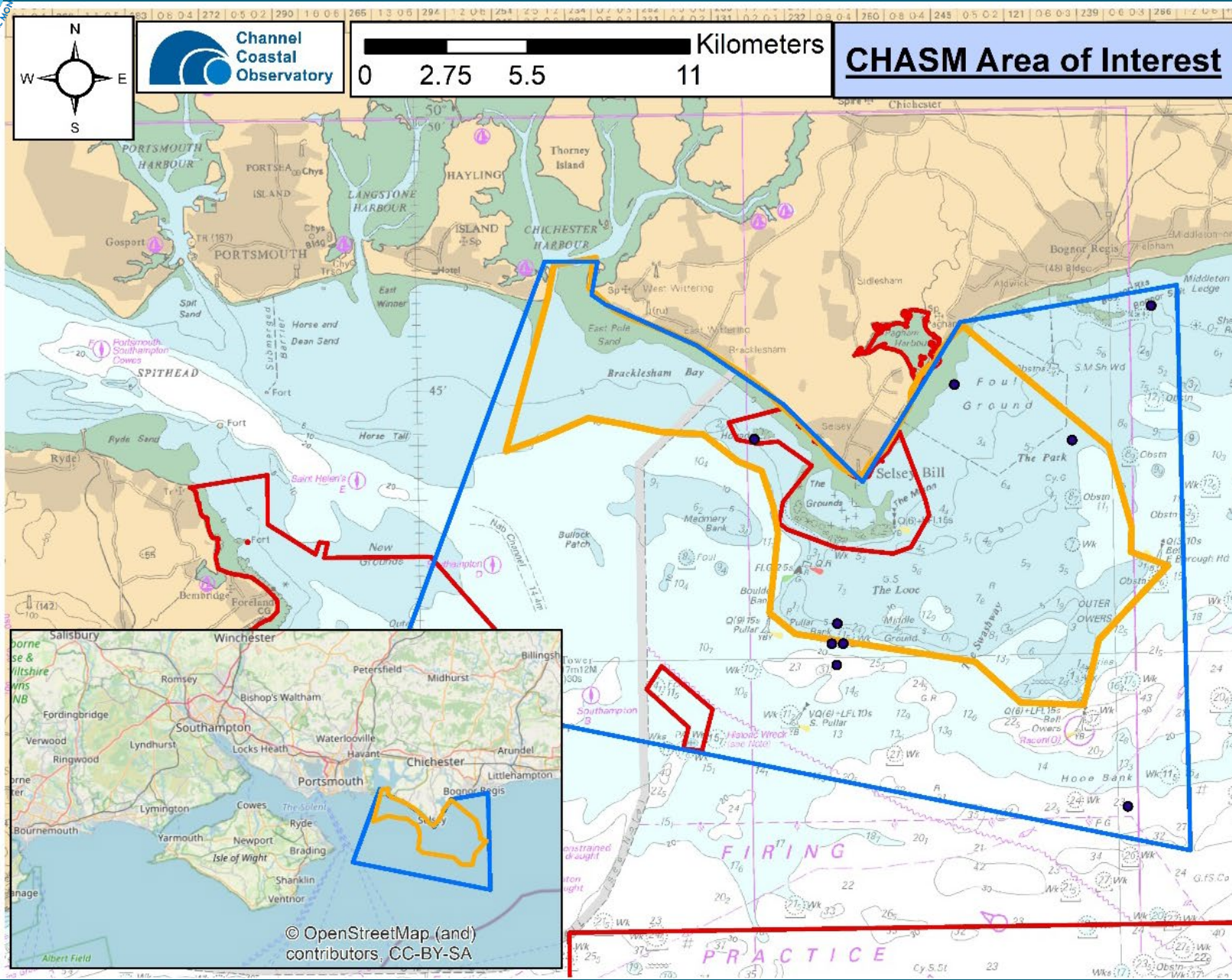
Katie Searles (CCO), Charlie Thompson (UoS, CCO)

Thanks to: Hachem Kassem (UoS)

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www.coastalmonitoring.org

Photo: Stuart McVey, CCO



West Wittering/Bracklesham



Medmerry/Selsey Bill



Selsey/Pagham Harbour

What changes have happened

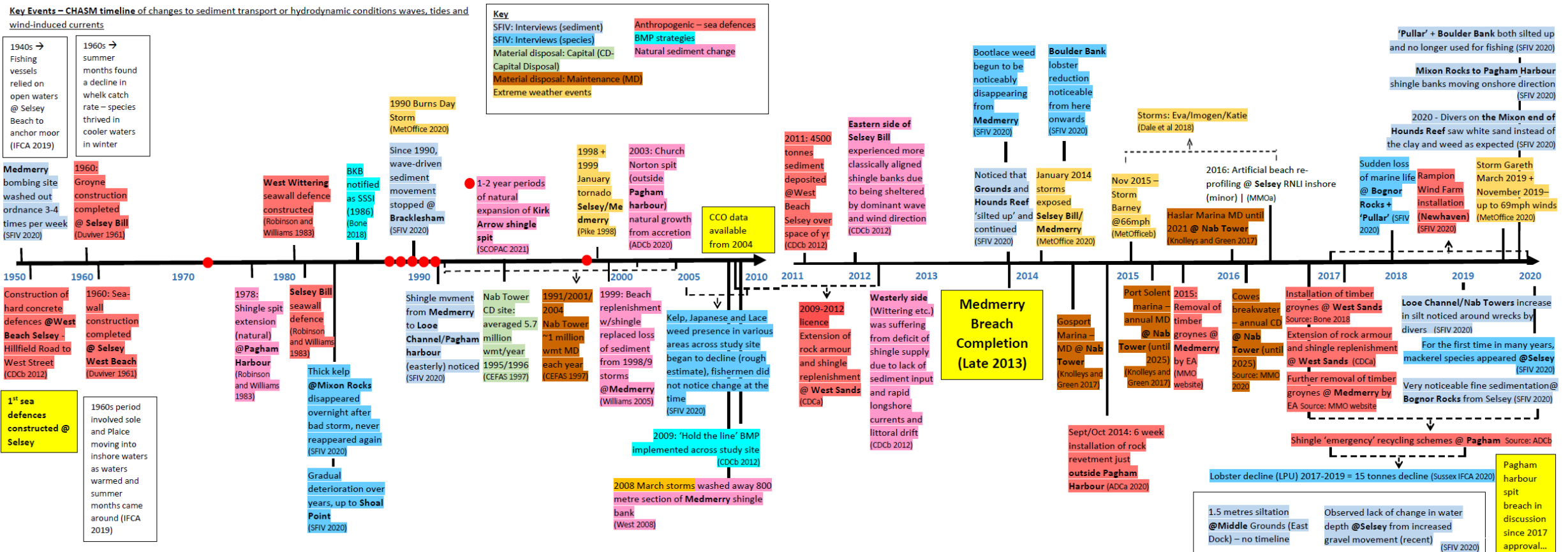
- *Determine the local narrative of the area, based on key user groups*
- *Established recorded events that may relate to local changes*

What is the existing evidence base, what is missing, novel avenues

- *CCO Regional Coastal Monitoring Programme data*
- *Historic data sources*
- *Satellite Observation data*

Assess Regional-Scale Change

- *Summarise the changes indicated from regional scale data*



Timeline of Observed Changes & Key Events



Weed species decline accelerates



Medmerry Realignment Scheme completed

Lobster populations dramatically decline

Sedimentation stops use of Pullar Bank fishing ground



25-31% monthly average occurrence of bi-modal seas b/w Dec 2013 – Feb 2014

- Changes in species populations
- Storm events
- Coastal defence installation/ maintenance
- Changes to sediment (anecdotal and evidence)
- Nab Tower dredge material disposal



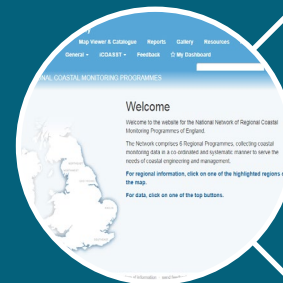
The National Network of Regional Coastal Monitoring Programmes



Standard, repeatable and cost effective monitoring



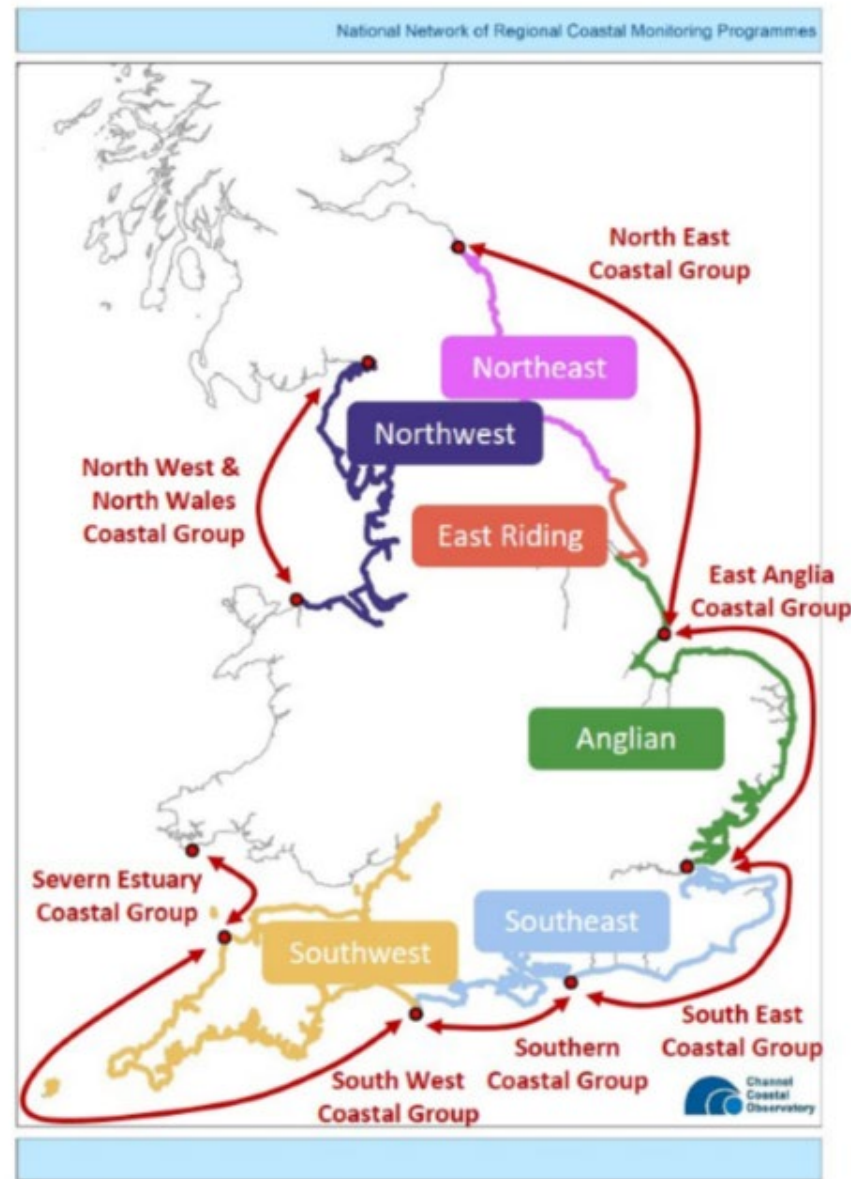
Working closely with RMAs and coastal managers & engineers



Open access to data, analysis and reports

“Good evidence is the cornerstone of effective policy making”

Defra 25 year Environment Plan



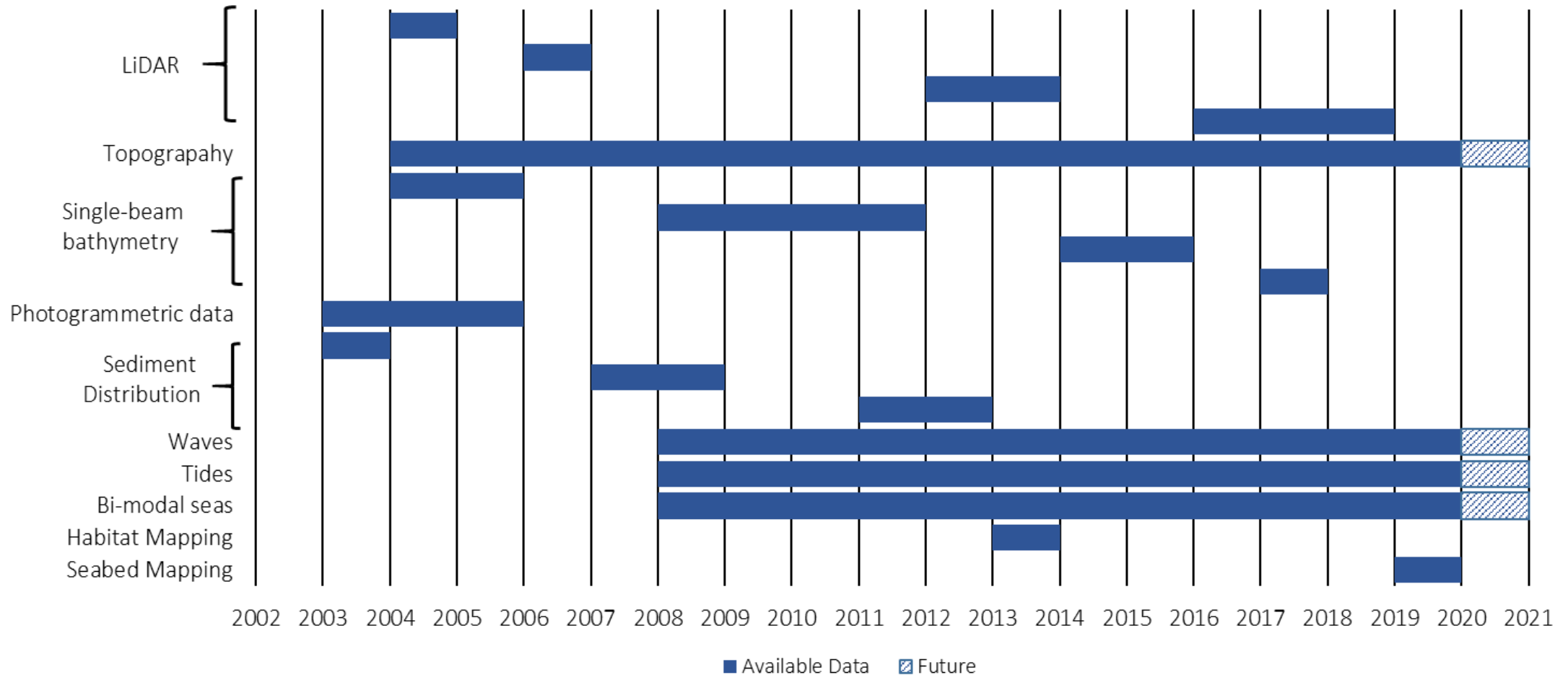
A BRIEF HISTORY OF STRATEGIC COASTAL MONITORING

The National Network of Regional Coastal Monitoring Programmes provides strategic monitoring to support FCERM. This is a brief history of the programme.

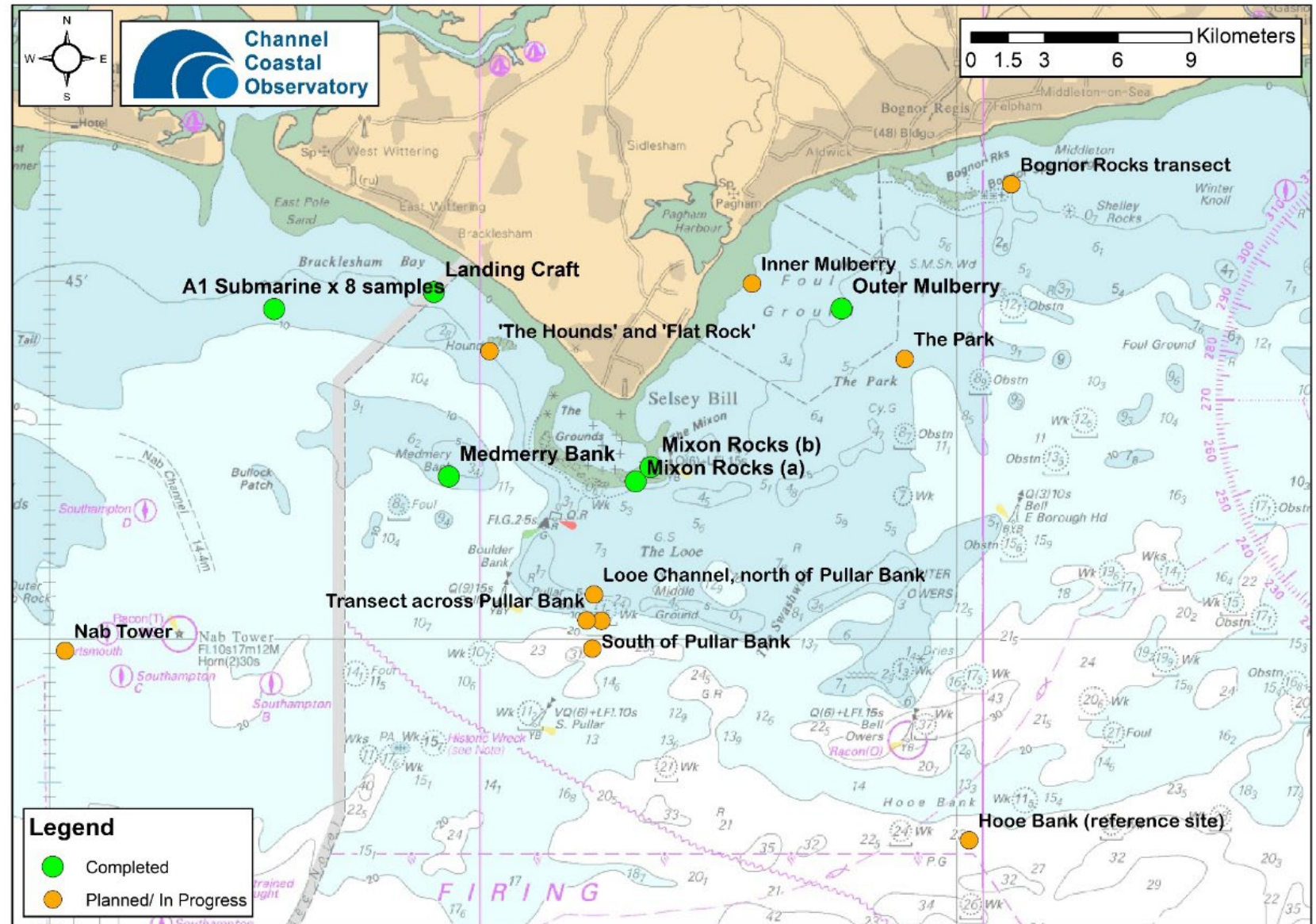
- 1950'S**
 - East Riding of Yorkshire** initiates cliff and beach monitoring, using photography and tape measures, in response to the management challenges of a rapidly eroding coastline. A period of local and regional ad-hoc coastal monitoring.
- 1987**
 - The **Anglian Coastal Monitoring Programme** originated as the "Anglian Sea Defence Management Study", the first regional scale monitoring programme, and forerunner to the development of **Shoreline Management Plans (SMPs)**.
- 1990's** **SMPs Established**
- 2002**
 - Andy Bradbury establishes the **Southeast Strategic Regional Coastal Monitoring Programme (RCMP)** to provide a standard, repeatable and cost-effective method of monitoring the coastal environment.
- 2006**
 - Strategic monitoring is extended to the **Southwest RCMP**.
- 2006-2011** **SMP2**
- 2007**
 - The Cell 11 (**Northwest**) Regional Monitoring Strategy is approved, expanding the regional monitoring ethos northwards.
- 2008**
 - The **Northeast Coastal Observatory (NECO)** completes the regional monitoring coverage of England.
- 2011**
 - The initiation of **Phase I** of the **National Network of RCMPs of England** brings together the regions and establishes strategic monitoring in its current form.
- 2016**
 - The success of the first 5 years of strategic monitoring secures continuation into **Phase II**.
- 2018**
 - The **Welsh Coastal Monitoring Centre (WCMC)** is funded by Welsh Government, modelled after the RCMPs.
- 2019-2020** **SMP refresh**
- 2021** **Phase III**



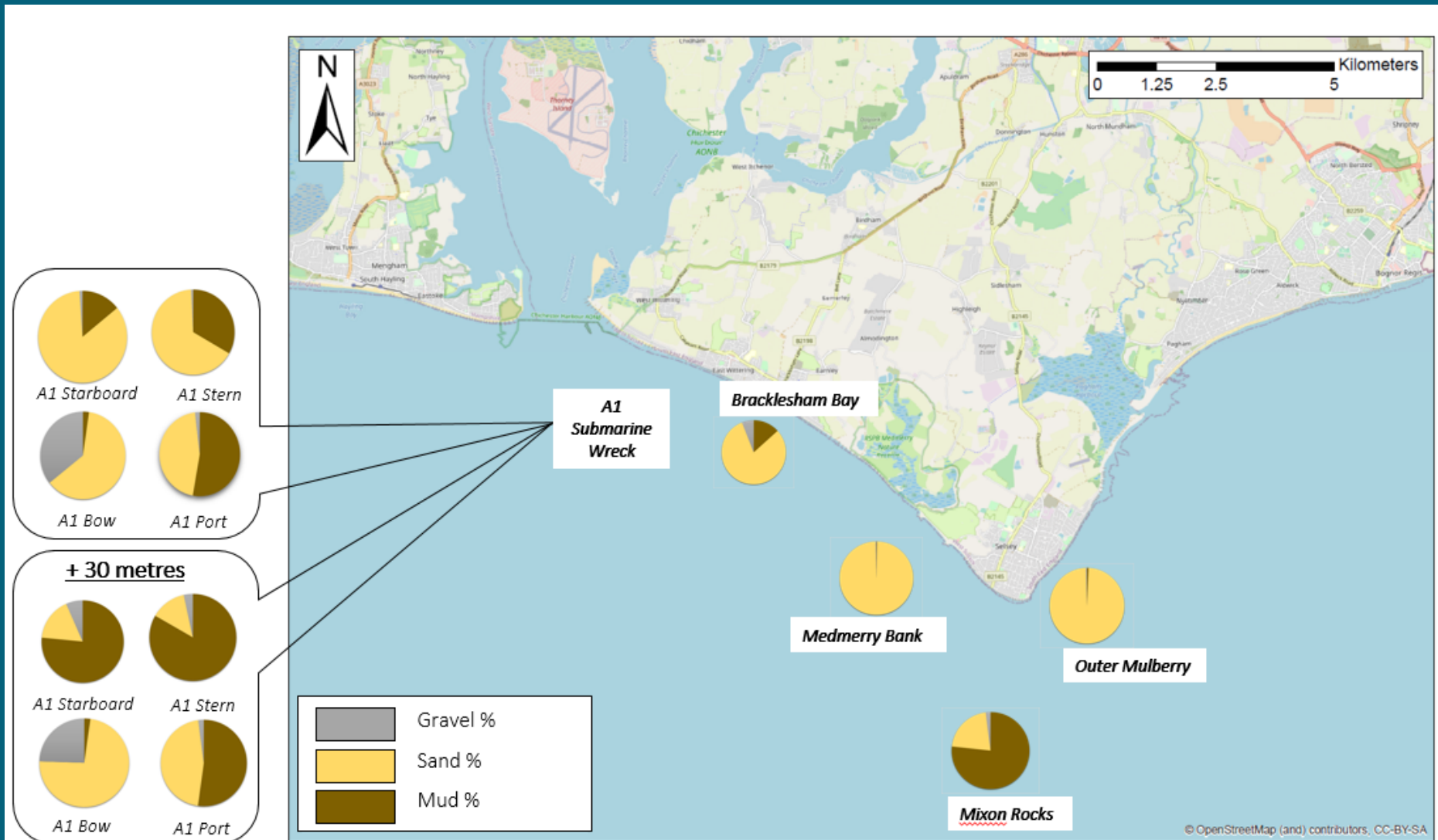
CCO Data Availability

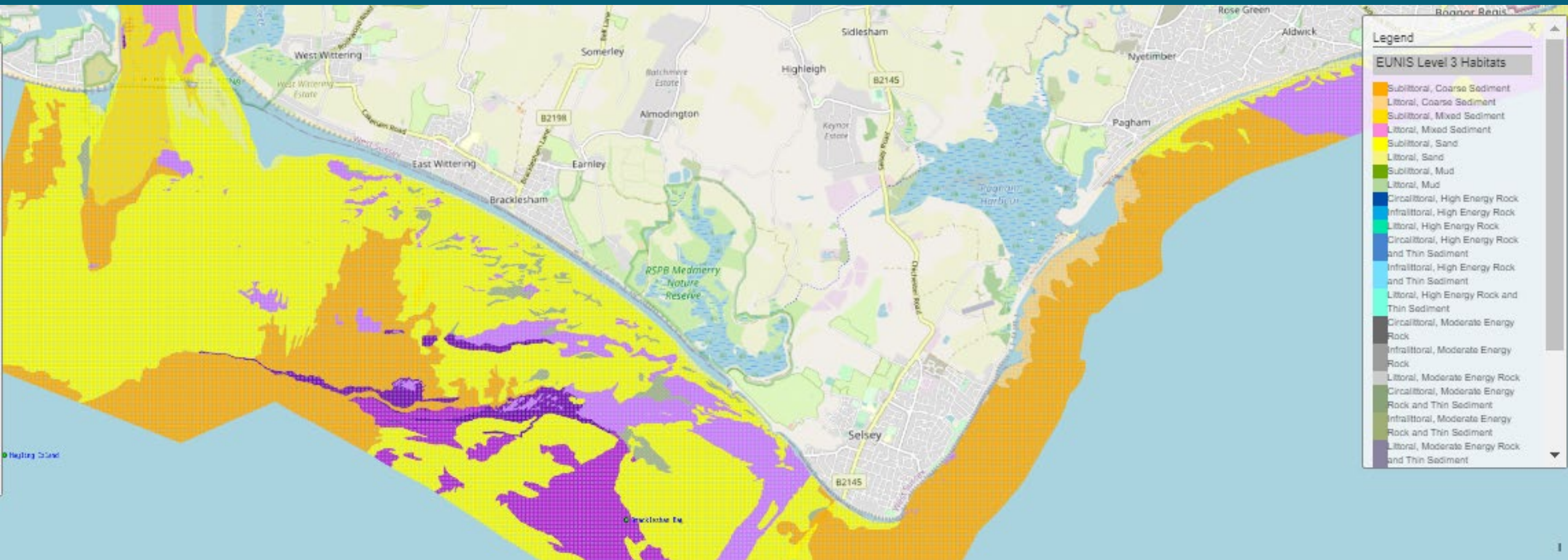


- Diver or Grab samples
- Collected by volunteers
- Analysed in University of Southampton and Brighton's Sediment Analysis Labs
- Locations Chosen
 - Baseline for Change
 - Key Areas of Interest
 - Logistical Access



Establish the extent to which changes in sedimentation have been observed across the area of interest (A1, A2)







Assessments of Evidence Base – Cross-Sectional Area Changes: Topographic Survey Data



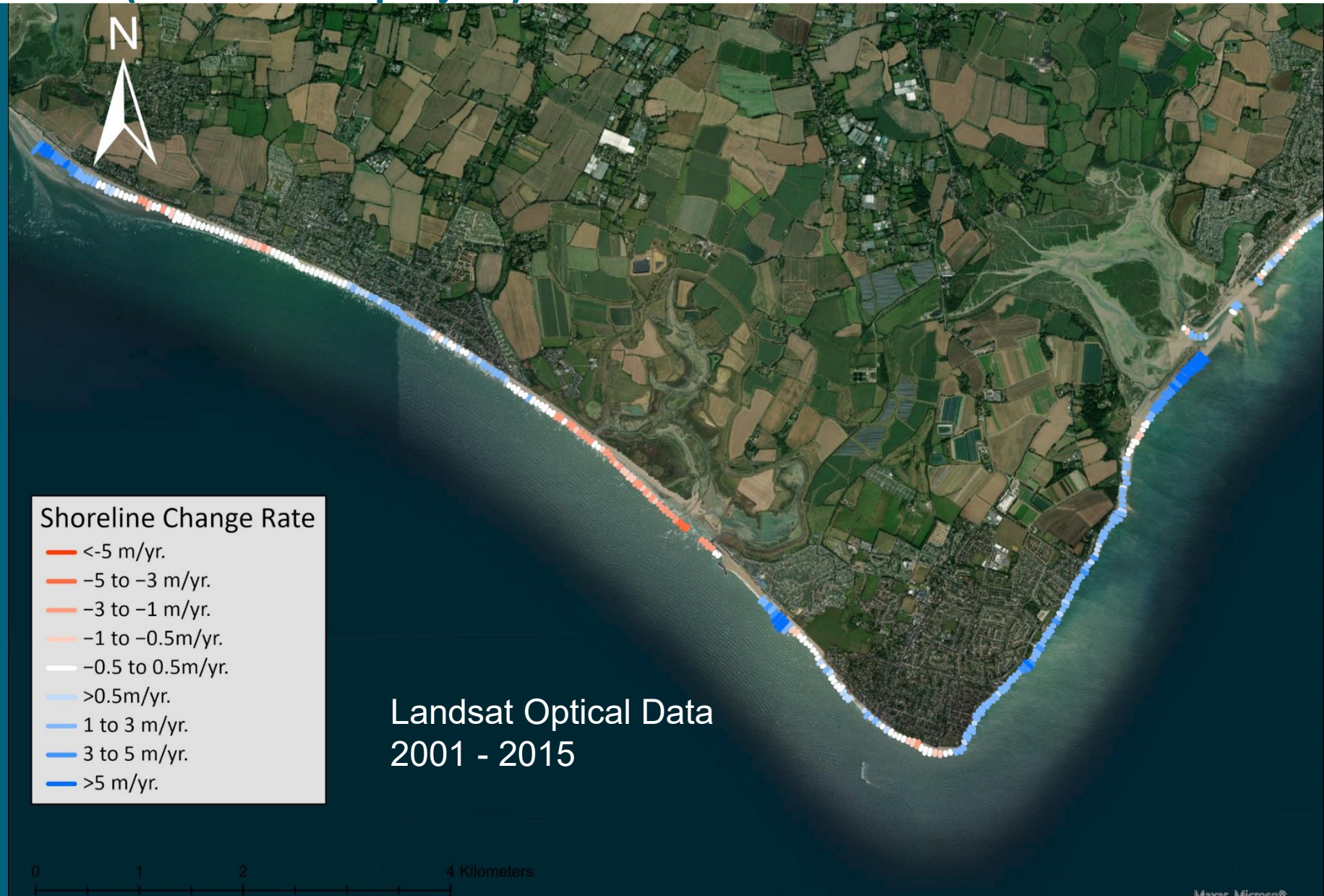
Assessments of Evidence Base – Cross-Sectional Area Changes: Topographic Survey Data





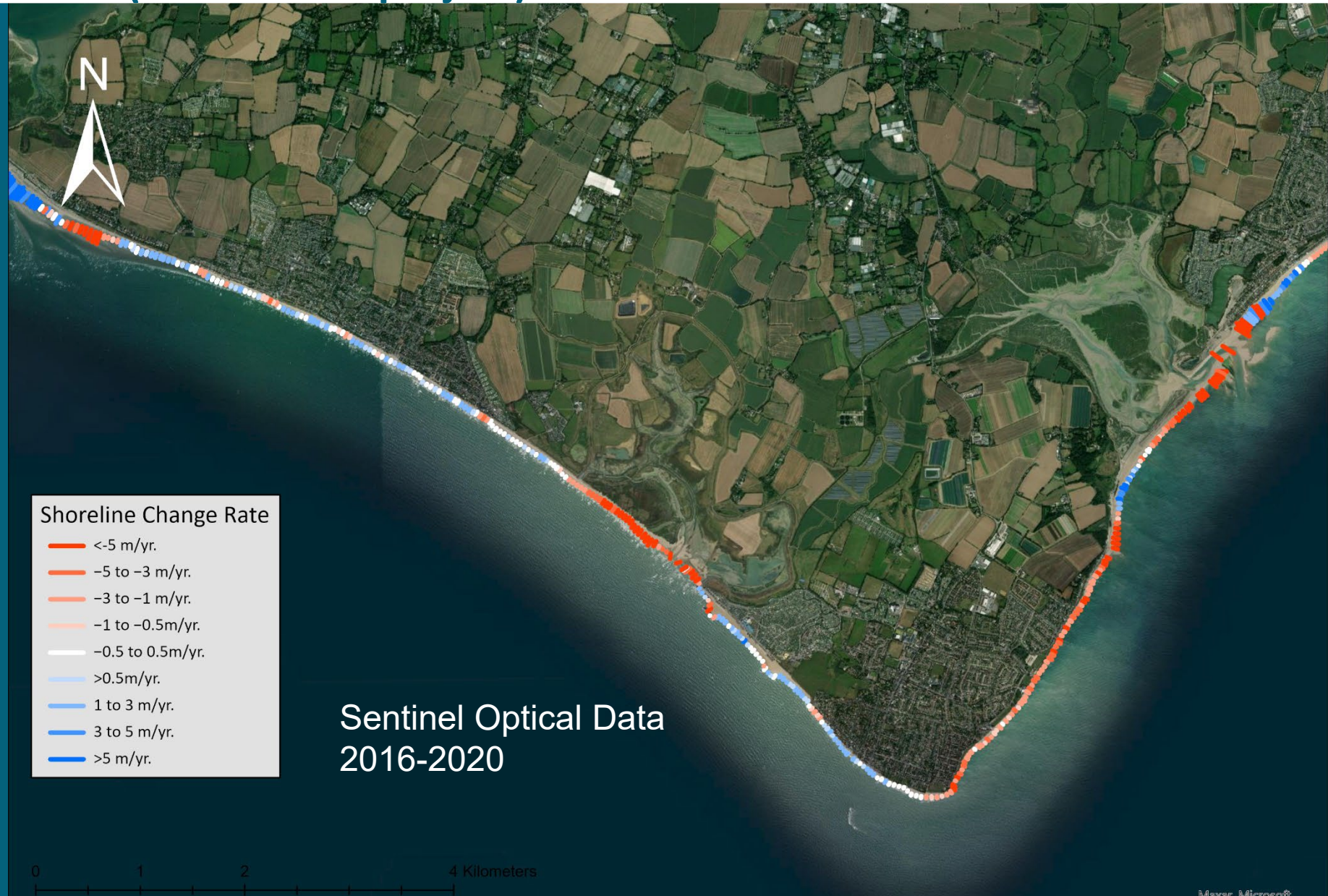
Assessments of Evidence Base – Cross-Sectional Area Changes: Satellite Derived Data (the BLUECO project)

Christine Sams, Clive
Neil, Stephen Carpenter
(NOC)

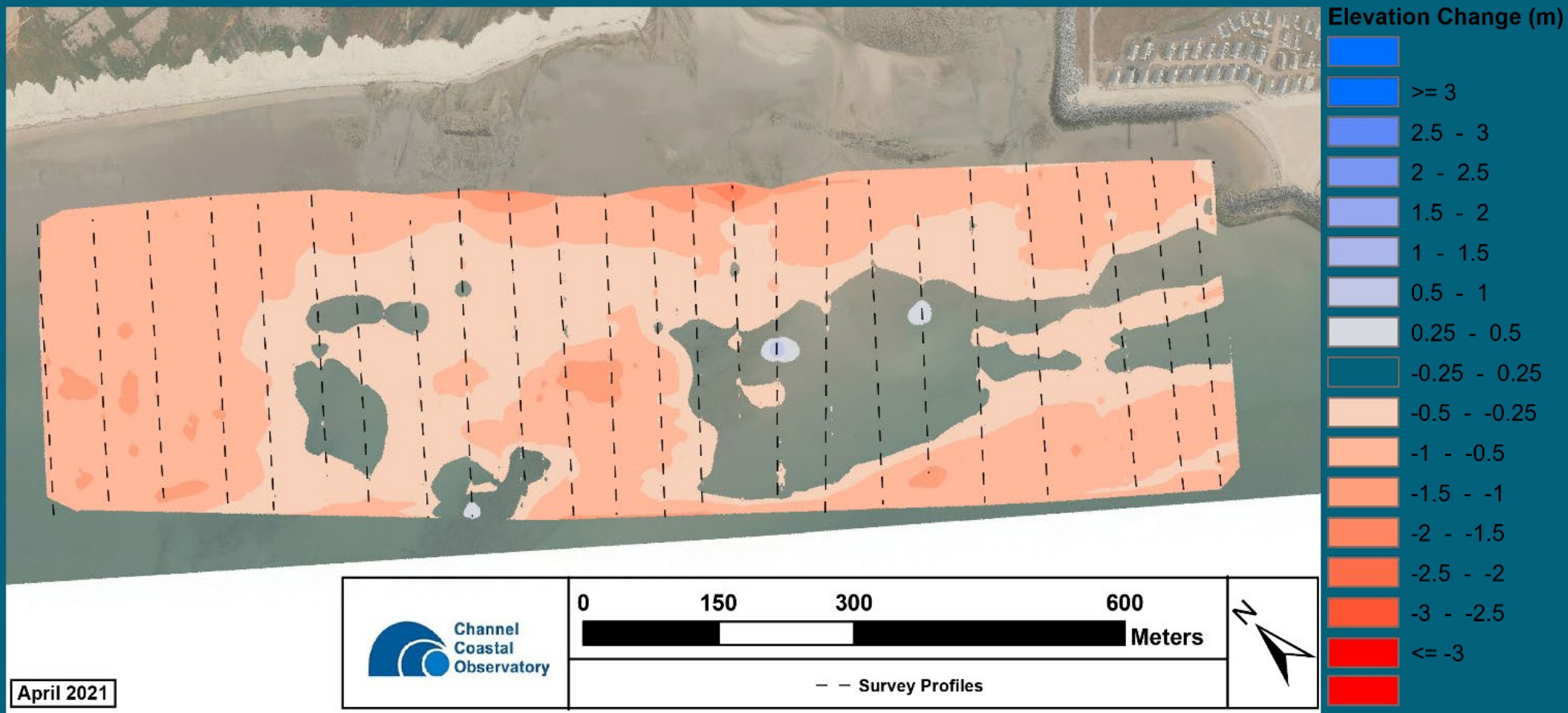


<https://noc.ac.uk/projects/blueco>

Assessments of Evidence Base – Cross-Sectional Area Changes: Satellite Derived Data (the BLUECO project)



5aSU01 Medmerry: Autumn 2004 (17/10/2004) and
Autumn 2018 (29/08/2018)





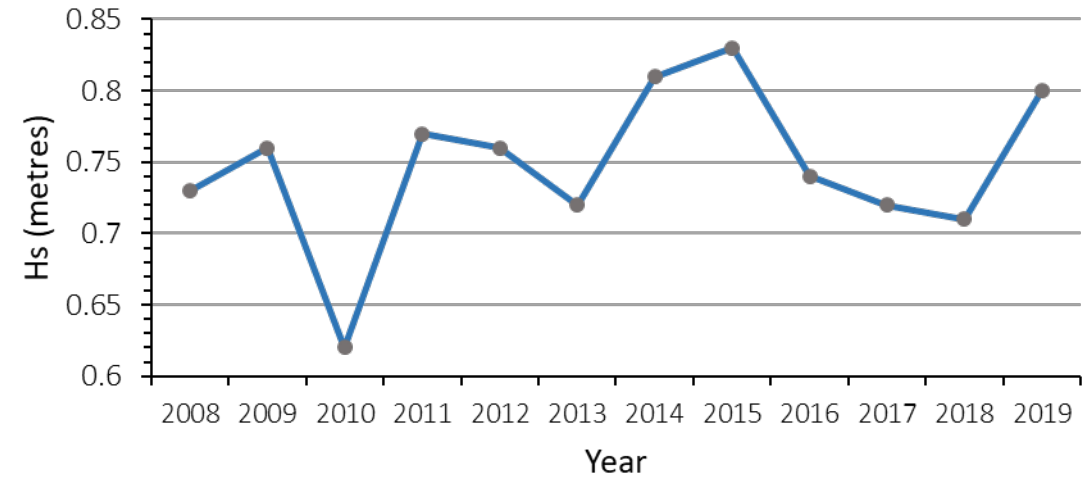
Assessments of Evidence Base – Wave Climate, Bracklesham Wave Buoy

Return Period (Years)

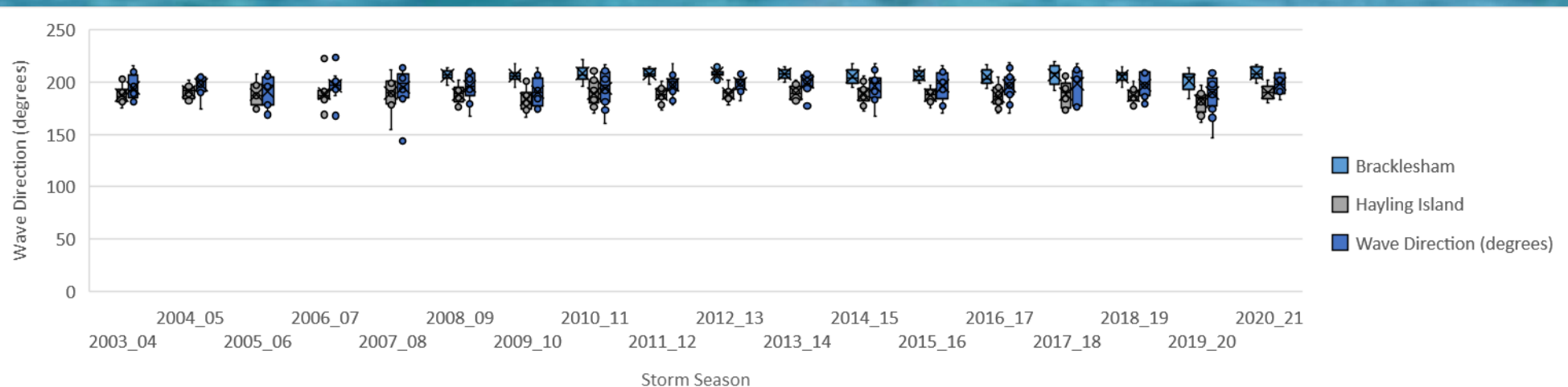
Significant Wave Height (m)

	2014	2015	2016	2017	2018	2019	2020
1	3.9	3.9	3.9	3.9	3.9	3.9	3.9
2	4.1	4.1	4.0	4.0	4.0	4.0	4.0
5	4.3	4.3	4.2	4.2	4.2	4.2	4.2
10	4.5	4.4	4.4	4.4	4.3	4.3	4.3
20	4.6	4.6	4.5	4.5	4.5	4.5	4.4
50	4.8	4.7	4.7	4.6	4.6	4.6	4.6

Significant wave height (Hs) time-series



- 1 in 1 year significant wave height is 3.9 metres (2014-2020)
- 1 in 2 year significant wave height is 4.0 metres (2014-2020)



	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Bracklesham Bay						2	6	2	3	4	8	8	6	6	4	5	4
Rustington	1	3	4	5	4	5	6	2	2	4	8	7	3	6	5	6	2
Hayling Island	1	3	3	4	6	8	9	3	1	3	2	8	3	7	4	7	4

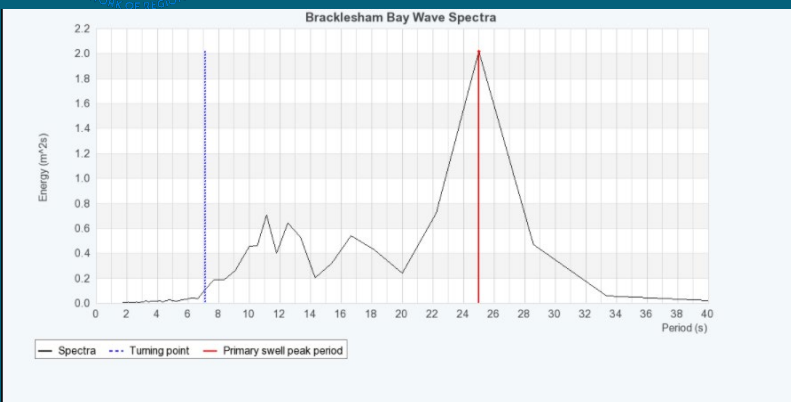
Key:

1	2	3	4	5	6	7-9
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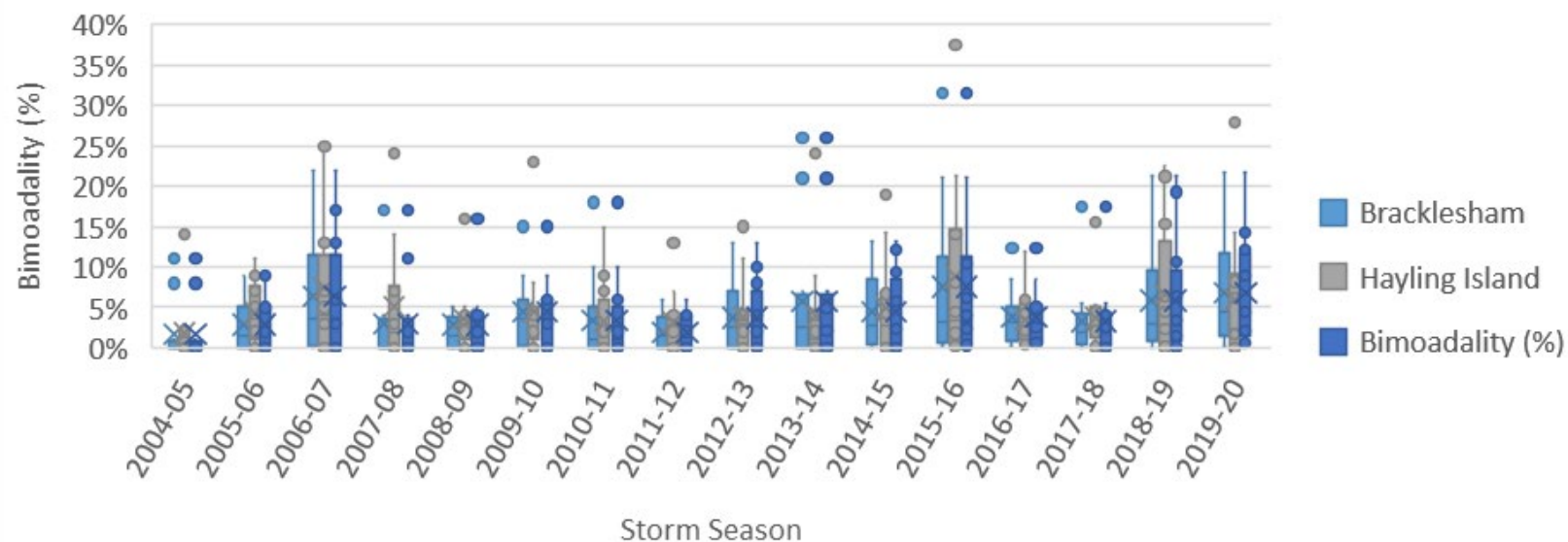
Number of recorded storm events



Assessments of Evidence Base – Wave Climate, Bracklesham Wave Buoy



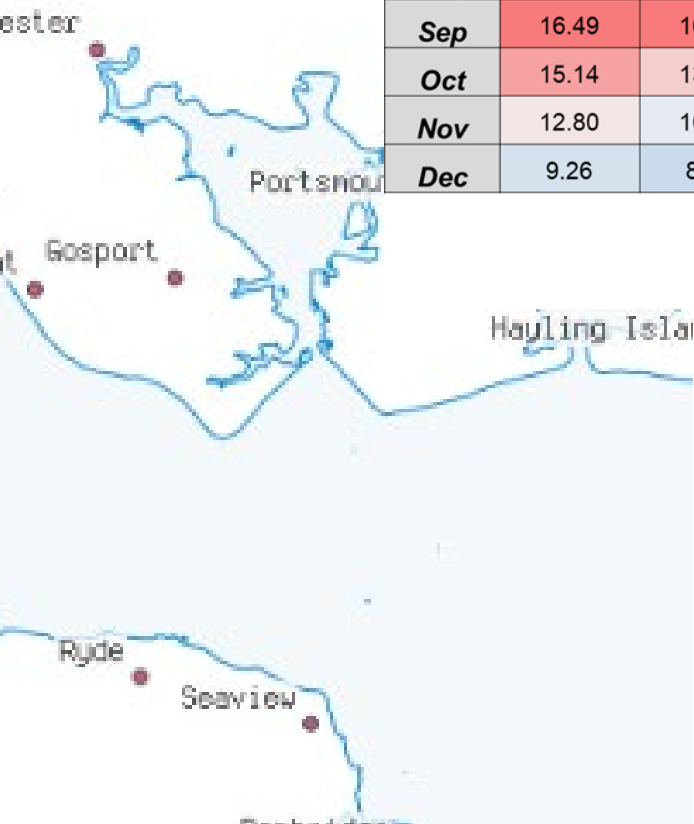
	2009-2010	2010-2011	2011-2012	2012-2013	2013-2014	2014-2015	2015-2016	2016-2017	2017-2018	2018-2019	2019-2020	Monthly Average
July	3%	1%	1%	0%	0%	0%	1%	2%	0%	0%	1%	1%
August	0%	0%	0%	3%	0%	1%	1%	2%	1%	0%	2%	1%
September	0%	0%	5%	0%	0%	0%	1%	4%	2%	2%	8%	2%
October	5%	5%	4%	2%	8%	9%	4%	0%	5%	2%	11%	5%
November	19%	5%	12%	5%	3%	13%	9%	2%	2%	19%	14%	9%
December	9%	2%	10%	18%	25%	3%	32%	6%	6%	23%	20%	14%
January	7%	11%	8%	11%	25%	12%	24%	3%	15%	3%	19%	13%
February	6%	18%	1%	4%	31%	6%	12%	13%	2%	5%	30%	12%
March	3%	0%	3%	1%	3%	5%	5%	4%	4%	11%	10%	4%
April	2%	1%	3%	8%	3%	0%	3%	0%	4%	2%	1%	2%
May	0%	2%	0%	0%	1%	1%	0%	0%	1%	2%	3%	1%
June	0%	1%	3%	1%	0%	0%	0%	2%	0%	0%	1%	1%
Storm season average	5%	4%	4%	4%	8%	4%	8%	3%	4%	6%	10%	





Assessments of Evidence Base – Sea Surface Temperature Changes

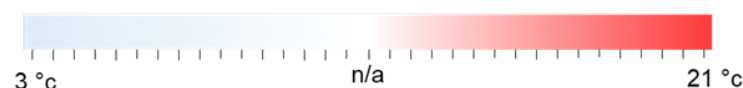
	2011	2012	2013	2014	2015	2016	2017	2018	2019
Jan	5.73	8.05	7.09	3.04	7.34	8.50	7.17	7.59	7.66
Feb	6.24	5.76	5.88	5.72	N/A	7.76	7.01	6.23	7.16
Mar	7.06	8.29	5.35	8.18	6.83	7.54	8.63	5.80	8.76
Apr	10.31	10.33	6.93	10.88	10.08	9.65	11.23	9.47	10.72
May	13.22	12.66	10.83	13.28	12.34	13.07	13.50	13.60	13.40
Jun	14.63	14.83	13.87	16.51	14.94	16.05	15.65	16.73	16.17
Jul	16.06	16.58	17.99	18.73	17.37	17.79	19.01	20.75	19.34
Aug	17.50	18.09	19.07	18.04	17.65	18.68	18.66	20.00	19.38
Sep	16.49	16.57	17.58	N/A	16.27	18.43	16.11	17.74	16.21
Oct	15.14	13.66	15.16	N/A	13.92	13.65	14.72	14.86	15.08
Nov	12.80	10.86	11.09	N/A	12.34	11.39	12.05	11.55	11.05
Dec	9.26	8.14	8.47	4.87	10.98	9.07	8.20	9.54	8.87



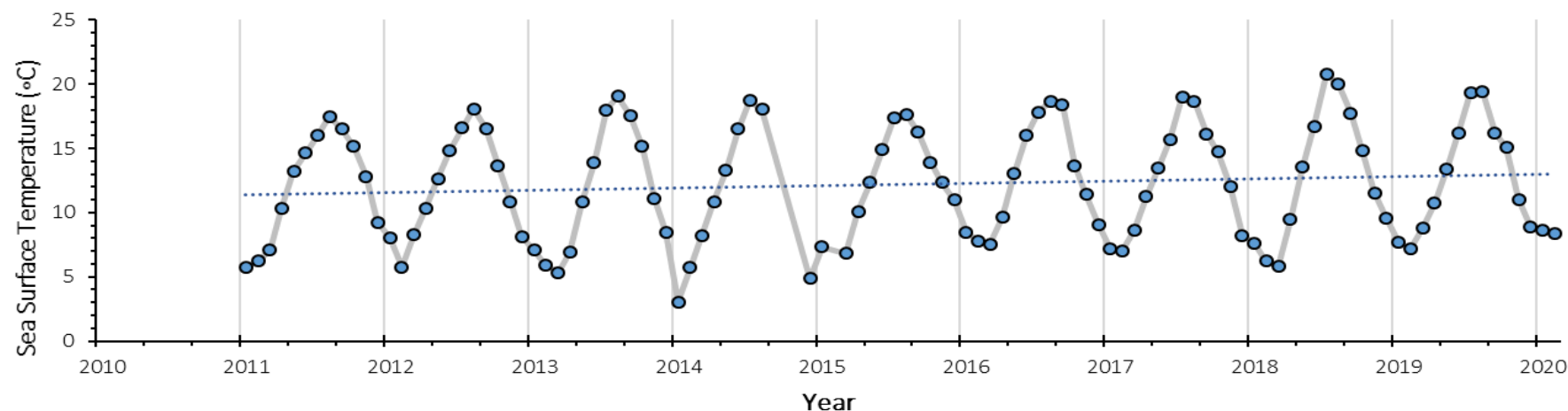
Arundel

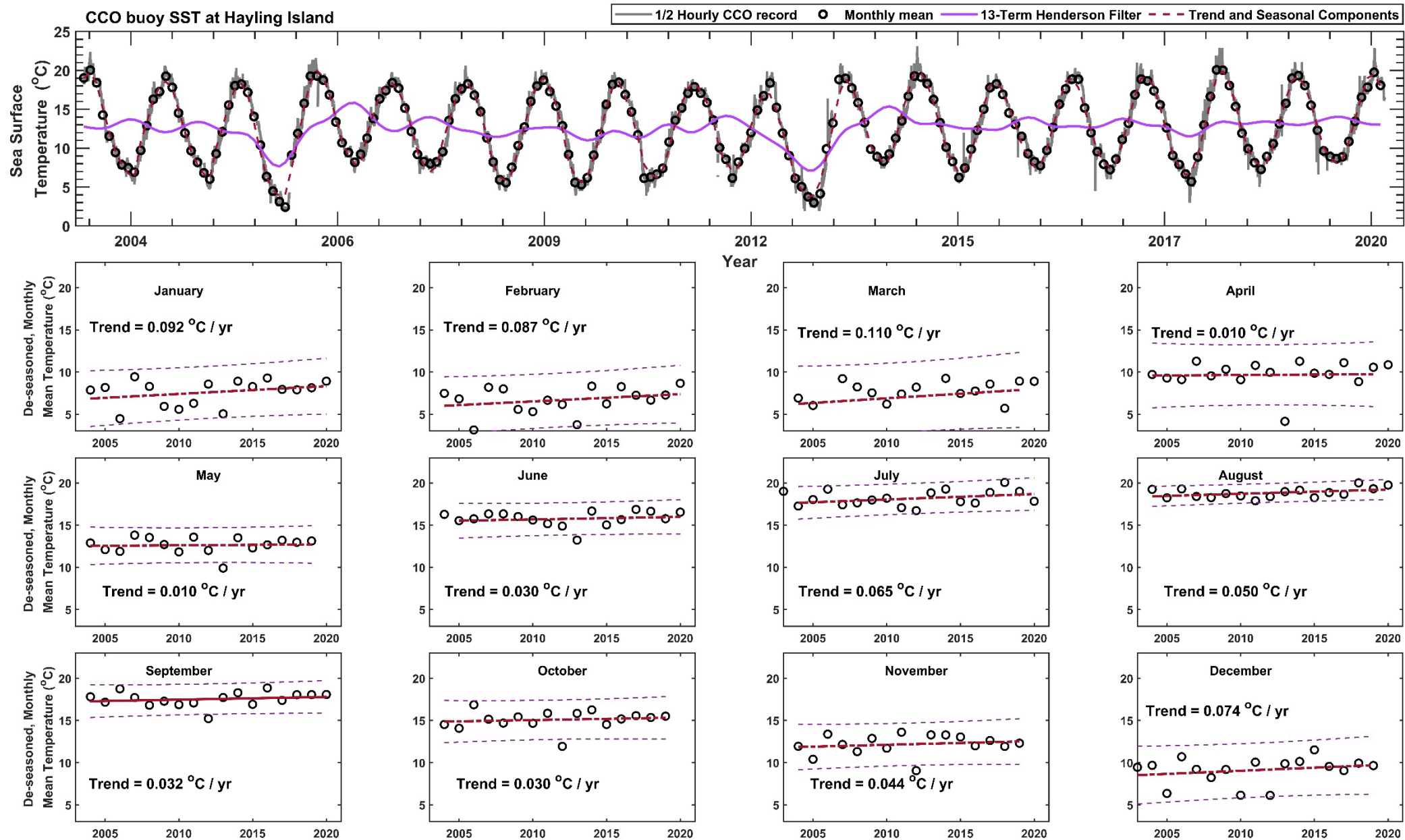
Worthing

Littlehampton



CCO Buoy at SST (Bracklesham Bay)







Assessments of Evidence Base – Key Findings

- The coastline is dynamic, and has a history of management intervention dating back to at least the 1950s.
- Observations indicate that several species of plants and marine animals appear to have declined, and this seems to be accelerating.
- Change from accretion to erosion between Selsey Bill and Pagham Harbour in last <10 years, but the area is dynamic, showing annual variability likely responding to variability in wave conditions.
- Non-significant increases in wave height, wave period and bimodality
- Sea surface temperature appears to be increasing across the region (temporarily variable)
- More data is needed about regional bathymetric change, and sediment size changes to the bed.
- The problem is complex, and all we can do is provide a context of change – more work is needed

The past year of investigation has raised a number of interesting topics for further investigation:

- eDNA (Environmental DNA)
- Sediment sources, and contaminants
- Water quality, land runoff and changes to inputs
- Changes in environmental parameters within the Selsey Bill and the Hounds MCZ
- Impacts on the Selsey Bill and The Hounds MCZ
- Community and visitor engagement
- Use of sonde units to acquire continuous data on changes in conductivity (salinity), turbidity, temperature
- Community and visitor engagement
- Viability of a Lobster hatchery at Shoreham
- Links with neighbouring projects – Sussex Kelp Restoration Project and Sussex Bay
- Use of Satellite imagery for monitoring – Ongoing
- Working with Kent Wildlife Trust to make the project more accessible to the public