Cover photograph: Hurst Spit
M. Dolan
Southeast Regional Coastal Monitoring Programme

Annual Report 2014 – Christchurch Bay

1. Introduction
Analysis presented in this report provides an overview of beach changes and wave and tidal measurements since the commencement of the Southeast Regional Coastal Monitoring Programme. The first beach surveys took place during the winter of 2003 and changes are reported until summer 2013. Historic data collected by New Forest District Council also exists from 2000 until the commencement of the monitoring programme and the data are included with this report.

Data are presented at several levels:
- Process cell summary of percentage and actual profile change from 2013 to 2014
- Process cell summary of percentage and actual profile change from 2000/01/02/03 to 2014
- Detailed beach profile change from 2013 to 2014
- Detailed beach profile change from 2000/01/02/03 to 2014
- Difference model from topographic baseline surveys from 2000/01/02/03 to 2014 (if applicable)
- Difference model from topographic baseline surveys from 2013 to 2014 (if applicable)
- Change in position of Mean High Water Springs (if applicable)
- Profile envelope graph (on CD)
- Trend analysis of beach cross-sectional area (on CD)

The process cell summary maps provide an at-a-glance summary of the changes during the past year and over the longer term. It is recommended that the user should use the maps to identify areas of interest and then examine the individual profile plots and trends. Colour coded lines highlight areas of maximum change and identify profiles which might need closer examination.

Difference models have been produced where there are at least two baseline surveys to compare. In addition, the topographic baseline data has been used to extract the level of Mean High Water (MHWS) from each baseline data set.

It must be appreciated that the accuracies of each measurement system must be taken into account when drawing conclusions, particularly from the difference models. In the case of topographic difference models from RTK GPS surveys, the accuracy of each data point is ±0.03m and therefore differences of ±0.06m can generally be considered as “real”, whilst smaller changes may be an artifact of the measuring system, and are considered to be “No Change”. Difference plots show changes >±0.25m, which should be indicative of areas of genuinely measurable change. Smaller changes may also be present but these are filtered from the analysis to provide clarity. This report displays difference models only where detailed analysis suggests that the changes are real but, nevertheless, the user should approach the results as indicative, unless reinforced over time or with other information.

Changes in beach profiles and volumes may be attributed to beach management activities. Beach recycling and replenishment operations are depicted on the difference plot maps.
2. Hydrodynamic data
   a. Waves
      A non-directional Waverider buoy was first deployed off Milford in 1996 and upgraded to a directional
      Waverider on 18 December 2006. The full wave report is given at Annex A.
   b. Tides
      There are no Regional Monitoring Programme tide gauges in this area.

3. Survey data – topographic

   There have been considerable changes across the majority of management units over the past year, with
   the greatest changes in cross-sectional area (CSA) at Hurst Spit before emergence beach operations.
   Over the longer term there is significant erosion of the frontage along Hordle Cliffs (5fSU04), whilst the
   erosion at 5fSU01 and 5fSU02 is countered by beach replenishment activities. The western end of
   Christchurch Bay, which also periodically managed, is relatively stable.

<table>
<thead>
<tr>
<th>Location</th>
<th>MLWS (m OD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hurst Point</td>
<td>-1.13</td>
</tr>
<tr>
<td>Christchurch Entrance</td>
<td>-0.31</td>
</tr>
</tbody>
</table>

   Table 1: Table of MLWS levels (Source: Admiralty Total Tide)

   Dates of the surveys are given in Annex E and the detailed topographic survey report is given in Annex
   F.

Annex A: Milford-on-Sea Storm Report
Annex B: N/A
Annex C: N/A
Annex D: N/A
Annex E: High Level Report – field data collection (SCOPAC)
Annex F: Topographic Survey Report for Christchurch Bay
Annex G: N/A
Annex H: N/A
Explanatory Notes
Annex A - Storm Report for Milford-on-Sea, Hampshire

Wave conditions are measured with a buoy moored about 1.4 km off Milford-on-Sea, in approx. 10-12m water depth.

Since 2003, 15 individual storms have exceeded the 1 year Return Period. 7 of those storms (47%) occurred between October 2013 and February 2014.
The individual storms since 2003 are ranked in Table 1, together with the Return Period (this season's storms are shaded pink). The Return Period statistics were last calculated for the period 2003 to 2012.

<table>
<thead>
<tr>
<th>Date</th>
<th>Wave height (metres)</th>
<th>Return Period</th>
</tr>
</thead>
<tbody>
<tr>
<td>14/02/2014</td>
<td>4.5</td>
<td>1 in 50 years</td>
</tr>
<tr>
<td>14/11/2009</td>
<td>4.1</td>
<td>1 in 10 years</td>
</tr>
<tr>
<td>05/02/2014</td>
<td>4.0</td>
<td>&gt; 1 in 5 years</td>
</tr>
<tr>
<td>03/01/2012</td>
<td>3.9</td>
<td>1 in 5 years</td>
</tr>
<tr>
<td>28/10/2013</td>
<td>3.9</td>
<td>1 in 5 years</td>
</tr>
<tr>
<td>08/02/2014</td>
<td>3.8</td>
<td>&gt; 1 in 3 years</td>
</tr>
<tr>
<td>24/12/2013</td>
<td>3.7</td>
<td>1 in 3 years</td>
</tr>
<tr>
<td>03/01/2014</td>
<td>3.7</td>
<td>1 in 3 years</td>
</tr>
<tr>
<td>18/01/2007</td>
<td>3.6</td>
<td>1 in 2 years</td>
</tr>
<tr>
<td>02/12/2005</td>
<td>3.5</td>
<td>&gt; 1 in 1 year</td>
</tr>
<tr>
<td>03/12/2006</td>
<td>3.5</td>
<td>&gt; 1 in 1 year</td>
</tr>
<tr>
<td>31/01/2004</td>
<td>3.4</td>
<td>1 in 1 year</td>
</tr>
<tr>
<td>10/03/2008</td>
<td>3.4</td>
<td>1 in 1 year</td>
</tr>
<tr>
<td>08/02/2014</td>
<td>3.4</td>
<td>1 in 1 year</td>
</tr>
<tr>
<td>10/03/2008</td>
<td>3.4</td>
<td>1 in 1 year</td>
</tr>
</tbody>
</table>

Table 2: Storms exceeding 1 year Return Period at Milford-on-Sea since 2003. Those occurring during the storm season October 2013 to February 2014 are shaded pink.
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>5aSU01</td>
<td>31/08/2012</td>
<td>31/12/2012</td>
<td>31/03/2013</td>
<td>31/08/2013</td>
<td>31/12/2013</td>
</tr>
<tr>
<td>5aSU02</td>
<td>16/11/2012</td>
<td>25/04/2013</td>
<td>24/09/2013</td>
<td>01/05/2014</td>
<td>Profile</td>
</tr>
<tr>
<td>5aSU03</td>
<td>Baseline</td>
<td>30/10/2012</td>
<td>11/04/2013</td>
<td>18/10/2013</td>
<td>28/04/2014</td>
</tr>
<tr>
<td>5aSU04</td>
<td>Baseline</td>
<td>15/08/2014</td>
<td>10/05/2012</td>
<td>17/10/2012</td>
<td>09/04/2013</td>
</tr>
<tr>
<td>5aSU05</td>
<td>06/07/2012</td>
<td>17/10/2012</td>
<td>09/04/2013</td>
<td>14/03/2014</td>
<td>15/04/2014</td>
</tr>
<tr>
<td>5aSU06</td>
<td>25/07/2012</td>
<td>28/09/2012</td>
<td>02/04/2013</td>
<td>01/08/2014</td>
<td>Profile</td>
</tr>
<tr>
<td>5aSU07</td>
<td>06/06/2013</td>
<td>Profile</td>
<td>Profile</td>
<td>Profile</td>
<td>Profile</td>
</tr>
<tr>
<td>5aSU08</td>
<td>05/04/2012</td>
<td>20/09/2012</td>
<td>30/04/2013</td>
<td>22/08/2013</td>
<td>30/04/2014</td>
</tr>
<tr>
<td>5aSU09</td>
<td>Baseline</td>
<td>03/05/2012</td>
<td>25/04/2012</td>
<td>02/04/2013</td>
<td>16/04/2014</td>
</tr>
<tr>
<td>5aSU10</td>
<td>Baseline</td>
<td>Profile</td>
<td>Profile</td>
<td>Profile</td>
<td>Profile</td>
</tr>
<tr>
<td>5aSU11</td>
<td>29/11/2013</td>
<td>Profile</td>
<td>Profile</td>
<td>Profile</td>
<td>Profile</td>
</tr>
<tr>
<td>5aSU12</td>
<td>11/04/2012</td>
<td>26/04/2013</td>
<td>10/09/2013</td>
<td>15/04/2014</td>
<td>Profile</td>
</tr>
<tr>
<td>5aSU13</td>
<td>Baseline</td>
<td>29/11/2012</td>
<td>02/04/2013</td>
<td>16/04/2014</td>
<td>Profile</td>
</tr>
<tr>
<td>5aSU14</td>
<td>Baseline</td>
<td>Profile</td>
<td>Profile</td>
<td>Profile</td>
<td>Profile</td>
</tr>
<tr>
<td>5aSU15</td>
<td>11/05/2012</td>
<td>Profile</td>
<td>28/05/2013</td>
<td>11/09/2013</td>
<td>30/05/2014</td>
</tr>
<tr>
<td>5aSU16</td>
<td>11/04/2012</td>
<td>25/04/2013</td>
<td>10/09/2013</td>
<td>14/04/2014</td>
<td>Profile</td>
</tr>
<tr>
<td>5aSU17</td>
<td>Baseline</td>
<td>19/07/2012</td>
<td>29/10/2012</td>
<td>28/02/2013</td>
<td>22/07/2013</td>
</tr>
<tr>
<td>5bSU01</td>
<td>Baseline</td>
<td>25/03/2013</td>
<td>12/06/2014</td>
<td>Profile</td>
<td>Profile</td>
</tr>
<tr>
<td>5bSU02</td>
<td>03/10/2012</td>
<td>27/03/2013</td>
<td>Profile</td>
<td>Profile</td>
<td>Profile</td>
</tr>
<tr>
<td>5bSU03</td>
<td>26/06/2012</td>
<td>19/10/2012</td>
<td>25/02/2013</td>
<td>27/06/2013</td>
<td>08/10/2013</td>
</tr>
<tr>
<td>5bSU04</td>
<td>22/08/2012</td>
<td>11/04/2013</td>
<td>11/06/2013</td>
<td>07/10/2013</td>
<td>Profile</td>
</tr>
<tr>
<td>5bSU05</td>
<td>01/10/2012</td>
<td>12/02/2013</td>
<td>28/06/2013</td>
<td>04/02/2014</td>
<td>Profile</td>
</tr>
<tr>
<td>5cSU01</td>
<td>Baseline</td>
<td>17/04/2014</td>
<td>Profile</td>
<td>Profile</td>
<td>Profile</td>
</tr>
<tr>
<td>5cSU02</td>
<td>Baseline</td>
<td>17/04/2014</td>
<td>Profile</td>
<td>Profile</td>
<td>Profile</td>
</tr>
<tr>
<td>5cSU03</td>
<td>Baseline</td>
<td>17/04/2014</td>
<td>Profile</td>
<td>Profile</td>
<td>Profile</td>
</tr>
<tr>
<td>5cSU04</td>
<td>Baseline</td>
<td>17/04/2014</td>
<td>Profile</td>
<td>Profile</td>
<td>Profile</td>
</tr>
<tr>
<td>5cSU05</td>
<td>Baseline</td>
<td>17/04/2014</td>
<td>Profile</td>
<td>Profile</td>
<td>Profile</td>
</tr>
<tr>
<td>5cSU06</td>
<td>Baseline</td>
<td>23/03/2013</td>
<td>Profile</td>
<td>Profile</td>
<td>Profile</td>
</tr>
<tr>
<td>5cSU07</td>
<td>Baseline</td>
<td>Profile</td>
<td>Profile</td>
<td>Profile</td>
<td>Profile</td>
</tr>
<tr>
<td>5cSU08</td>
<td>Baseline</td>
<td>Profile</td>
<td>Profile</td>
<td>Profile</td>
<td>Profile</td>
</tr>
<tr>
<td>5cSU09</td>
<td>Baseline</td>
<td>15/04/2014</td>
<td>Profile</td>
<td>Profile</td>
<td>Profile</td>
</tr>
<tr>
<td>5cSU10</td>
<td>Baseline</td>
<td>15/04/2014</td>
<td>Profile</td>
<td>Profile</td>
<td>Profile</td>
</tr>
<tr>
<td>5cSU11</td>
<td>11/04/2012</td>
<td>26/04/2013</td>
<td>10/09/2013</td>
<td>15/04/2014</td>
<td>Profile</td>
</tr>
<tr>
<td>5cSU12</td>
<td>11/04/2012</td>
<td>25/04/2013</td>
<td>10/09/2013</td>
<td>14/04/2014</td>
<td>Profile</td>
</tr>
<tr>
<td>5cSU13</td>
<td>Baseline</td>
<td>31/01/2013</td>
<td>Profile</td>
<td>Profile</td>
<td>Profile</td>
</tr>
<tr>
<td>5cSU14</td>
<td>Baseline</td>
<td>15/10/2012</td>
<td>31/01/2013</td>
<td>12/08/2013</td>
<td>Profile</td>
</tr>
<tr>
<td>5cSU15</td>
<td>Baseline</td>
<td>28/05/2013</td>
<td>11/09/2013</td>
<td>30/05/2014</td>
<td>Profile</td>
</tr>
<tr>
<td>5cSU16</td>
<td>23/01/2013</td>
<td>19/07/2012</td>
<td>29/10/2012</td>
<td>28/02/2013</td>
<td>22/07/2013</td>
</tr>
<tr>
<td>5dSU01</td>
<td>Baseline</td>
<td>23/05/2012</td>
<td>Profile</td>
<td>Profile</td>
<td>Profile</td>
</tr>
<tr>
<td>5dSU02</td>
<td>02/05/2012</td>
<td>11/12/2012</td>
<td>Profile</td>
<td>Profile</td>
<td>Profile</td>
</tr>
<tr>
<td>5dSU03</td>
<td>03/05/2012</td>
<td>11/12/2012</td>
<td>Profile</td>
<td>Profile</td>
<td>Profile</td>
</tr>
<tr>
<td>5dSU04</td>
<td>03/05/2012</td>
<td>11/12/2012</td>
<td>Profile</td>
<td>Profile</td>
<td>Profile</td>
</tr>
<tr>
<td>5dSU05</td>
<td>05/04/2012</td>
<td>08/05/2013</td>
<td>Profile</td>
<td>Profile</td>
<td>Profile</td>
</tr>
<tr>
<td>5dSU06</td>
<td>05/04/2012</td>
<td>08/05/2013</td>
<td>18/10/2013</td>
<td>Profile</td>
<td>Profile</td>
</tr>
<tr>
<td>5dSU07</td>
<td>23/04/2012</td>
<td>Profile</td>
<td>Profile</td>
<td>Profile</td>
<td>Profile</td>
</tr>
<tr>
<td>5dSU08</td>
<td>23/04/2012</td>
<td>Profile</td>
<td>Profile</td>
<td>Profile</td>
<td>Profile</td>
</tr>
<tr>
<td>5dSU09</td>
<td>20/04/2012</td>
<td>03/09/2012</td>
<td>29/05/2013</td>
<td>Profile</td>
<td>Profile</td>
</tr>
<tr>
<td>5dSU10</td>
<td>20/04/2012</td>
<td>03/09/2012</td>
<td>29/05/2013</td>
<td>Profile</td>
<td>Profile</td>
</tr>
<tr>
<td>5dSU11</td>
<td>20/04/2012</td>
<td>31/08/2012</td>
<td>29/05/2013</td>
<td>Profile</td>
<td>Profile</td>
</tr>
</tbody>
</table>

Southeast Regional Coastal Monitoring Programme - Phase III - Channel Coastal Observatory Topographic Surveys

Post-storm

Year 11 (2012/13)
Year 12 (2013/14)
Year 13 (2014/15)
Year 14 (2015/16)
Year 15 (2016/17)
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>5dSU13</td>
<td>11/08/2012</td>
<td>20/04/2012</td>
<td>Baseline</td>
<td>Baseline</td>
<td>Baseline</td>
</tr>
<tr>
<td>5dSU14</td>
<td>06/09/2012</td>
<td>06/09/2012</td>
<td>Profile</td>
<td>Profile</td>
<td>Profile</td>
</tr>
<tr>
<td>5dSU15</td>
<td>06/09/2012</td>
<td>06/09/2012</td>
<td>Baseline</td>
<td>Baseline</td>
<td>Baseline</td>
</tr>
<tr>
<td>5dSU16</td>
<td>06/09/2012</td>
<td>06/09/2012</td>
<td>Baseline</td>
<td>Baseline</td>
<td>Baseline</td>
</tr>
<tr>
<td>5dSU17</td>
<td>06/09/2012</td>
<td>06/09/2012</td>
<td>Baseline</td>
<td>Baseline</td>
<td>Baseline</td>
</tr>
<tr>
<td>5dSU18</td>
<td>06/09/2012</td>
<td>06/09/2012</td>
<td>Baseline</td>
<td>Baseline</td>
<td>Baseline</td>
</tr>
<tr>
<td>5dSU19</td>
<td>06/09/2012</td>
<td>06/09/2012</td>
<td>Profile</td>
<td>Profile</td>
<td>Profile</td>
</tr>
<tr>
<td>5dSU20</td>
<td>06/09/2012</td>
<td>06/09/2012</td>
<td>Baseline</td>
<td>Baseline</td>
<td>Baseline</td>
</tr>
<tr>
<td>5dSU21</td>
<td>06/09/2012</td>
<td>06/09/2012</td>
<td>Baseline</td>
<td>Baseline</td>
<td>Baseline</td>
</tr>
<tr>
<td>5dSU22</td>
<td>06/09/2012</td>
<td>06/09/2012</td>
<td>Baseline</td>
<td>Baseline</td>
<td>Baseline</td>
</tr>
<tr>
<td>5dSU23</td>
<td>06/09/2012</td>
<td>06/09/2012</td>
<td>Baseline</td>
<td>Baseline</td>
<td>Baseline</td>
</tr>
<tr>
<td>5dSU24</td>
<td>06/09/2012</td>
<td>06/09/2012</td>
<td>Baseline</td>
<td>Baseline</td>
<td>Baseline</td>
</tr>
<tr>
<td>5dSU25</td>
<td>06/09/2012</td>
<td>06/09/2012</td>
<td>Baseline</td>
<td>Baseline</td>
<td>Baseline</td>
</tr>
<tr>
<td>5dSU26</td>
<td>06/09/2012</td>
<td>06/09/2012</td>
<td>Baseline</td>
<td>Baseline</td>
<td>Baseline</td>
</tr>
<tr>
<td>5eSU01</td>
<td>20/09/2012</td>
<td>20/09/2012</td>
<td>Baseline</td>
<td>Baseline</td>
<td>Baseline</td>
</tr>
<tr>
<td>5eSU02</td>
<td>17/09/2012</td>
<td>17/09/2012</td>
<td>Baseline</td>
<td>Baseline</td>
<td>Baseline</td>
</tr>
<tr>
<td>5eSU03</td>
<td>21/09/2012</td>
<td>21/09/2012</td>
<td>Baseline</td>
<td>Baseline</td>
<td>Baseline</td>
</tr>
<tr>
<td>5eSU04</td>
<td>08/05/2012</td>
<td>08/05/2012</td>
<td>Baseline</td>
<td>Baseline</td>
<td>Baseline</td>
</tr>
<tr>
<td>5eSU05</td>
<td>08/05/2012</td>
<td>08/05/2012</td>
<td>Baseline</td>
<td>Baseline</td>
<td>Baseline</td>
</tr>
<tr>
<td>5eSU06</td>
<td>08/05/2012</td>
<td>08/05/2012</td>
<td>Baseline</td>
<td>Baseline</td>
<td>Baseline</td>
</tr>
<tr>
<td>5eSU07</td>
<td>08/05/2012</td>
<td>08/05/2012</td>
<td>Baseline</td>
<td>Baseline</td>
<td>Baseline</td>
</tr>
<tr>
<td>5fSU01</td>
<td>09/03/2012</td>
<td>09/03/2012</td>
<td>Baseline</td>
<td>Baseline</td>
<td>Baseline</td>
</tr>
<tr>
<td>5fSU02</td>
<td>26/03/2012</td>
<td>26/03/2012</td>
<td>Baseline</td>
<td>Baseline</td>
<td>Baseline</td>
</tr>
<tr>
<td>5fSU03</td>
<td>28/03/2012</td>
<td>28/03/2012</td>
<td>Baseline</td>
<td>Baseline</td>
<td>Baseline</td>
</tr>
<tr>
<td>5fSU04</td>
<td>07/03/2012</td>
<td>07/03/2012</td>
<td>Baseline</td>
<td>Baseline</td>
<td>Baseline</td>
</tr>
<tr>
<td>5fSU05</td>
<td>13/11/2012</td>
<td>13/11/2012</td>
<td>Baseline</td>
<td>Baseline</td>
<td>Baseline</td>
</tr>
<tr>
<td>5fSU06</td>
<td>11/09/2012</td>
<td>11/09/2012</td>
<td>Baseline</td>
<td>Baseline</td>
<td>Baseline</td>
</tr>
<tr>
<td>5fSU07</td>
<td>18/06/2012</td>
<td>18/06/2012</td>
<td>Baseline</td>
<td>Baseline</td>
<td>Baseline</td>
</tr>
<tr>
<td>5fSU08</td>
<td>12/06/2012</td>
<td>12/06/2012</td>
<td>Baseline</td>
<td>Baseline</td>
<td>Baseline</td>
</tr>
<tr>
<td>5fSU09</td>
<td>11/06/2012</td>
<td>11/06/2012</td>
<td>Baseline</td>
<td>Baseline</td>
<td>Baseline</td>
</tr>
<tr>
<td>5fSU10</td>
<td>22/03/2012</td>
<td>22/03/2012</td>
<td>Baseline</td>
<td>Baseline</td>
<td>Baseline</td>
</tr>
<tr>
<td>5fSU11</td>
<td>03/07/2012</td>
<td>03/07/2012</td>
<td>Baseline</td>
<td>Baseline</td>
<td>Baseline</td>
</tr>
<tr>
<td>5fSU12</td>
<td>31/10/2012</td>
<td>31/10/2012</td>
<td>Baseline</td>
<td>Baseline</td>
<td>Baseline</td>
</tr>
<tr>
<td>5fSU13</td>
<td>03/07/2012</td>
<td>03/07/2012</td>
<td>Baseline</td>
<td>Baseline</td>
<td>Baseline</td>
</tr>
<tr>
<td>5fSU14</td>
<td>11/09/2012</td>
<td>11/09/2012</td>
<td>Baseline</td>
<td>Baseline</td>
<td>Baseline</td>
</tr>
<tr>
<td>5fSU15</td>
<td>11/09/2012</td>
<td>11/09/2012</td>
<td>Baseline</td>
<td>Baseline</td>
<td>Baseline</td>
</tr>
<tr>
<td>5fSU16</td>
<td>11/09/2012</td>
<td>11/09/2012</td>
<td>Baseline</td>
<td>Baseline</td>
<td>Baseline</td>
</tr>
<tr>
<td>5fSU17</td>
<td>11/09/2012</td>
<td>11/09/2012</td>
<td>Baseline</td>
<td>Baseline</td>
<td>Baseline</td>
</tr>
<tr>
<td>5fSU18</td>
<td>11/09/2012</td>
<td>11/09/2012</td>
<td>Baseline</td>
<td>Baseline</td>
<td>Baseline</td>
</tr>
</tbody>
</table>
### Southeast Regional Coastal Monitoring Programme - Phase III - Channel Coastal Observatory Topographic Surveys

#### Year 11 (2012/13)

<table>
<thead>
<tr>
<th>Site Unit</th>
<th>Date</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>5fSU25</td>
<td>02/05/2013</td>
<td>Baseline</td>
</tr>
<tr>
<td>5fSU26</td>
<td>08/03/2013</td>
<td>Profile</td>
</tr>
<tr>
<td>5fSU27</td>
<td>06/09/2013</td>
<td>Profile</td>
</tr>
<tr>
<td>5fSU28</td>
<td>19/03/2014</td>
<td>Profile</td>
</tr>
<tr>
<td>5fSU29</td>
<td>08/09/2014</td>
<td>Profile</td>
</tr>
</tbody>
</table>

#### Year 12 (2013/14)

<table>
<thead>
<tr>
<th>Site Unit</th>
<th>Date</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>5fSU30</td>
<td>26/06/2012</td>
<td>Baseline</td>
</tr>
<tr>
<td>5fSU31</td>
<td>03/10/2012</td>
<td>Profile</td>
</tr>
<tr>
<td>5fSU32</td>
<td>13/02/2013</td>
<td>Baseline</td>
</tr>
<tr>
<td>5fSU33</td>
<td>25/06/2013</td>
<td>Baseline</td>
</tr>
<tr>
<td>5fSU34</td>
<td>18/02/2014</td>
<td>Profile</td>
</tr>
<tr>
<td>5fSU35</td>
<td>16/05/2014</td>
<td>Profile</td>
</tr>
</tbody>
</table>

#### Year 13 (2014/15)

<table>
<thead>
<tr>
<th>Site Unit</th>
<th>Date</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>5fSU36</td>
<td>06/06/2012</td>
<td>Baseline</td>
</tr>
<tr>
<td>5fSU37</td>
<td>03/10/2012</td>
<td>Profile</td>
</tr>
<tr>
<td>5fSU38</td>
<td>13/02/2013</td>
<td>Baseline</td>
</tr>
<tr>
<td>5fSU39</td>
<td>01/05/2012</td>
<td>Profile</td>
</tr>
<tr>
<td>5fSU40</td>
<td>23/05/2013</td>
<td>Baseline</td>
</tr>
<tr>
<td>5fSU41</td>
<td>09/10/2013</td>
<td>Baseline</td>
</tr>
<tr>
<td>5fSU42</td>
<td>16/04/2014</td>
<td>Profile</td>
</tr>
<tr>
<td>5fSU43</td>
<td>29/05/2014</td>
<td>Profile</td>
</tr>
</tbody>
</table>

#### Year 14 (2015/16)

<table>
<thead>
<tr>
<th>Site Unit</th>
<th>Date</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>5fSU44</td>
<td>07/01/2014</td>
<td>Baseline</td>
</tr>
<tr>
<td>5fSU45</td>
<td>29/05/2014</td>
<td>Profile</td>
</tr>
</tbody>
</table>

#### Year 15 (2016/17)

<table>
<thead>
<tr>
<th>Site Unit</th>
<th>Date</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>5fSU46</td>
<td>09/05/2012</td>
<td>Baseline</td>
</tr>
<tr>
<td>5fSU47</td>
<td>03/10/2012</td>
<td>Profile</td>
</tr>
<tr>
<td>5fSU48</td>
<td>14/02/2013</td>
<td>Baseline</td>
</tr>
<tr>
<td>5fSU49</td>
<td>01/05/2012</td>
<td>Profile</td>
</tr>
<tr>
<td>5fSU50</td>
<td>23/05/2013</td>
<td>Profile</td>
</tr>
<tr>
<td>5fSU51</td>
<td>09/10/2013</td>
<td>Profile</td>
</tr>
<tr>
<td>5fSU52</td>
<td>17/02/2014</td>
<td>Profile</td>
</tr>
</tbody>
</table>

#### Notes:

1. Access restricted during Olympics - rescheduled to spring 2013
2. To be done by lidar, February 2013
3. Re-scheduled due to nesting birds
4. Re-scheduled due to beach works in March 2014
5. Delayed due to access problems
6. No longer surveyed (no beach and difficult access, as approved by P Marsden)
Annex F – Topographic Survey Report for Christchurch Bay

1. Introduction
Analysis has been conducted for those sites where a minimum of four surveys have been recorded. In general, changes are measured relative to the Mean Low Water Springs level, although this has not been possible for much of the historic data at many of the sites. Where possible, longer-term records from earlier programmes are also presented in the profile analysis, although historical data was often collected using significantly different survey techniques, specifications and even datums. Continuity of record has been attempted but is not always possible.

The profile envelope, along with the two most recent profiles at each profile location, is shown superimposed and relative to a Master Profile (on the accompanying CD). The Master Profile provides the basis for calculation of beach cross-section area changes. Where possible, identical depth boundaries have been used for all profiles within a Survey Unit. However, even where this has not been possible, direct comparisons can be made for the beach cross sectional area at one profile over time, since the master profile is constant for each profile (Figure 4). In some instances, raising the lower depth of the Master Profile may reduce the overall cross sectional area of the profile. This may cause small changes in the beach profile to have a large impact on the percentage change. This effect has been taken into account in the analysis of change to beach profiles. The trend in cross-sectional area (CSA) is presented on the accompanying CD as a graph for each profile (Figure 5). The yellow boxes show recycling events (Figure 5).

![Figure 4: Example Master Profile with CSA calculated from the surveyed GPS profile](image)
Figure 5: Example of Beach Profile Trend Analysis

1. Beach Cross-Sectional Area (CSA)
2. Replenishment Activities
3. Mathematically Derived Trend line

2. Condition of process sub-cell
The Beach Change Summary maps contain an at-a-glance condition of the whole of Christchurch Bay with profile lines representing accretion, no change or erosion for each Survey Unit. Whilst the maps displaying actual change in m$^2$ highlight the regions of erosion or accretion, it must be appreciated that given the short nature of many of the profile lines in Christchurch Bay, small changes in actual volume may translate into large percentage changes in cross-sectional area (eg. Barton-on-sea).

3. Condition of individual Survey Units
Changes within each Survey Unit are summarised on two maps: Beach change map (Spring to Spring), beach change map (Baseline to Spring). Beach Change maps show the location of each beach profile, superimposed on 2013 aerial photography (note that the line may have been extended for clarity). Where possible, the annual change in cross-sectional area has been calculated from spring 2013 to spring 2014 and from baseline 2000/01 to spring 2014. In some cases several profile maps are included for each management unit to show profile changes since the previous baseline (if applicable) or changes since the introduction of additional survey lines to interim or baseline surveys.
5fSU01: Hurst Spit

March 2013 to March 2014
Over the previous year there is shown to be only modest changes. 5f00058 shows erosion of 12% with profiles 5f00060, 42, 39, 37, 17 and 16 all showing losses. Profile 5f00027 showed gains of 10% with 5f00024 and 34 also showing accretion. Hurst spit experienced 6 storms over the period October 2013 to February 2014 resulting in 5 times the normal maintenance recycling. The survey completed in March 2014 was post-recycling works and so the losses of up to 47,000m³ (across the 1.8km frontage) were experienced during the winter storms are not shown.

November 2003 to March 2014
10 of the 24 profiles show a loss in CSA, particularly to the central and eastern end of the spit where roll back over the saltmarsh by up to 12m has occurred between profiles 5f00047 to 5f00032. There are consistent gains of material to the front face at the eastern end of the spit nearest Hurst Castle. Changes over this period have been minimised by numerous recycling operations.

Topographic difference model changes 2013 – 2014
The most significant losses have occurred to the west of the breakwater, below the rock revetment and from the breakwater east to 5f00027. Seaward of the crest has experienced accretion across the frontage with the largest gains between 5f00056 and 5f00024. The changes shown over this period will be affected by the recycling works completed prior to the March 2014 survey.

Topographic difference model changes 2003 – 2014
The erosion to the front face of the spit is natural, as is the accretion west of Hurst Castle. The accretion seen along the back of the spit between profiles 5f00032 to 5f00051 is entirely artificial and due to material placed on the back slope between 2003 and 2011. In contrast, the apparent erosion to the back of the spit between profiles 5f00015 and 5f00028 is due to the extraction of material from the rear slope in 2003, 2005, 2009 and 2011.

Topographic difference model changes 2007 – 2014
The most significant erosion has occurred between the breakwater and 5f00027. There have been gains to the west of Hurst Castle and along the back of the spit at the western end. There have also been several beach operations over this period which will have affected the changes shown.

MHWS changes
The continued growth of material at the eastern end of the spit has advanced the MHWS line by over 17m seaward. Further west towards the elbow of the spit, there has been a retreat in the position of MHWS of over 13m due to continued erosion of the front face of the spit.

5fSU02: Milford-on-Sea

February 2013 to March 2014
There have been some significant losses at Milford with much of the frontage affected by the winter storms. Profile 5f00088, 86 and 73 all show losses of 30% or more. Profile 5f00091 in front of the rock revetment has gained material.
June 2003 to March 2014
Profiles 5f00088 and 5f00069 have lost >30% of beach material despite 5 small scale replenishments to the beach between 5f00081 and 5f00076 since 2008. There have also been some areas of accretion at 5f00091 and 5f00073, both profiles intersect rock revetments. In 2009 the rock revetment was extended east of the White House for approximately 40m and a rock groyne added to stabilize the beach.

Topographic difference model changes 2013 – 2014
The frontage shows mainly erosion with the biggest losses occurring towards the back of the beach. There has been some areas of accretion above the rock revetment to the west of the unit and at the lower beach to the east of the White House.

Topographic difference model changes 2000 – 2014
This unit shows extensive loss of material across the frontage. There have been some small areas of accretion dispersed across the unit, but largely at the seaward limit of the model extent. In 2009, 2500 tonnes of rock armour was added to protect the seawall immediately east of the White House. There have also been five periods of beach operation during this period which could have affected the changes shown.

Topographic difference model changes 2006 – 2014
Over this period accretion is shown to the east of the rock revetment at the west end of the survey unit and to the east of the White House between profiles 5f00077A and 5f00074A. The most extensive areas of erosion are east of the rock revetment at the western end of the survey unit, to the east of the rock revetment at the White House and to the west of the rock revetment at 5f00073. There have also been several beach operations during this period which could have affected the changes shown.

MHWS changes
The position of MHWS has retreated along this whole coastline since 2000, with the largest retreat in front of the eastern car park (over 10m). Elsewhere much of the change has been minimized by beach recycling works since 2008.

5fSU03: Hordle Cliffs

March 2013 to March 2014
All profiles within this unit have lost material with profiles 5f00101 and 5f0099 experiencing the biggest change in cross-sectional area.

June 2003 to March 2014
Profile 5f00101 shows erosion while the remaining profiles have experienced little change.

Topographic difference model changes 2013 – 2014
There are three main areas of change across the unit. The top and bottom of the beach have shown gains in material, with a band of erosion in the middle of the beach from 5f00105 west.
**Topographic difference model changes 2000 – 2014**
Over this period there are areas of accretion and erosion across the survey unit. The largest area of accretion is shown towards the centre of the unit, from the seaward limit of the model extent towards the cliffs backing the beach.

**Topographic difference model changes 2006 – 2014**
There are areas of erosion immediately west of the groyne at the east of the unit, and a band of erosion running across the unit towards the back/middle of the beach. There are two bands of accretion at the west of the survey unit.

**MHWS changes**
The MHWS level has advanced 5m seawards in the middle of the unit area since 2000, although there has been very little change to the position of MHWS across the unit over the last 13 years.

**5fSU04: Becton to Hordle**

**July 2013 to February 2014**
The profiles 5f00160 – 5f00153 were not surveyed this year. Much of the frontage in this unit shows little change. There have been significant gains at profile 5f00150 east of the rock groyne, and at profile 5f00132. Profiles 5f00141 and 5f00140 have lost material over this period.

**May 2002 to February 2014**
The profiles 5f00160 – 5f00153 were not surveyed this year. Significant losses have occurred to most profiles within this unit with the most erosion occurring between 5f00151 east of the rock groyne to 5f00125. The narrow gravel beach here is slowly retreating and reducing in width with regular cliff slumping, although the losses become smaller to the east as the beach width increases and the offshore sandbar is more prominent.

**Topographic difference model changes 2013 – 2014**
Erosion has occurred immediately east of the rock groyne and along much of the back beach at the foot of the cliffs. There is also a band of erosion stretching across the middle of the beach at the east end of the survey unit. Accretion can be seen to the east of the rock groyne and along much of the lower beach.

**Topographic difference model changes 2002 – 2014**
Erosion has occurred along the whole frontage, with over 3m of loss at the foot of the cliffs along much of the frontage. There has been some accretion at the eastern end of the survey unit as the beach widens.

**Topographic difference model changes 2006 – 2014**
There have been losses throughout the unit with the most significant areas of erosion at the back beach.
MHWS changes
The position of MHWS has continued to retreat landwards along this whole survey unit. The central section of the unit shows the greatest retreat of up to 18m from 2002 although there has been little change over the last year.

5fSU05: Barton-On-Sea to Naish Cliffs

February 2013 to February 2014
The changes are variable across Barton and Naish. Profile 5f00191 shows significant gains to the beach. Profile 5f00190 shows a significant loss of material, however the profile was not surveyed towards the back beach due to the unstable cliffs. The majority of profiles have eroded at Naish with the largest losses at profiles 5f00226, 225 and 222 at the west end of the survey unit.

July 2002 to February 2014
The profiles at Naish are variable. Profiles 5f00165 and 190 showing the biggest losses, although the losses shown at 5f00190 are intensified by the top of the profile failing to be surveyed due to the instability of the landslide. The west end of Naish is eroding while the east end has accreted over this period.

Topographic difference model changes 2013 – 2014
There has been erosion at the back beach along much of the Naish frontage and to the east of the groyne at the west end of the unit. Accretion has occurred over much of the beach, particularly at the east end of Naish.

Topographic difference model changes 2002 – 2014
At Naish, much of the frontage has accreted over this period. There has been some extending from the rock groyne at the west end of the survey unit east along the lower beach for 350m.

Topographic difference model changes 2007 – 2014
Erosion can be seen extending from the rock revetments at either end of Naish. Much of the middle of the beach has accreted or experienced little change in elevation.

MHWS changes
At Naish the change in position of MHWS has not altered significantly over the past 10 years for much of the beach, however in some localized areas, the position of MLWS has extended up to 13m seaward since 2002.

5fSU06: Highcliffe to Mudeford Quay

February 2013 to April 2014
There has been little change over the majority of profiles at the eastern end of the survey unit, although profiles 5f00244, 248 and 253 all show accretion. At the Mudeford Quay end of the survey unit there is a lot more change. There are significant losses at profiles 5f00300 at the harbour
entrance and 5f00280 and erosion at all other profiles in this region except 5f00296 and 292 which have experienced small gains.

**February 2003 to April 2014**
The eastern end of Highcliffe beach has lost material over this period with profiles 5f00230, 235 and 239 all eroding. The western end of Highcliffe beach has accreted with profiles 5f00244, 248 and 253 all experiencing significant gains. At the western end of the survey unit there have been notable losses at profiles 5f00280, 284 and 300 at the Harbour entrance. The other profiles at the western end of this survey unit have experienced minimal changes. There have been beach operations over this period which could affect the changes shown.

**Topographic difference model changes 2013 to 2014**
The changes are variable at the eastern side of the survey unit with more accretion at this end of the unit in general. There is a concentrated area of accretion north west of the third rock groyne from the east, however, this is an area of anthropogenic sediment storage and is not a natural area of accretion. There have been significant gains to the fourth groyne bay from the east. The west end of the survey unit towards Mudeford Quay shows more concentrated areas of erosion, particularly in the first 6 groyne bays from Friars Cliff West. There has also been significant losses at the Harbour entrance at the west end of the survey unit. East of this at Avon beach, there is predominantly accretion, with most erosion occurring towards the back of the beach.

**Topographic difference model changes 2002 – 2014**
Accretion has occurred to the beach in front of Highcliffe Castle and in between the three groynes furthest east, with erosion to the rock groyne bays at Highcliffe. There is a concentrated area of accretion north west of the third rock groyne from the east, however, this is an area of anthropogenic sediment storage and is not a natural area of accretion. At Avon beach the 8 groyne bays from the east all show almost exclusively erosion. The harbour entrance also shows losses, with some gains in material to the north west. There have been beach operations over this period which could affect the changes shown.

**Topographic difference model changes 2007 – 2014**
The fourth and fifth groyne bays from the east show significant accretion over this period. There is a concentrated area of accretion north west of the third rock groyne however this is an area of anthropogenic sediment storage and is not a natural area of accretion. There has been mostly accretion, particularly at the upper beach over the unprotected area of beach between the groynes at Highcliffe and Avon beach. The groyne bays at Avon show erosion over this period with some accretion at the entrance to Christchurch Harbour. There have been beach operations over this period which could affect the changes shown.

**MHWS changes**
The most notable change to the MHWS line is at the Harbour entrance where the beach has retreated east by 80m over the last year. Still, the MHWS position on this section of beach has fluctuated since 2002. The MHWS line has changed little over the last year over much of the frontage. MHWS has retreated landward by up to 10m between the groyne bays at the eastern end of Avon beach. At Highcliffe there has been little change over much of the beach, the notable change a 10m extension of the MHWS line seaward in the 3rd groyne bay from the west.
5fSU07: Grimbury Marshes

The survey frequency has now been reduced to a five yearly baseline. The next survey is due in 2019.

5fSU08: Christchurch Harbour

**September 2013 to February 2014**
No change to the profile.

**November 2003 to September 2013**
There has been some accretion to the profile 5f00312.

5fSU09: Mudeford Sandbank

**February 2013 to February 2014**
There has been little change at the western end of the unit. Profile 5f00325 and 323 at the distal end of the spit show significant losses.

**November 2003 to February 2014**
There has been some significant erosion to profile 5f00323 at the Harbour Entrance, while profile 5f00325 also shows losses. There has been accretion to 5f00332 and 338, while the west end of the survey unit shows little change. There have been some beach operations over this period which could have affected the changes shown.

**Topographic difference model changes 2013 – 2014**
There has been some accretion at the western end of the spit with only small areas of erosion towards the middle of the survey unit. There has been little change throughout much of the unit.

**Topographic difference model changes 2007 – 2014**
There has been little change to the lower beach between 5f00356 and 5f00338 with gains to the beach at the west end of the survey unit and towards the distal end of the spit. Losses are shown mainly along the dunes backing the beach between 5f00356 and 5f00338. There has been some beach operations over this period which could have affected the changes shown.

**Topographic difference model changes 2003 – 2014**
There has been accretion over much of the survey unit over this period with the most significant gains to the west end of the unit. Erosion has largely occurred to the dunes at the back of the beach between 5f00361A and 5f00338. The sandbank has been periodically managed with beach replenishment operations since 2004.

**MHWS changes**
The position of MHWS has advanced seaward by up to 21m in the last year at the west end of the survey unit. MHWS is in a similar position to that of 2002 over much of the spit.
Beach Change Summary: % change in cross-sectional area 2013 to 2014

Christchurch Bay Annual Report 2014
Beach Change Summary: % change in cross-sectional area 2000/01/02/03 to 2014

Christchurch Bay Annual Report 2014

% change in cross-sectional area

- > 30%
- 15 - 30%
- 5 - 15%
- Less than 5%
- No Change
- 15 - 30%
- > 30%

Not applicable

eg: 5f00420 (45)

Line name (actual change, m²)

SU Boundary
Beach Change Summary: Actual change in cross-sectional area (m²) 2013 to 2014

Christchurch Bay Annual Report 2014

- **5fSU06**
- **5fSU05**
- **5fSU04**
- **5cSU18**
- **5fSU01**
- **5fSU07**
- **5fSU02**
- **5fSU09**
- **5fSU10**
- **5fSU03**
- **5fSU01**
- **5fSU04**
- **5fSU02**
- **5fSU03**
- **5fSU04**
- **5fSU01**

**SU Boundary**

**Actual change in cross-sectional area**

- **Accretion**
  - > 30m²
  - 15 - 30m²
  - 5 - 15m²
  - Less than 5m²

- **Erosion**
  - 5 - 15m²
  - 15 - 30m²
  - > 30m²

**No Change**

**Example:** 5fSU01 (45)

**Line name (actual change, m²)**

- 5fSU01 (45)
Beach Change Summary: Actual change in cross-sectional area (m²) 2000/01/02/03 to 2014

Christchurch Bay Annual Report 2014
Southeast Regional Coastal Monitoring Programme

Christchurch Bay Annual Report 2014

Hurst Spit: 5fSU01

% change in cross-sectional area - March 2013 to March 2014

Aerial Photography: 2013

SU Boundary

% change in cross-sectional area

- > 30 %
- 15 - 30 %
- 5 - 15 %
- Less than 5 %
- No Change

Line name (actual change, m²)

eg: 5f00420 (45)
Southeast Regional Coastal Monitoring Programme

Christchurch Bay Annual Report 2014

% change in cross-sectional area - November 2003 to March 2014

Hurst Spit: 5fSU01

<table>
<thead>
<tr>
<th>Line name (actual change, m²)</th>
<th>% change in cross-sectional area</th>
</tr>
</thead>
<tbody>
<tr>
<td>SU002</td>
<td>&gt; 30 %</td>
</tr>
<tr>
<td>SU003</td>
<td>15 - 30 %</td>
</tr>
<tr>
<td>SU004</td>
<td>5 - 15 %</td>
</tr>
<tr>
<td>SU005</td>
<td>Less than 5 %</td>
</tr>
<tr>
<td>SU006</td>
<td>5 - 15 %</td>
</tr>
<tr>
<td>SU007</td>
<td>15 - 30 %</td>
</tr>
<tr>
<td>SU008</td>
<td>&gt; 30 %</td>
</tr>
<tr>
<td>SU009</td>
<td>No Change</td>
</tr>
</tbody>
</table>

Aerial Photography: 2013

SU Boundary

Hurst Spit: 5fSU01

% change in cross-sectional area - November 2003 to March 2014
Southeast Regional Coastal Monitoring Programme

Christchurch Bay Annual Report 2014

Topographic Difference Model - March 2013 to March 2014

Hurst Spit: 5fSU01

Change in Elevation (m)

Accretion
Erosion

Beach Operations

Extraction Deposition

Model Extent

Aerial Photography: 2013

0 50 100 200 300 400 m
Southeast Regional Coastal Monitoring Programme

Topographic Difference Model - November 2003 to March 2014

Christchurch Bay Annual Report 2014

Hurst Spit: 5fSU01

Change in Elevation (m)

-3 to -2.5
-2.5 to -2
-2 to -1.5
-1.5 to -1
-1 to -0.5
-0.5 to -0.25
-0.25 to 0
0 to 0.25
0.25 to 0.5
0.5 to 1
1 to 1.5
1.5 to 2
2 to 2.5
2.5 to 3
3 to 4

Accretion
Erosion

Beach Operations

Extraction
Deposition

2014
2013
2011
2010
2009
2007
2005
2004
2003

Model Extent

Aerial Photography: 2013

Topographic Difference Model - November 2003 to March 2014

Hurst Spit: 5fSU01
Southeast Regional Coastal Monitoring Programme

Topographic Difference Model - March 2007 to March 2014

Christchurch Bay Annual Report 2014

Hurst Spit: 5fSU01

±

Change in Elevation (m)

Accretion

Erosion

Beach Operations

Extraction

Deposition

2014

2013

2011

2010

2009

2007

Aerial Photography: 2013

Model Extent

0 50 100 200 300 400 m
Position of MHWS - 2003 to 2014

Hurst Spit: 5fSU01
Southeast Regional Coastal Monitoring Programme

% change in cross-sectional area - February 2013 to March 2014

Milford-on-Sea: 5fSU02

Line name (actual change, m²)

<table>
<thead>
<tr>
<th>Line name</th>
<th>Actual Change, m²</th>
</tr>
</thead>
<tbody>
<tr>
<td>5f00420</td>
<td>(-45)</td>
</tr>
</tbody>
</table>

Legend:
- **> 30 %**
- **15 - 30 %**
- **5 - 15 %**
- **Less than 5 %**
- **No Change**

Aerial Photography: 2013
SU Boundary
Southeast Regional Coastal Monitoring Programme

% change in cross-sectional area - June 2003 to March 2014

Milford-on-Sea: 5fSU02

Aerial Photography: 2013
Topographic Difference Model - November 2000 to March 2014

Milford-on-Sea: 5fSU02
Topographic Difference Model - August 2006 to March 2014

Milford-on-Sea: 5fSU02
Southeast Regional Coastal Monitoring Programme

Position of MHWS - 2000 to 2014

Milford-on-Sea: 5fSU02

Aerial Photography: 2013

Position of MHWS

- 2014
- 2013
- 2006
- 2000

SU Boundary
% change in cross-sectional area - March 2013 to March 2014

Hordle Cliffs: 5fSU03

<table>
<thead>
<tr>
<th>Line name (actual change, m²)</th>
<th>No Change</th>
<th>Less than 5 %</th>
<th>5 - 15 %</th>
<th>15 - 30 %</th>
<th>&gt; 30 %</th>
</tr>
</thead>
<tbody>
<tr>
<td>SU00420</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Aerial Photography: 2013
Southeast Regional Coastal Monitoring Programme

% change in cross-sectional area - June 2003 to March 2014

Christchurch Bay Annual Report 2014

Hordle Cliffs: 5fSU03

<table>
<thead>
<tr>
<th>Line name</th>
<th>Actual change, m²</th>
</tr>
</thead>
<tbody>
<tr>
<td>5f00420</td>
<td>±45</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>% change in cross-sectional area</th>
<th>Accretion</th>
<th>Erosion</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt; 30 %</td>
<td>5 - 15 %</td>
<td>15 - 30 %</td>
</tr>
<tr>
<td>15 - 30 %</td>
<td>&gt; 30 %</td>
<td>Less than 5 %</td>
</tr>
<tr>
<td>No Change</td>
<td>5 - 15 %</td>
<td>Less than 5 %</td>
</tr>
</tbody>
</table>

Aerial Photography: 2013

SU Boundary

0 50 100 200 m

% change in cross-sectional area - June 2003 to March 2014

Hordle Cliffs: 5fSU03
Southeast Regional Coastal Monitoring Programme

Topographic Difference Model - March 2013 to March 2014

Christchurch Bay Annual Report 2014

Hordle Cliffs: 5fSU03

Change in Elevation (m)

Accretion

Erosion

Model Extent

Aerial Photography: 2013

Hordle Cliffs: 5fSU03
Southeast Regional Coastal Monitoring Programme

Christchurch Bay Annual Report 2014

Hordle Cliffs: 5fSU03

±

0 100 200 m

Aerial Photography: 2008

SU Boundary

Change in Elevation (m)

Accretion
Erosion

Hordle Cliffs: 5fSU03

Topographic Difference Model - November 2000 to March 2014

Model Extent

Aerial Photography: 2013

0 50 100 200 m
Southeast Regional Coastal Monitoring Programme

Christchurch Bay Annual Report 2014

Hordle Cliffs: 5fSU03

±0 100 200 300

Aerial Photography: 2008

SU Boundary

Change in Elevation (m)

Accretion

Erosion

>= 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

Model Extent

Topographic Difference Model - August 2006 to March 2014

Aerial Photography: 2013

0 50 100 200 m

Channel Coastal Observatory

Hordle Cliffs: 5fSU03
Position of MHWS - 2000 to 2014

Aerial Photography: 2013

Position of MHWS

2014
2013
2006
2000

SU Boundary

Hordle Cliffs: 5fSU03
Southeast Regional Coastal Monitoring Programme

% change in cross-sectional area - July 2013 to February 2014

Accretion
- > 30%
- 15 - 30%
- 5 - 15%

Erosion
- Less than 5%
- 15 - 30%
- > 30%

No Change

eg: 5f00420 (45) Line name (actual change, m²)

Becton to Hordle: 5fSU04
Southeast Regional Coastal Monitoring Programme

Christchurch Bay Annual Report 2014

% change in cross-sectional area - May 2002 to February 2014

- 5000420 (45)

eg: 5000420 (45)

Line name (actual change, m²)

% change in cross-sectional area

- > 30 %
- 15 - 30 %
- 5 - 15 %
- Less than 5 %
- Erosion
- Accretion

Aerial Photography: 2013

SU Boundary

Becton to Hordle: 5fSU04
Position of MHWS - 2002 to 2014

Becton to Hordle: 5fSU04
Southeast Regional Coastal Monitoring Programme

% change in cross-sectional area - February 2013 to February 2014 (1 of 2)

Christchurch Bay Annual Report 2014

Naish to Barton: 5fSU05

% change in cross-sectional area

<table>
<thead>
<tr>
<th>Line name</th>
<th>Actual change, m²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accretion</td>
<td>&gt; 30 %</td>
</tr>
<tr>
<td>Erosion</td>
<td>&gt; 30 %</td>
</tr>
<tr>
<td>No Change</td>
<td>5 - 15 %</td>
</tr>
<tr>
<td>Less than 5 %</td>
<td>5 - 15 %</td>
</tr>
<tr>
<td>5 - 15 %</td>
<td>15 - 30 %</td>
</tr>
<tr>
<td>&gt; 30 %</td>
<td>15 - 30 %</td>
</tr>
</tbody>
</table>

Aerial Photography: 2013

SU Boundary
Southeast Regional Coastal Monitoring Programme

Naish to Barton: 5fSU05

% change in cross-sectional area - February 2013 to February 2014 (2 of 2)

% change in cross-sectional area

- Less than 5%
- 5 - 15%
- 15 - 30%
- > 30%

Aerial Photography: 2013
Southeast Regional Coastal Monitoring Programme

% change in cross-sectional area - July 2002 to February 2014 (1 of 2)

Naish to Barton: 5fSU05
### % change in cross-sectional area - July 2002 to February 2014 (2 of 2)

<table>
<thead>
<tr>
<th>% change in cross-sectional area</th>
<th>Line name (actual change, m²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt; 30 %</td>
<td>5f00420 (45)</td>
</tr>
<tr>
<td>15 - 30 %</td>
<td>5f0025 (19)</td>
</tr>
<tr>
<td>5 - 15 %</td>
<td>5f0022 (24)</td>
</tr>
<tr>
<td>15 - 30 %</td>
<td>5f00217 (-7)</td>
</tr>
<tr>
<td>&gt; 30 %</td>
<td>5f00215 (7)</td>
</tr>
<tr>
<td>&gt; 30 %</td>
<td>5f00209 (6)</td>
</tr>
<tr>
<td>&gt; 30 %</td>
<td>5f00205 (10)</td>
</tr>
<tr>
<td>&gt; 30 %</td>
<td>5f00202 (9)</td>
</tr>
<tr>
<td>&gt; 30 %</td>
<td>5f00197 (-8)</td>
</tr>
<tr>
<td>&gt; 30 %</td>
<td>5f00195 (0)</td>
</tr>
<tr>
<td>5 - 15 %</td>
<td>5f00225 (-19)</td>
</tr>
<tr>
<td>Less than 5 %</td>
<td>5f00226 (-30)</td>
</tr>
<tr>
<td>Less than 5 %</td>
<td>5f00222 (-24)</td>
</tr>
</tbody>
</table>

*eg:* Line name (actual change, m²)

### Aerial Photography: 2013

- SU Boundary

### Naish to Barton: 5fSU05
Southeast Regional Coastal Monitoring Programme

Christchurch Bay Annual Report 2014

Topographic Difference Model - June 2002 to April 2014 (2 of 2)

Naish to Barton: 5fSU05
Southeast Regional Coastal Monitoring Programme

Christchurch Bay Annual Report 2014

Aerial Photography: 2008

Model Extent

Change in Elevation (m)

Accretion

Erosion

Topographic Difference Model - August 2007 to April 2014 (2 of 2)

Naish to Barton: 5SU05
Position of MHWS - 2002 to 2014 (2 of 2)

Naish to Barton: 5fSU05
% change in cross-sectional area - February 2013 to April 2014 (2 of 2)

Mudeford Quay to Highcliffe: 5fSU06
% change in cross-sectional area - February 2003 to April 2014 (1 of 2)

<table>
<thead>
<tr>
<th>Line name</th>
<th>Actual change, m²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accretion</td>
<td>5 - 15 %</td>
</tr>
<tr>
<td>Erosion</td>
<td>5 - 15 %</td>
</tr>
<tr>
<td>No Change</td>
<td>15 - 30 %</td>
</tr>
<tr>
<td></td>
<td>&gt; 30 %</td>
</tr>
<tr>
<td></td>
<td>Less than 5 %</td>
</tr>
</tbody>
</table>

Aerial Photography: 2013

SU Boundary

Mudeford Quay to Highcliffe: 5fSU06
% change in cross-sectional area - February 2003 to April 2014 (2 of 2)

Mudeford Quay to Highcliffe: 5fSU06
Topographic Difference Model - March 2013 to April 2014 (2 of 2)

Mudeford Quay to Highcliffe: 5fSU06
Southeast Regional Coastal Monitoring Programme

Christchurch Bay Annual Report 2014

Topographic Difference Model - August 2002 to April 2014 (2 of 2)

Mudeford Quay to Highcliffe: 5SU06

Change in Elevation (m)

- <= -3
- -2 - -1.5
- -1.5 - -1
- -1 - -0.5
- -0.5 - -0.25
- 0 - 0.25
- 0.25 - 0.5
- 0.5 - 1
- 1 - 1.5
- 1.5 - 2
- 2 - 2.5
- 2.5 - 3
- >= 3

Extraction Deposition

Aerial Photography: 2013

Beach Operations

<table>
<thead>
<tr>
<th>Year</th>
<th>Extraction</th>
<th>Deposition</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2009</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2006</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2004</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Model Extent

Aerial Photography: 2013

0 50 100 200 m
Topographic Difference Model - September 2007 to April 2014 (2 of 2)

Christchurch Bay Annual Report 2014

Southeast Regional Coastal Monitoring Programme

Change in Elevation (m)

- >= 3
- 2.5 - 3
- 2.0 - 2.5
- 1.5 - 2.0
- 1.0 - 1.5
- 0.5 - 1.0
- 0.25 - 0.5
- -0.25 - 0.25
- -0.5 - -0.25
- -1.0 - -0.5
- -1.5 - -1.0
- -2.0 - -1.5
- -2.5 - -2.0
- -3.0 - -2.5
- <= -3

Model Extent

Beach Operations

<table>
<thead>
<tr>
<th>Year</th>
<th>Extraction</th>
<th>Deposition</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2009</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Aerial Photography: 2013

Mudeford Quay to Highcliffe: 5fSU06
% change in cross-sectional area - September 2013 to February 2014

Mudeford Harbour: 5fSU08

SU Boundary

% change in cross-sectional area

- > 30%
- 15 - 30%
- 5 - 15%
- Less than 5%

No Change

Erosion

eg: 5f00420 (45)

Line name (actual change, m²)
% change in cross-sectional area - November 2003 to February 2014

Mudeford Harbour: 5fSU08

SU Boundary

Aerial Photography: 2013
Southeast Regional Coastal Monitoring Programme

Christchurch Bay Annual Report 2014

% change in cross-sectional area Feb 2013 to Feb 2014

Mudeford Sandbank: 5fSU09

% change in cross-sectional area

Accretion

- > 30%
- 15 - 30%
- 5 - 15%
- Less than 5%

No Change

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

Erosion

eg: 5f00420 (45)

Line name (actual change, m²)

SU Boundary

Aerial Photography: 2013

0 50 100 150 200 m
Southeast Regional Coastal Monitoring Programme

% change in cross-sectional area November 2003 to February 2014

Christchurch Bay Annual Report 2014

Mudeford Sandbank: 5fSU09

% change in cross-sectional area

<table>
<thead>
<tr>
<th>Line name</th>
<th>(actual change, m²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SU Boundary</td>
<td>Aerial Photography: 2013</td>
</tr>
</tbody>
</table>

- **Accretion**
  - > 30 %
  - 15 - 30 %
  - 5 - 15 %
  - Less than 5 %

- **Erosion**
  - > 30 %
  - 15 - 30 %
  - 5 - 15 %
  - Less than 5 %

- **No Change**
  - No change
Southeast Regional Coastal Monitoring Programme

Christchurch Bay Annual Report 2014

Topographic Difference Model - June 2007 to June 2014

Mudeford Sandbank: 5fSU09

Change in Elevation (m)

- <= -3
- -3 - -2.5
- -2 - -1.5
- -1.5 - -1
- -1 - -0.5
- -0.5 - 0.0
- 0.0 - 0.25
- 0.25 - 0.5
- 0.5 - 1.0
- 1.0 - 1.5
- 1.5 - 2.0
- 2.0 - 2.5
- 2.5 - 3.0
- >= 3

Model Extent

Beach Operations

<table>
<thead>
<tr>
<th>Extraction</th>
<th>Deposition</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Aerial Photography: 2013
EXPLANATORY NOTES

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.

\[
\frac{CSA_1 - CSA_2}{CSA_2} \times 100
\]

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.