Annual Survey Report
Land’s End to Hartland Point
2016
# Annual Survey Report 2016
**Land’s End to Hartland Point**

**Plymouth Coastal Observatory**  
University of Plymouth  
Drake Circus  
Plymouth  
PL4 8AA  
+44 (0)1752 586 156  
[coastal.observatory@plymouth.ac.uk](mailto:coastal.observatory@plymouth.ac.uk)  
[www.coastalmonitoring.org/southwest](http://www.coastalmonitoring.org/southwest)

| Document Title          | Annual Survey Report 2016  
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Land’s End to Hartland Point</td>
</tr>
<tr>
<td>Reference</td>
<td>AR 59</td>
</tr>
<tr>
<td>Status</td>
<td>Final</td>
</tr>
<tr>
<td>Date</td>
<td>September 2016</td>
</tr>
<tr>
<td>Project Name</td>
<td>South West Regional Coastal Monitoring Programme</td>
</tr>
<tr>
<td>Author</td>
<td>C K Corti</td>
</tr>
<tr>
<td>Checked By</td>
<td>E A Siggery</td>
</tr>
</tbody>
</table>
## Contents

**Summary**.................................................................................................................................................. 1

**Introduction**............................................................................................................................................ 2

**Wave Reports**......................................................................................................................................... 4

- Perranporth Wave Buoy ......................................................................................................................... 4
- Wave Hub Wave Buoy ........................................................................................................................... 9

**Tide Reports**.......................................................................................................................................... 14

- Port Isaac Step Gauge ............................................................................................................................ 14

**Topographic Survey Record** ................................................................................................................. 22

**Topographic Survey Report** .................................................................................................................. 24

**Explanatory Notes** ............................................................................................................................... 27

**Process Cell Summary Maps** ............................................................................................................... 28

**Individual Survey Unit Reports** ........................................................................................................... 32

- 7a7A1-2 - Sennen ................................................................................................................................. 32
- 7a7A2-2 - Porthmeor ............................................................................................................................. 36
- 7a7A2-3 - Porth Gwidden ....................................................................................................................... 40
- 7a7A2-4 - St Ives ................................................................................................................................... 44
- 7a7A2-5 - Carbis Bay ............................................................................................................................ 48
- 7a7A2-6 - Hayle ..................................................................................................................................... 52
- 7a7A2-7 - Hayle to Godrevy ................................................................................................................. 60
- 7a7A3-2 - Portreath ............................................................................................................................... 67
- 7a7A3-4 - Porthtowan ........................................................................................................................... 70
- 7a7A3-8 - Perranporth ........................................................................................................................... 73
- 7a7A3-9 - Perranporth Sands ................................................................................................................ 77
- 7a7A3-13 - Crantock ............................................................................................................................. 81
- 7a7A3-15 - Fistral .................................................................................................................................. 85
- 7a7A3-17 - Newquay ............................................................................................................................ 89
- 7a7A3-18 - Watergate Bay .................................................................................................................... 93
- 7a7A3-19 - Trenance ............................................................................................................................ 97
- 7a7A3-21 - Porthcothan ....................................................................................................................... 100
- 7a7A3-23 - Treyarnon and Constantine .............................................................................................. 103
- 7b7B1-2 - Harlyn Bay ........................................................................................................................... 106
- 7b7B1-8 - Polzeath ............................................................................................................................... 109
7b7B2-4 - Port Isaac ............................................................................................................................. 112
7b7B3-1 - Black Rock ............................................................................................................................. 115
7b7B3-2 - Widemouth Bay ..................................................................................................................... 118
7b7B3-4 - Bude ..................................................................................................................................... 121

Profile Change Graphs* ................................................................. CD
Cross-sectional Area Charts* .......................................................... CD

* Presented on the CD accompanying printed copies of this report distributed by the Plymouth Coastal Observatory.
Summary

This report summarises beach changes that have affected survey units located between Land’s End and Hartland Point between Spring 2015 and Spring 2016 and between Spring 2007 and Spring 2016. Observations also take into account changes in wave conditions.

Over the last year, the majority of survey units within the area of interest have eroded, with up to 11% decreases in cross-sectional area at 7a7A3-4 (Porthtowan). 7a7A3-8 (Perranporth) and 7a7A3-9 (Perran Sands) have experienced considerable sediment losses, just under 194m$^2$ at some locations. A trend for erosion is also noticed at 7a7A3-15 (Fistral beach) and 7a7A3-17 (Newquay), where up to 45m$^2$ of material have been lost. A combination of accretion and erosion has been observed at 7a7A2-6 and 7a7A2-7 (Hayle to Godrevy), to the east of St Ives Bay. Accretion and erosion are also concurrent at 7a7A2-15 (Watergate Bay) and at 7b7B1-8 (Polzeath). Conversely, survey units to the west of St Ives Bay have displayed an opposite trend: 7a7A2-3 (Porth Gwidden), 7a7A2-4 (St Ives) and 7a7A2-5 (Carbis Bay) have experienced accretion over the past year.

Longer term, erosion has prevailed at most locations. An acute trend for erosion is mainly dominant at 7a7A3-4 (Porhtowan), where up to ~123m$^2$ of material have been lost since the original baseline survey in 2007, resulting in the beach being at its lowest level since the start of the Programme. Similarly, 7a7A3-9 (Perran Sands) has lost just under 715m$^2$ of material since April 2007. High level erosion is also present at 7b7B3-4 (Bude), despite a mixture of stability, accretion and erosion having occurred over the short term.

At the Repeat Baseline site 7a7A2-6 (Hayle), the trend has mostly been for erosion both over the short and long term, a trend also confirmed by the difference model obtained from continuous topographic data, which has shown a net sediment loss of up to 1.7% since 2007.

Wave data recorded by the Perranporth Directional Waverider buoy has shown 5 storms exceeding the 5.25m storm threshold between April 2015 and March 2016, mainly incident from a westerly direction, as well as December 2015 being the month with the largest average significant wave height since the deployment of the buoy. In addition to this, wave data recorded by the Wave Hub Directional Waverider Buoy, which was made freely available by Wave Hub Ltd., has shown 5 westerly storms exceeding the 5m threshold during winter 2015.
South West Regional Coastal Monitoring Programme

Annual Survey Report 2016 – Land’s End to Hartland Point

Introduction

Analysis presented in this report provides an overview of beach changes and wave and tidal measurements since the commencement of the South West Regional Coastal Monitoring Programme. The first beach surveys took place during the spring of 2007 and changes are reported until spring 2016.

Data are presented at the following levels:

• Process Cell
  o Process cell summary of percentage and actual profile change from Spring 2015 to Spring 2016.
  o Process cell summary of percentage and actual profile change from Baseline 2007 to Spring 2016.

• Survey Unit
  o Detailed beach profile change from Spring 2015 to Spring 2016.
  o Detailed beach profile change from Baseline 2007 to Spring 2016.
  o Topographic difference model change from Repeat Baseline 2015 to Repeat Baseline 2016 (where available).
  o Topographic difference model change from Baseline 2007 to Repeat Baseline 2016 (where available).
  o Change in position of Mean High Water contour (where available).
  o Beach sediment distribution (where available).
  o Time series of beach profile graphs*.
  o Trend analysis of beach cross-sectional area*.

*Note that beach profile graphs and cross-sectional area charts are presented on the CD accompanying hard copies of this report distributed by the Plymouth Coastal Observatory.

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.

Lines are colour-coded based on actual change; percentage change is displayed in brackets following the profile name on each line. Please note that lines on the map have been extended for clarity and therefore may not represent the actual distance surveyed.

Difference models have been produced where there are at least two baseline surveys to compare. Where available, the most recent LiDAR data has been used to extract the level of Mean High Water (MHW) for each survey unit, and where possible, sediment distribution maps are produced from the latest topographic baseline survey information.
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 artefact 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 overtime or with other information.

Where LiDAR has provided the source data sets, the modelling is less precise. Each LiDAR cell value has a plan position representative of a 1m² grid. It is not reasonable to expect to observe changes with positional accuracy of better than 1-2m therefore. Profiles of steep slopes may suggest that the changes “bounce” back and forth. This is an artefact of the accuracy of the source data. LiDAR is particularly ineffective at identifying sharp edges or steep slopes e.g. cliffs, seawalls. Despite these limitations in accuracy the changes shown indicate an overview of profile change, but to a lower precision than the RTK data. The location of the regularly surveyed profiles superimposed on the difference plots indicates how representative these profiles might be of overall changes.

It must be emphasised that this is only the 8th report of a series and that changes identified are indicative only of relatively short-term trends.
Perranporth Directional Waverider Buoy

<table>
<thead>
<tr>
<th>Location</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>OS</td>
<td>174305 E  55125 N</td>
</tr>
<tr>
<td>WGS84</td>
<td>Latitude: 50° 21.160’ N  Longitude: 05° 10.445’ W</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Instrument type</th>
<th>Datawell Directional Waverider Mk III</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Water depth</th>
<th>~14m CD</th>
</tr>
</thead>
</table>

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

Location of buoy (Google mapping)

Summary

During this reporting period from April 2015 to March 2016, there was a high frequency of storms of typical magnitude for the site. The largest storm on 08 February 2016 reached 6.75m Hs with Tp of 13.3s at 04:00, close to High Water. However, between 06:30 and 18:00 waves were breaking over the buoy and, accordingly, the significant wave height may have exceeded 6.75m during this period. Additionally, while no storms occurred during December, the month had the largest average significant wave height since the buoy was deployed; indeed moderate seas were almost continuous from mid-November to mid-February.

Data Quality

<table>
<thead>
<tr>
<th>Recovery rate (%)</th>
<th>Sample interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>99</td>
<td>30 minutes</td>
</tr>
</tbody>
</table>

Monthly Averages – 2015/16

<table>
<thead>
<tr>
<th>Month</th>
<th>Hs (m)</th>
<th>Tp (s)</th>
<th>Ts (s)</th>
<th>Dir. (°)</th>
<th>SST (°C)</th>
<th>No. of days</th>
<th>Bimodal seas (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>April</td>
<td>1.21</td>
<td>11.2</td>
<td>6.0</td>
<td>284</td>
<td>10.7</td>
<td>30</td>
<td>9</td>
</tr>
<tr>
<td>May</td>
<td>1.43</td>
<td>8.9</td>
<td>5.1</td>
<td>277</td>
<td>12.2</td>
<td>31</td>
<td>12</td>
</tr>
<tr>
<td>June</td>
<td>1.22</td>
<td>8.8</td>
<td>5.0</td>
<td>292</td>
<td>14.2</td>
<td>30</td>
<td>8</td>
</tr>
<tr>
<td>July</td>
<td>1.31</td>
<td>8.7</td>
<td>5.1</td>
<td>277</td>
<td>16.0</td>
<td>31</td>
<td>4</td>
</tr>
<tr>
<td>August</td>
<td>1.23</td>
<td>9.0</td>
<td>5.2</td>
<td>280</td>
<td>16.4</td>
<td>31</td>
<td>8</td>
</tr>
<tr>
<td>September</td>
<td>1.13</td>
<td>8.8</td>
<td>5.1</td>
<td>291</td>
<td>15.5</td>
<td>30</td>
<td>8</td>
</tr>
<tr>
<td>October</td>
<td>1.19</td>
<td>11.0</td>
<td>5.8</td>
<td>287</td>
<td>14.6</td>
<td>31</td>
<td>6</td>
</tr>
<tr>
<td>November</td>
<td>2.50</td>
<td>11.1</td>
<td>6.4</td>
<td>283</td>
<td>13.4</td>
<td>30</td>
<td>12</td>
</tr>
<tr>
<td>December</td>
<td>2.57</td>
<td>12.6</td>
<td>6.8</td>
<td>279</td>
<td>12.2</td>
<td>31</td>
<td>9</td>
</tr>
<tr>
<td>January</td>
<td>2.54</td>
<td>12.3</td>
<td>6.8</td>
<td>283</td>
<td>10.5</td>
<td>31</td>
<td>12</td>
</tr>
<tr>
<td>February</td>
<td>2.42</td>
<td>12.9</td>
<td>6.7</td>
<td>283</td>
<td>9.8</td>
<td>28</td>
<td>19</td>
</tr>
<tr>
<td>March</td>
<td>1.91</td>
<td>12.1</td>
<td>6.3</td>
<td>284</td>
<td>9.3</td>
<td>31</td>
<td>16</td>
</tr>
</tbody>
</table>

All times are GMT
**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>08-Feb-2016 04:00</td>
<td>6.75</td>
<td>13.3</td>
<td>8.7</td>
<td>288</td>
<td>-</td>
<td>HW -1</td>
<td>~6.4</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>02-Mar-2016 11:30</td>
<td>6.69</td>
<td>11.8</td>
<td>8.5</td>
<td>293</td>
<td>-</td>
<td>HW +1</td>
<td>~2.9</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>09-Mar-2016 09:00</td>
<td>6.27</td>
<td>10.0</td>
<td>8.2</td>
<td>319</td>
<td>-</td>
<td>HW +3</td>
<td>~7.9</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>21-Nov-2015 06:00</td>
<td>5.37</td>
<td>9.1</td>
<td>7.4</td>
<td>321</td>
<td>-1.60</td>
<td>HW +5</td>
<td>4.0</td>
<td>-0.17</td>
<td>0.22</td>
</tr>
<tr>
<td>29-Nov-2015 16:00</td>
<td>5.36</td>
<td>11.1</td>
<td>7.8</td>
<td>285</td>
<td>-0.72</td>
<td>HW -4</td>
<td>6.1</td>
<td>0.04</td>
<td>0.25</td>
</tr>
</tbody>
</table>

**Distribution plots**

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

- Monthly time series of $H_s$ (red line is 5.25 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
- Percentage of occurrence of $H_s$, $T_p$, $T_z$ and Direction from April 2015 to March 2016
- Wave rose (percentage of occurrence of Direction vs. $H_s$) for all measured data

**General**

The buoy was first deployed on 18 December 2006, at which time the magnetic declination at the site was 3.9° west, changing by 0.15° east per year.

**Acknowledgements**

The shore station is kindly hosted by Perranporth Youth Hostel. Tidal predictions were produced using the TASK windows edition software, kindly provided by the Marine Data Products team at the UK National Oceanography Centre (Liverpool).

* Tidal information is obtained from the nearest recording tide gauge (the step gauge at Port Isaac). 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.
Annual Survey Report

Offshore Wave Hs (m)

Perranporth WB: 18/12/2006 - 31/03/2016

- >= 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)
Wave Hub Directional Waverider Buoy

Location

<table>
<thead>
<tr>
<th>OS</th>
<th>142878 E  56036 N</th>
</tr>
</thead>
<tbody>
<tr>
<td>WGS84</td>
<td>Latitude: 50° 20.84' N  Longitude: 05° 36.86' W</td>
</tr>
</tbody>
</table>

Instrument type

Datawell Directional Waverider Mk III

Water depth

~50m CD

Example buoy in situ. Photo courtesy of Fugro EMU Limited

Location of buoy (Google mapping)

Data Quality

<table>
<thead>
<tr>
<th>Recovery rate (%)</th>
<th>Sample interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>57</td>
<td>30 minutes</td>
</tr>
</tbody>
</table>

Monthly averages - 2015

<table>
<thead>
<tr>
<th>Month</th>
<th>Hs (m)</th>
<th>Tp (s)</th>
<th>Ts (s)</th>
<th>Dir. (°)</th>
<th>SST (°C)</th>
<th>No. of days</th>
</tr>
</thead>
<tbody>
<tr>
<td>January</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>February</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>March</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>April</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>May</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>June</td>
<td>1.40</td>
<td>8.7</td>
<td>5.4</td>
<td>238</td>
<td>13.2</td>
<td>26</td>
</tr>
<tr>
<td>July</td>
<td>1.67</td>
<td>8.7</td>
<td>5.5</td>
<td>260</td>
<td>14.8</td>
<td>30</td>
</tr>
<tr>
<td>August</td>
<td>1.55</td>
<td>8.9</td>
<td>5.6</td>
<td>267</td>
<td>14.8</td>
<td>31</td>
</tr>
<tr>
<td>September</td>
<td>1.39</td>
<td>8.0</td>
<td>4.9</td>
<td>236</td>
<td>14.9</td>
<td>30</td>
</tr>
<tr>
<td>October</td>
<td>1.62</td>
<td>10.4</td>
<td>5.7</td>
<td>232</td>
<td>14.5</td>
<td>31</td>
</tr>
<tr>
<td>November</td>
<td>3.11</td>
<td>10.8</td>
<td>6.8</td>
<td>277</td>
<td>13.5</td>
<td>30</td>
</tr>
<tr>
<td>December</td>
<td>3.75</td>
<td>12.1</td>
<td>7.3</td>
<td>267</td>
<td>12.4</td>
<td>31</td>
</tr>
</tbody>
</table>

All times are GMT
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>29-Nov-2015</td>
<td>6.58</td>
<td>10.5</td>
<td>7.8</td>
<td>277</td>
<td>1.48</td>
<td>HW -2</td>
<td>6.1</td>
<td>-0.08</td>
<td>0.25</td>
</tr>
<tr>
<td>05-Dec-2015</td>
<td>6.53</td>
<td>15.4</td>
<td>9.3</td>
<td>286</td>
<td>-</td>
<td>HW +4</td>
<td>~3.3</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>31-Dec-2015</td>
<td>6.50</td>
<td>14.3</td>
<td>8.3</td>
<td>266</td>
<td>-0.62</td>
<td>HW -4</td>
<td>~5.0</td>
<td>0.03</td>
<td>0.50</td>
</tr>
<tr>
<td>30-Dec-2015</td>
<td>6.24</td>
<td>15.4</td>
<td>9.3</td>
<td>273</td>
<td>3.17</td>
<td>HW +1</td>
<td>5.7</td>
<td>0.52</td>
<td>0.67</td>
</tr>
<tr>
<td>06-Dec-2015</td>
<td>6.12</td>
<td>14.3</td>
<td>8.9</td>
<td>284</td>
<td>-</td>
<td>HW +5</td>
<td>~3.0</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Annual Statistics

<table>
<thead>
<tr>
<th>Year</th>
<th>Annual $H_s$ exceedance* (m)</th>
<th>Annual Maximum $H_s$</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.05%</td>
<td>0.5%</td>
</tr>
<tr>
<td>2015</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

* i.e. 5% of the $H_s$ values measured in 2015 exceeded 4.54 m

Distribution plots

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

- Annual time series of $H_s$ (red line is 5m storm threshold)
- Incidence of storm waves for 2015. Storm events are defined using the Peaks-over-Threshold method. The highest $H_s$ of each storm event is shown
- Wave height exceedance each year since deployment
- Percentage of occurrence of $H_s$, $T_p$, $T_z$ and Direction for 2015
- Joint distribution of all parameters for all measured data, given as percentage of occurrence
- Wave rose (percentage of occurrence of direction vs. $H_s$) for all measured data

General

The buoy was first deployed on 22 May 2015, at which time the magnetic declination at the site was 2.65° west, changing by 0.15° east per year.

Acknowledgements

The wave buoy is owned by Wave Hub Ltd., who have kindly agreed to make the data freely available via the Channel Coastal Observatory website. The shore station is kindly hosted by Perranporth Youth Hostel. TASK2000 tidal prediction software was kindly provided by the Permanent Service for Mean Sea Level, Proudman Oceanographic Laboratory.

* Tidal information is obtained from the nearest recording tide gauge (the step gauge at Port Isaac). 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.
Wave Hub – Significant Wave Height (Hs) during 2015

Storms at Wave Hub during 2015

Storm threshold is Hs = 5m
Port Isaac Tide Gauge

Location
OS: 199490E 80998N
WGS84: Latitude: 50° 35' 39.083" N Longitude: 04° 50' 03.881" W

Instrument Type
Etrometa step gauge

Benchmarks

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>TGBM = 7.715 above Ordnance Datum Newlyn</td>
<td>Top of galvanised horizontal frame</td>
</tr>
<tr>
<td>TGZ = -3.970m above Ordnance Datum Newlyn</td>
<td></td>
</tr>
<tr>
<td>TGZ = -0.170m above Chart Datum</td>
<td></td>
</tr>
<tr>
<td>TGZ = 11.685m below TGBM</td>
<td></td>
</tr>
</tbody>
</table>

Datum
All data are to Ordnance Datum Newlyn. The height of Chart Datum relative to Ordnance Datum at Port Isaac is -3.80m (Admiralty Tide Tables, Supplementary Table III).

Survey information
The site was first surveyed on 29 June 2010, using a ~25 hour occupation to account for tidal loading.

Site characteristics
The breakwater is on open coast, although sheltered from the southwest by a headland. Some wave reflection from the breakwater can occur. There are no nearby estuaries. Spring tidal range is approx. 6.6m.
Data Quality

<table>
<thead>
<tr>
<th>Recovery rate (%)</th>
<th>Sample interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>98</td>
<td>10 minutes</td>
</tr>
</tbody>
</table>

Service history

The step gauge became operational on 26 July 2010 and was last serviced in October 2015. No recalibration of the instrument is required.

Measurements

Residuals and Elevations (OD and CD) for the whole year are shown in Figures 1 to 3 respectively.

Statistics

All times GMT

<table>
<thead>
<tr>
<th>Month</th>
<th>Extreme maxima</th>
<th>Extreme minima</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Elevation (OD)</td>
<td>Date/Time</td>
</tr>
<tr>
<td>January</td>
<td>4.35</td>
<td>23-Jan-2015 07:00</td>
</tr>
<tr>
<td>April</td>
<td>4.30</td>
<td>20-Apr-2015 06:10</td>
</tr>
<tr>
<td>May</td>
<td>4.09</td>
<td>18-May-2015 05:10</td>
</tr>
<tr>
<td>August</td>
<td>4.62</td>
<td>31-Aug-2015 18:30</td>
</tr>
<tr>
<td>September</td>
<td>4.56</td>
<td>29-Sep-2015 18:10</td>
</tr>
<tr>
<td>Month</td>
<td>Surge maxima</td>
<td>Surge minima</td>
</tr>
<tr>
<td>---------</td>
<td>--------------</td>
<td>--------------</td>
</tr>
<tr>
<td></td>
<td>Value (m)</td>
<td>Date/Time</td>
</tr>
<tr>
<td>January</td>
<td>0.84</td>
<td>14-Jan-2015 23:20</td>
</tr>
<tr>
<td>February</td>
<td>0.65</td>
<td>24-Feb-2015 01:50</td>
</tr>
<tr>
<td>March</td>
<td>0.37</td>
<td>31-Mar-2015 01:20</td>
</tr>
<tr>
<td>April</td>
<td>0.23</td>
<td>16-Apr-2015 11:50</td>
</tr>
<tr>
<td>May</td>
<td>0.49</td>
<td>05-May-2015 14:00</td>
</tr>
<tr>
<td>June</td>
<td>0.44</td>
<td>02-Jun-2015 00:00</td>
</tr>
<tr>
<td>July</td>
<td>0.38</td>
<td>26-Jul-2015 10:40</td>
</tr>
<tr>
<td>August</td>
<td>0.43</td>
<td>26-Aug-2015 06:10</td>
</tr>
<tr>
<td>September</td>
<td>0.43</td>
<td>16-Sep-2015 12:10</td>
</tr>
<tr>
<td>October</td>
<td>0.40</td>
<td>05-Oct-2015 05:30</td>
</tr>
<tr>
<td>November</td>
<td>0.44</td>
<td>17-Nov-2015 13:00</td>
</tr>
<tr>
<td>December</td>
<td>0.67</td>
<td>30-Dec-2015 07:20</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Month</th>
<th>Mean Level</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No. of days</td>
</tr>
<tr>
<td>January</td>
<td>31</td>
</tr>
<tr>
<td>February</td>
<td>28</td>
</tr>
<tr>
<td>March</td>
<td>31</td>
</tr>
<tr>
<td>April</td>
<td>30</td>
</tr>
<tr>
<td>May</td>
<td>31</td>
</tr>
<tr>
<td>June</td>
<td>30</td>
</tr>
<tr>
<td>July</td>
<td>31</td>
</tr>
<tr>
<td>August</td>
<td>31</td>
</tr>
<tr>
<td>September</td>
<td>30</td>
</tr>
<tr>
<td>October</td>
<td>31</td>
</tr>
<tr>
<td>November</td>
<td>30</td>
</tr>
<tr>
<td>December</td>
<td>31</td>
</tr>
</tbody>
</table>
### Highest values in 2015

<table>
<thead>
<tr>
<th>Extreme</th>
<th>Surge</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Elevation (OD)</strong>&lt;br&gt;(<strong>Surge component</strong>)</td>
<td><strong>Date/Time</strong></td>
</tr>
<tr>
<td>4.74 (0.17)</td>
<td>28-Oct-2015 17:50</td>
</tr>
<tr>
<td>4.66 (0.16)</td>
<td>27-Oct-2015 17:00</td>
</tr>
<tr>
<td>4.62 (0.15)</td>
<td>29-Oct-2015 06:00</td>
</tr>
<tr>
<td>4.62 (0.01)</td>
<td>31-Aug-2015 18:30</td>
</tr>
<tr>
<td>4.62 (0.19)</td>
<td>20-Feb-2015 05:50</td>
</tr>
<tr>
<td>4.60 (0.07)</td>
<td>21-Feb-2015 06:40</td>
</tr>
<tr>
<td>4.57 (0.12)</td>
<td>28-Oct-2015 05:20</td>
</tr>
<tr>
<td>4.56 (-0.16)</td>
<td>29-Sep-2015 18:10</td>
</tr>
<tr>
<td>4.53 (0.23)</td>
<td>02-Aug-2015 18:50</td>
</tr>
<tr>
<td>4.53 (0.09)</td>
<td>29-Oct-2015 18:30</td>
</tr>
</tbody>
</table>

### Annual extreme maxima

<table>
<thead>
<tr>
<th>Year</th>
<th>Elevation (OD)</th>
<th>Date/Time</th>
<th>Value (m)</th>
<th>Z₀ (OD)</th>
<th>Annual recovery rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>4.66 (-)</td>
<td>08-Oct-2010 17:40</td>
<td>-</td>
<td>-</td>
<td>44%</td>
</tr>
<tr>
<td>2011</td>
<td>4.59 (0.09)</td>
<td>21-Feb-2011 07:20</td>
<td>0.70</td>
<td>13-Dec-2011 02:30</td>
<td>0.304</td>
</tr>
<tr>
<td>2012</td>
<td>4.76 (0.53)</td>
<td>17-Oct-2012 18:30</td>
<td>0.77</td>
<td>17-Oct-2012 11:10</td>
<td>0.311</td>
</tr>
<tr>
<td>2013</td>
<td>4.48 (0.06)</td>
<td>24-Jul-2013 18:30</td>
<td>1.12</td>
<td>27-Dec-2013 06:50</td>
<td>0.318</td>
</tr>
<tr>
<td>2014</td>
<td>4.80 (0.46)</td>
<td>03-Jan-2014 06:50</td>
<td>1.09</td>
<td>12-Feb-2014 11:20</td>
<td>-</td>
</tr>
<tr>
<td>2015</td>
<td>4.74 (0.17)</td>
<td>28-Oct-2015 17:50</td>
<td>0.84</td>
<td>14-Jan-2015 23:20</td>
<td>-</td>
</tr>
</tbody>
</table>

### Tidal levels

<table>
<thead>
<tr>
<th>Tide Level</th>
<th>Elevation (OD)</th>
<th>Elevation (CD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>HAT</td>
<td>4.73</td>
<td>8.53</td>
</tr>
<tr>
<td>MHWS</td>
<td>3.64</td>
<td>7.44</td>
</tr>
<tr>
<td>MHWN</td>
<td>1.88</td>
<td>5.68</td>
</tr>
<tr>
<td>MSL</td>
<td>0.31</td>
<td>4.11</td>
</tr>
<tr>
<td>MLWN</td>
<td>-1.27</td>
<td>2.53</td>
</tr>
<tr>
<td>MLWS</td>
<td>-3.03</td>
<td>0.77</td>
</tr>
<tr>
<td>LAT</td>
<td>-4.01</td>
<td>-0.21</td>
</tr>
</tbody>
</table>

Observation period: August 2010 to December 2012.
General

The time series of 10 minute tidal elevations for one year is quality-checked in accordance with ESEAS guidelines, flagged and archived. The archived time series is continuous and monotonic, with missing data given as 9999. The missing data shown are days where the entire 24 hours of data are missing.

Monthly extreme maxima/minima are the maximum and minimum water levels from all measured data for that month. Monthly surge maxima/minima (residuals) are calculated in a similar manner from the time series of residuals. Residuals are derived as the measured tidal elevation minus the predicted tidal elevation.

The monthly Mean Level is calculated as the average of all readings for the given month. The annual $Z_0$ is the value of Mean Sea Level derived by the harmonic analysis of the year's data. These values should not be used for any purpose without consideration of the recovery rate.

Acknowledgements

The step gauge is mounted on Port Isaac breakwater by kind permission of the Port Isaac Harbour Commissioners and the shore station is kindly hosted by Port Isaac Aquarium. Tidal predictions were produced using the TASK windows edition software, kindly provided by the Marine Data Products team at the UK National Oceanography Centre (Liverpool). Tide levels were produced by Fugro EMU Limited.
Figure 1: Port Isaac residuals for 2015
Figure 2: Port Isaac tidal elevations for 2015 relative to Ordnance Datum
Figure 3: Port Isaac tidal elevations for 2015 relative to Chart Datum
Topographic Survey Record

The table below gives the target and completion dates for topographic surveys between spring 2015 and the repeat baseline surveys of 2016.

<table>
<thead>
<tr>
<th>Survey Unit</th>
<th>Spring Interim Profile 2015</th>
<th>Repeat Baseline 2015</th>
<th>Autumn Interim Profile 2015</th>
<th>Spring Interim Profile 2016</th>
<th>Post-Storm</th>
<th>Repeat Baseline 2016</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Target</td>
<td>Completion</td>
<td>Target</td>
<td>Completion</td>
<td>Target</td>
<td>Completion</td>
</tr>
<tr>
<td>7A2-3</td>
<td>31/03/2015</td>
<td>23/02/2015</td>
<td>31/12/2015</td>
<td>30/09/2015</td>
<td>31/03/2016</td>
<td>11/03/2016</td>
</tr>
<tr>
<td>7A2-4</td>
<td>31/03/2015</td>
<td>23/02/2015</td>
<td>31/12/2015</td>
<td>30/09/2015</td>
<td>31/03/2016</td>
<td>11/03/2016</td>
</tr>
<tr>
<td>7A2-5</td>
<td>31/03/2015</td>
<td>23/02/2015</td>
<td>31/12/2015</td>
<td>02/09/2015</td>
<td>31/03/2016</td>
<td>11/03/2016</td>
</tr>
<tr>
<td>7A2-6</td>
<td>31/03/2015</td>
<td>22/02/2015</td>
<td>31/08/2015</td>
<td>22/04/2015</td>
<td>31/12/2015</td>
<td>29/09/2015</td>
</tr>
<tr>
<td>7A2-7</td>
<td>31/03/2015</td>
<td>21/02/2015</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7A3-2</td>
<td>31/03/2015</td>
<td>20/02/2015</td>
<td>31/12/2015</td>
<td>31/08/2015</td>
<td>31/03/2016</td>
<td>12/03/2016</td>
</tr>
<tr>
<td>7A3-4</td>
<td>31/03/2015</td>
<td>20/02/2015</td>
<td>31/12/2015</td>
<td>31/08/2015</td>
<td>31/03/2016</td>
<td>12/03/2016</td>
</tr>
<tr>
<td>7A3-8</td>
<td>31/03/2015</td>
<td>18/02/2015</td>
<td>31/12/2015</td>
<td>31/08/2015</td>
<td>31/03/2016</td>
<td>08/03/2016</td>
</tr>
<tr>
<td>7A3-9</td>
<td>31/03/2015</td>
<td>18/02/2015</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7A3-13</td>
<td>31/03/2015</td>
<td>23/03/2015</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7A3-15</td>
<td>31/03/2015</td>
<td>18/02/2015</td>
<td>31/12/2015</td>
<td>30/08/2015</td>
<td>31/03/2016</td>
<td>13/03/2016</td>
</tr>
<tr>
<td>7A3-17</td>
<td>31/03/2015</td>
<td>19/02/2015</td>
<td>31/12/2015</td>
<td>01/10/2015</td>
<td>31/03/2016</td>
<td>09/02/2016</td>
</tr>
<tr>
<td>7A3-18</td>
<td>31/03/2015</td>
<td>20/02/2015</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7A3-19</td>
<td>31/03/2015</td>
<td>21/02/2015</td>
<td>31/12/2015</td>
<td>29/08/2015</td>
<td>31/03/2016</td>
<td>14/03/2016</td>
</tr>
<tr>
<td>7A3-21</td>
<td>31/03/2015</td>
<td>21/02/2015</td>
<td>31/12/2015</td>
<td>29/08/2015</td>
<td>31/03/2016</td>
<td>14/03/2016</td>
</tr>
<tr>
<td>7A3-23</td>
<td>31/03/2015</td>
<td>22/02/2015</td>
<td>31/12/2015</td>
<td>01/09/2015</td>
<td>31/03/2016</td>
<td>08/04/2016</td>
</tr>
<tr>
<td>7B1-2</td>
<td>31/03/2015</td>
<td>19/02/2015</td>
<td>31/12/2015</td>
<td>03/09/2015</td>
<td>31/03/2016</td>
<td>09/03/2016</td>
</tr>
<tr>
<td>7B1-8</td>
<td>31/03/2015</td>
<td>21/03/2015</td>
<td>31/12/2015</td>
<td>01/09/2015</td>
<td>31/03/2016</td>
<td>08/04/2016</td>
</tr>
<tr>
<td>7B2-4</td>
<td>31/03/2015</td>
<td>23/03/2015</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7B3-1</td>
<td>31/03/2015</td>
<td>22/03/2015</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7B3-2</td>
<td>31/03/2015</td>
<td>22/03/2015</td>
<td>31/12/2015</td>
<td>02/09/2015</td>
<td>31/03/2016</td>
<td>12/03/2016</td>
</tr>
<tr>
<td>7B3-4</td>
<td>31/03/2015</td>
<td>19/03/2015</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
For the most recent survey schedules for each survey unit please see http://southwest.coastalmonitoring.org/latest-updates/survey-schedule/
Topographic Survey Report

Profile Data

Analysis has been conducted for those sites where a minimum of three surveys have been recorded. In general, changes are measured relative to the Mean Low Water Springs (MLWS) level. In cases where none of these levels can be reached the Master Profile is placed at the most appropriate level for the survey unit in question.

A full time series of plotted beach profiles is shown superimposed on and relative to a Master Profile for each profile location. The Master Profile provides the basis for calculation of beach cross-sectional 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 1). 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 as a graph for each profile (Figure 2).

Figure 1: Example Master Profile with CSA Calculated from the Surveyed GPS Profile
**Baseline Data**

As part of the Monitoring Programme specification, each survey unit receives a full topographic baseline survey once every five years. In addition, highly managed sites, or those with a beach management plan, receive an annual baseline survey. Baseline surveys include a full profile survey at 50m intervals and continuous spot height data collected at approximately 1m intervals across the whole beach to the level of MLWS. This continuous data also includes a feature code for each spot height data point recorded, indicating the surface sediment type.

Where there are at least two baseline surveys for a survey unit, a topographic difference model is produced based on the spot height elevations. The raw spot height data is processed into a grid model and successive models are subtracted from one another to produce a difference model for the survey unit. The spot height data from each survey can be used to derive Mean High Water (MHW) and Mean Low Water (MLW) contours along each survey unit. In some cases, where there is no topographic baseline data collected, the information described above may be derived from LiDAR data.

**Process Cell**

The Beach Change Summary maps contain an at-a-glance condition of the whole area between Land’s End and Hartland Point, with the lines representing the average accretion, no change or erosion for each survey unit where there is topographic data.
Survey Unit

Topographic changes within each survey unit are summarised on six maps where applicable:

- Beach change map (Spring to Spring).
- Beach change map (Baseline to Spring).
- Topographic difference model map (Phase 1 Baseline to 2016 Repeat Baseline).
- Topographic difference model map (2015 Repeat Baseline to 2016 Repeat Baseline).
- Mean High Water line.
- Sediment distribution maps.

Beach change maps show the location of each beach profile, superimposed on an aerial photograph (note that the line may be extended for clarity). Where possible, the annual change in cross-sectional area has been calculated from Spring 2015 to Spring 2016 and from Baseline 2007 to Spring 2016.

Survey Schedules

Spring interim surveys are conducted between January and March each year. Baseline and repeat baseline surveys are carried out between April and August. A minimum of 8 weeks must elapse between successive surveys. The dates of individual surveys are given in the topographic survey record and with the analysis for each survey unit.
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.

\[
\frac{CSA_1 - CSA_2}{CSA_2} \times 100 \quad \text{eqn}(1)
\]

Where \(CSA_1\) = most recent spring 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.

Net Sediment Volume Calculation

This is the volume change in \(m^3\) across each individual survey unit over time. The initial volumes are derived from the Digital Terrain Models (DTM) made for consecutive baseline topographic surveys. Both models are clipped to cover the same area, and a volume above the MLWS plane is calculated for each DTM. The net sediment change is calculated as

\[
Vol_1 - Vol_2 \quad \text{eqn}(2)
\]

Where \(Vol_1\) = most recent DTM model volume and \(Vol_2\) = earlier DTM model volume. Therefore a net change of \(-19,730m^3\) represents erosion since the earlier survey.
% Change in Cross-sectional Area (Spring 2015 to Spring 2016)

- **Survey Unit Boundary**
- **Accretion**
- **No Change**
- **Erosion**

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

- < 5%
Actual Change in Cross-sectional Area
(Baseline 2007 to Spring 2016)

- Survey Unit Boundary

Accretion
No Change
Erosion

0 10 20 km

Beach Change Summary - Baseline 2007 to Spring 2016
CISCAG - Cornwall
With a similar trend to previous spring to spring analysis, most profiles have lost material, with the exception of profile 7a00081. Profile 7a00062 has experienced the greatest changes, losing ~46m² of sediment. Profiles 7a00053, 7a00066 and 7a00081 have displayed a trend of erosion from the upper part of the beach and accretion on the lower beach, which has resulted in smaller overall changes in cross-sectional area at these locations.

Since the baseline survey in 2007, the profiles to the middle of the survey unit have all lost material, with profile 7a00062 losing ~138m², equating to 16% change in cross-sectional area. The remaining profiles have shown very little change.
Actual Change in Cross-sectional Area (Spring 2015 to Spring 2016)

- 7a00081 (4%)
- 7a00066 (-3%)
- 7a00062 (-6%)
- 7a00058 (-6%)
- 7a00053 (-4%)

Survey Unit Boundary

- No Change
- Erosion
- Accretion

Aerial Photography from 2013
Actual Change in Cross-sectional Area (Baseline 2007 to Spring 2016)

<table>
<thead>
<tr>
<th>Area</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>7a00081</td>
<td>1%</td>
</tr>
<tr>
<td>7a00066</td>
<td>-9%</td>
</tr>
<tr>
<td>7a00068</td>
<td>-16%</td>
</tr>
<tr>
<td>7a00058</td>
<td>-13%</td>
</tr>
</tbody>
</table>

Survey Unit Boundary

Aerial Photography from 2013

Survey Unit Boundary

No Change

Erosion

Accretion

> 30 m²

15 - 30 m²

5 - 15 m²

< 5 m²

5 - 15 m²

15 - 30 m²

> 30 m²
Contours

- MHW 2016 - 02
- MHW 2014 - 04
- MHW 2012 - 04
- MHW 2011 - 03
- MHW 2009 - 02
- MHW 2008 - 02
- MLW 2016 - 02

MHW Elevation: 1.95OD
MLW Elevation: -1.65OD
Since the 2015 spring survey, all profiles within the survey unit have lost sediment, with the exception of profile 7a00685 which has gained very little material, equating to 1% change in cross-sectional area. Profile 7a00679 has on the other hand lost ~46m² of material along its whole length.

Over the longer term, all profiles have lost material. To the east of the survey unit, material has been deposited on the very upper beach in front of residential buildings; however, an overall trend for erosion is present. Profiles 7a00679 and 7a00681, at the western end, have undergone the greatest changes, equating to 11% and 8% decrease in cross-sectional area respectively.

### Profile Cross-Sectional Area

<table>
<thead>
<tr>
<th>Profile</th>
<th>Spring to Spring</th>
<th>Baseline to Spring</th>
<th>Master Profile</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Feb 2015 to Mar 2016</td>
<td>Mar 2007 to Mar 2016</td>
<td>Level (m)</td>
</tr>
<tr>
<td></td>
<td>CSA Diff (m²)</td>
<td>% Change</td>
<td>CSA Diff (m²)</td>
</tr>
<tr>
<td>7a00679</td>
<td>-45.5</td>
<td>-8</td>
<td>-63.3</td>
</tr>
<tr>
<td>7a00681</td>
<td>-12.1</td>
<td>-3</td>
<td>-38.8</td>
</tr>
<tr>
<td>7a00685</td>
<td>5.8</td>
<td>1</td>
<td>-9.5</td>
</tr>
<tr>
<td>7a00689</td>
<td>-9.4</td>
<td>-2</td>
<td>-9.3</td>
</tr>
</tbody>
</table>
South West Regional Coastal Monitoring Programme

Annual Survey Report 2016

Actual Change in Cross-sectional Area (Spring 2015 to Spring 2016)

Survey Unit Boundary

Accretion
No Change
Erosion

Aerial Photography from 2013

0 100 200 m

7a7A2-2 - Porthmeor - Beach Change

CISCAG - Cornwall
Actual Change in Cross-sectional Area (Baseline 2007 to Spring 2016)

Survey Unit Boundary

Accretion

No Change

Erosion

Aerial Photography from 2013
Contours

- MHW 2016 - 02
- MHW 2009 - 02
- MHW 2014 - 04
- MHW 2008 - 03
- MHW 2012 - 04
- MHW 2007 - 03
- MHW 2011 - 03
- MLW 2016 - 02

MHW Elevation: 2.35OD
MLW Elevation: -1.8OD

Aerial Photography from 2013
### Survey Unit

<table>
<thead>
<tr>
<th>Survey Unit</th>
<th>7a7A2-3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local Name</td>
<td>Porth Gwidden</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Profile Cross-Sectional Area</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Profile</strong></td>
</tr>
<tr>
<td>CSA Diff (m²)</td>
</tr>
<tr>
<td>7a00700A</td>
</tr>
<tr>
<td>7a00705</td>
</tr>
</tbody>
</table>

Over the last year, profile 7a00705 has increased its cross-sectional area by 20%, amounting to a gain of ~29m² of material. Profile 7a00700A has displayed very low level accretion.

Over the longer term, both profiles have experienced significant accretion; sediment has been deposited along the whole length of the profiles, resulting in changes in cross-sectional area up to 37%.

The large %changes in cross-sectional area observed are due to the short length of the profiles within the survey unit.
LiDAR data used for 2008.

Actual Change in Cross-sectional Area (Baseline 2008 to Spring 2016)

Survey Unit Boundary

LiDAR data used for 2008.

Aerial Photography from 2013

0 90 180 m

Accretion
No Change
Erosion

> 30 m²
15 - 30 m²
5 - 15 m²
5 - 15 m²
15 - 30 m²
> 30 m²
As opposed to previous year to year analysis, all profiles have gained material, with profile 7a00706A experiencing the greatest percentage change (32%) and profile 7a00708A gaining the greatest amount of sediment (~79m²). In general, all profiles have displayed a trend for accretion on the mid-lower beach.

With a similar trend to the spring to spring analysis, all profiles have been following a trend for accretion, with profiles 7a00706B, 7a00708A and 7a00714 experiencing cross-sectional area changes up to 271m². It must to be noted that the relatively high %change (35%) for profile 7a00706A is due to its short length.

<table>
<thead>
<tr>
<th>Profile</th>
<th>Spring to Spring</th>
<th>Baseline to Spring</th>
<th>Master Profile Level (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>CSA Diff (m²)</td>
<td>% Change</td>
<td>CSA Diff (m²)</td>
</tr>
<tr>
<td>7a00706A</td>
<td>31.8</td>
<td>32</td>
<td>34.3</td>
</tr>
<tr>
<td>7a00706B</td>
<td>1.6</td>
<td>0</td>
<td>271.0</td>
</tr>
<tr>
<td>7a00708A</td>
<td>78.9</td>
<td>9</td>
<td>252.5</td>
</tr>
<tr>
<td>7a00714</td>
<td>46.0</td>
<td>12</td>
<td>157.0</td>
</tr>
<tr>
<td>7a00722</td>
<td>24.4</td>
<td>4</td>
<td>104.6</td>
</tr>
<tr>
<td>7a00724</td>
<td>22.2</td>
<td>3</td>
<td>108.3</td>
</tr>
<tr>
<td>7a00726</td>
<td>9.5</td>
<td>2</td>
<td>91.3</td>
</tr>
</tbody>
</table>
South West Regional Coastal Monitoring Programme
Annual Survey Report 2016

Actual Change in Cross-sectional Area (Spring 2015 to Spring 2016)

Accretion
- > 30 m²
- 15 - 30 m²
- 5 - 15 m²
- < 5 m²

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

Survey Unit Boundary

Aerial Photography from 2013

7a7A2-4 - St Ives - Beach Change

CISCAG - Cornwall

45
Actual Change in Cross-sectional Area (Baseline 2007 to Spring 2016)

Aerial Photography from 2013

No Change

Accretion

> 30 m²

15 - 30 m²

5 - 15 m²

Erosion

< 5 m²

5 - 15 m²

15 - 30 m²

> 30 m²

Survey Unit Boundary
MHW Elevation: 2.35OD
MLW Elevation: -1.8OD

Contours

- MHW 2016 - 02
- MHW 2007 - 03
- MHW 2014 - 04
- MLW 2016 - 02
- MHW 2012 - 04
- MHW 2011 - 03
- MLW 2009 - 02
- MHW 2008 - 03

Aerial Photography from 2013
In the last year, profiles to the north of the survey unit have experienced no change in overall cross-sectional area; sediment has however been moved from the upper beach to the lower beach. To the south of the survey unit, profiles present a similar trend for accretion on the lower beach and erosion from the upper beach, which results in an overall sediment gain of ~25m² for profile 7a00759.

Longer term, accretion has occurred along all profile lines, with sediment deposition taking place mostly at the top of the beach. Profile 7a00759 has been affected by the greatest changes, resulting in a gain of 56m² of material.
Actual Change in Cross-sectional Area (Baseline 2007 to Spring 2016)

Survey Unit Boundary

Accretion
No Change
Erosion

> 30 m²
15 - 30 m²
< 5 m²
5 - 15 m²
15 - 30 m²
> 30 m²

Aerial Photography from 2013

0 200 400 m

7a7A2-5 - Carbis Bay - Beach Change

CISCAG - Cornwall
MHW Elevation: 2.35OD
MLW Elevation: -1.8OD
### Survey Unit 7a7A2-6

#### Local Name Hayle

<table>
<thead>
<tr>
<th>Survey Type</th>
<th>Dates Surveyed</th>
<th>Observations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spring - Spring</td>
<td>22/02/2015 - 09/04/2016</td>
<td>Since the 2015 spring interim survey, profiles located to the west of the survey unit have experienced little change, with the exception of profile 7a00783, which has experienced a loss of ~42m² of material, mostly from the upper beach. Moving east, profiles 7a00975 and 7a00799 have both lost substantial amounts of sediment, with the latter eroding by 14%. However, it must be noted that profile 7a00799 ends at the river, and therefore sediment losses or gains need to be carefully evaluated past the profile's end point. Profile 7a00807, located to the east of the river, has lost ~83m² of material along its entire cross-section. Whilst the majority of profiles that cross the river have lost material, profile 7a00809 has experienced an increase in cross-sectional area by 6% since February 2015. Profiles 7a00813 and 7a00817 have furthermore displayed high level erosion (up to 17%), with great changes taking place along the whole length of the profiles. Finally, to the eastern end of the survey unit, the remaining two profiles have shown a trend for accretion, with sediment gains mostly at the top of the beach.</td>
</tr>
</tbody>
</table>

| Baseline - Spring            | 24/03/2007 - 09/04/2016 | Over the longer term, most profiles have followed a trend for erosion, with profiles to the west of the survey unit losing sediment, mostly from the upper beach, and those located near the river being the most dynamic. Substantial amounts of sediment have been lost by profiles 7a00799 and 7a00817, which have changed by 25% and 22% respectively. Again, it must be noted that both profiles are strongly affected by the position of the river. Profile 7a00805 has displayed a contrary trend for accretion, which resulted in a gain of 234m² of sediment. The high %change is due in this case to the short length of the profile. Finally, no change has been observed at the very eastern end of the survey unit. |

| Spring - Spring              | 22/04/2015 - 04/06/2016 | Over the last year, the survey unit has displayed a trend for erosion, with 34,152m³ of material being lost. To the west of the survey unit, very little change has occurred, with the exception of the dunes that have seen considerable sediment losses. Along the river course, accretion has dominated to the west, whilst erosion has mostly occurred to the east of the Hayle. The beach to the east of the river has shown a very dynamic behaviour. Between profiles 7a00804 and 7a00813 material has mostly been lost. Pockets of accretion have prevailed on the upper beach, to the east of profile 7a00813, whilst the lower beach appears to have mostly eroded over the past year. Net sediment balance above MLWS | -34,152m³ |
|                             |                         | Net sediment change                                                                                                                                  | -1.1% |
| Baseline - Spring            | 24/03/2007 - 04/06/2016 | The longer term analysis displays a similar trend to the year on year trend, with larger sediment change pockets to the west of the river and smaller pockets to the east, confirming the more dynamic behaviour of the former. The dunes between profile 7a00779 and 7a00795 and the beach between profiles 7a00804 and 7a00813 have been affected by high level erosion, whilst accretion has occurred along |
the river, between profiles 7a00805 and 7a00804, and on the upper beach to the east of the survey unit. Overall, 50,033 m³ of sediment have been lost, equating to a 1.7% net sediment change.

| Net sediment balance above MLWS | -50,033 m³ |
| Net sediment change            | -1.7%      |

The changing position of the river Hayle has great influence on the shape of the profiles that intersect it, hence the different level of the master profile for profiles 7a00805 to 7a00813 and the high %changes at these locations.

<table>
<thead>
<tr>
<th>Profile</th>
<th>Spring to Spring CSA Diff (m³)</th>
<th>% Change</th>
<th>Baseline to Spring CSA Diff (m³)</th>
<th>% Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>7a00775</td>
<td>-14.1</td>
<td>-2</td>
<td>-6.3</td>
<td>-1</td>
</tr>
<tr>
<td>7a00779</td>
<td>0.0</td>
<td>0</td>
<td>-31.4</td>
<td>-3</td>
</tr>
<tr>
<td>7a00783</td>
<td>-42.4</td>
<td>-4</td>
<td>-91.6</td>
<td>-7</td>
</tr>
<tr>
<td>7a00787</td>
<td>0.1</td>
<td>0</td>
<td>-60.4</td>
<td>-5</td>
</tr>
<tr>
<td>7a00791</td>
<td>7.8</td>
<td>1</td>
<td>-45.0</td>
<td>-3</td>
</tr>
<tr>
<td>7a00795</td>
<td>-38.3</td>
<td>-2</td>
<td>6.9</td>
<td>0</td>
</tr>
<tr>
<td>7a00799</td>
<td>-204.0</td>
<td>-14</td>
<td>-426.4</td>
<td>-25</td>
</tr>
<tr>
<td>7a00804</td>
<td>-10.7</td>
<td>-5</td>
<td>-20.3</td>
<td>-8</td>
</tr>
<tr>
<td>7a00805</td>
<td>0.7</td>
<td>0</td>
<td>233.6</td>
<td>61</td>
</tr>
<tr>
<td>7a00807</td>
<td>-82.9</td>
<td>-12</td>
<td>-117.6</td>
<td>-17</td>
</tr>
<tr>
<td>7a00809</td>
<td>39.8</td>
<td>6</td>
<td>-93.0</td>
<td>-12</td>
</tr>
<tr>
<td>7a00813</td>
<td>-142.6</td>
<td>-17</td>
<td>-69.0</td>
<td>-9</td>
</tr>
<tr>
<td>7a00817</td>
<td>-36.1</td>
<td>-4</td>
<td>-221.5</td>
<td>-22</td>
</tr>
<tr>
<td>7a00820</td>
<td>14.0</td>
<td>2</td>
<td>-0.8</td>
<td>0</td>
</tr>
<tr>
<td>7a00823</td>
<td>38.4</td>
<td>7</td>
<td>1.6</td>
<td>0</td>
</tr>
</tbody>
</table>
South West Regional Coastal Monitoring Programme

Annual Survey Report 2016

7a7A2-6 - Hayle - Beach Change

Actual Change in Cross-sectional Area (Spring 2015 to Spring 2016)

Survey Unit Boundary

Accretion
Erosion
No Change

> 30 m²
15 - 30 m²
5 - 15 m²
< 5 m²
15 - 30 m²
> 30 m²

Aerial Photography from 2013

CISCAG - Cornwall
South West Regional Coastal Monitoring Programme  
Annual Survey Report 2016

Actual Change in Cross-sectional Area  
(Baseline 2007 to Spring 2016)

Survey Unit Boundary

Accretion  
No Change  
Erosion

> 30 m²  
15 - 30 m²  
5 - 15 m²  
< 5 m²  
15 - 30 m²  
> 30 m²

Aerial Photography from 2013

5a7A2-6 - Hayle - Beach Change  
CISCAG - Cornwall
**Change in Elevation (m) between April 2015 and April 2016**

- **Model Extent**

**Legend**
- **< -3**
- **-3 - -2.5**
- **-2.5 - -2**
- **-2 - -1.5**
- **-1.5 - -1**
- **-1 - -0.5**
- **-0.5 - 0.25**
- **0.25 - 0.5**
- **0.5 - 1**
- **1 - 1.5**
- **1.5 - 2**
- **2 - 2.5**
- **2.5 - 3**
- **> 3**

**Elevation (m)**

- **Accretion**
- **Erosion**
- **No Change**

**Aerial Photography from 2013**

**South West Regional Coastal Monitoring Programme**

**Annual Survey Report 2016**

**7a7A2-6 - Hayle - Topographic Difference Model**

**CISCAG - Cornwall**
Change in Elevation (m) between March 2007 and April 2016

Model Extent

Elevation (m)

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

ACCRETION
EROSION
NO CHANGE

Aerial Photography from 2013

0 260 520 m
Survey Unit | 7a7A2-7
---|---
Local Name | Hayle to Godrevy

### Profile Cross-Sectional Area

<table>
<thead>
<tr>
<th>Profile</th>
<th>CSA Diff (m²)</th>
<th>% Change</th>
<th>CSA Diff (m²)</th>
<th>% Change</th>
<th>Level (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>7a00829</td>
<td>23.0</td>
<td>3</td>
<td>5.7</td>
<td>1</td>
<td>-2.6</td>
</tr>
<tr>
<td>7a00839</td>
<td>21.6</td>
<td>2</td>
<td>-79.3</td>
<td>-8</td>
<td>-2.6</td>
</tr>
<tr>
<td>7a00849</td>
<td>1.6</td>
<td>0</td>
<td>-36.8</td>
<td>-3</td>
<td>-2.6</td>
</tr>
<tr>
<td>7a00857</td>
<td>-8.8</td>
<td>-1</td>
<td>-10.8</td>
<td>-1</td>
<td>-2.6</td>
</tr>
<tr>
<td>7a00869</td>
<td>-9.0</td>
<td>-1</td>
<td>-85.5</td>
<td>-7</td>
<td>-2.6</td>
</tr>
<tr>
<td>7a00879</td>
<td>-8.4</td>
<td>-1</td>
<td>-71.7</td>
<td>-7</td>
<td>-2.6</td>
</tr>
<tr>
<td>7a00891</td>
<td>13.6</td>
<td>2</td>
<td>16.8</td>
<td>3</td>
<td>-2.6</td>
</tr>
<tr>
<td>7a00899</td>
<td>-56.3</td>
<td>-7</td>
<td>-61.6</td>
<td>-8</td>
<td>-2.6</td>
</tr>
<tr>
<td>7a00909</td>
<td>-45.9</td>
<td>-5</td>
<td>-73.7</td>
<td>-8</td>
<td>-2.6</td>
</tr>
<tr>
<td>7a00919</td>
<td>-6.0</td>
<td>-1</td>
<td>-8.9</td>
<td>-2</td>
<td>-2.6</td>
</tr>
</tbody>
</table>

**Survey Type**

<table>
<thead>
<tr>
<th>Spring - Spring</th>
<th>Beach Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dates Surveyed</td>
<td>21/02/2015 - 10/03/2016</td>
</tr>
</tbody>
</table>

Over the past year, most profiles have experienced little change, with profiles to the west of the survey unit displaying a small trend for accretion and those to the middle for erosion. Conversely, profiles 7a00899 and 7a00909, to the east of the survey unit, have lost ~46m² and ~56m² of material, equating to 5% and 7% change respectively.

<table>
<thead>
<tr>
<th>Baseline - Spring</th>
<th>Beach Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dates Surveyed</td>
<td>21/03/2007 - 10/03/2016</td>
</tr>
</tbody>
</table>

Since the original baseline survey, the majority of profiles have lost sediment, with changes in cross-sectional area up to 8% for profiles 7a00839, 7a00899 and 7a00909. Despite the small cross-sectional area difference at location 7a00919, the profile trend has changed, resulting in sediment deposition on the mid-upper beach and less sediment on the lower beach.
### Actual Change in Cross-sectional Area (Spring 2015 to Spring 2016)

<table>
<thead>
<tr>
<th>Survey Unit Boundary</th>
<th>Accretion</th>
<th>Erosion</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>&gt; 30 m²</td>
<td>&gt; 30 m²</td>
</tr>
<tr>
<td></td>
<td>15 - 30 m²</td>
<td>15 - 30 m²</td>
</tr>
<tr>
<td></td>
<td>5 - 15 m²</td>
<td>5 - 15 m²</td>
</tr>
<tr>
<td>No Change</td>
<td>&lt; 5 m²</td>
<td>&lt; 5 m²</td>
</tr>
</tbody>
</table>

Aerial Photography from 2013

Survey Unit Boundary

---

7a7A2-7 - Hayle to Godrevy - Beach Change
South West Regional Coastal Monitoring Programme

Annual Survey Report 2016

CISCAG - Cornwall

Aerial Photography from 2013

Actual Change in Cross-sectional Area (Baseline 2007 to Spring 2016)

<table>
<thead>
<tr>
<th>Survey Unit</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>7a00919</td>
<td>-2%</td>
</tr>
<tr>
<td>7a00909</td>
<td>-8%</td>
</tr>
<tr>
<td>7a00899</td>
<td>-8%</td>
</tr>
<tr>
<td>7a00891</td>
<td>3%</td>
</tr>
<tr>
<td>7a00869</td>
<td>-7%</td>
</tr>
<tr>
<td>7a00857</td>
<td>-1%</td>
</tr>
<tr>
<td>7a00849</td>
<td>-3%</td>
</tr>
<tr>
<td>7a00829</td>
<td>-8%</td>
</tr>
</tbody>
</table>

Survey Unit Boundary

Accretion
- > 30 m²
- 15 - 30 m²
- 5 - 15 m²
- < 5 m²

Erosion
- No Change
- 15 - 30 m²
- > 30 m²

Aerial Photography from 2013

0 410 820 m

7a7A2-7 - Hayle to Godrevy - Beach Change

CISCAG - Cornwall
MHW Elevation: 2.35OD
MLW Elevation: -1.8OD

Contours

<table>
<thead>
<tr>
<th>Year</th>
<th>Color</th>
</tr>
</thead>
<tbody>
<tr>
<td>MHW 2016 - 02</td>
<td>Cyan</td>
</tr>
<tr>
<td>MHW 2014 - 04</td>
<td>Green</td>
</tr>
<tr>
<td>MHW 2012 - 04</td>
<td>Orange</td>
</tr>
<tr>
<td>MHW 2011 - 03</td>
<td>Blue</td>
</tr>
<tr>
<td>MHW 2009 - 02</td>
<td>Yellow</td>
</tr>
<tr>
<td>MHW 2008 - 03</td>
<td>Red</td>
</tr>
<tr>
<td>MLW 2016 - 02</td>
<td>Black</td>
</tr>
</tbody>
</table>

Aerial Photography from 2013

0 410 820 m
Contours

MHW Elevation: 2.35OD
MLW Elevation: -1.80OD

Aerial Photography from 2013

7a7A2-7 - Hayle to Godrevy - MHW and MLW Contours (2 of 3)
Contours

- MHW 2016 - 02
- MHW 2009 - 02
- MHW 2014 - 04
- MHW 2008 - 03
- MHW 2012 - 04
- MLW 2016 - 02
- MHW 2011 - 03

MHW Elevation: 2.35OD
MLW Elevation: -1.8OD
Over the short term, profile 7a01106 has gained 17.2m² of material, equating to an increase of 5% in cross-sectional area, while profile 7a01109 has lost 33m².

Longer term, both profiles have been following a trend for erosion, with profile 7a01109 having lost almost 39m² of material, equating to a 7% decrease in cross-sectional area. Erosion has occurred on the lower beach for the most.
Actual Change in Cross-sectional Area (Baseline 2007 to Spring 2016)

Survey Unit Boundary

- Accretion
- No Change
- Erosion

Aerial Photography from 2013

CISCAG - Cornwall
As opposed to previous spring to spring analysis, both profiles have experienced major sediment losses, equating to cross-sectional area changes of ~118m² and 104m² for profiles 7a01213 and 7a01215 respectively.

Over the longer term, both profiles have displayed a trend for erosion, with sediment losses of up to 123m². Material has been lost along most of the cross-section of the beach and from the dunes along profile 7a01215, resulting in both profiles being at their lowest level since the beginning of the Programme.

<table>
<thead>
<tr>
<th>Survey Type</th>
<th>Dates Surveyed</th>
<th>Observations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spring - Spring</td>
<td>20/02/2015 - 12/03/2016</td>
<td>As opposed to previous spring to spring analysis, both profiles have experienced major sediment losses, equating to cross-sectional area changes of ~118m² and 104m² for profiles 7a01213 and 7a01215 respectively.</td>
</tr>
<tr>
<td>Baseline - Spring</td>
<td>21/03/2007 - 12/03/2016</td>
<td>Over the longer term, both profiles have displayed a trend for erosion, with sediment losses of up to 123m². Material has been lost along most of the cross-section of the beach and from the dunes along profile 7a01215, resulting in both profiles being at their lowest level since the beginning of the Programme.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Profile</th>
<th>Spring to Spring</th>
<th>Baseline to Spring</th>
<th>Master Profile Level (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>CS Diff (m²)</td>
<td>% Change</td>
<td>CS Diff (m²)</td>
</tr>
<tr>
<td>7a01213</td>
<td>-117.6</td>
<td>-11</td>
<td>-38.1</td>
</tr>
<tr>
<td>7a01215</td>
<td>-104.0</td>
<td>-6</td>
<td>-122.6</td>
</tr>
</tbody>
</table>
South West Regional Coastal Monitoring Programme

Annual Survey Report 2016

Actual Change in Cross-sectional Area (Spring 2015 to Spring 2016)

Survey Unit Boundary

Aerial Photography from 2013

7a7A3-4 - Porthtowan - Beach Change

CISCAG - Cornwall
Actual Change in Cross-sectional Area (Baseline 2007 to Spring 2016)

Survey Unit Boundary

7a01213 (-4%)

7a01215 (-7%)

Aerial Photography from 2013

Accretion
No Change
Erosion

> 30 m²
15 - 30 m²
5 - 15 m²
< 5 m²
15 - 30 m²
> 30 m²

0 100 200 m

7a7A3-4 - Porthtowan - Beach Change

CISCAG - Cornwall
**Survey Unit** 7a7A3-8

**Local Name** Perranporth

<table>
<thead>
<tr>
<th>Survey Type</th>
<th>Dates Surveyed</th>
<th>Observations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spring - Spring Beach Change</td>
<td>18/02/2015-08/03/2016</td>
<td>Over the short term, most profiles have experienced erosion, with the exception of profile 7a01435, which has seen a sediment gain of 25m² on the lower beach for the most, equating to 11% increase in cross-sectional area. Profile 7a01441, in front of the café, has seen very little change over the past year. The remaining profiles have experienced sediment losses ranging between 31m² and 148m², with erosion affecting most of the length of the profiles. The relatively small % change values are due to the beach being particularly wide.</td>
</tr>
<tr>
<td>Baseline - Spring Beach Change</td>
<td>04/04/2007-08/03/2016</td>
<td>Since the original baseline survey in 2007, profiles to the south of the survey unit have shown a trend for accretion, with sediment deposition mostly on the lower beach. Profile 7a01141 has overall remained stable, with some accretion at the back of the beach, in front of the café. Profiles to the north of the survey unit have eroded, resulting in 6% decrease in cross-sectional area. As per the spring to spring analysis, sediment losses have affected most of the cross-section of the beach.</td>
</tr>
</tbody>
</table>

### Comments

- Over the short term, most profiles have experienced erosion, with the exception of profile 7a01435, which has seen a sediment gain of 25m² on the lower beach for the most, equating to 11% increase in cross-sectional area. Profile 7a01441, in front of the café, has seen very little change over the past year. The remaining profiles have experienced sediment losses ranging between 31m² and 148m², with erosion affecting most of the length of the profiles. The relatively small % change values are due to the beach being particularly wide.

- Since the original baseline survey in 2007, profiles to the south of the survey unit have shown a trend for accretion, with sediment deposition mostly on the lower beach. Profile 7a01141 has overall remained stable, with some accretion at the back of the beach, in front of the café. Profiles to the north of the survey unit have eroded, resulting in 6% decrease in cross-sectional area. As per the spring to spring analysis, sediment losses have affected most of the cross-section of the beach.

<table>
<thead>
<tr>
<th>Profile</th>
<th>Spring to Spring</th>
<th>Baseline to Spring</th>
<th>Master Profile Level (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>CSA Diff (m²)</td>
<td>% Change</td>
<td>CSA Diff (m²)</td>
</tr>
<tr>
<td>7a01435</td>
<td>24.9</td>
<td>11</td>
<td>24.3</td>
</tr>
<tr>
<td>7a01438</td>
<td>-30.9</td>
<td>-2</td>
<td>73.6</td>
</tr>
<tr>
<td>7a01441</td>
<td>-3.3</td>
<td>0</td>
<td>-5.5</td>
</tr>
<tr>
<td>7a01444</td>
<td>-148.3</td>
<td>-7</td>
<td>-124.3</td>
</tr>
<tr>
<td>7a01448</td>
<td>-67.9</td>
<td>-5</td>
<td>-81.4</td>
</tr>
</tbody>
</table>
Actual Change in Cross-sectional Area (Baseline 2007 to Spring 2016)

Survey Unit Boundary

- 7a01448 (-6%)
- 7a01444 (-6%)
- 7a01441 (0%)
- 7a01438 (4%)
- 7a01435 (11%)
Contours

- MHW 2016 - 03
- MHW 2009 - 02
- MHW 2014 - 04
- MHW 2008 - 02
- MHW 2012 - 04
- MLW 2016 - 03
- MLW 2011 - 01

MHW Elevation: 2.45OD
MLW Elevation: -1.95OD

7a7A3-8 - Perranporth - MHW and MLW Contours

CISCAG - Cornwall
## Annual Survey Report Land's End to Hartland Point 2016

### Survey Unit

<table>
<thead>
<tr>
<th>Survey Unit</th>
<th>7a7A3-9</th>
</tr>
</thead>
</table>

### Local Name

<table>
<thead>
<tr>
<th>Local Name</th>
<th>Perran Sands</th>
</tr>
</thead>
</table>

### Survey Type

<table>
<thead>
<tr>
<th>Survey Type</th>
<th>Dates Surveyed</th>
<th>Observations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spring - Spring</td>
<td>Beach Change 18/02/2015 - 03/08/2016</td>
<td>Unlike previous spring to spring analysis, where the survey unit displayed a trend for accretion, all profiles have experienced high level erosion. The greatest sediment loss (~194m²) has occurred along profile 7a01477, despite its low %change value, which is due to the beach being more than 500m wide at this location.</td>
</tr>
<tr>
<td>Baseline - Spring</td>
<td>Beach Change 05/04/2007 - 03/08/2016</td>
<td>Over the longer term, profile 7a01487 has gained 16.5m² of material, whilst the remaining profiles have experienced high level erosion, with sediment being lost along the entire cross-shore distance. Along profile 7a01477, substantial amounts of material have also been lost from the dunes, resulting in an overall sediment loss of 713m².</td>
</tr>
</tbody>
</table>

### Profile Cross-Sectional Area

<table>
<thead>
<tr>
<th>Profile</th>
<th>CSA Diff (m²)</th>
<th>% Change</th>
<th>CSA Diff (m²)</th>
<th>% Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>7a01454</td>
<td>-10.0</td>
<td>-2</td>
<td>-56.7</td>
<td>-9</td>
</tr>
<tr>
<td>7a01464</td>
<td>-38.7</td>
<td>-4</td>
<td>-188.8</td>
<td>-17</td>
</tr>
<tr>
<td>7a01477</td>
<td>-193.7</td>
<td>-2</td>
<td>-712.5</td>
<td>-8</td>
</tr>
<tr>
<td>7a01487</td>
<td>-48.7</td>
<td>-4</td>
<td>16.5</td>
<td>2</td>
</tr>
<tr>
<td>7a01497</td>
<td>-48.8</td>
<td>-5</td>
<td>-44.7</td>
<td>-4</td>
</tr>
</tbody>
</table>
Actual Change in Cross-sectional Area (Spring 2015 to Spring 2016)

Survey Unit Boundary

Accretion
- > 30 m²
- 15 - 30 m²
- 5 - 15 m²
- < 5 m²

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

No Change

Survey Unit Boundary

Aerial Photography from 2013
Actual Change in Cross-sectional Area (Baseline 2007 to Spring 2016)

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

Survey Unit Boundary

Aerial Photography from 2013
MHW Elevation: 2.45OD
MLW Elevation: -1.95OD

Contours
- MHW 2016 - 03
- MHW 2014 - 04
- MHW 2012 - 04
- MHW 2011 - 01
- MHW 2009 - 02
- MHW 2008 - 02
- MLW 2016 - 03

Aerial Photography from 2013

0 290 580 m
### Survey Unit: 7a7A3-13
### Local Name: Crantock

<table>
<thead>
<tr>
<th>Survey Type</th>
<th>Dates Surveyed</th>
<th>Observations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spring - Spring</td>
<td>Beach Change 23/03/2015 - 13/03/2016</td>
<td>Over the last year, profile 7a01634 has lost considerable amounts of sediment (~174m²), mostly from the middle section of the beach. The remaining two profiles have remained stable, with only small changes to their shape.</td>
</tr>
<tr>
<td>Baseline - Spring</td>
<td>Beach Change 01/04/2007 - 13/03/2016</td>
<td>Longer term, both profiles 7a01634 and 7a01639 have experienced high level erosion, with sediment losses up to ~249m², equating to 5% change in cross-sectional area. As per spring to spring analysis, changes have mostly affected the middle section of the beach. Profile 7a01643 has, conversely, gained 92.2m² of material since the original baseline survey in 2007, which resulted in berm formation on the lower beach.</td>
</tr>
</tbody>
</table>

### Profile Cross-Sectional Area

<table>
<thead>
<tr>
<th>Profile</th>
<th>Spring to Spring</th>
<th>Baseline to Spring</th>
<th>Master Profile</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mar 2015 to Mar 2016</td>
<td>Apr 2007 to Mar 2016</td>
<td>Level (m)</td>
</tr>
<tr>
<td>CSA Diff (m²)</td>
<td>% Change</td>
<td>CSA Diff (m²)</td>
<td>% Change</td>
</tr>
<tr>
<td>7a01634</td>
<td>-174.1</td>
<td>-4</td>
<td>-110.0</td>
</tr>
<tr>
<td>7a01639</td>
<td>-0.6</td>
<td>0</td>
<td>-248.6</td>
</tr>
<tr>
<td>7a01643</td>
<td>-2.2</td>
<td>0</td>
<td>92.2</td>
</tr>
</tbody>
</table>
Actual Change in Cross-sectional Area (Spring 2015 to Spring 2016)

- Survey Unit Boundary

- Accretion
- Erosion
- No Change

Aerial Photography from 2013
### Survey Unit

<table>
<thead>
<tr>
<th>Survey Unit</th>
<th>7a7A3-15</th>
</tr>
</thead>
</table>

### Local Name

<table>
<thead>
<tr>
<th>Local Name</th>
<th>Fistral Beach</th>
</tr>
</thead>
</table>

### Survey Type

<table>
<thead>
<tr>
<th>Survey Type</th>
<th>Dates Surveyed</th>
<th>Observations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spring - Spring</td>
<td>18/02/2015 - 13/03/2016</td>
<td>Over the last year, all profiles within the survey unit have shown a trend for erosion, with the exception of profile 7a01686, which has seen a sediment gain of 23.8m², equating to an increase of 3% in cross-sectional area. Cross-sectional area changes for the remaining profiles have resulted in sediment losses up to ~35m².</td>
</tr>
<tr>
<td>Baseline - Spring</td>
<td>06/04/2007 - 13/03/2016</td>
<td>Since the original baseline survey in 2007, most profiles have experienced a decrease in cross-sectional area up to 4%. Steepening of the upper beach and dune face retreat has occurred along profile 7a0169. Profile 7a01694 has remained stable.</td>
</tr>
</tbody>
</table>

### Profile Cross-Sectional Area

<table>
<thead>
<tr>
<th>Profile</th>
<th>Spring to Spring</th>
<th>Baseline to Spring</th>
<th>Master Profile Level (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>CSA Diff (m²)</td>
<td>% Change</td>
<td>CSA Diff (m²)</td>
</tr>
<tr>
<td>7a01682</td>
<td>-32.8</td>
<td>-3</td>
<td>-13.1</td>
</tr>
<tr>
<td>7a01686</td>
<td>23.8</td>
<td>3</td>
<td>-43.7</td>
</tr>
<tr>
<td>7a01690</td>
<td>-34.7</td>
<td>-2</td>
<td>-55.0</td>
</tr>
<tr>
<td>7a01694</td>
<td>-25.5</td>
<td>-2</td>
<td>5.1</td>
</tr>
</tbody>
</table>
Actual Change in Cross-sectional Area (Spring 2015 to Spring 2016)

- **Accretion**
  - $> 30 \text{ m}^2$
  - $15 - 30 \text{ m}^2$
  - $5 - 15 \text{ m}^2$
- **Erosion**
  - $< 5 \text{ m}^2$
  - $5 - 15 \text{ m}^2$
  - $15 - 30 \text{ m}^2$
  - $> 30 \text{ m}^2$
- **No Change**

Aerial Photography from 2013

Survey Unit Boundary

7a7A3-15 - Fistral Beach - Beach Change

CISCAG - Cornwall
South West Regional Coastal Monitoring Programme

Annual Survey Report 2016

CISCAG - Cornwall

Aerial Photography from 2013

Actual Change in Cross-sectional Area (Baseline 2007 to Spring 2016)

Survey Unit Boundary

Accretion

> 30 m²

15 - 30 m²

5 - 15 m²

No Change

< 5 m²

5 - 15 m²

Erosion

15 - 30 m²

> 30 m²

2

2

2

2

2

2

2

87
South West Regional Coastal Monitoring Programme

Annual Survey Report 2016

CISCAG - Cornwall

Contours

- MHW 2016 - 03
- MHW 2014 - 04
- MHW 2012 - 04
- MHW 2010 - 10
- MHW 2009 - 03
- MHW 2008 - 03
- MLW 2016 - 03

Aerial Photography from 2013

MHW Elevation: 2.55OD
MLW Elevation: -2.05OD
Since the last year, most profiles within the survey unit have displayed a trend for erosion, with the exception of profile 7a01746, to the west of the survey unit, which has increased its cross-sectional area by 3%, mostly on the lower beach. Profiles 7a01759 and 7a01764, to the west and the east of Tolcarne Point respectively, have experienced sediment losses of 32.8m² and ~45m², leaving the upper beach sediment depleted. Profile 7a01785, at the very eastern end, has also experienced erosion, losing 1% of its cross-sectional area.

Over the longer term, profile 7a01759 has remained stable, whilst profiles 7a01746 and 7a01766 have slightly accreted. Profile 7a01785, in Porth Beach, has, on the contrary, experienced erosion from the lower beach and deposition on the upper beach, resulting in an overall sediment loss of 56.5m². Material has also been lost along most of the cross-section of profiles 7a01753 and 7a01756, resulting in cross-sectional area changes of 6% and 4% respectively.

Profiles 7a01769, 7a01773, 7a01776 and 7a01779, which had been previously included in the analysis, have been excluded from this year’s report since they were not surveyed upon request of the owners of Lusty Glaze beach.

<table>
<thead>
<tr>
<th>Survey Type</th>
<th>Dates Surveyed</th>
<th>Observations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spring - Spring</td>
<td>19/02/2015 - 29/02/2016</td>
<td>Since the last year, most profiles within the survey unit have displayed a trend for erosion, with the exception of profile 7a01746, to the west of the survey unit, which has increased its cross-sectional area by 3%, mostly on the lower beach. Profiles 7a01759 and 7a01764, to the west and the east of Tolcarne Point respectively, have experienced sediment losses of 32.8m² and ~45m², leaving the upper beach sediment depleted. Profile 7a01785, at the very eastern end, has also experienced erosion, losing 1% of its cross-sectional area.</td>
</tr>
<tr>
<td>Baseline - Spring</td>
<td>03/04/2007 - 29/02/2016</td>
<td>Over the longer term, profile 7a01759 has remained stable, whilst profiles 7a01746 and 7a01766 have slightly accreted. Profile 7a01785, in Porth Beach, has, on the contrary, experienced erosion from the lower beach and deposition on the upper beach, resulting in an overall sediment loss of 56.5m². Material has also been lost along most of the cross-section of profiles 7a01753 and 7a01756, resulting in cross-sectional area changes of 6% and 4% respectively.</td>
</tr>
<tr>
<td>Comments</td>
<td></td>
<td>Profiles 7a01769, 7a01773, 7a01776 and 7a01779, which had been previously included in the analysis, have been excluded from this year’s report since they were not surveyed upon request of the owners of Lusty Glaze beach.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Profile</th>
<th>CSA Diff (m²)</th>
<th>% Change</th>
<th>CSA Diff (m²)</th>
<th>% Change</th>
<th>Master Profile Level (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>7a01746</td>
<td>8.4</td>
<td>3</td>
<td>8.3</td>
<td>3</td>
<td>-3</td>
</tr>
<tr>
<td>7a01749</td>
<td>-7.7</td>
<td>-1</td>
<td>-11.4</td>
<td>-2</td>
<td>-3</td>
</tr>
<tr>
<td>7a01753</td>
<td>-9.6</td>
<td>-4</td>
<td>-15.4</td>
<td>-6</td>
<td>-3</td>
</tr>
<tr>
<td>7a01756</td>
<td>-14.7</td>
<td>-2</td>
<td>-23.8</td>
<td>-4</td>
<td>-3</td>
</tr>
<tr>
<td>7a01759</td>
<td>-32.8</td>
<td>-3</td>
<td>-0.4</td>
<td>0</td>
<td>-3</td>
</tr>
<tr>
<td>7a01764</td>
<td>-44.9</td>
<td>-5</td>
<td>-12.0</td>
<td>-1</td>
<td>-3</td>
</tr>
<tr>
<td>7a01766</td>
<td>1.8</td>
<td>0</td>
<td>23.7</td>
<td>3</td>
<td>-3</td>
</tr>
<tr>
<td>7a01785</td>
<td>-27.3</td>
<td>-1</td>
<td>-56.5</td>
<td>-2</td>
<td>-3</td>
</tr>
</tbody>
</table>
Actual Change in Cross-sectional Area (Spring 2015 to Spring 2016)

Survey Unit Boundary

South West Regional Coastal Monitoring Programme

Annual Survey Report 2016

CISCAG - Cornwall

PLYMOUTH COASTAL OBSERVATORY

Aerial Photography from 2013

0 260 520 m

Accretion No Change Erosion

> 30 m² 15 - 30 m² < 5 m²

30 - 5 m² 15 - 30 m² > 30 m²

7a7A3-17 - Newquay - Beach Change

CISCAG - Cornwall
Actual Change in Cross-sectional Area (Baseline 2007 to Spring 2016)

Survey Unit Boundary

Accretion
No Change
Erosion

> 30 m²
15 - 30 m²
5 - 15 m²
< 5 m²
15 - 30 m²
> 30 m²

Aerial Photography from 2013

South West Regional Coastal Monitoring Programme
Annual Survey Report 2016

7a7A3-17 - Newquay - Beach Change
CISCAG - Cornwall
### Annual Survey Report

#### Land’s End to Hartland Point 2016

<table>
<thead>
<tr>
<th>Survey Unit</th>
<th>7a7A3-18</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local Name</td>
<td>Watergate Bay</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Survey Type</th>
<th>Dates Surveyed</th>
<th>Observations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spring - Spring</td>
<td>20/02/2015 - 06/05/2016</td>
<td>Over the short term, the majority of profiles have been following a trend for accretion, with material being deposited along the whole cross-section of the beach. Accretion has occurred along profile 7a01819, which has increased its cross-sectional area by 48%. However, it must be appreciated that this exceptional value is due to the beach being relatively narrow at this location. Erosion has on the other hand affected profiles 7a01828, 7a01842 and 7a01866 for the most, with drops in cross-sectional area up to 12%. Substantial sediment losses have also taken place along profiles 7a01807, 7a01812 and 7a01874, which have lost between 11% and 32% of their cross-sectional area due to their short length.</td>
</tr>
<tr>
<td>Baseline - Spring</td>
<td>03/05/2007 - 06/05/2016</td>
<td>Longer term, the survey unit has been affected by a mixture of accretion, erosion and stability. Profiles 7a01803 to 7a01812, to the south of the survey unit, have mostly lost sediment from the lower beach and gained material on the upper beach, resulting in an overall decrease in cross-sectional area up to 10%. Profile 7a01819 has gained 14.6m² of material, equating to 26% change. Profiles 7a01824 to 7a01837 have seen accretion along the middle section of the beach and erosion from the upper and lower beach. To the centre of the survey unit, 68m² of sediment has been lost from the whole cross-section of profile 7a01842, whilst profile 7a01850, in front of the hotel, has increased its cross-sectional area by 9%, gaining 93m² of material. Finally, profile 7a01874, to the very north of the survey unit, has lost 22m², resulting in a 39% change in cross-sectional area.</td>
</tr>
</tbody>
</table>

| Comments | The beach being not uniformly wide results in the shorter profiles displaying relatively high % changes in cross-sectional area. |

---

*PLMOUTH COASTAL OBSERVATORY*
### Profile Cross-Sectional Area

<table>
<thead>
<tr>
<th>Profile</th>
<th>Spring to Spring</th>
<th>Baseline to Spring</th>
<th>Master Profile Level (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>CSA Diff (m²)</td>
<td>% Change</td>
<td>CSA Diff (m²)</td>
</tr>
<tr>
<td>7a01803</td>
<td>-1.8</td>
<td>0</td>
<td>-34.1</td>
</tr>
<tr>
<td>7a01807</td>
<td>-22.8</td>
<td>-11</td>
<td>-20.5</td>
</tr>
<tr>
<td>7a01812</td>
<td>-29.7</td>
<td>-19</td>
<td>-3.5</td>
</tr>
<tr>
<td>7a01819</td>
<td>23.4</td>
<td>48</td>
<td>14.6</td>
</tr>
<tr>
<td>7a01824</td>
<td>31.4</td>
<td>9</td>
<td>-25.9</td>
</tr>
<tr>
<td>7a01828</td>
<td>-61.9</td>
<td>-12</td>
<td>-8.1</td>
</tr>
<tr>
<td>7a01832</td>
<td>42.0</td>
<td>18</td>
<td>11.6</td>
</tr>
<tr>
<td>7a01837</td>
<td>2.6</td>
<td>1</td>
<td>4.2</td>
</tr>
<tr>
<td>7a01842</td>
<td>-82.0</td>
<td>-10</td>
<td>-68.1</td>
</tr>
<tr>
<td>7a01846</td>
<td>44.7</td>
<td>4</td>
<td>28.1</td>
</tr>
<tr>
<td>7a01850</td>
<td>50.8</td>
<td>4</td>
<td>93.1</td>
</tr>
<tr>
<td>7a01854</td>
<td>63.7</td>
<td>9</td>
<td>-1.5</td>
</tr>
<tr>
<td>7a01858</td>
<td>26.9</td>
<td>3</td>
<td>13.6</td>
</tr>
<tr>
<td>7a01862</td>
<td>58.8</td>
<td>8</td>
<td>-13.6</td>
</tr>
<tr>
<td>7a01866</td>
<td>-38.2</td>
<td>-4</td>
<td>28.2</td>
</tr>
<tr>
<td>7a01870</td>
<td>13.9</td>
<td>2</td>
<td>43.0</td>
</tr>
<tr>
<td>7a01874</td>
<td>-16.3</td>
<td>-32</td>
<td>-22.1</td>
</tr>
</tbody>
</table>
Actual Change in Cross-sectional Area (Baseline 2007 to Spring 2016)

Accretion
- > 30 m²
- 15 - 30 m²
- 5 - 15 m²
- < 5 m²

Erosion
- < 5 m²
- 5 - 15 m²
- 15 - 30 m²
- > 30 m²

No Change
- < 5 m²

Survey Unit Boundary

Aerial Photography from 2013
Since the last spring survey, profiles 7a01913 and 7a01916 have lost 42.3 m² and ~21 m² of material respectively. Despite lowering of the back of the beach along profile 7a01920, sediment has been gained at this location thanks the formation of a berm on the lower beach.

The baseline to spring analysis presents similar results to the year on year one, with erosion occurring along profiles 7a01913 and 7a01916 and accretion taking place along profile 7a01920. In particular, profile 7a01913 has experienced beach steepening and dune face retreat since the baseline survey in 2007.

<table>
<thead>
<tr>
<th>Survey Type</th>
<th>Dates Surveyed</th>
<th>Observations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spring - Spring</td>
<td>Beach Change 21/02/2015 - 14/03/2016</td>
<td>Since the last spring survey, profiles 7a01913 and 7a01916 have lost 42.3 m² and ~21 m² of material respectively. Despite lowering of the back of the beach along profile 7a01920, sediment has been gained at this location thanks the formation of a berm on the lower beach.</td>
</tr>
<tr>
<td>Baseline - Spring</td>
<td>Beach Change 02/04/2007 - 14/03/2016</td>
<td>The baseline to spring analysis presents similar results to the year on year one, with erosion occurring along profiles 7a01913 and 7a01916 and accretion taking place along profile 7a01920. In particular, profile 7a01913 has experienced beach steepening and dune face retreat since the baseline survey in 2007.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Profile</th>
<th>Spring to Spring</th>
<th>Baseline to Spring</th>
<th>Master Profile Level (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>CSA Diff (m²)</td>
<td>% Change</td>
<td>CSA Diff (m²)</td>
</tr>
<tr>
<td>7a01913</td>
<td>-42.3</td>
<td>-2</td>
<td>-130.9</td>
</tr>
<tr>
<td>7a01916</td>
<td>-20.8</td>
<td>-1</td>
<td>-14.3</td>
</tr>
<tr>
<td>7a01920</td>
<td>5.3</td>
<td>1</td>
<td>35.5</td>
</tr>
</tbody>
</table>
Actual Change in Cross-sectional Area (Baseline 2007 to Spring 2016)

Survey Unit Boundary

Accretion
No Change
Erosion

> 30 m²
15 - 30 m²
< 5 m²
5 - 15 m²
15 - 30 m²
> 30 m²

CISCAG - Cornwall

South West Regional Coastal Monitoring Programme

Annual Survey Report 2016

7a7A3-19 - Trenance - Beach Change

CISCAG - Cornwall
Survey Unit | 7a7A3-21
--- | ---
Local Name | Porthcothan

<table>
<thead>
<tr>
<th>Survey Type</th>
<th>Dates Surveyed</th>
<th>Observations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spring - Spring</td>
<td>Beach Change 21/02/2015 - 14/03/2016</td>
<td>Over the short term, profiles at either ends of the survey unit have experienced accretion, with 24.4m² of material being deposited along profile 7a02028, equating to a 5% increase in cross-sectional area. Profile 7a02031, in contrast, has lost ~78m² of material, mostly from the dunes.</td>
</tr>
<tr>
<td>Baseline - Spring</td>
<td>Beach Change 18/05/2007 - 14/03/2016</td>
<td>Similar to the spring to spring analysis, the short profiles to the ends of the survey unit have displayed a trend for accretion, whilst profile 7a02031 has seen a decrease in cross-sectional area of 7%, with a loss of 166.5m² of material.</td>
</tr>
</tbody>
</table>

### Profile Cross-Sectional Area

<table>
<thead>
<tr>
<th>Profile</th>
<th>Spring to Spring</th>
<th>Baseline to Spring</th>
<th>Master Profile Level (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSA Diff (m²)</td>
<td>% Change</td>
<td>CSA Diff (m²)</td>
<td>% Change</td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>7a02028</td>
<td>24.4</td>
<td>5</td>
<td>34.2</td>
</tr>
<tr>
<td>7a02031</td>
<td>-77.7</td>
<td>-3</td>
<td>-166.5</td>
</tr>
<tr>
<td>7a02034</td>
<td>3.5</td>
<td>3</td>
<td>3.5</td>
</tr>
</tbody>
</table>
Actual Change in Cross-sectional Area (Baseline 2007 to Spring 2016)

- Survey Unit Boundary

Accretion: ++
Erosion: --
No Change: -

Changes in Cross-sectional Area:
- 7a02028 (8%)
- 7a02031 (~7%)
- 7a02034 (3%)
Over the last year, profiles 7a02071 and 7a02092, to the ends of the survey unit, have experienced erosion, losing 16.1 m$^2$ and 72 m$^2$ of material respectively. The remaining profiles have either accreted or remained stable; profile 7a02088 has seen an increase in cross-sectional area of 14%, with sediment deposition both on the lower and upper beach.

Longer term, both profiles in Treyarnon Bay have displayed a trend for erosion, with sediment losses up to 42.8 m$^2$ along profile 7a02073, equating to 9% decrease in cross-sectional area. With the exception of profile 7a02092, which has lost over 320 m$^2$ of material, equating to 12% change in cross-sectional area, the remaining profiles in Constantine Bay have been following a trend for accretion, with ~102 m$^2$ of material being deposited along profile 7a02088.

<table>
<thead>
<tr>
<th>Survey Unit</th>
<th>7a7A3-23</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local Name</td>
<td>Treyarnon and Constantine</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Survey Type</th>
<th>Dates Surveyed</th>
<th>Observations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spring - Spring</td>
<td>22/02/2015 - 08/04/2016</td>
<td>Over the last year, profiles 7a02071 and 7a02092, to the ends of the survey unit, have experienced erosion, losing 16.1 m$^2$ and 72 m$^2$ of material respectively. The remaining profiles have either accreted or remained stable; profile 7a02088 has seen an increase in cross-sectional area of 14%, with sediment deposition both on the lower and upper beach.</td>
</tr>
<tr>
<td>Baseline - Spring</td>
<td>17/05/2007 - 08/04/2016</td>
<td>Longer term, both profiles in Treyarnon Bay have displayed a trend for erosion, with sediment losses up to 42.8 m$^2$ along profile 7a02073, equating to 9% decrease in cross-sectional area. With the exception of profile 7a02092, which has lost over 320 m$^2$ of material, equating to 12% change in cross-sectional area, the remaining profiles in Constantine Bay have been following a trend for accretion, with ~102 m$^2$ of material being deposited along profile 7a02088.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Profile</th>
<th>CSA Diff (m$^2$)</th>
<th>% Change</th>
<th>CSA Diff (m$^2$)</th>
<th>% Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>7a02071</td>
<td>-16.1</td>
<td>-1</td>
<td>-18.8</td>
<td>-1</td>
</tr>
<tr>
<td>7a02073</td>
<td>12.2</td>
<td>3</td>
<td>-42.8</td>
<td>-9</td>
</tr>
<tr>
<td>7a02084</td>
<td>0.4</td>
<td>0</td>
<td>74.2</td>
<td>2</td>
</tr>
<tr>
<td>7a02088</td>
<td>123.2</td>
<td>14</td>
<td>101.6</td>
<td>11</td>
</tr>
<tr>
<td>7a02092</td>
<td>-72.0</td>
<td>-3</td>
<td>-322.8</td>
<td>-12</td>
</tr>
</tbody>
</table>

Comments

103
Actual Change in Cross-sectional Area (Spring 2015 to Spring 2016)

- **7a02092 (-3%)**
- **7a02088 (14%)**
- **7a02084 (0%)**
- **7a02073 (3%)**
- **7a02071 (-1%)**

Survey Unit Boundary:
- **Accretion**:
  - > 30 m²
  - 15 - 30 m²
  - 5 - 15 m²
- **Erosion**:
  - < 5 m²
  - 5 - 15 m²
  - 15 - 30 m²
  - > 30 m²
- **No Change**

Aerial Photography from 2013
### Survey Unit

**7b7B1-2**

### Local Name

**Harlyn Bay**

<table>
<thead>
<tr>
<th>Survey Type</th>
<th>Dates Surveyed</th>
<th>Observations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spring - Spring</td>
<td>19/02/2015 - 09/03/2016</td>
<td>Over the past year, profile 7b00072 has gained just above 12m² of sediment, increasing its cross-sectional area by 4%; sediment has been lost from the very top of the beach, whilst accretion has occurred along the remaining cross-section of the profile. Profile 7b00076 has lost ~41m² of material, mostly from the upper beach. Profiles to the east of the survey unit have remained stable; however, sediment has been moved from the dunes to the middle section of the beach along profile 7b00084.</td>
</tr>
<tr>
<td>Baseline - Spring</td>
<td>04/05/2007 - 09/03/2016</td>
<td>Similar to the spring to spring analysis, profile 7b00072 has displayed a trend for accretion since the original baseline survey in 2007, whilst profile 7b00076 has experienced low level erosion. The remaining profiles have remained stable overall, with only minor sediment gains.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Profile</th>
<th>CSA Diff (m²)</th>
<th>% Change</th>
<th>CSA Diff (m²)</th>
<th>% Change</th>
<th>Master Profile Level (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>7b00072</td>
<td>12.1</td>
<td>4</td>
<td>13.3</td>
<td>5</td>
<td>-3</td>
</tr>
<tr>
<td>7b00076</td>
<td>-41.1</td>
<td>-5</td>
<td>-6.0</td>
<td>-1</td>
<td>-3</td>
</tr>
<tr>
<td>7b00080</td>
<td>-3.0</td>
<td>0</td>
<td>0.1</td>
<td>0</td>
<td>-3</td>
</tr>
<tr>
<td>7b00084</td>
<td>-1.8</td>
<td>0</td>
<td>5.9</td>
<td>0</td>
<td>-3</td>
</tr>
</tbody>
</table>
South West Regional Coastal Monitoring Programme

Annual Survey Report 2016

Actual Change in Cross-sectional Area (Spring 2015 to Spring 2016)

Survey Unit Boundary

Accretion

No Change

Erosion

> 30 m²

15 - 30 m²

5 - 15 m²

< 5 m²

15 - 30 m²

> 30 m²

< 5 m²
Actual Change in Cross-sectional Area (Baseline 2007 to Spring 2016)

Survey Unit Boundary

Accretion
Erosion
No Change
Since the last year, profiles 7b00303 and 7b00313 have experienced accretion, with the first gaining just under 22 m² of material. Conversely, profiles 7b00305 and 7b00309 have lost 9.2 m² and 19.8 m² of material, equating to 1% and 5% decreases in cross-sectional area respectively.

Over the longer term, the majority of profiles have displayed a trend for accretion, with up to 59.6 m² of material being gained along profile 7b00313, in Pentireglaze Haven. Profile 7b00309 has eroded since the original baseline survey in 2007, with a loss of just under 24 m² of material, equating to 7% change in cross-sectional area.

The higher % change along profile 7b00309, both in the year on year and in the baseline to spring analysis, is due to its shorter length, compared to the other profiles.
Actual Change in Cross-sectional Area (Spring 2015 to Spring 2016)

Survey Unit Boundary

- 5b00313 (1%)
- 5b00309 (-5%)
- 5b00305 (-1%)
- 5b00303 (1%)
- 5b00301 (0%)

Accretion
Erosion
No Change

> 30 m²
15 - 30 m²
5 - 15 m²
< 5 m²
5 - 15 m²
15 - 30 m²
> 30 m²

Aerial Photography from 2013
Actual Change in Cross-sectional Area (Baseline 2007 to Spring 2016)

Survey Unit Boundary

Accretion
Erosion
No Change

> 30 m$^2$
15 - 30 m$^2$
5 - 15 m$^2$
< 5 m$^2$
15 - 30 m$^2$
> 30 m$^2$

Aerial Photography from 2013

0 180 360 m

South West Regional Coastal Monitoring Programme
Annual Survey Report 2016

7b00313 (5%)
7b00309 (-6%)
7b00305 (1%)
7b00303 (0%)
7b00301 (2%)

7b7B1-8 - Polzeath - Beach Change
CISCAG - Cornwall
Over the last year, both profiles within the survey unit have remained stable, with less than 1% changes in cross-sectional area.

Longer term, both profiles have lost material. In particular, profile 7b00584A, in Port Gaverne, has lost 27 m$^2$ of material, equating to 5% decrease in cross-sectional area. However, it should be appreciated that the baseline survey was derived from LiDAR data at this location.

Baseline data for profile 7b00584A was derived from LiDAR data flown on 06/05/2008, due to the profile not being surveyed during Phase 1 of the Programme.

<table>
<thead>
<tr>
<th>Survey Type</th>
<th>Dates Surveyed</th>
<th>Observations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spring - Spring</td>
<td>Beach Change 23/03/2015 - 05/04/2016</td>
<td>Over the last year, both profiles within the survey unit have remained stable, with less than 1% changes in cross-sectional area.</td>
</tr>
<tr>
<td>Baseline - Spring</td>
<td>Beach Change 13/05/2007 - 05/04/2016</td>
<td>Longer term, both profiles have lost material. In particular, profile 7b00584A, in Port Gaverne, has lost 27 m$^2$ of material, equating to 5% decrease in cross-sectional area. However, it should be appreciated that the baseline survey was derived from LiDAR data at this location.</td>
</tr>
</tbody>
</table>

**Profile Cross-Sectional Area**

<table>
<thead>
<tr>
<th>Profile</th>
<th>Spring to Spring (Mar 2015 to Apr 2016)</th>
<th>Baseline to Spring (May 2007 to Apr 2016)</th>
<th>Master Profile Level (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>CSA Diff (m$^2$)</td>
<td>% Change</td>
<td>CSA Diff (m$^2$)</td>
</tr>
<tr>
<td>7b00566</td>
<td>3.0</td>
<td>1</td>
<td>-5.5</td>
</tr>
<tr>
<td>7b00584A</td>
<td>1.7</td>
<td>0</td>
<td>-27.0</td>
</tr>
</tbody>
</table>
Profile 7b00584A was added to the programme at the beginning of Phase II, and hence baseline data is taken from LiDAR flown in May 2008.

Actual Change in Cross-sectional Area (Baseline 2007 to Spring 2016)

- Survey Unit Boundary
- > 30 m²
- 15 - 30 m²
- 5 - 15 m²
- < 5 m²
- 15 - 30 m²
- > 30 m²
- Erosion
- No Change
- Accretion

Aerial Photography from 2013
Despite overall stability over the short term, sediment has been lost from the very upper and mid-lower beach and placed on the upper beach along profile 7b01342.

Over the longer term, the profile has displayed a trend for accretion, with a gain of 7.8m$^2$ of material, equating to 4% increase in cross-sectional area.

Changes only concern the main sandy beach above the hard bedrock, which is assumed to remain stable.

<table>
<thead>
<tr>
<th>Profile Cross-Sectional Area</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Profile</strong></td>
</tr>
<tr>
<td>CSA Diff (m$^2$)</td>
</tr>
<tr>
<td>7b01342</td>
</tr>
</tbody>
</table>
Actual Change in Cross-sectional Area (Spring 2015 to Spring 2016)

Survey Unit Boundary

- 7b01143 (+2%)

Aerial Photography from 2013

0 100 200 m

Accretion  No Change  Erosion

> 30 m²  15 - 30 m²  < 15 m²

5 - 15 m²

> 30 m²

< 5 m

2 2 2 2 2 2
Actual Change in Cross-sectional Area
(Baseline 2007 to Spring 2016)

- > 30 m²
- 15 - 30 m²
- < 15 m²
- > 30 m²
- < 5 m²
- 5 - 15 m²
- 15 - 30 m²
- > 30 m²

Survey Unit Boundary

Aerial Photography from 2013
### Survey Type and Dates

<table>
<thead>
<tr>
<th>Survey Type</th>
<th>Dates Surveyed</th>
<th>Observations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spring - Spring</td>
<td>Beach Change, 22/03/2015 - 12/03/2016</td>
<td>Since last spring, profile 7b01352 has gained material, increasing its cross-sectional area by 10%, whilst profile 7b01355 has remained stable. Profiles 7b01359 to 7b01368, located on the sandy shore towards the north of the survey unit, have conversely experienced erosion, with sediment losses up to 43 m², mostly affecting the lower beach.</td>
</tr>
<tr>
<td>Baseline - Spring</td>
<td>Beach Change, 15/05/2007 - 12/03/2016</td>
<td>Over the longer term, profiles to the south and centre of the survey unit have displayed a trend for erosion, with profile 7b01355 losing just under 50 m² of material, equating to 5% change in cross-sectional area; sediment has mostly been lost from the lower beach, where rocks have become more exposed. On the other hand, to the north of the survey unit, the remaining profiles have gained sediment, with changes in cross-sectional area up to 2% and accretion on the upper beach.</td>
</tr>
</tbody>
</table>

### Comments

Observations for profile 7b01352 only concern the main sandy beach above the rock platform, which is assumed to remain stable.

### Profile Cross-Sectional Area

<table>
<thead>
<tr>
<th>Profile</th>
<th>Spring to Spring</th>
<th>Baseline to Spring</th>
<th>Master Profile Level (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Spring 2015 to 2016</td>
<td>Baseline 2007 to 2016</td>
<td></td>
</tr>
<tr>
<td></td>
<td>CSA Diff (m²)</td>
<td>% Change</td>
<td>CSA Diff (m²)</td>
</tr>
<tr>
<td>7b01352</td>
<td>19.1</td>
<td>10</td>
<td>-5.0</td>
</tr>
<tr>
<td>7b01355</td>
<td>1.3</td>
<td>0</td>
<td>-49.3</td>
</tr>
<tr>
<td>7b01359</td>
<td>-40.5</td>
<td>-3</td>
<td>-13.8</td>
</tr>
<tr>
<td>7b01365</td>
<td>-43.0</td>
<td>-4</td>
<td>22.1</td>
</tr>
<tr>
<td>7b01368</td>
<td>-34.5</td>
<td>-3</td>
<td>7.5</td>
</tr>
</tbody>
</table>
### Actual Change in Cross-sectional Area (Baseline 2007 to Spring 2016)

<table>
<thead>
<tr>
<th>Survey Unit Boundary</th>
<th>Accretion</th>
<th>Erosion</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>&gt; 30 m²</td>
<td>&gt; 30 m²</td>
</tr>
<tr>
<td></td>
<td>15 - 30 m²</td>
<td>15 - 30 m²</td>
</tr>
<tr>
<td></td>
<td>5 - 15 m²</td>
<td>5 - 15 m²</td>
</tr>
<tr>
<td>No Change</td>
<td>&lt; 5 m²</td>
<td>&lt; 5 m²</td>
</tr>
<tr>
<td></td>
<td>5 - 15 m²</td>
<td>5 - 15 m²</td>
</tr>
<tr>
<td></td>
<td>15 - 30 m²</td>
<td>15 - 30 m²</td>
</tr>
<tr>
<td></td>
<td>&gt; 30 m²</td>
<td>&gt; 30 m²</td>
</tr>
</tbody>
</table>

Aerial Photography from 2013
Since the last year, profile 7b01461E has remained stable, whilst profile 7b01463A has gained just under 37m² of material, equating to 2% increase in cross-sectional area. Profile 7b01473, on Crooklets beach, has lost 8.8m² of sediment.

Over the longer term, all profiles within the survey unit have been following a trend for erosion; sediment has been lost from the entire cross-section of the beach, with the exception of the upper part of profile 7b01463A, which has seen some accretion on the dunes. Profile 7b01473 has experienced the greatest changes, with a loss of just under 117m² of material, equating to 9% decrease in cross-sectional area.

Profiles 7b01461E and 7b01463A, in Summerleaze Beach, were only added to the Programme in Phase II. Changes are therefore computed against the original baseline survey from May 2007.

<table>
<thead>
<tr>
<th>Survey Type</th>
<th>Dates Surveyed</th>
<th>Observations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spring - Spring</td>
<td>Beach Change</td>
<td>Since the last year, profile 7b01461E has remained stable, whilst profile 7b01463A has gained just under 37m² of material, equating to 2% increase in cross-sectional area. Profile 7b01473, on Crooklets beach, has lost 8.8m² of sediment.</td>
</tr>
<tr>
<td>Baseline - Spring</td>
<td>Beach Change</td>
<td>Over the longer term, all profiles within the survey unit have been following a trend for erosion; sediment has been lost from the entire cross-section of the beach, with the exception of the upper part of profile 7b01463A, which has seen some accretion on the dunes. Profile 7b01473 has experienced the greatest changes, with a loss of just under 117m² of material, equating to 9% decrease in cross-sectional area.</td>
</tr>
</tbody>
</table>

### Comments
Profiles 7b01461E and 7b01463A, in Summerleaze Beach, were only added to the Programme in Phase II. Changes are therefore computed against the original baseline survey from May 2007.

### Profile Cross-Sectional Area

<table>
<thead>
<tr>
<th>Profile</th>
<th>Spring to Spring</th>
<th>Baseline to Spring</th>
<th>Master Profile Level (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>CSA Diff (m²)</td>
<td>% Change</td>
<td>CSA Diff (m²)</td>
</tr>
<tr>
<td>7b01461E</td>
<td>-4.3</td>
<td>0</td>
<td>-78.3</td>
</tr>
<tr>
<td>7b01463A</td>
<td>36.9</td>
<td>2</td>
<td>-143.2</td>
</tr>
<tr>
<td>7b01473</td>
<td>-8.8</td>
<td>-1</td>
<td>-116.7</td>
</tr>
</tbody>
</table>
Actual Change in Cross-sectional Area (Baseline 2007 to Spring 2016)

- Survey Unit Boundary

**7b01473 (-9%)**
- **7b01463A (-7%)**
- **7b01461E (-5%)**

**7b7B3-4 - Bude - Beach Change**

---

**Annual Survey Report 2016**

**South West Regional Coastal Monitoring Programme**

**CISCAG - Cornwall**

**Aerial Photography from 2013**

- **Accretion**
- **No Change**
- **Erosion**

---

**PLUMOUTH COASTAL OBSERVATORY**

---

**C ISC A G - C ornwall**
Cross Sectional Area above MP Trend for Location: 7a00062 and Reference Profile Set

Area Above MP Trend: Eroding at -5.02 m²/Year
Cross Sectional Area above MP Trend for Location: 7a00066 and Reference Profile Set

Area Above MP Trend: Eroding at -2.196 m²/Year

Survey Date:
- 04/12/2007
- 03/12/2008
- 03/12/2009
- 03/12/2010
- 03/12/2011
- 02/12/2012
- 02/12/2013
- 02/12/2014
- 02/12/2015

Graph showing the trend of area above MP, with data points indicating erosion over the years.
Cross Sectional Area above MP Trend for Location: 7a00679 and Reference Profile Set

Area Above MP Trend: Eroding at -4.317 m²/Year
Cross Sectional Area above MP Trend for Location: 7a00681 and Reference Profile Set

Area Above MP Trend: Eroding at -3.554 m²/Year
Cross Sectional Area above MP Trend for Location: 7a00714 and Reference Profile Set

Area Above MP Trend: Accreting at 17.025 m²/Year

Survey Date:
- 04/12/2007
- 03/12/2008
- 03/12/2009
- 03/12/2010
- 03/12/2011
- 02/12/2012
- 02/12/2013
- 02/12/2014
- 02/12/2015

Graph shows the trend of cross-sectional area above MP with survey dates.
Cross Sectional Area above MP Trend for Location: 7a00722 and Reference Profile Set

Area Above MP Trend: Accreting at 13.192 m²/Year

Survey Date:
- 04/12/2007
- 03/12/2008
- 03/12/2009
- 03/12/2010
- 03/12/2011
- 02/12/2012
- 02/12/2013
- 02/12/2014
- 02/12/2015

Graph showing the trend of area above MP over time, indicating an accreting trend at a rate of 13.192 m²/year.
Cross Sectional Area above MP Trend for Location: 7a00726 and Reference Profile Set

Area Above MP Trend Accreting at 9900 m²/Year

Survey Date:
04/12/2007 03/12/2008 03/12/2009 03/12/2010 03/12/2011 02/12/2012 02/12/2013 02/12/2014 02/12/2015

Survey Unit 7a/A2-4
Cross-Sectional Area Charts
Cross Sectional Area above MP Trend for Location: 7a00759 and Reference Profile Set

Area Above MP Trend: Accreting at 5.732 m²/Year

Survey Date

04/12/2007 03/12/2008 03/12/2009 03/12/2010 03/12/2011 02/12/2012 02/12/2013 02/12/2014 02/12/2015

Recycling Event  Area Above MP  Area Trend
Profile Charts for Survey Unit 7a0787

Profiles: 7a0787

- Chainage (m)
- Level (m)
Cross Sectional Area above MP Trend for Location: 7a00783 and Reference Profile Set

Area Above MP Trend: Eroding at -6.099 m²/Year
Cross Sectional Area above MP Trend for Location: 7a00787 and Reference Profile Set

Area Above MP Trend: Eroding at -4.253 m²/Year
Cross Sectional Area above MP Trend for Location: 7a00795 and Reference Profile Set

Area Above MP Trend, Accreting at 4.269 m²/Year
Cross Sectional Area above MP Trend for Location: 7a00799 and Reference Profile Set

Area Above MP Trend: Eroding at -84.265 m²/Year
Cross Sectional Area above MP Trend for Location: 7a00804 and Reference Profile Set

Area Above MP Trend: Eroding at -1.114 m²/Year

Survey Date:
- 04/12/2007
- 03/12/2008
- 03/12/2009
- 03/12/2010
- 03/12/2011
- 02/12/2012
- 02/12/2013
- 02/12/2014
- 02/12/2015

Chart details:
- Plotted area (m²)
- Surveyed dates

Legend:
- Yellow square: Recycling Event
- Black square: Area Above MP
- Green line: Area Trend
Cross Sectional Area above MP Trend for Location: 7a00817 and Reference Profile Set

Area Above MP Trend: Eroding at -7.273 m²/Year
Cross Sectional Area above MP Trend for Location: 7a00839 and Reference Profile Set

Area Above MP Trend: Eroding at -7.120 m²/Year
Cross Sectional Area above MP Trend for Location: 7a00849 and Reference Profile Set

Area Above MP Trend: Eroding at -1.025 m²/Year

Survey Date:
- 04/12/2007
- 03/12/2008
- 03/12/2009
- 03/12/2010
- 03/12/2011
- 02/12/2012
- 02/12/2013
- 02/12/2014
- 02/12/2015

Graph showing changes in Cross-sectional area over time.
Cross-Sectional Area above MP Trend for Location: 7a00869 and Reference Profile Set

Area Above MP Trend: Eroding at -9.030 m²/Year

Survey Date:

- 04/12/2007
- 03/12/2008
- 03/12/2009
- 03/12/2010
- 03/12/2011
- 02/12/2012
- 02/12/2013
- 02/12/2014
- 02/12/2015

Graph Details:
- Y-axis: Eroded Area (m²)
- X-axis: Survey Date

Legend:
- Yellow square: Recycling Event
- Green line: Area Above MP
- Green line: Area Trend

SAHDS
Cross-sectional Area above MP Trend for Location: 7a00879 and Reference Profile Set

Area Above MP Trend: Eroding at -7.164 m²/Year
Cross-Sectional Area above MP Trend for Location: 7a00899 and Reference Profile Set

Area Above MP Trend: Eroding at -5.448 m^2/Year
Cross Sectional Area above MP Trend for Location: 7a00909 and Reference Profile Set

Area Above MP Trend: Eroding at -11.123 m2/Year

Survey Date
04/12/2007 03/12/2008 03/12/2009 03/12/2010 03/12/2011 02/12/2012 02/12/2013 02/12/2014 02/12/2015

Plot Area (m²)
Cross Sectional Area above MP Trend for Location: 7a00919 and Reference Profile Set

Area Above MP Trend: Eroding at -2.993 m²/Year

Survey Date:

- Yellow square: Recycling Event
- Green line: Area Above MP
- Green line: Area Trend
Cross Sectional Area above MP Trend for Location: 7a01109 and Reference Profile Set

Area Above MP Trend: Eroding at -6.718 m²/Year
Cross Sectional Area above MP Trend for Location: 7a01213 and Reference Profile Set

Area Above MP Trend: Eroding at -4.661 m^2/Year
Cross Sectional Area above MP Trend for Location: 7a01215 and Reference Profile Set

Area Above MP Trend: Eroding at -4.172 m²/Year
Cross Sectional Area above MP Trend for Location: 7a01435 and Reference Profile Set

Area Above MP Trend: Eroding at -0.033 m²/Year

Survey Date:
- 04/2/2007
- 03/12/2008
- 03/12/2009
- 03/12/2010
- 03/12/2011
- 02/2/2012
- 02/12/2013
- 02/12/2014
- 02/12/2015

Survey Unit 7a7A3-8
Cross-Sectional Area Charts
Cross Sectional Area above MP Trend for Location: 7a01454 and Reference Profile Set

Area Above MP Trend: Eroding at -6.519 m²/Year
Survey Unit 7a7A3-9
Cross-Sectional Area Charts

Cross Sectional Area above MP Trend for Location: 7a01464 and Reference Profile Set

Area Above MP Trend: Eroding at -18.322 m²/Year
Cross Sectional Area above MP Trend for Location: 7a01487 and Reference Profile Set

Area Above MP Trend Accreting at 61.26 m²/Year
Cross Sectional Area above MP Trend for Location: 7a01643 and Reference Profile Set

Area Above MP Trend: Eroding at -0.302 m²/Year
Cross Sectional Area above MP Trend for Location: 7a01682 and Reference Profile Set

Area Above MP Trend: Eroding at -3.399 m²/Year

Survey Date

04/1/2007 03/1/2008 03/1/2009 03/1/2010 03/1/2011 02/1/2012 02/1/2013 02/1/2014 02/1/2015

Survey Unit 7a7A3-15
Cross-Sectional Area Charts
Cross Sectional Area above MP Trend for Location: 7a01690 and Reference Profile Set

Area Above MP Trend: Eroding at -9.416 m²/Year
Cross sectional area above MP trend for Location: 7a01749 and Reference Profile Set

Area above MP trend: Eroding at -2.479 m²/Year
Cross Sectional Area above MP Trend for Location: 7a01753 and Reference Profile Set

Area Above MP Trend: Eroding at -0.462 m²/Year
Cross Sectional Area above MP Trend for Location: 7a01756 and Reference Profile Set

Area Above MP Trend: Eroding at -3.723 m²/Year

Survey Date:
- 04/12/2007
- 03/12/2008
- 03/12/2009
- 03/12/2010
- 03/12/2011
- 03/12/2012
- 03/12/2013
- 03/12/2014
- 03/12/2015
Survey Unit 7a7A3-17

Cross-Sectional Area Charts

Cross Sectional Area above MP Trend for Location: 7a01764 and Reference Profile Set

Area Above MP Trend Accreting at 1.174 m²/Year

Survey Date

04/12/2007 03/12/2008 03/12/2009 03/12/2010 03/12/2011 02/12/2012 02/12/2013 02/12/2014 02/12/2015

Survey Date

Recycling Event Area Above MP Area Trend
Cross Sectional Area above MP Trend for Location: 7a01812 and Reference Profile Set

Area Above MP Trend: Eroding at -2.071 m²/Year

Survey Date:
- 04/12/2007
- 03/12/2008
- 03/12/2009
- 03/12/2010
- 03/12/2011
- 02/12/2012
- 02/12/2013
- 02/12/2014
- 02/12/2015

Legend:
- Recycling Event
- Area Above MP
- Area Trend

Survey Unit 7a7A3-18
Cross-Sectional Area Charts
Cross Sectional Area above MP Trend for Location: 7a01819 and Reference Profile Set

Area Above MP Trend: Eroding at -0.740 m²/Year
Cross Sectional Area above MP Trend for Location: 7a01824 and Reference Profile Set

Area Above MP Trend: Eroding at -3.802 m²/Year

Survey Date

- Recycling Event
- Area Above MP
- Area Trend
Cross Sectional Area above MP Trend for Location: 7a01828 and Reference Profile Set

Area Above MP Trend: Accreting at 2.879 m²/Year

Survey Date:
- 04/12/2007
- 03/12/2008
- 03/12/2009
- 03/12/2010
- 03/12/2011
- 02/12/2012
- 02/12/2013
- 02/12/2014
- 02/12/2015

Legend:
- Yellow square: Recycling Event
- Green line: Area Above MP
- Grey line: Area Trend

SAHDS
Cross Sectional Area above MP Trend for Location: 7a01832 and Reference Profile Set

Area Above MP Trend: Eroding at -1.470 m²/Year

Survey Date

Recycling Event或其他标记

Area Above MP或其他标记

Area Trend或其他标记
Cross Sectional Area above MP Trend for Location: 7a01837 and Reference Profile Set

Area Above MP Trend: Eroding at -4.756 m²/Year
Cross Sectional Area above MP Trend for Location: 7a01858 and Reference Profile Set

Area Above MP Trend: Accreting at 0.837 m²/Year

Survey Date

Survey Unit 7a7A3-18
Cross-Sectional Area Charts
Cross Sectional Area above MP Trend for Location: 7a01862 and Reference Profile Set

Area Above MP Trend: Eroding at -0.400 m²/Year
Cross Sectional Area above MP Trend for Location: 7a01874 and Reference Profile Set

Area Above MP Trend: Eroding at -3.558 m²/Year

Survey Dates:
- 04/12/2007
- 03/12/2008
- 03/12/2009
- 03/12/2010
- 03/12/2011
- 02/12/2012
- 02/12/2013
- 02/12/2014
- 02/12/2015

Survey Unit 7a7A3-18
Cross-Sectional Area Charts
Cross Sectional Area above MP Trend for Location: 7a01916 and Reference Profile Set

Area Above MP Trend: Accreting at 1.784 m²/Year
Cross Sectional Area above MP Trend for Location: 7a01920 and Reference Profile Set

Area Above MP Trend: Eroding at -5.088 m²/Year
Cross Sectional Area above MP Trend for Location: 7a02031 and Reference Profile Set

Area Above MP Trend: Eroding at -16.573 m²/Year

Survey Date

04/2/2007  03/12/2008  03/12/2009  03/12/2010  03/12/2011  02/12/2012  02/12/2013  02/12/2014  02/12/2015

Survey Unit 7a7A3-21
Cross-Sectional Area Charts
Cross Sectional Area above MP Trend for Location: 7a02034 and Reference Profile Set

Area Above MP Trend: Eroding at -1.379 m²/Year

Survey Date:
- 04/2/2007
- 03/12/2008
- 03/12/2009
- 03/12/2010
- 03/12/2011
- 02/12/2012
- 02/12/2013
- 02/12/2014
- 02/12/2015
Cross Sectional Area above MP Trend for Location: 7a02073 and Reference Profile Set

Area Above MP Trend Accreting at 3.389 m²/Year
Cross Sectional Area above MP Trend for Location: 7a02084 and Reference Profile Set

Area Above MP Trend: Accreting at 13.502 m²/Years
Cross Sectional Area above MP Trend for Location: 7a02092 and Reference Profile Set

Area Above MP Trend: Eroding at -6.461 m²/Year

Survey Date:
- 04/12/2007
- 03/12/2008
- 03/12/2009
- 03/12/2010
- 03/12/2011
- 02/12/2012
- 02/12/2013
- 02/12/2014
- 02/12/2015

Survey Unit 7a7A3-23
Cross-Sectional Area Charts
Cross Sectional Area above MP Trend for Location: 7b00076 and Reference Profile Set

Area Above MP Trend: Accreting at 2.235 m²/Year

Survey Date:
- 04/12/2007
- 03/12/2008
- 03/12/2009
- 03/12/2010
- 03/12/2011
- 03/12/2012
- 02/12/2013
- 02/12/2014
- 02/12/2015

Survey Unit 7b781-2
Cross-Sectional Area Charts
Cross Sectional Area above MP Trend for Location: 7b00303 and Reference Profile Set

Area Above MP Trend: Eroding at -5.009 m²/Year
Cross Sectional Area above MP Trend for Location: 7b000305 and Reference Profile Set

Area Above MP Trend: Eroding at -0.227 m²/Year
Cross Sectional Area above MP Trend for Location: 7b00313 and Reference Profile Set

Area Above MP Trend: Accreting at 1.558 m²/Year
Cross Sectional Area above MP Trend for Location: 7b01342 and Reference Profile Set

Area Above MP Trend: Accreting at 1.321 m²/Year

Survey Date: 04/12/2007 to 02/22/2015

- Yellow square = Recycling Event
- Black circle = Area Above MP
- Green line = Area Trend

Survey Unit 7b/B3-1
Cross-Sectional Area Charts
Cross Sectional Area above MP Trend for Location: 7b01352 and Reference Profile Set

Area Above MP Trend: Eroding at -3.330 m²/Year
Cross Sectional Area above MP Trend for Location: 7b01359 and Reference Profile Set

Area Above MP Trend: Eroding at -5.836 m²/Year
Cross Sectional Area above MP Trend for Location: 7b01365 and Reference Profile Set

Area Above MP Trend: Eroding at -1.525 m²/Year

Survey Date:
- 04/1/2007
- 03/1/2008
- 03/1/2009
- 03/1/2010
- 03/1/2011
- 02/1/2012
- 02/1/2013
- 02/1/2014
- 02/1/2015

Graph shows the trend of cross-sectional area above the MP over time, with a trend line indicating erosion at -1.525 m²/Year.
Cross Sectional Area above MP Trend for Location: 7b01463A and Reference Profile Set

Area Above MP Trend: Eroding at -29.421 m²/Year

Survey Date:
- 04/2/2007
- 03/12/2008
- 03/12/2009
- 03/12/2010
- 03/12/2011
- 02/12/2012
- 02/12/2013
- 02/12/2014
- 02/12/2015

Graphical representation showing the trend of cross-sectional area above the Mean Past (MP) level over time, indicating erosion.
Cross Sectional Area above MP Trend for Location: 7b01473 and Reference Profile Set

Area Above MP Trend: Eroding at -21.255 m²/Year