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North Foreland to
Dover Harbour

AR20
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Cover photo: Early morning survey at Sowley, West Solent
M. Wadey
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1.0 Introduction

Analysis in this annual report provides an overview of beach performance and wave and tidal measurements for East Kent (North Foreland to Dover Harbour), from the strategic regional coastal monitoring project, over the last year of data collection. Topographic surveys are conducted at all viable sites using land based RTK GPS in the spring and autumn of each year, covering pre-determined designated profiles at intervals along the coast. This report looks specifically at the difference between the latest survey set (Spring 2006) and the comparable data from Spring 2005.

All profile data was imported into SANDS® for analysis. This enables cross sectional areas (CSA) to be calculated providing a representative beach between a landward point, master profile and beach toe location (Figure 4.1-1). Where available, seawalls are located spatially using a combination of design schematics and a sea defence survey conducted in 2003. Master profiles are set at the beach toe level or mean low water, which ever is deemed most appropriate. In some areas clay levels have also been established using the results from trial holes dug in beach, these have been incorporated to produce a more accurate master profile that calculates the actual beach area.

![Figure 1.1-1: Definition of Cross Sectional Area (CSA)](image)

Data is presented at a number of scales, from an overview of the average change in each management unit, to changes and trends for each individual profile. The topographic analysis section of the report highlights notable changes, and areas for concern, for each of the management units. While this provides an accurate portrayal of current beach conditions and changes over the preceding year it should be stressed that these are only short-term trends. In order to view the results in a meaningful light they should be compared to the full data set for each location.

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

To provide an overview of the annual change in each management unit the average change in beach profile CSA is calculated for each unit. These averages are expressed in terms of percentage difference and actual change (m²) and are presented in Table 2-1.

<table>
<thead>
<tr>
<th>Management Unit</th>
<th>No. of Profiles</th>
<th>Average Change (%)</th>
<th>Average Change (m²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>7B</td>
<td>8</td>
<td>5.3</td>
<td>-5.1</td>
</tr>
<tr>
<td>8A</td>
<td>2</td>
<td>20.33</td>
<td>7.9</td>
</tr>
<tr>
<td>8B</td>
<td>N/A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8C</td>
<td>41</td>
<td>0.65</td>
<td>1.9</td>
</tr>
<tr>
<td>9A</td>
<td>39</td>
<td>2.23</td>
<td>7.34</td>
</tr>
<tr>
<td>9B</td>
<td>N/A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9C</td>
<td>3</td>
<td>-8.6</td>
<td>-6.87</td>
</tr>
<tr>
<td>9D</td>
<td>N/A</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

These results are also illustrated as coloured thematic maps in figures 2-1 to 2-3, with arrows representing the average erosion, accretion or no change for each unit. Arrows pointing out to sea represent accretion, whilst those pointing landward are indicative of erosion.

The two large units show an average change of less than 5% that is considered to be in the realms of natural variation. It should be noted that the largest changes result from units with very few profiles, in these areas a single profile can skew the results. Although these figures can highlight a highly erosive unit, or a recent replenishment, they should be viewed with caution, for example, it is possible to have a small highly erosive area within a unit that on average accretes material.

The results also reflect a short-term trend through just a snapshot in time, these figures can be viewed as a starting point, but individual profiles should be examined in those areas of interest. Crucially the significance of any results should be put in context with previous fluctuations in beach CSA since the start of the project in 2003, or even further back where reliable historic data exists.
Average Annual % Change in Cross-sectional Area

- > 30% (Accretion)
- 16 - 30% (Accretion)
- 5 - 15% (Accretion)
- Less than 5% (No Change)
- 5 - 15% (Erosion)
- 16 - 30% (Erosion)
- > 30% (Erosion)

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Beach Change Summary - Spring 2005 to Spring 2006

SECG: Pegwell Bay - Kingsdown
3.0 Profile Change Summary

Changes along individual profiles within each management unit are summarised in a series of thematic maps (figure 3-2 to 3-12). The maps show the location of each beach profile, superimposed on an aerial photograph (note the lines have been extended for clarity). Where possible the annual change in cross-sectional area (CSA) has been calculated from Spring 2005 to Spring 2006.

Annex A contains profile summary sheets for each location, which incorporate two diagrams. The first is a plot of the 2006 spring survey, including the master profile used for analysis and structures where available. The second is a graph plotting the CSA values over time. Calculating CSA values for each survey allows for a trend to be calculated, this is considered representative of the neighbouring coastline and helps establish accretion/erosion trends. Anthropogenic interference, namely the introduction of shingle, artificial movement of material and the construction of controlling structures all affect these trends. As a consequence trends are only calculated between works, and replenishment activities are highlighted on the graphs. Where possible historic data has been incorporated into the analysis (Figure 3.1).

![Figure 3.1-1: Example of Beach Profile Trend Analysis](image)

A figure representing the mathematically derived trend (m²/year) is included in the summary sheets, in addition to the ‘actual’ change since the first project survey in 2003. These put into context the short-term trends that are displayed in the following thematic maps. Significant or unusual changes within a management unit are highlighted in the topographic analysis section of this report.
Profile Change Summary - Spring 2005 to Spring 2006

Annual Change in Cross-sectional Area (m²) (Summer 2004 - Summer 2005)

- EROSION
  - > 30%
  - 15 - 30%
  - Less Than 5%
- NO CHANGE
- ACCRETION
  - > 30%
  - 15 - 30%
  - Less Than 5%

Management Unit Boundaries

Profile Name

Assignment Date: 7% (12)
4.0 Hydrodynamic Data

4.1 Deal Pier Wave Recorder

Location
OS: 638145 E 1527000 N
WGS84: Latitude: 51° 13' 25.652"N Longitude: 01° 24' 33.332"E

Water Depth
~0.5m CD

Instrument Type
Saab WaveRadar Rex

The Saab WaveRadar Rex was installed on 25 August 2005. Until a complete years worth of data has been obtained it is not possible to produce a meaningful analysis. Currently data is available to view on the project website (www.channelcoast.org), both in real time and as historic data to view or download.

![Wave height diagram](image-url)  

**Figure 4.1-1: Deal Pier On-line Waverex data**
5.0 Topographic Analysis

This section describes any significant changes that have taken place in each unit, highlighting any areas of concern, and putting the results in context with previous surveys. Where appropriate plots of different surveys are overlaid and included to illustrate the changes described in the text.

5.1 East Thanet

5.1.1 Unit 7A (N/A)

No topographic beach surveys are conducted in this unit.

5.1.2 Unit 7B (4b00024 – 4b00080)

Two pocket beaches are monitored in this unit, Broadstairs and the beach north of Ramsgate harbour. Profiles along the Broadstairs frontage have mixed results for the last year of monitoring, two profiles exhibit an increase in beach material, while two show a reduction. The most significant change is a loss of 6% (15m$^2$) at profile 4b00029.

Ramsgate beach shows a significant loss along the two most southern profiles, ranging from 6-9% (15-29m$^2$) in CSA. Profile 4b00068 is of most concern with heavy losses since the August 2004 survey, culminating in a 20m+ reduction in beach crest width (figure 3.1-1). The remaining profiles cover the smaller northern beach section and demonstrate a minimal increase in beach material over the last year.

![Figure 5.1-1: Reduction in beach crest at Ramsgate beach](image)

5.1.3 Unit 8A (4b00085 – 4b00093)

Two profiles are monitored along the small beach west of Ramsgate harbour, both show an increase in material over the last year from 15-26% (5-11m$^2$). This represents a reversal in what have historically been erosive trends.
5.1.4 Unit 8B (N/A)

No topographic beach surveys are conducted in this unit.

5.2 Pegwell Bay to Dover Harbour

5.2.1 Unit 8C (4b00122 – 4b00361)

This unit covers an 8.5km length of undefended frontage. The profiles along the entire length display varying trends from an increase of 20m$^2$ at the northern end (profile 4b00147) to a loss of 11m$^2$ in the south at profile 4b00361. However the overall change for the unit is less than 1m$^2$.

5.2.2 Unit 9A (4b00362 – 4b00540)

To the north of Deal Pier there is a generally erosive trend with a maximum loss of between 4-12% (2.8-12m$^2$)

To the south of the pier the beach becomes more stable with accretion of between 0.4-14% (2-14m$^2$).

Between Walmer Castle and the start of Willington Road the beach shows erosive trends with profiles 4b00483 – 4b00491 showing a loss of material of approx 18m$^2$ (2%)
in each case. The loss occurs between 2.5 and 4m OD, which is above the mean high water level. The crest of the beach however is stable.

**Figure 5.2-2: Beach erosion at Walmer**

The beach in front of the northern stretch of Willington Road shows erosion of on average 11m² at the northern end whilst the southern end is accreting by an average of 15.5m².

**Figure 5.2-3: Beach accretion at Willington Road (Northern section)**
The beach in front of the southern stretch of Willington Road shows an erosive trend in the order of 14.5% (15m²) with the central section loosing 31% (27m²). This has reduced the beach level in front of the concrete wall to below mean high water level.

The Oldstairs Bay section continues to show accretion of between 16 and 39m² (6-20%). This is as a result of the north to south literal drift and the construction of the rock arm terminal structure at the Coastguard Cottages preventing further downdrift.

5.2.3 Unit 9B (N/A)

No topographic beach surveys are conducted in this unit.

5.2.4 Unit 9C (4b00563 – 4b00475)

Three profiles are monitored along the small beach at St. Margarets Bay. The most northerly and southerly profiles show a loss of 12m² (approx 14%) being a reduction in the beach level against the sea wall. This has returned the beach profile to that which existed in 2004 whilst the central profile show a small increase in material over the last year of 3% (4m²)

5.2.5 Unit 9D (N/A)

No topographic beach surveys are conducted in this unit.