



# **Cell 1 Regional Coastal Monitoring Programme Cambois Bay 'Post Storm' Cliff-Top Monitoring Survey Report 2023**



**Northumberland County  
Council**

**December 2023**

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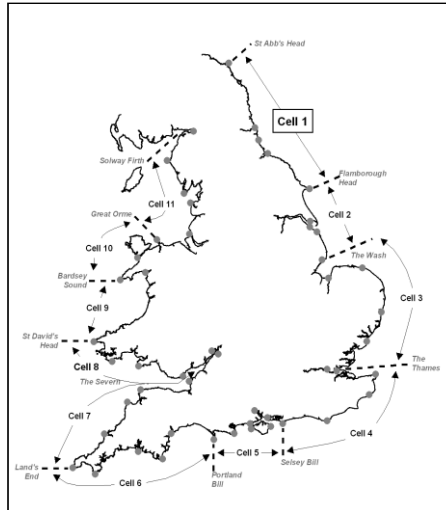
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## Preamble

The Cell 1 Regional Coastal Monitoring Programme covers approximately 300km of the north east coastline, from the Scottish Border (just south of St. Abb's Head) to Flamborough Head in East Yorkshire. This coastline is often referred to as 'Coastal Sediment Cell 1' in England and Wales (**Figure 1**). Within this frontage, the coastal landforms vary considerably, comprising low-lying tidal flats with fringing salt marshes, hard rock cliffs that are mantled with glacial sediment to varying thicknesses, softer rock cliffs and extensive landslide complexes.



**Figure 1 Sediment Cells in England and Wales**

The programme commenced in its present guise in September 2008<sup>1</sup> and is managed by Scarborough Borough Council on behalf of the North East Coastal Observatory. It is funded by the Environment Agency, working in partnership with the following organisations:



<sup>1</sup> Prior to 2008, coastal monitoring was undertaken on a consistent basis across Northumberland and North Tyneside as part of the (then) Northumbrian Coastal Authorities Group's monitoring programme which commenced in 2002, whilst several authorities between the River Tyne and Flamborough Head undertook their own local monitoring programmes.

Royal HaskoningDHV has been appointed to provide Analytical Services in relation to the present phase of the Cell 1 Regional Coastal Monitoring Programme, between 2016 - 2027. The main elements of the Cell 1 Regional Coastal Monitoring Programme involve:

- beach profile surveys
- topographic surveys
- cliff top recession surveys
- real-time wave data collection
- bathymetric and seabed characterisation surveys
- aerial photography
- LiDAR Surveys
- walk-over cliff and coastal defence asset surveys

The beach profile surveys, topographic surveys and cliff top recession surveys are undertaken as a 'Full Measures' survey in autumn/early winter every year. Some of these surveys are then repeated the following spring as part of a 'Partial Measures' survey.

Each year, an Analytical Report is produced for each individual authority, providing a detailed analysis and interpretation of the 'Full Measures' surveys. This is followed by a brief Update Report for each individual authority, providing ongoing findings from the 'Partial Measures' surveys.

During late October / early November 2023, the UK was subject to a period of stormy weather where three named storms occurred within a 4-week period (**Table 1**). To assess the impact of these storms on the coastline, a series of targeted **Post Storm Beach Profile / Topographic / Cliff Top Recession Surveys** were undertaken as part of the Cell 1 Regional Coastal Monitoring Programme. The report presents the analysis of the post-storm cliff-top survey undertaken at Cambois Bay.

**Table 1** UK Named storms 2023 ([UK Storm Centre - Met Office](#))

Name	Date named	Date of impact on UK and/or Ireland and/or Netherlands
<a href="#">Agnes</a>	25 September 2023	27 - 28 September 2023
<a href="#">Babet</a>	16 October 2023	18 - 21 October 2023
<a href="#">Ciarán</a>	29 October 2023	1 - 2 November 2023
Debi	12 November 2023	

**Table 2 Analytical, Update and Overview Reports Produced to Date**

Year		Full Measures		Partial Measures		Post-storm		Cell 1 Overview Report
		Survey	Analytical Report	Survey	Update Report	Survey	Post-storm Report	
1	2008/09	Sep-Dec 08	May 09	Mar-May 09		-	-	
2	2009/10	Sep-Dec 09	Mar 10	Feb-Mar 10	Jul 10	-	-	
3	2010/11	Aug-Nov 10	Feb 11	Feb-Apr 11	Aug 11	-	-	Sep 11
4	2011/12	Oct-Nov 11	Oct 12	Mar-May 12	Feb13	-	-	
5	2012/13	Sep-Nov 12	Mar 13	Mar-Apr 13	Jun 13	-	-	
6	2013/14	Sep-Oct 13	Feb 14	Mar-Apr 14	Jul 14	-	-	
7	2014/15	Sep-Nov 14	Feb 15	Mar-Apr 15	Jul 15	-	-	
8	2015/16	Sep-Dec 15	Feb 16	Mar-May 16	Jul 16	-	-	Jun 16
9	2016/17	Aug-Nov 16	Mar 17	Feb-Apr 17	Jul 17	-	-	
10	2017/18	Sep-Dec 17	Mar 18	Feb-Apr 18	Jul 18	-	-	
11	2018/19	Sep-Dec 18	Feb 19	Feb-Apr 19	Jul 19	-	-	
12	2019/20	Aug-Dec 19	Mar 20	Mar-May 20	Jun 20	-	-	
13	2020/21	Oct-Dec 20	Feb 21	Mar 21	May 21	-	-	Aug 21
14	2021/22	Aug-Oct 21	Feb 22	Aug-Oct 22	Aug 22	-	-	
15	2022/23	Aug-Nov 22	Apr 23	Feb-Mar 23	Jul 23	-	-	
16	2023/24	Aug-Sep 23	In Progress	-	-	Nov 23	Dec 23	

(\*) The present report provides an analysis of the 2023 Post Storm survey for the Cambois Bay cliff top.

## 1. Introduction

### 1.1 Study Area

This report presents the Post Storm Walkover Inspection for Cambois Bay.

### 1.2 Methodology

A cliff top survey has been undertaken along the Sandy Bay frontage since 2008 and along Cambois Bay since 2009. These have been supplemented by a post-storm survey in November 2023.

The Post-Storm survey was undertaken along this frontage between 14 – 16<sup>th</sup> November 2023. During this time the weather conditions ranged from dry and sunny with a calm sea, to showery and sunny with a sea state of slight.

The Analytical Report produced follows a standard structure, involving;

- description of the changes observed since the previous survey and an interpretation of the drivers of these changes (**Section 2**);
- documentation of any problems encountered during surveying or uncertainties inherent in the analysis (**Section 3**);
- recommendations for 'fine-tuning' the programme to enhance its outputs (**Section 4**); and
- providing key conclusions and highlighting any areas of concern (**Section 5**).

## 2. Analysis of Survey Data

### 2.1 Cambois Bay

Survey Date	Description of Changes Since Last Survey	Interpretation
<p><b>November 2023</b></p>	<p><b>Cliff-top Survey:</b> Cliff top survey data was last collected for the Full Measures survey in autumn 2023 and supplemented by a post-storm survey in November 2023.</p> <p>The cliff top survey is carried out as a continuous cliff edge line survey in two locations within Cambois Bay; at Sandy Bay Caravan Park to the north of the River Wansbeck estuary, and Cambois Bay from south of the River Wansbeck to the breakwater at the southern end of the bay. The results from the cliff top monitoring are anticipated to have an accuracy of <math>\pm 0.2\text{m}</math> due to the technique used. Furthermore, problems in precisely locating the cliff top, due to vegetation growth or the indistinct form of the cliff top, have also affected the data quality.</p> <p>There has been a uniform retreat of the cliff line adjacent to Sandy Bay caravan park by up to 0.5m between the autumn 2023 survey and the post-storm survey in November 2023 (<b>Figure 2</b>).</p> <p>There has been relatively little change along the defended coastline to the south of Wansbeck Estuary to the cross-shore outfall adjacent to the 'northern' car park between the autumn 2023 and post-storm survey in November 2023 (<b>Figure 3</b>). The coastline to the south of the cross-shore outfall, where the rock armour no longer protects the coastline, has retreated in some sections by between 1m and 3m (<b>Figure 3</b>). This is corroborated by the survey report which notes 'up to 3m of cliff has eroded as result of storm Babet on the main stretch of cliff top at Cambois'.</p> <p>South of the cross-shore outfall towards North Blyth, the greatest change occurs at the most 'southern' car park close to North Blyth terminal, where the cliff top (or vegetation line at this point) has retreated by up to 4.7m (<b>Figure 3</b>). The coastline adjacent to the rock revetment at Blyth terminal has not significantly changed since the previous survey in autumn 2023 (<b>Figure 4</b>).</p>	<p>Since the last survey in autumn 2023, there has been a retreat in cliff top position recorded at Sandy Bay Caravan Park, with a maximum retreat of up to 0.5m. Cambois Bay appears to have been relatively stable along much of its frontage with isolated areas of significant retreat of up to 1-3m in the north and centre of the bay, and up to 4.7m in the south of the bay.</p> <p><b>Longer term trends:</b> The coastline adjacent to Sandy Bay Caravan Park has undergone significant cliff top retreat since 2008, particularly in the north of the survey area (up to 11.0m) whilst the southern part of the survey area has eroded by c.1.0-5.0m. Some caravans are now within 2-3m of the cliff top.</p> <p>In Cambois Bay, the area of greatest cliff top retreat since the surveys began in 2009 is the centre of the bay opposite Ridley Terrace, Cambois, where up to 16.0m of erosion has occurred. The north and south of the bay have retreat more typically c.1.0-5.0m.</p>

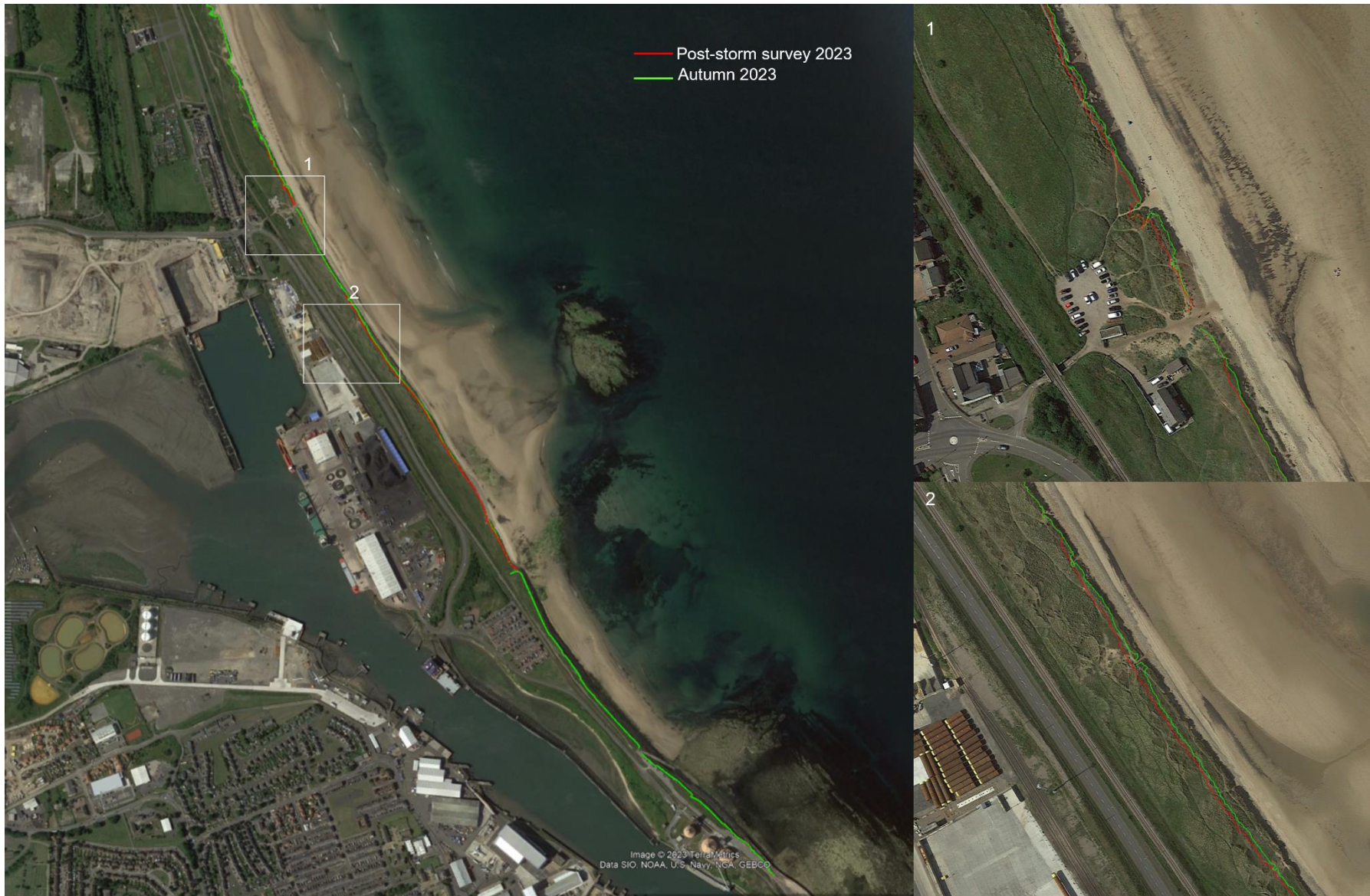




**Figure 2** Cambois Bay (Sandy Park) cliff top surveys in Autumn 2023 (pre-storm survey) and November 2023 (post-storm survey)



Figure 3 Cambois Bay cliff top surveys in Autumn 2023 (pre-storm survey) and November 2023 (post-storm survey) – North of bay



**Figure 4** Cambois Bay cliff top surveys in Autumn 2023 (pre-storm survey) and November 2023 (post-storm survey) - South of bay

#### **4. Problems Encountered and Uncertainty in Analysis**

The survey report notes that very thick dense vegetation at the northern end of Cambois cliff top hinders survey of the line.

#### **5. Conclusions and Areas of Concern**

The cliff top surveys show a significant retreat of the cliff top has occurred at some sections in the north of the survey area (adjacent to Sandy Bay Caravan Park), south of Wansbeck Estuary (south of the rock revetment) and adjacent to Ridley Terrace, Cambois.

Cliff top surveys have shown a gradual retreat of the cliff top adjacent to the Sandy Bay caravan park and a small number of caravans are now very close to the cliff edge. It is likely that the cliff top will continue to retreat, accelerating following stormy periods and eventually undermining the closest caravans. This is continuing to be monitored but there should be proactive measures taken by caravan park owners (advised by Northumberland County Council) to relocate the closest caravans further inland as a matter of health and safety.