

South East Strategic Regional Coastal Monitoring Programme

# BEACH MANAGEMENT PLAN REPORT

## Hythe Ranges

2011

**BMP 140 - Annex**  
April 2013





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**Beach Management Plan Site Report 2011  
4cMU10 - Hythe Ranges**

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# **Annex A**

## *Explanatory Notes*

## **1. Summary of method of conducting topographic and hydrographic surveys (based on the Environment Agency's National Specification Sections XII and XIII)**

Topographic cross-shore (profile) measurements are made at the intercept of the beach and a hard structure, at all changes of beach slope, at changes in surface sediment and at maximum defined intervals (every 5 metres). Each measurement is feature-coded with the type of surface material. Profiles are 100-500m apart, depending on management status. The seaward limit to be achieved is Mean Low Water Springs or 50 metres from the beach toe.

Topographic spot height (baseline) surveys are carried out annually at Beach Management Plan sites. Profiles are measured at 50m intervals, with the addition of spot heights at the toe of hard structures, the beach surface surrounding structures, all beach ridge crests, all other changes in slope and sediment changes, plus contour lines at a maximum spacing of 5m. All measurements are feature-coded with sediment type. Sufficient data points must be measured to generate a reliable Digital Terrain Model.

Hydrographic surveys are conducted with a single beam echo-sounder, with the position fixing requirement relaxed to DGPS. Soundings are taken along cross-shore profile lines 50m apart and extend 1km offshore. A minimum of 4 shore parallel tie lines are required (including one near the landward and seaward boundaries). The landward limit varies slightly across the region, due to the variation in tidal range, but in general is landward of Mean Sea Level, thus providing overlap with the topographic surveys. Tidal control may be by RTK GPS or by correction from tide gauges which are tied to the survey control network

## **2. Change in Cross-sectional Area (CSA)**

The annual change in cross-sectional area is calculated as the difference in CSA between two surveys, expressed as a percentage change compared to the earlier CSA.

$$\frac{CSA_1 - CSA_2}{CSA_2} * 100 \quad \text{Eqn (1)}$$

where  $CSA_1$  = most recent springtime survey and  $CSA_2$  = spring survey previous year. Therefore an annual change of -14% represents erosion during the last year of 14% of the area of last year's survey.

## **3. Method of derivation of Digital Ground and difference models**

The Digital Terrain Model is created by interpolating the points of a topographic baseline survey collected by using RTK GPS system. The interpolation method used to create the SECG DGMs is specified as

Triangulation with smoothing and is applied in MapInfo Vertical Mapper to create a 1 metre resolution grid.

Triangulation is a process of grid generation that is usually applied to data that requires no regional averaging, such as elevation readings. The surface created by triangulation passes through all of the original data points while generating some degree of "overshoot" above local high values and "undershoot" below local low values. Elevation is an example of point values that are best "surfaced" with a technique that predicts some degree of over- and under- estimation. In modelling a topographic surface from scattered elevation readings, it is not reasonable to assume that data points were collected at the absolute top or bottom of each local rise or depression in the land surface.

Triangulation involves a process whereby all the original data points are connected in space by a network of triangular faces, drawn as equilaterally as possible. This network of triangular faces is referred to as a Triangular Irregular Network (TIN). Points are connected based on the nearest neighbour relationship (the Delaunay criterion) which states that a circumcircle drawn around any triangle will not enclose the vertices of any other triangle.

To visualise the resulting grid, the same colour scheme is applied, thus enabling comparison between grids of different geographic origin. The colour bands cover a elevation range between -4 to +12 metres OD with elevations lying between -2 and + 5 metres OD are shown in 0.5 metres intervals, the remaining elevation bands shown in 1 metre intervals.

All difference models are created by using a grid calculator within the GIS system. For example the difference model of two baseline surveys is created by subtracting the earlier baseline grid from the most recent baseline grid:

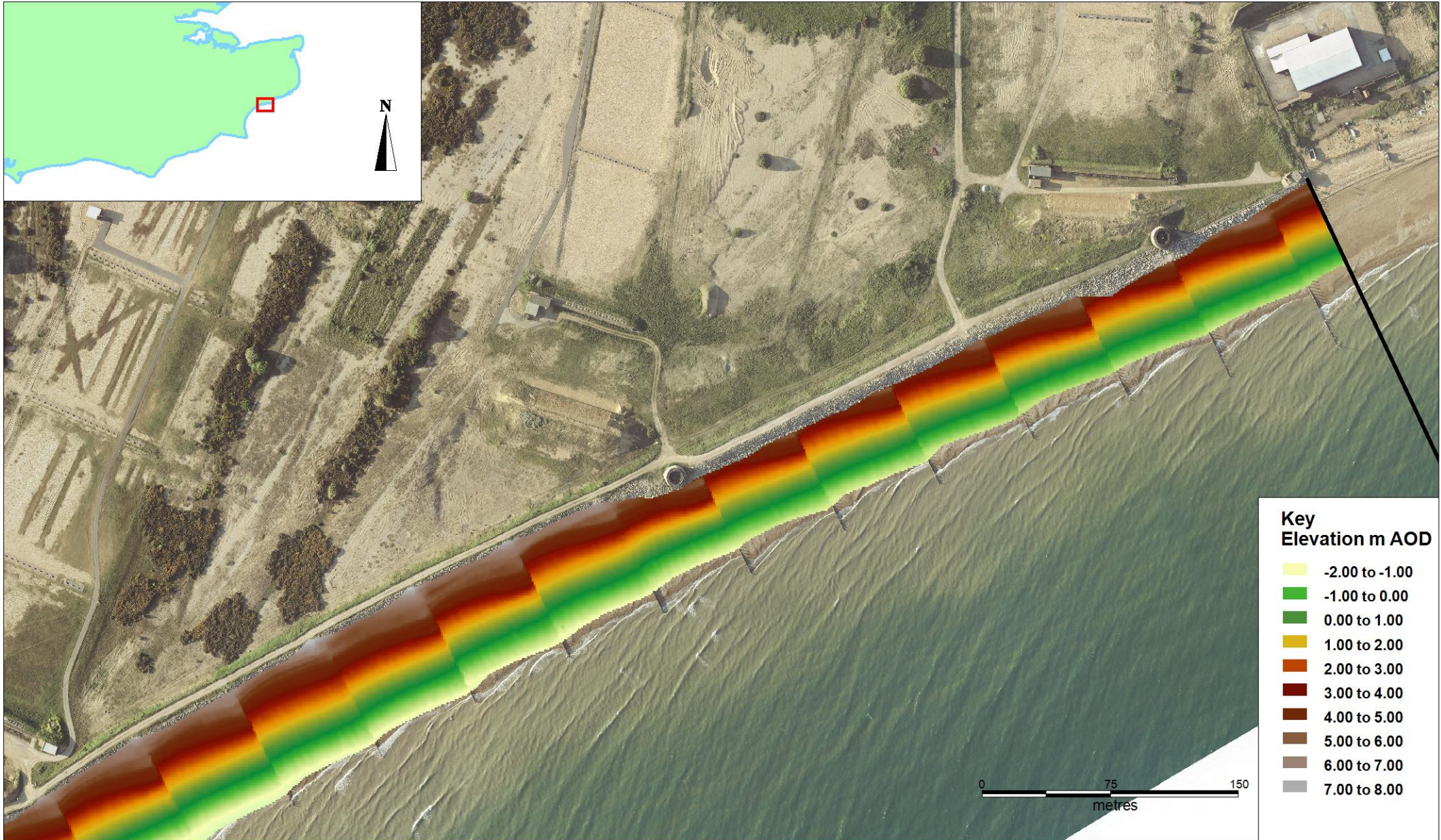
$$Grid_1 - Grid_2 \qquad \text{Eqn (2)}$$

where  $Grid_1$  = most recent baseline grid and  $Grid_2$  = previous baseline grid. Therefore an annual change of  $-14m^2$  represents erosion during the last year of  $14m^2$ , whilst positive values represent accretion over the period.

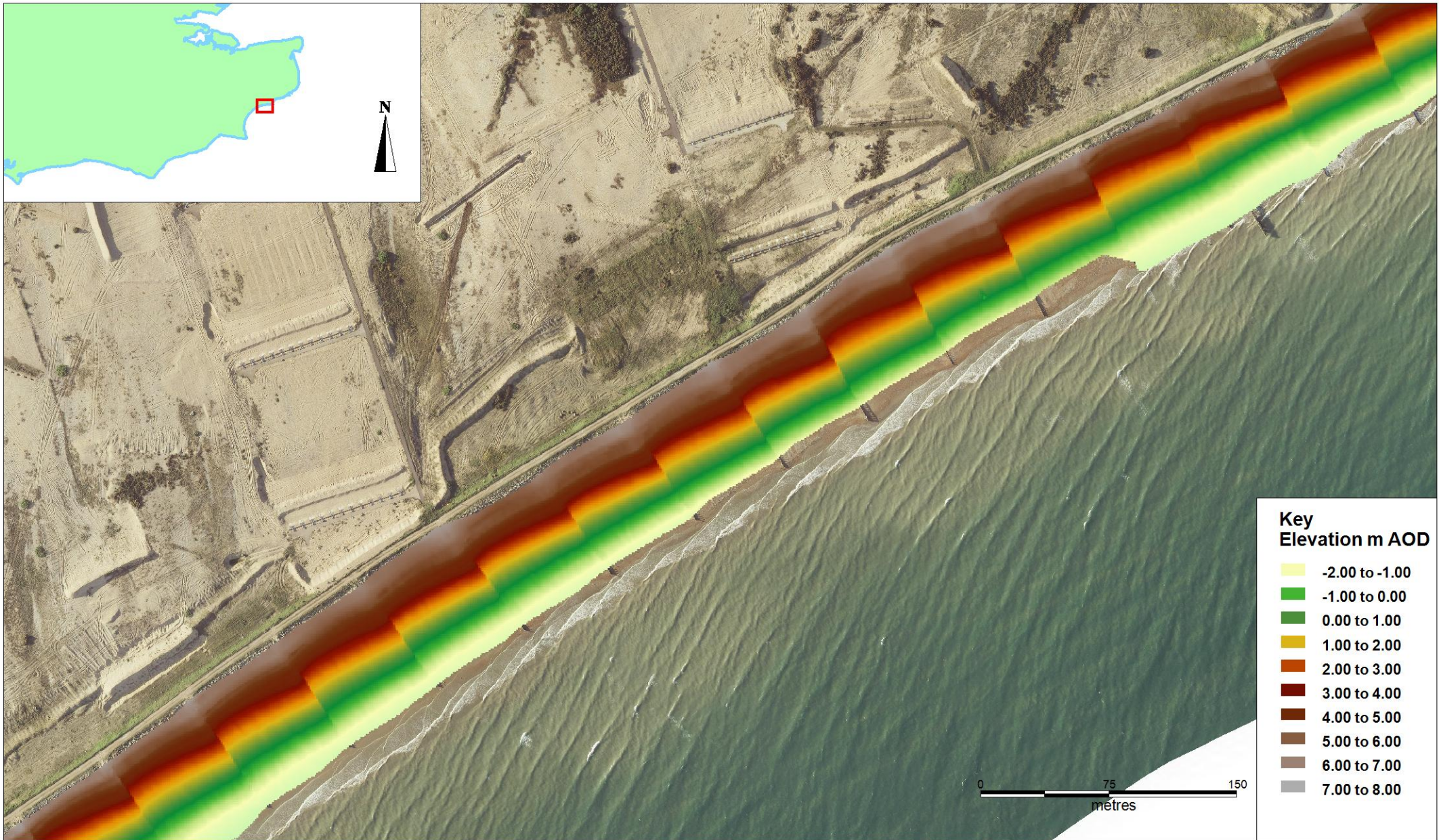
## **Annex B**

### *Digital Ground Models*

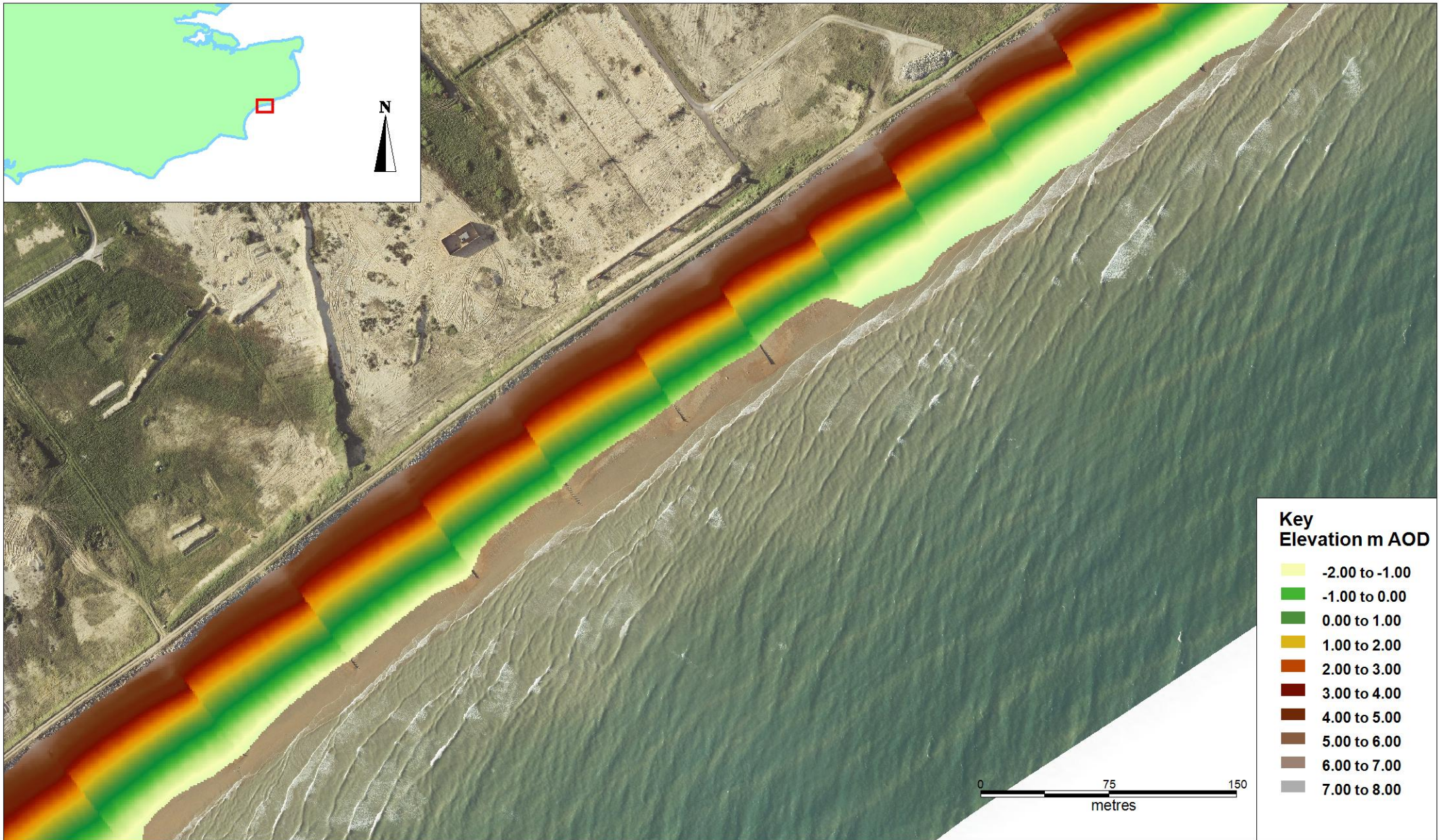




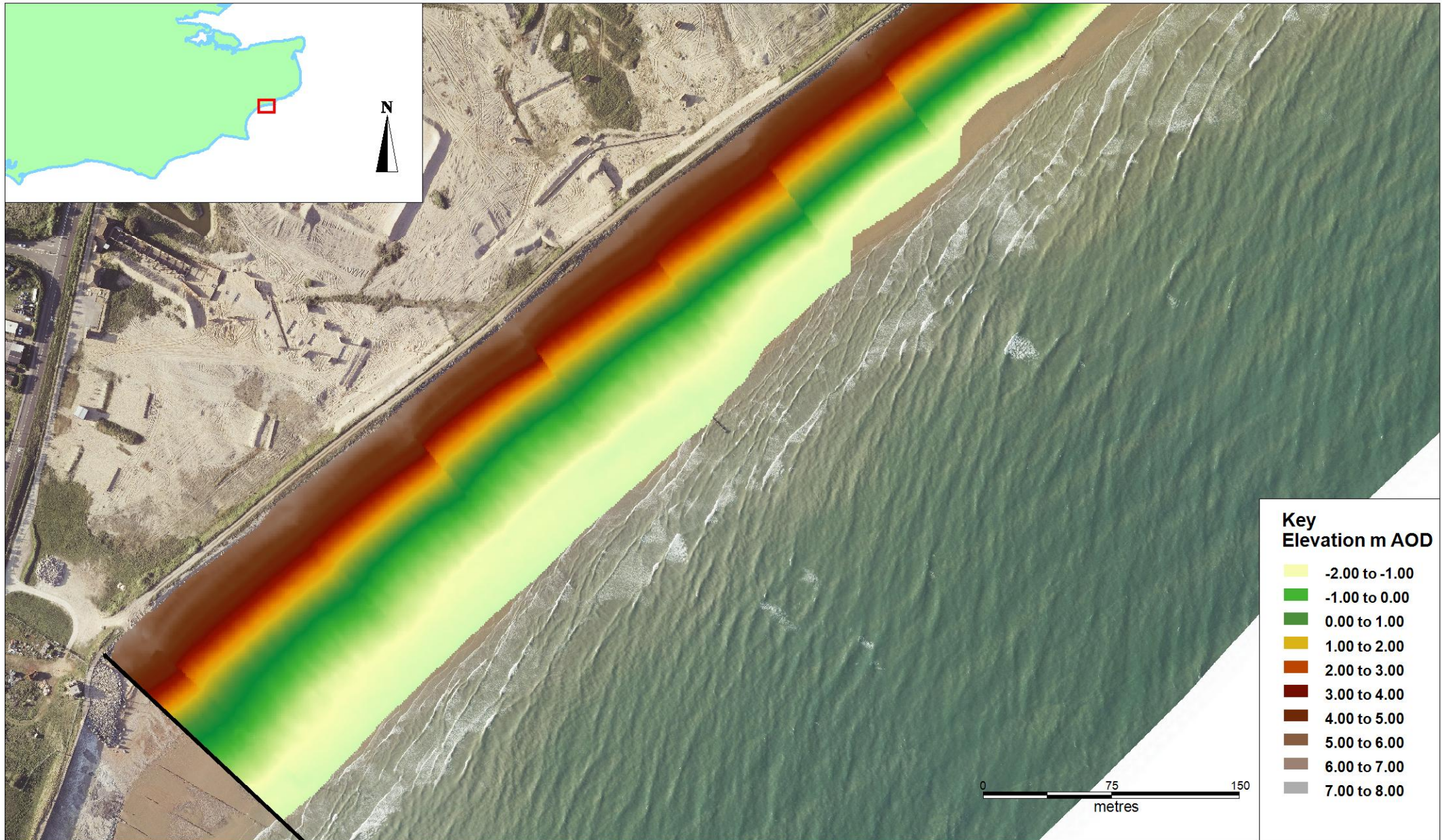














## **Annex C**

*Folkestone WaveRider Buoy*

*2010 – 2011*

## Folkestone Directional Waverider Buoy

### Location

OS: 619265E 133907N  
WGS84: Latitude: 51° 03.7563'N Longitude: 01° 07.6714'E

### Water Depth

Approx. 12.7m CD

### Instrument Type

Datawell Directional Waverider Buoy Mk III

### Data Quality

C1 (%)	Sample interval
98	30 minutes

### Monthly Means

*All times GMT*

Folkestone April 2010 to March 2011						
Month	H <sub>s</sub>	T <sub>p</sub>	T <sub>z</sub>	Direction	SST	No. of days
	(m)	(s)	(s)	(°)	(°C)	
April	0.41	5.1	3.4	136	8.5	30
May	0.40	5.1	3.5	130	10.9	31
June	0.34	5.5	3.5	129	14.1	30
July	0.40	4.3	3.2	173	15.9	29
August	0.51	4.6	3.5	166	17.6	31
September	0.46	4.9	3.5	151	16.9	30
October	0.65	5.3	3.8	143	14.6	30
November	0.67	5.9	3.9	142	9.0	30
December	0.54	5.6	3.9	131	6.3	31
January	0.68	5.2	3.8	144	6.3	30
February	0.70	6.0	3.6	165	6.8	28
March	0.41	4.9	3.3	125	7.2	28

*Tables and plots of these values, together with the minimum and maximum values and the standard deviation are available on the website*

Highest events in 2010/11									
Date/Time	H <sub>s</sub>	T <sub>p</sub>	T <sub>z</sub>	Dir.	Water level elevation (OD)	Tidal stage (hrs re: HW)	Tidal range (m)	Tidal surge* (m)	Max. surge* (m)
08-Nov-2010 12:00	2.92	6.7	5.4	174	2.73	HW	5.41	-0.45	-0.45
11-Nov-2010 13:00	2.75	7.7	5.1	177	1.58	HW -1	5.00	-0.75	0.52
11-Jan-2011 06:00	2.61	7.1	5.3	174	0.48	HW +3	4.10	0.01	0.35

\* Tidal information is obtained from the nearest recording tide gauge (the National Network gauge at Dover). The surge shown is the residual at the time of the highest H<sub>s</sub>. The maximum tidal surge is the largest positive surge during the storm event.

## Distribution plots

The distribution of wave parameters is shown in the accompanying graphs of:

- Wave roses (Direction vs.  $H_s$ ) from April 2010 to March 2011 and all data
- Percentage of occurrence of  $H_s$ ,  $T_p$ ,  $T_z$  and Direction from April 2010 to March 2011
- Monthly time series of significant wave height (the red line is the storm threshold)
- Incidence of storms during the reporting period and all previous years. Storms are defined using the Peaks-over-Threshold method. The highest  $H_s$  of each storm is shown.

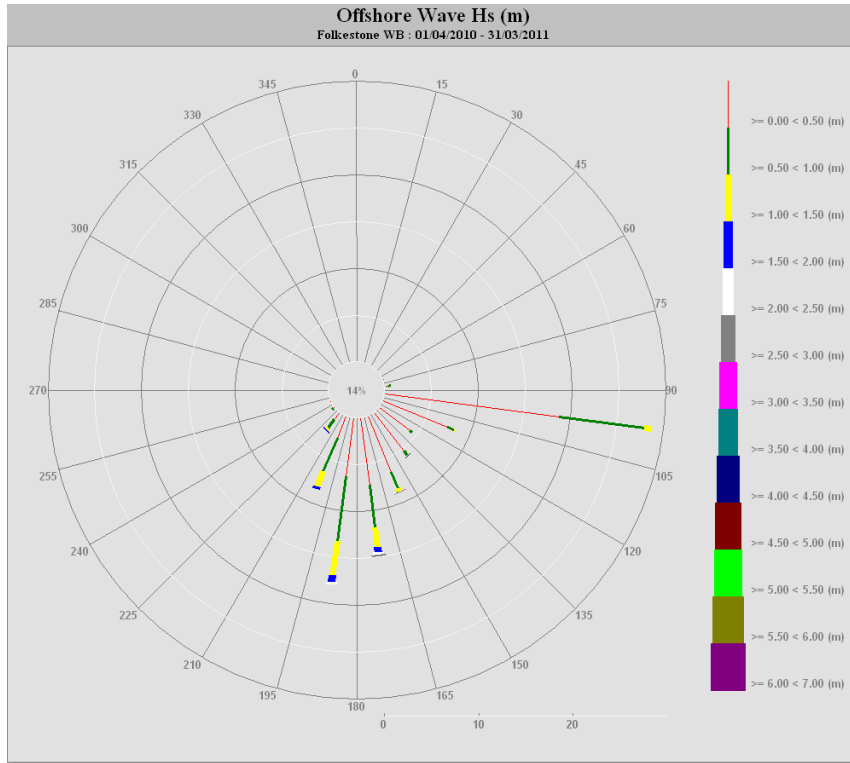
## Summary

This reporting year was relatively uneventful, with only 3 events exceeding the 2.5m storm threshold. Dominant storm wave direction is from the south, although the highest percentage of smaller waves approach from the east.

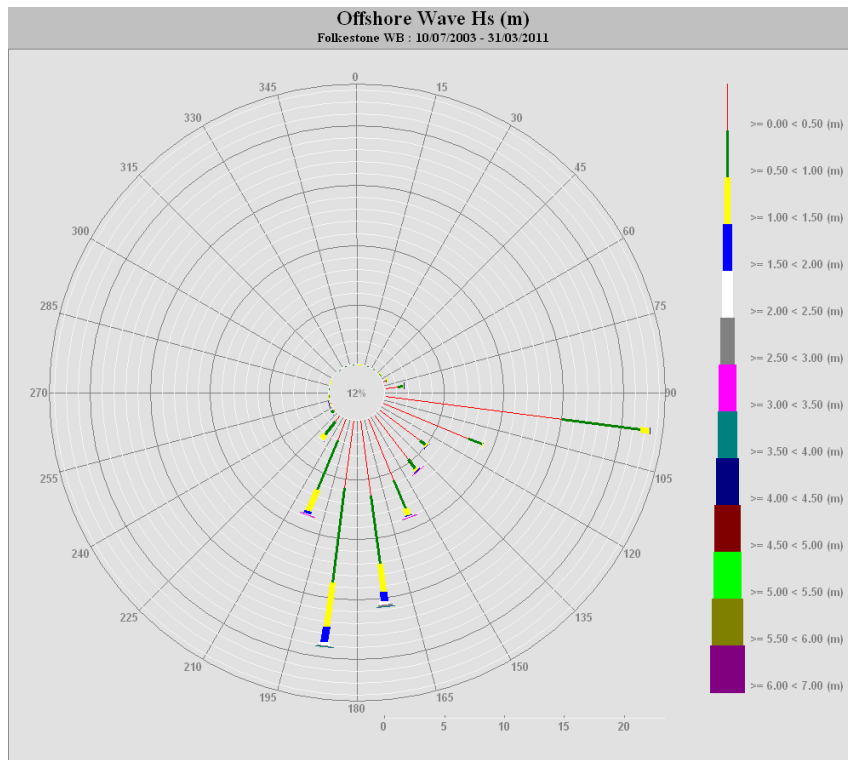
## Acknowledgements

Tidal data were supplied by the British Oceanographic Data Centre as part of the function of the National Tidal and Sea Level Facility, hosted by the Proudman Oceanographic Laboratory and funded by DEFRA and the Natural Environment Research Council.





Percentage of occurrence of direction vs.  $H_s$  for April 2010 to March 2011 (this reporting year)



Percentage of occurrence of direction vs.  $H_s$  for July 2003 to March 2011 (all data)

Folkestone Apr 2010 to Mar 2011

