Document Title: Annual Report 2015

Reference: AR 113

Status: Final

Date: August 2016

Project Name: Regional Coastal Monitoring

Survey Units: 4cSU17 – 4cSU25

Author: A. Stevens

Checked By: C. Milburn

Approved By: C. Milburn

<table>
<thead>
<tr>
<th>Issue</th>
<th>Revision</th>
<th>Description</th>
<th>Authorised</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>-</td>
<td>Draft Report for Consultation</td>
<td>CM</td>
</tr>
<tr>
<td>02</td>
<td>01</td>
<td>Final Report</td>
<td>CM</td>
</tr>
</tbody>
</table>
## Contents

List of Figures ................................................................................................................. iii
List of Tables .................................................................................................................. iii

1. Introduction ............................................................................................................... 1
2. Condition of Survey Units ..................................................................................... 3
3. Short Term Profile Change Summary ................................................................... 3
4. Long Term Profile Change Summary ................................................................... 94
5. Hydrodynamics ...................................................................................................... 101
6. Topographic Analysis .......................................................................................... 113
   6.3 Pett Levels & Fairlight ................................................................................... 113
   6.3.1 4cSU17 – Winchelsea Beach (Profiles 4c01061 – 4c01263) .................... 113
   6.3.2 4cSU18 – Fairlight Cove (Profiles 4c01275 – 4c01288) ......................... 114
   6.3.3 4cSU19 – Fairlight Glen (Profiles 4c01302 – 4c01324) ......................... 114
   6.4 Hastings & Bexhill ......................................................................................... 115
   6.4.1 4cSU20 – Hastings (Profiles 4c01349 – 4c01455) ................................ 115
   6.4.2 4cSU21 – Bulverhythe (Profiles 4c01459 – 4c01524) ......................... 116
   6.4.3 4cSU22 – Bexhill (Profiles 4c01532 – 4c01667) ..................................... 117
   6.5 Pevensey Bay & Eastbourne ........................................................................ 119
   6.5.1 4cSU23 – Pevensey (Profiles 4c01672 – 4c01729) ................................. 119
   6.5.2 4cSU24 – Eastbourne (Profiles 4c01732 – 4c01857) ......................... 120
   6.5.3 4cSU25 – Beachy Head ........................................................................... 121
7. Storm Analysis ...................................................................................................... 122
List of Figures

Figure 1-1: Definition of Cross Sectional Area (CSA) ................................................................. 1
Figure 1-2: Survey Unit Overview Map (4cSU01–4cSU24) ............................................................ 2
Figure 6-1 Profile 4c01228 ........................................................................................................ 114
Figure 6-2 Profile 4c01466 ........................................................................................................ 115
Figure 6-3 Profile 4c01376 ........................................................................................................ 116
Figure 6-4 Profile 4c01495 (note the rock revetment at chainage 5-25m) ................................. 117
Figure 6-5 Profile 4c01487 (note the rock revetment at chainage 5-25m) ................................. 117
Figure 6-6 Profile 4c01591 ........................................................................................................ 118
Figure 6-7 Profile 4c01690 ........................................................................................................ 119
Figure 6-8 Profile 4c01679 ........................................................................................................ 120
Figure 6-9 Profile 4c01812 ........................................................................................................ 121
Figure 6-10 Profile 4c01734 .................................................................................................... 121

List of Tables

Table 2-1 Survey Unit Beach Change Summary (Spring 2013 - Spring 2014) .......................... 3
1. Introduction

The analysis within this annual report provides an overview of beach performance and wave and tidal measurements for Coastal Cell 4c (Rye Harbour to Beachy Head), using data collected over the last year from the regional coastal monitoring programme. Topographic surveys are conducted at all viable sites using land based RTK GPS in the spring, summer and autumn of each year, covering pre-determined designated profiles at intervals along the coast. This report looks specifically at the difference between the latest survey set, Spring 2015, and the comparable data from Spring 2014.

All profile data was imported into SANDS® for analysis. This enables beach cross sectional areas (CSA) to be calculated as an indicator of beach quantity above and seaward of a master profile (Figure 1.1). Where available, seawalls are located spatially using a combination of design schematics and a sea defence survey conducted in 2003. The vertical level of master profiles are set close to the beach toe level or mean low water, whichever is deemed most appropriate. In some areas, clay levels have also been established using the results from trial holes dug into the beach. These have been incorporated to produce a more accurate master profile that calculates the actual beach area.

![Figure 1-1: Definition of Cross Sectional Area (CSA)](image)

Data is presented at a number of scales, from an overview of the average change in each survey unit, to changes and trends for profiles that have exhibited a significant change. The topographic analysis section of the report highlights notable changes, and areas for concern, for each of the survey units. While this provides an accurate portrayal of current beach conditions and changes over the preceding year it should be stressed that these are only short-term trends. In order to view the results in a meaningful light, they should be compared to the full data set for each location. To put these into context, total change is also shown from the baseline survey (2003/2004) to the most recent spring survey (2015).

Those areas that are designated beach management plan sites (Figure 1.2) benefit from a high-resolution beach plan survey every summer. These are utilised to produce a much more comprehensive beach analysis report; as such, this report should be viewed as an interim update for those sites.
Figure 1-1: Survey Unit Overview Map (4cSU17–4cSU24)
2. Condition of Survey Units

To provide an overview of the annual change in each survey unit, the average change in beach profile CSA is calculated for each unit. These averages are expressed in terms of percentage difference and actual change (m²) and are presented in Table 2.1.

<table>
<thead>
<tr>
<th>Survey Unit</th>
<th>No. of Profiles surveyed</th>
<th>Average CSA Change (%)</th>
<th>Average CSA Change (m²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4cSU17</td>
<td>44</td>
<td>0.34</td>
<td>1.39</td>
</tr>
<tr>
<td>4cSU18</td>
<td>N/A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4cSU19</td>
<td>N/A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4cSU20</td>
<td>26</td>
<td>0.58</td>
<td>1.92</td>
</tr>
<tr>
<td>4cSU21</td>
<td>22</td>
<td>12.77</td>
<td>7.50</td>
</tr>
<tr>
<td>4cSU22</td>
<td>27</td>
<td>0.81</td>
<td>0.48</td>
</tr>
<tr>
<td>4cSU23</td>
<td>53</td>
<td>0.19</td>
<td>0.77</td>
</tr>
<tr>
<td>4cSU24</td>
<td>42</td>
<td>-0.10</td>
<td>-2.50</td>
</tr>
<tr>
<td>4cSU25</td>
<td>N/A</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

These results are also illustrated as coloured thematic maps in Section 3.

Those units that demonstrate an average change of less than 5% CSA are considered to be within the possible effects of natural processes and survey error. It should be noted that the largest changes often result from units with very few profiles, where a single profile can skew the results. Although these figures can highlight a highly erosive unit, or a recent replenishment, they should be viewed with caution as, for example, it is possible to have a small highly erosive area within a unit that accretes material overall.

Caution should be given to detailed coastal examination based on these results alone as they reflect a short-term trend based on the state of the beach at snapshots in time. These figures show overall trends, but individual profiles should be examined in more detail in those areas of interest. Crucially, the significance of any results should be put in context with previous fluctuations in beach CSA since the start of the monitoring programme in 2003.

3. Short Term Profile Change Summary

Changes along individual profiles within each survey unit are summarised in a series of thematic maps on the following pages. The maps show the location of each beach profile, superimposed on aerial photography (NB the profile lines have been extended for clarity). Where possible, the annual change in Cross-Sectional Area (CSA) has been calculated from spring 2014 to spring 2015.

In order to put these changes in context, thematic maps are also included illustrating the change from the first spring survey in 2003/2004 and the most recent spring survey (2015). These help to establish whether changes in beach morphology have followed a trend, or are an anomaly that has occurred in the past year.
South East Strategic Regional Monitoring Project

Profile Change Summary for Spring 2014- Spring 2015

©Aerial photography is copyright to the Channel Coast Observatory. Additional overlaid information is copyright of Canterbury City Council 2015

Annual Change in Cross-Sectional Area (m²)

ACCRETION

- >30%
- 15-30%
- 5-15%
- Less than 5% (no change)

EROSION

- 15-30%
- >30%
South East Strategic Regional Monitoring Project

Profile Change Summary for Spring 2014- Spring 2015

©Aerial photography is copyright to the Channel Coast Observatory. Additional overlaid information is copyright of Canterbury City Council 2015

Annual Change in Cross-Sectional Area (m²)

- ACCRETION
  - >30%
  - 15-30%
  - 5-15%
  - <5% (no change)

- EROSION
  - 15-30%
  - >30%
South East Strategic Regional Monitoring Project

Profile Change Summary for Spring 2014- Spring 2015

©Aerial photography is copyright to the Channel Coast Observatory. Additional overlaid information is copyright of Canterbury City Council 2015

Annual Change in Cross-Sectional Area (m²)
- >30%
- 5-15%
- 15-30%
- 5-15%
- >30%
- Less than 5% (no change)
South East Strategic Regional Monitoring Project

Profile Change Summary for Spring 2014- Spring 2015

©Aerial photography is copyright to the Channel Coast Observatory. Additional overlaid information is copyright of Canterbury City Council 2015

Annual Change in Cross-Sectional Area (m²)

- ACCRETION
  - >30%
  - 15-30%
  - 5-15%
  - <5% (no change)

- EROSION
  - 15-30%
  - >30%
South East Strategic Regional Monitoring Project

Profile Change Summary for Spring 2014- Spring 2015

©Aerial photography is copyright to the Channel Coast Observatory. Additional overlaid information is copyright of Canterbury City Council 2015

Annual Change in Cross-Sectional Area (m²)

<table>
<thead>
<tr>
<th></th>
<th>&gt;30%</th>
<th>5-15%</th>
<th>15-30%</th>
<th>&gt;30%</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCRETION</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EROSION</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Less than 5% (no change)
South East Strategic Regional Monitoring Project

Profile Change Summary for Spring 2014- Spring 2015

©Aerial photography is copyright to the Channel Coast Observatory. Additional overlaid information is copyright of Canterbury City Council 2015

Annual Change in Cross-Sectional Area (m²)

ACCRETION
- >30%
- 15-30%
- 5-15%
- Less than 5% (no change)

EROSION
- >30%
- 15-30%
- 5-15%
- Less than 5% (no change)
South East Strategic Regional Monitoring Project

Profile Change Summary for Spring 2014 - Spring 2015

©Aerial photography is copyright to the Channel Coast Observatory. 
Additional overlaid information is copyright of Canterbury City Council 2015

Annual Change in Cross-Sectional Area (m²)

- >30%
- 15-30%
- 5-15%
- 15-30%
- <5% (no change)
4. Long Term Profile Change Summary
South East Strategic Regional Monitoring Project

Profile Change Summary for Spring 2004 - Spring 2015

©Aerial photography is copyright to the Channel Coast Observatory. Additional overlaid information is copyright of Canterbury City Council 2015

Annual Change in Cross-Sectional Area (m²)

- Blue: >30%
- Light Blue: 15-30%
- Orange: 5-15%
- Red: 15-30%
- Brown: >30%
- Grey: Less than 5% (no change)
South East Strategic Regional Monitoring Project

Profile Change Summary for Spring 2004 - Spring 2015

©Aerial photography is copyright to the Channel Coast Observatory. Additional overlaid information is copyright of Canterbury City Council 2015

Annual Change in Cross-Sectional Area (m²)

- **Accretion**:
  - >30%
  - 15-30%
  - 5-15%
  - Less than 5% (no change)

- **Erosion**:
  - 15-30%
  - >30%
South East Strategic Regional Monitoring Project

Profile Change Summary for Spring 2004 - Spring 2015

©Aerial photography is copyright to the Channel Coast Observatory.
Additional overlaid information is copyright of Canterbury City Council 2015

Annual Change in Cross-Sectional Area (m²)

- **ACCRETION**
- **EROSION**

- >30%
- 5-15%
- 15-30%
- 5-15%
- >30%
- Less than 5% (no change)
South East Strategic Regional Monitoring Project

Profile Change Summary for Spring 2004 - Spring 2015

©Aerial photography is copyright to the Channel Coast Observatory. Additional overlaid information is copyright of Canterbury City Council 2015

Annual Change in Cross-Sectional Area (m²)

- >30%
- 15-30%
- 5-15%
- <5%

EROSION

ACCRETION
South East Strategic Regional Monitoring Project
Profile Change Summary for Spring 2004 - Spring 2015

©Aerial photography is copyright to the Channel Coast Observatory. Additional overlaid information is copyright of Canterbury City Council 2015

Annual Change in Cross-Sectional Area (m²)
- ACCRETION:
  - >30%
  - 15-30%
  - 5-15%
- EROSION:
  - 15-30%
  - >30%
  - Less than 5% (no change)
South East Strategic Regional Monitoring Project
Profile Change Summary for Spring 2004 - Spring 2015

©Aerial photography is copyright to the Channel Coast Observatory. Additional overlaid information is copyright of Canterbury City Council 2015

Annual Change in Cross-Sectional Area (m²)
- Blue: >30%
- Red: 15-30%
- Light Blue: 5-15%
- Dark Red: >30%
- Grey: Less than 5% (no change)
South East Strategic Regional Monitoring Project
Profile Change Summary for Spring 2007 - Spring 2015

©Aerial photography is copyright to the Channel Coast Observatory. Additional overlaid information is copyright of Canterbury City Council 2015

Annual Change in Cross-Sectional Area (m²)

- >30%
- 5-15%
- 15-30%
- 5-15%
- >30%
- Less than 5% (no change)
South East Strategic Regional Monitoring Project
Profile Change Summary for Spring 2004 - Spring 2015

©Aerial photography is copyright to the Channel Coast Observatory. Additional overlaid information is copyright of Canterbury City Council 2015

Annual Change in Cross-Sectional Area (m²)

- >30%
- 15-30%
- 5-15%
- <5%

ACCRETION
EROSION

Less than 5% (no change)
South East Strategic Regional Monitoring Project

Profile Change Summary for Spring 2004 - Spring 2015

©Aerial photography is copyright to the Channel Coast Observatory. Additional overlaid information is copyright of Canterbury City Council 2015
South East Strategic Regional Monitoring Project

Profile Change Summary for Spring 2004 - Spring 2015

©Aerial photography is copyright to the Channel Coast Observatory. Additional overlaid information is copyright of Canterbury City Council 2015

Annual Change in Cross-Sectional Area (m²)

- **ACCRETION**
  - >30%
  - 15-30%
  - 5-15%
  - Less than 5% (no change)

- **EROSION**
  - 15-30%
  - >30%
South East Strategic Regional Monitoring Project

Profile Change Summary for Spring 2004 - Spring 2015

©Aerial photography is copyright to the Channel Coast Observatory. Additional overlaid information is copyright of Canterbury City Council 2015

Annual Change in Cross-Sectional Area ($m^2$)

- $>30\%$
- $15-30\%$
- $15-30\%$
- $5-15\%$
- Less than $5\%$ (no change)
South East Strategic Regional Monitoring Project

Profile Change Summary for Spring 2004 - Spring 2015

©Aerial photography is copyright to the Channel Coast Observatory. Additional overlaid information is copyright of Canterbury City Council 2015

Annual Change in Cross-Sectional Area (m²)

ACCRETION
- >30%
- 15-30%
- 5-15%
- Less than 5% (no change)

EROSION
- 15-30%
- >30%
South East Strategic Regional Monitoring Project

Profile Change Summary for Spring 2004 - Spring 2015

©Aerial photography is copyright to the Channel Coast Observatory. Additional overlaid information is copyright of Canterbury City Council 2015

Annual Change in Cross-Sectional Area (m²)

- >30%
- 15-30%
- 5-15%
- 15-30%
- 5-15%
- >30%
- Less than 5% (no change)
South East Strategic Regional Monitoring Project

Profile Change Summary for Spring 2004 - Spring 2015

©Aerial photography is copyright to the Channel Coast Observatory. Additional overlaid information is copyright of Canterbury City Council 2015

Annual Change in Cross-Sectional Area (m²)

- >30%
- 5-15%
- 15-30%
- 5-15%
- >30%
- Less than 5% (no change)
5. Hydrodynamics

Folkestone Directional Waverider Buoy

<table>
<thead>
<tr>
<th>Location</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>OS</td>
<td>619263 E 133906 N</td>
</tr>
<tr>
<td>WGS84</td>
<td>Latitude: 51° 03.756’ N Longitude: 01° 07.671’ E</td>
</tr>
</tbody>
</table>

Instrument type

Datawell Directional Waverider Mk III

Water depth ~13m CD

Buoy in situ off Sandgate beach. Photo courtesy of Fugro EMU Limited

Location of buoy (Google mapping)

Summary

During this reporting period from April 2014 to March 2015, four distinct storms of relatively low magnitude for the site exceeded the 2.5m storm threshold. The largest storm on 15 January 2015 had a maximum significant wave height of 2.71m and occurred around High Water but on a neap tide.

Data Quality

<table>
<thead>
<tr>
<th>Recovery rate (%)</th>
<th>Sample interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>96</td>
<td>30 minutes</td>
</tr>
</tbody>
</table>

Monthly Averages – 2014/15

All times are GMT

<table>
<thead>
<tr>
<th>Month</th>
<th>$H_s$ (m)</th>
<th>$T_p$ (s)</th>
<th>$T_z$ (s)</th>
<th>Dir. (°)</th>
<th>SST (°C)</th>
<th>No. of days</th>
</tr>
</thead>
<tbody>
<tr>
<td>April</td>
<td>0.40</td>
<td>5.4</td>
<td>3.3</td>
<td>144</td>
<td>11.0</td>
<td>30</td>
</tr>
<tr>
<td>May</td>
<td>0.48</td>
<td>4.7</td>
<td>3.3</td>
<td>148</td>
<td>13.0</td>
<td>31</td>
</tr>
<tr>
<td>June</td>
<td>0.33</td>
<td>4.6</td>
<td>3.3</td>
<td>133</td>
<td>15.7</td>
<td>30</td>
</tr>
<tr>
<td>July</td>
<td>0.35</td>
<td>4.4</td>
<td>3.3</td>
<td>141</td>
<td>18.1</td>
<td>31</td>
</tr>
<tr>
<td>August</td>
<td>0.54</td>
<td>4.5</td>
<td>3.3</td>
<td>173</td>
<td>18.4</td>
<td>31</td>
</tr>
<tr>
<td>September</td>
<td>0.32</td>
<td>4.6</td>
<td>3.3</td>
<td>121</td>
<td>18.0</td>
<td>30</td>
</tr>
<tr>
<td>October</td>
<td>0.73</td>
<td>5.4</td>
<td>3.5</td>
<td>171</td>
<td>16.2</td>
<td>31</td>
</tr>
<tr>
<td>November</td>
<td>0.78</td>
<td>5.4</td>
<td>3.6</td>
<td>153</td>
<td>13.4</td>
<td>30</td>
</tr>
<tr>
<td>December</td>
<td>0.68</td>
<td>6.0</td>
<td>3.8</td>
<td>154</td>
<td>10.1</td>
<td>31</td>
</tr>
<tr>
<td>January</td>
<td>0.93</td>
<td>6.2</td>
<td>3.9</td>
<td>174</td>
<td>8.6</td>
<td>18</td>
</tr>
<tr>
<td>February</td>
<td>0.60</td>
<td>6.4</td>
<td>3.9</td>
<td>143</td>
<td>6.3</td>
<td>26</td>
</tr>
<tr>
<td>March</td>
<td>0.55</td>
<td>5.6</td>
<td>3.5</td>
<td>146</td>
<td>7.8</td>
<td>31</td>
</tr>
</tbody>
</table>
Storm Analysis

<table>
<thead>
<tr>
<th>Date/Time</th>
<th>$H_s$ (m)</th>
<th>$T_p$ (s)</th>
<th>$T_z$ (s)</th>
<th>Dir. (°)</th>
<th>Water level elevation* (OD)</th>
<th>Tidal stage (hours re. HW)</th>
<th>Tidal range (m)</th>
<th>Tidal surge* (m)</th>
<th>Max. surge* (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>15-Jan-2015 06:00</td>
<td>2.71</td>
<td>7.7</td>
<td>4.9</td>
<td>181</td>
<td>-</td>
<td>HW</td>
<td>~3.3</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>07-Nov-2014 08:30</td>
<td>2.68</td>
<td>7.7</td>
<td>5.5</td>
<td>180</td>
<td>-</td>
<td>HW -2</td>
<td>~6.1</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>26-Dec-2014 22:00</td>
<td>2.64</td>
<td>7.1</td>
<td>5.4</td>
<td>173</td>
<td>-</td>
<td>HW -4</td>
<td>~5.8</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>03-Nov-2014 07:00</td>
<td>2.59</td>
<td>7.1</td>
<td>4.9</td>
<td>193</td>
<td>-</td>
<td>HW</td>
<td>~4.4</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Distribution plots

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

- Wave rose (percentage of occurrence of Direction vs. $H_s$) for all measured data
- Percentage of occurrence of $H_s$, $T_p$, $T_z$ and Direction from April 2014 to March 2015
- Monthly time series of $H_s$ (red line is 2.5 m storm threshold)
- Incidence of storms during the reporting period and for all previous years. Storm events are defined using the Peaks-over-Threshold method. The highest $H_s$ of each storm event is shown

General

The buoy was first deployed on 1 June 2003, at which time the magnetic declination at the site was 2.1° west, changing by 0.14° east per year.

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.

---

* 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 $H_s$. The maximum tidal surge is the largest surge during the storm event.
Offshore Wave Hs (m)
Folkestone WB: 10/07/2003 - 31/03/2015

- >= 0.00 < 0.50 (m)
- >= 0.50 < 1.00 (m)
- >= 1.00 < 1.50 (m)
- >= 1.50 < 2.00 (m)
- >= 2.00 < 2.50 (m)
- >= 2.50 < 3.00 (m)
- >= 3.00 < 3.50 (m)
- >= 3.50 < 4.00 (m)
- >= 4.00 < 4.50 (m)
- >= 4.50 < 5.00 (m)
- >= 5.00 < 5.50 (m)
- >= 5.50 < 6.00 (m)
- >= 6.00 >998.00 (m)
Annual Report 2015
Coastal Cell 4c: East Sussex/South Kent

Hs at Folkestone Apr 2014 to Mar 2015

Day in month

Apr

May

Jun

Jul

Aug

Sep

Oct

Nov

Dec

Jan

Feb

Mar
Pevensey Bay Directional Waverider Buoy

Location

<table>
<thead>
<tr>
<th>OS</th>
<th>570427 E 100916 N</th>
</tr>
</thead>
<tbody>
<tr>
<td>WGS84</td>
<td>Latitude: 50° 46.966' N  Longitude: 00° 24.975' E</td>
</tr>
</tbody>
</table>

Instrument type

Datawell
Directional Waverider Mk III

Water depth ~10m CD

Buoy in situ in Pevensey Bay. Photo courtesy of Fugro EMU Limited

Location of buoy (Google mapping)

Summary

During this reporting period from April 2014 to March 2015, only two storms exceeded the 3.25m storm threshold of typical magnitude for the site although several others came close. The largest storm on 15 January 2015 occurred at High Water on a neap tide.

Data Quality

<table>
<thead>
<tr>
<th>Recovery rate (%)</th>
<th>Sample interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>98</td>
<td>30 minutes</td>
</tr>
</tbody>
</table>

Monthly Averages – 2014/15

*All times are GMT*

<table>
<thead>
<tr>
<th>Month</th>
<th>$H_s$ (m)</th>
<th>$T_p$ (s)</th>
<th>$T_z$ (s)</th>
<th>Dir. (°)</th>
<th>SST (°C)</th>
<th>No. of days</th>
</tr>
</thead>
<tbody>
<tr>
<td>April</td>
<td>0.52</td>
<td>5.8</td>
<td>3.4</td>
<td>175</td>
<td>8.9</td>
<td>29</td>
</tr>
<tr>
<td>May</td>
<td>0.62</td>
<td>5.1</td>
<td>3.4</td>
<td>177</td>
<td>11.4</td>
<td>30</td>
</tr>
<tr>
<td>June</td>
<td>0.41</td>
<td>5.0</td>
<td>3.2</td>
<td>158</td>
<td>16.0</td>
<td>29</td>
</tr>
<tr>
<td>July</td>
<td>0.43</td>
<td>4.2</td>
<td>3.1</td>
<td>173</td>
<td>18.3</td>
<td>30</td>
</tr>
<tr>
<td>August</td>
<td>0.72</td>
<td>5.0</td>
<td>3.5</td>
<td>210</td>
<td>18.9</td>
<td>30</td>
</tr>
<tr>
<td>September</td>
<td>0.44</td>
<td>4.5</td>
<td>3.1</td>
<td>133</td>
<td>18.2</td>
<td>30</td>
</tr>
<tr>
<td>October</td>
<td>0.93</td>
<td>5.7</td>
<td>3.9</td>
<td>203</td>
<td>16.4</td>
<td>31</td>
</tr>
<tr>
<td>November</td>
<td>1.02</td>
<td>5.8</td>
<td>3.8</td>
<td>174</td>
<td>13.8</td>
<td>30</td>
</tr>
<tr>
<td>December</td>
<td>1.01</td>
<td>6.4</td>
<td>4.1</td>
<td>192</td>
<td>10.5</td>
<td>30</td>
</tr>
<tr>
<td>January</td>
<td>1.17</td>
<td>6.8</td>
<td>4.3</td>
<td>205</td>
<td>8.4</td>
<td>31</td>
</tr>
<tr>
<td>February</td>
<td>0.80</td>
<td>6.6</td>
<td>3.9</td>
<td>177</td>
<td>6.5</td>
<td>28</td>
</tr>
<tr>
<td>March</td>
<td>0.78</td>
<td>6.2</td>
<td>3.7</td>
<td>175</td>
<td>7.9</td>
<td>31</td>
</tr>
</tbody>
</table>
Storm Analysis

<table>
<thead>
<tr>
<th>Date/Time</th>
<th>$H_s$ (m)</th>
<th>$T_p$ (s)</th>
<th>$T_z$ (s)</th>
<th>Dir. (°)</th>
<th>Water level elevation* (OD)</th>
<th>Tidal stage (hours re. HW)</th>
<th>Tidal range (m)</th>
<th>Tidal surge* (m)</th>
<th>Max. surge* (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>15-Jan-2015 05:00</td>
<td>3.95</td>
<td>9.1</td>
<td>6.2</td>
<td>207</td>
<td>1.94</td>
<td>HW</td>
<td>3.4</td>
<td>0.31</td>
<td>0.68</td>
</tr>
<tr>
<td>12-Dec-2014 06:00</td>
<td>3.63</td>
<td>10.0</td>
<td>6.3</td>
<td>218</td>
<td>0.05</td>
<td>HW +3</td>
<td>4.4</td>
<td>0.51</td>
<td>0.53</td>
</tr>
</tbody>
</table>

Distribution plots

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

- Wave rose (percentage of occurrence of Direction vs. $H_s$) for all measured data
- Percentage of occurrence of $H_s$, $T_p$, $T_z$ and Direction from April 2014 to March 2015
- Monthly time series of $H_s$, (red line is 3.25 m storm threshold)
- Incidence of storms during the reporting period and for all previous years. Storm events are defined using the Peaks-over-Threshold method. The highest $H_s$ of each storm event is shown

General

The buoy was first deployed on 9 July 2003, at which time the magnetic declination at the site was 2.3° west, changing by 0.14° east per year.

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.

* Tidal information is obtained from the nearest recording tide gauge (the National Network gauge at Newhaven). The surge shown is the residual at the time of the highest $H_s$. The maximum tidal surge is the largest positive surge during the storm event.
6. Topographic Analysis
This section describes any significant changes that have taken place in each unit, highlighting any areas of concern, and putting the results in context with previous surveys. Where appropriate, different survey plots are super-imposed to illustrate the changes described in the text.

6.1 Pett Levels & Fairlight

6.1.1 4cSU17 – Winchelsea Beach (Profiles 4c01061 – 4c01263)
SU17 covers the low lying grazing land from Cliff End to Rye Harbour arm. Since 2006, a capital coast protection scheme and annual recycling have been undertaken. The scheme consisted of installing and upgrading the groyne field along the frontage, particularly the stretches of beach in front of Cliff End and Winchelsea Beach. The recycling scheme transports beach material from the sediment sink at Rye harbour arm, and returns it to Cliff End and other locations within 4cSU17 as required. During 2014-2015 15,000m$^3$ of material was recycled within the frontage.

The short term trend is not representative of the natural longshore drift due to the artificial beach movement. Cliff End, at the west of the unit where 10,200m$^3$ of the recycled shingle is deposited (a greater quantity than previous years), shows accretion. The profiles to the east show erosion (Profile 4c01228 loses 12% (27m$^2$) through loss of material in the lower beach (Figure 5.11)), despite this area receiving 4,900m$^3$ of recycled material. The central section (Winchelsea beach) shows accretion (Profile 4c01104 gains 10% (37m$^2$)); this is likely recycled material moving north-easterly. At the eastern extent of the unit, towards the Rye harbour arm, most profiles are erosive but significant accretion is present in the two most easterly profiles, 4c01061 gains 12% (39m$^2$) and 4c01065 gains 9% (51m$^2$).

The autumn and spring surveys are conducted during anthropogenic activities, so for this survey unit only, the summer BMP is the best indicator for natural volume change, which always indicates movement from south west to north east.
Over the long term (2004-2015) the west of the unit was erosive. This is typified by Profile 4c01228 which lost 18% (44m$^2$). Over the last year the berm is unchanged whilst the lower beach has eroded; over the longer term the entire beach has cut back by 5-10m (Figure 5.9). The central beach is highly accretive from Profile 4c01214 to 4c01162. Profile 4c01180 gained 45% (123m$^2$) and 4c01185 gained 46% (80m$^2$). The north-east of the unit (towards Rye harbour) shows low levels of erosion. At the harbour arm the long term change is of low significance (<5% change); suggesting the correct level of material is extracted annually.

The longer term trends indicate higher gains as the coastal scheme is included in the analysis.

6.1.2 4cSU18 – Fairlight Cove (Profiles 4c01275 – 4c01288)  
This survey unit is not currently surveyed as part of the Regional Coastal Monitoring Programme’s Topographic Survey Programme. Data is collected instead using remote sensing techniques such as Lidar.

6.1.3 4cSU19 – Fairlight Glen (Profiles 4c01302 – 4c01324)  
This survey unit is not currently surveyed as part of the Regional Coastal Monitoring Programme’s Topographic Survey Programme. Data is collected instead using remote sensing techniques such as Lidar.
6.2 Hastings & Bexhill

6.2.1 4cSU20 – Hastings (Profiles 4c01349 – 4c01455)

Beach material is transported west to east along this whole stretch of coast from Pevensey to Hastings. Hastings beach gained material between 2014 and 2015 although to a smaller degree than last year when storms at Pevensey increased the natural transport of material to this unit; overall Hastings gained 0.58% per profile.

The western end of Hastings showed low levels of change with isolated erosion at Profile 4c01446 lost 15% (37m²) (Figure 5.12). Immediately west of the pier the profiles accreted with the most significant accretion at 4c01397 which gained 21% (42m²) of material.

![Figure 6-2 Profile 4c01466](image)

There was accretion at Fisherman’s beach with a 10% (57m²) gain at Profile 4c001349. The beach west of Fisherman's beach showed little change until Profiles 4c01374-4c01382 just east of the pier, which were highly erosive (profile 4c01376 lost 23% (48m²) translating to 1m loss in beach height). This was only a short term trend; over the long term this profile has gained 42% (48m²), the most accretive profile in the whole unit (Figure 5.13).
Over the longer term nearly every profile along this frontage has gained material. The beach west of the newest rock groyne installed in 2009 has allowed the beach to accumulate by 42% since 2003. Material has also accumulated either side of the Harbour Arm at the Fisherman’s beach.

6.2.2 4cSU21 – Bulverhythe (Profiles 4c01459 – 4c01524)

Bulverhythe is generally a case of two extremes, with large gains in the west due to material from Pevensey travelling east through longshore drift, and a section of large losses in front of the rock revetment as there is little in the way of structures to hold the material in place. Overall the unit was highly accretive over 2014-2015 with an average gain of 12.77% (7.5m$^2$), however the accretion on the western beach was of a smaller magnitude than previous years, possibly due to a calmer winter releasing less sediment from the west following severe storms in winter 2013.

Beach recharge was undertaken in June 2014 with 23,400m$^3$ forward-cycled over the rock groyne from Profiles 4c01498A-4c01502 to Profile 4c01495. Despite the large volume of material moved, the profiles at the extraction site were accretive, gaining 14% (35m$^2$).

The material deposited at 4c01495 quickly moved eastwards – despite the quantity of material deposited this profile lost 39% (10m$^2$) of material. The beach has retreated by around 25m and is 0.5m lower than in 2014 (Figure 5.14) Profiles 4c01487 to 4c01478A, in front of the revetment, saw large percentage increases as a result of the material moving further west. The most extreme gain was Profile 4c01487 at 139% (19m$^2$). The beach here has moved seaward by 45m, closely matching its position in 2003 (Figure 5.15).
6.2.3 4cSU22 – Bexhill (Profiles 4c01532 – 4c01667)

The majority of Bexhill has gained material or experienced negligible losses, with the average change across the unit at 0.81% (0.48m²). There are two areas of significant...
erosion. Profile 4c01641 which lost 54m$^2$ (17%), and the central section, which lost 68m$^2$ (21%) in Figure 5.16 and 30m$^2$ (10%).

To counteract this, there are several profiles towards the east which are showing significant increases; Profile 4c01543 was the most accretive, gaining 37m$^2$ (17%).

The longer term trend is more reflective of the actual beach change at Bexhill, where profiles indicate that the frontage has gained material since 2004 and the general overall trend for all of the profiles are accretive. Profile 4c01591 gained 15% (35m$^2$) over the longer term, suggesting the erosion seen from 2014-2015 was not reflective of the long term change (Figure 5.16).

The most significant accretion occurs towards the west of the unit; profiles 4c01641-4c0163 all gained approx. 40% (70-80m$^2$) of cross sectional area.
6.3 Pevensey Bay & Eastbourne

6.3.1 4cSU23 – Pevensey (Profiles 4c01672 – 4c01729)

The Environment Agency’s appointed PFI Contractor, Pevensey Coastal Defence Ltd, to actively manage the section of beach between Sovereign Harbour to Cooden, as part of a 25-year contract. As a result the beach is so artificially managed that conclusions of natural movement cannot be calculated.

The total annual change between spring 2014 and spring 2015 is 0.19 m$^2$ or 0.77%, suggesting that despite the heavy losses experienced annually, the beach levels are maintained throughout. Individual profiles will fluctuate over the course of the year but the overall condition is preserved.

However there are a few areas of concern. Profile 4c01690, immediately east of the Wallers Haven outflow at Normans Bay lost 25% (55 m$^2$). The beach has dropped in height by 1.0-1.5 m along the slope since 2014 and the levels are up to 2.5 m lower than the first survey in 2003 (Figure 5.17).

![Figure 6-7 Profile 4c01690](image)

The other potential area of concern is Profile 4c01679 at the eastern extent of the unit which lost 26% (41 m$^2$). Over 2014-2015 the crest has been removed and the whole beach lowered by between 0.5-1.0 m. However the longer term trend is not so severe; the 2015 profile is within 0.5 m of the mean profile, and the lower beach is similar to the beach in 2003.
6.3.2 4cSU24 – Eastbourne (Profiles 4c01732 – 4c01857)

The survey results indicate an overall average change of -0.1% (-2.5 m$^2$). The majority of the profiles showed low levels of erosion, with significant accretion at Sovereign harbour (39%, 45 m$^2$ gained at Profile 4c01732 and 28%, 41 m$^2$ gained at Profile 4c01734).

Beach recycling was undertaken in December 2014 with 2,524 m$^3$ extracted from the Wish Tower (Profiles 4c01816 to 4c01820) and deposited in front of the Bandstand (Profiles 4c01810 to 4c01814). At the extraction site Profile 4c01819 lost 1% (-2 m$^2$) since Spring 2014 and Profile 4c01816 gained 7% (34 m$^2$); increasing in size despite the quantity of material extracted. The profile within the deposition site, 4c01812, showed a small gain of 3% (9 m$^2$) suggesting recycling works were sufficient to maintain this profile. The profile is similar to that in 2004, with a 1 m increase in the upper beach elevation since 2014 (Figure 5.19).

The longer term trend in Eastbourne shows low levels of change over most profiles, with around half accreting and half eroding. The west of the section was most erosive, Profile 4c01844 lost 7% (17 m$^2$) and Profile 4c01833 lost 9% (18 m$^2$). The long term accretion at Sovereign Harbour is significant; Profile 4c01734 gained 306% (141 m$^2$ – Figure 5.20) and Profile 4c01735 gained 213% (72 m$^2$). This demonstrates the dominant west-east movement of sediment in the unit.
6.3.3 4cSU25 – Beachy Head
This survey unit is not currently surveyed as part of the Regional Coastal Monitoring Programme’s Topographic Survey Programme. Data is collected instead using remote sensing techniques such as Lidar.
7. Storm Analysis

There were no extensive storms during April 2014 to April 2015 which required post-storm surveys.