

Meeting of:	Environment and Regeneration Scrutiny Committee
Date of Meeting:	Tuesday, 12 November 2024
Relevant Scrutiny Committee:	Environment and Regeneration
Report Title:	Coastal Monitoring Update
Purpose of Report:	To update Committee on monitoring of the coastline with regards to flood and coastal erosion risk management
Report Owner:	Miles Punter, Director of Environment and Housing
Responsible Officer:	Colin Smith, Head of Neighbourhood Services
Elected Member and Officer Consultation:	Vale wide therefore no Ward Member consultation Committee Reports Finance
Policy Framework:	This is a matter within the policy framework and budget
<p>Executive Summary:</p> <ul style="list-style-type: none"> • Strategic long-term monitoring of the Wales coastline for flood and coastal risk management is now funded and delivered on behalf of the Welsh Maritime local authorities by the Wales Coastal Monitoring Centre (WCMC), funded directly by Welsh Government. • Monitoring is prioritised using a risk- based methodology, with local priority areas subject to additional monitoring to supplement the WCMC monitoring programme. • A range of monitoring techniques are utilised including ground-based GPS, photogrammetry and fixed-aspect photography, UAV-based LiDAR and photogrammetry, traditional (aeroplane-based) LiDAR and multi-beam bathymetric surveys. • The results will be used to inform the long-term management of the coastline by providing a long-term evidence-base to inform the delivery of shoreline management plan policies, and, where appropriate, help inform any requirement for changes to SMP policy 	

Recommendation

1. That the Environment and Regeneration Scrutiny Committee (the Committee) notes the current programme of coastal monitoring.

Reason for Recommendation

1. To ensure the Committee is aware of the current programme of monitoring undertaken to monitor the Vale of Glamorgan coastline to inform ongoing flood and coastal risk management.

1. Background

- 1.1 Authority to establish the Wales Coastal Monitoring Centre (WCMC) hosted by the Authority was agreed on 30th July 2018 (minute no. C388 refers).
- 1.2 Cabinet on 17th November 2010 (minute no. C1125), confirmed adoption of the Severn Estuary Shoreline Management Plan 2 (SMP2).
- 1.3 Cabinet on 3rd December 2012 (minute no. C1923), confirmed adoption of the Lavernock Point to St. Ann's Head - Shoreline Management Plan (SMP2)
- 1.4 Cabinet on 19th September 2024 February 2024 (minute no. C117 refers) considered and noted the WCMC as a strategic collaborative working initiative between the Authority and external partners.
- 1.5 In 2019, the Council established Project Zero as response to the climate change emergency declared by Welsh Government. It brings together the wide range of work and opportunities available to tackle the climate emergency, reduce the Council's carbon emissions to net zero by 2030 and encourage others to make positive changes.

2. Key Issues for Consideration

- 2.1 The Vale of Glamorgan has approximately 45 kilometres of open coast, of which around 4 kilometres benefit from formal coastal defences maintained by the Council.
- 2.2 The coastline is subject to ongoing erosion and the risk of flooding to low-lying areas, with projected sea-level rise in the order of one metre over the next century likely to increase the frequency and impact of these hazards over time.
- 2.3 Strategic long-term monitoring of the Vale coastline has been co-ordinated and delivered through the WCMC as part of a pan-Wales risk-based monitoring programme since 2019. Full details of the programme and risk-based monitoring programme are available on the [Wales Coastal Monitoring Centre website](#).

2.4 The WCMC recently developed a [new data platform](#) with the assistance of the Office for National Statistics Data Visualisation Accelerator Programme 2023, allowing users to view and interrogate survey data more readily (Figure 1). The WCMC also collates and signposts users to other coastal datasets collected by other organisations.

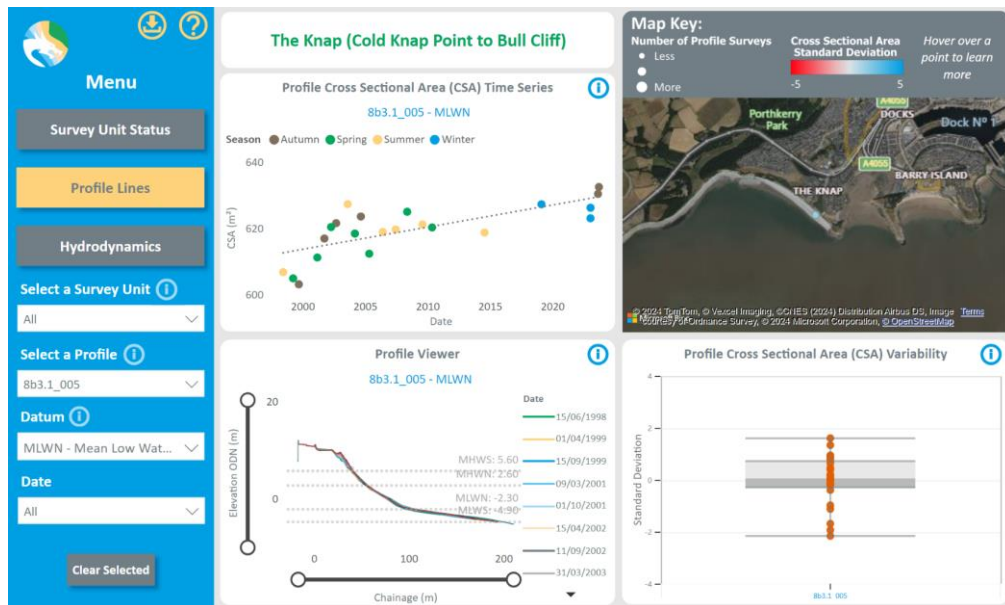


Figure 1 – WCMC data dashboard

2.5 Additional local monitoring data-sets are collected to assist deliver the Council’s flood and coastal risk management functions at a range of scales, from delivery of the shoreline management plan policies through to responding to local issues, e.g. localised cliff falls.

Priority monitoring areas

- 2.6 Monitoring is generally prioritised in areas where there is a high risk of flooding or coastal erosion in combination with vulnerable receptors, e.g. residential properties, critical infrastructure, non-residential property. The WCMC risk-based methodology is based on policy and schemes, asset risk and coastal processes (flood and coastal erosion).
- 2.7 The WCMC risk-based monitoring programme prioritises monitoring in Penarth, around Barry Island and the Knap, Aberthaw and Llantwit Major (Figure 2). Most of the Vale is identified as a low priority with limited high risk assets around the rural Vale coastline and an SMP policy of *No Active Intervention*.

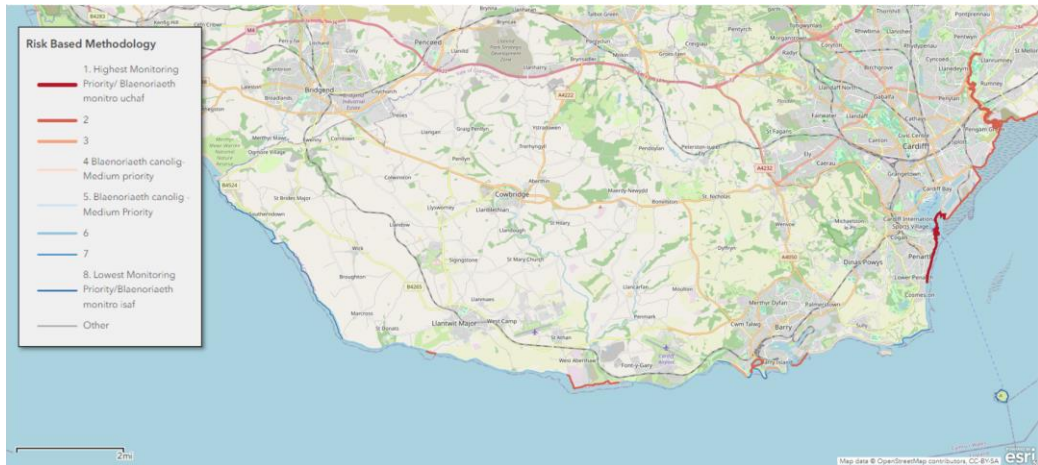


Figure 2 – WCMC risk-based monitoring priorities

- 2.8 Within the Council key areas where the SMP policy is due to change from epoch 1 (0-20yrs) to epoch 2 (20-50yrs) are also targeted for additional monitoring. These areas include Swanbridge (SMP20, PU1.3 & PU1.4; *Hold the Line* moving to *No Active Intervention*) and The Knap (SMP20, PU3.1; *Hold the Line* moving to *Managed Realignment*).

Monitoring data-sets

- 2.9 Topographic beach profile data is collected at set locations around the coastline allowing change in the beach profile to be assessed. Over time trends in the area under the profile can be used to identify areas of loss or gain (see Figure 1). This data is generally collected as part of the WCMC programme, usually with ground-based GPS but occasionally derived from UAV-based LiDAR.
- 2.10 Repeat baseline topographic surveys of beach levels are mainly collected through the WCMC either using survey grade GPS, often mounted on a quad bike or more recently utilising UAV mounted LiDAR.
- 2.11 Annual cliff surveys are now undertaken along the Penarth frontage and ad hoc surveys have been undertaken at all high-risk cliffed locations. The surveys deliver a point cloud representing the cliff face, with more recent surveys colourised as well representing a coordinate. Surveys were initially undertaken using terrestrial laser scanning but in recent years have switched to UAV-based LiDAR as a more efficient method of data collection (Figure 3). Trials have also been undertaken using mobile laser-scanning on backpacks, ground-based photogrammetry and structure from motion (SfM) as well as UAV-based photogrammetry. Comparison of the various surveys (Figure 4) will allow the erosion rates to be more accurately quantified, with plans to develop a more detailed understanding of erosion rates around the coastline.

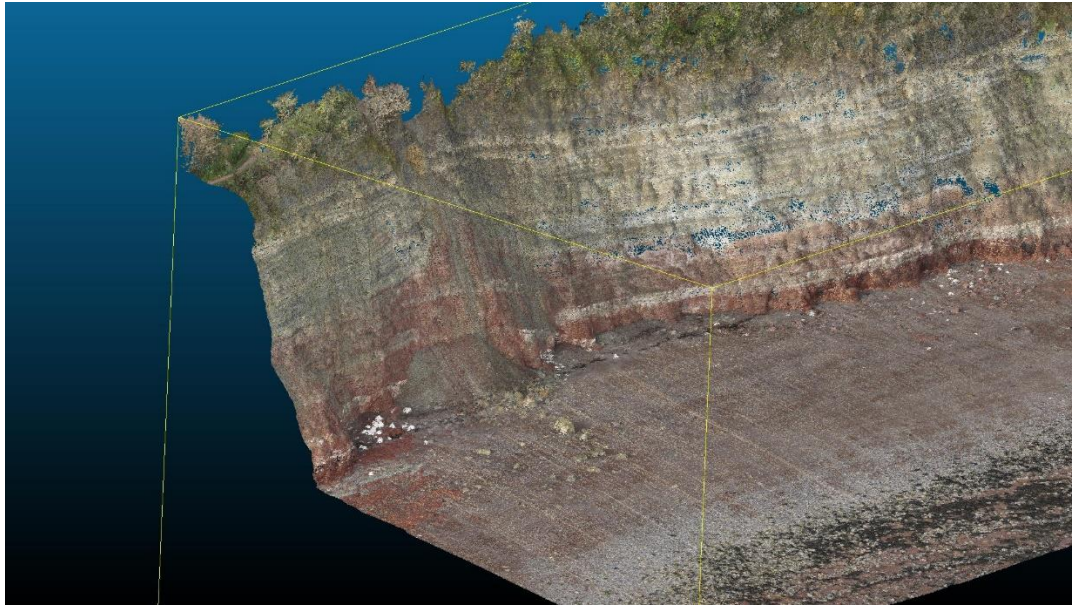


Figure 3 – Example of UAV based LiDAR cliff survey collected south of Penarth (colourised point cloud rather than a photograph)

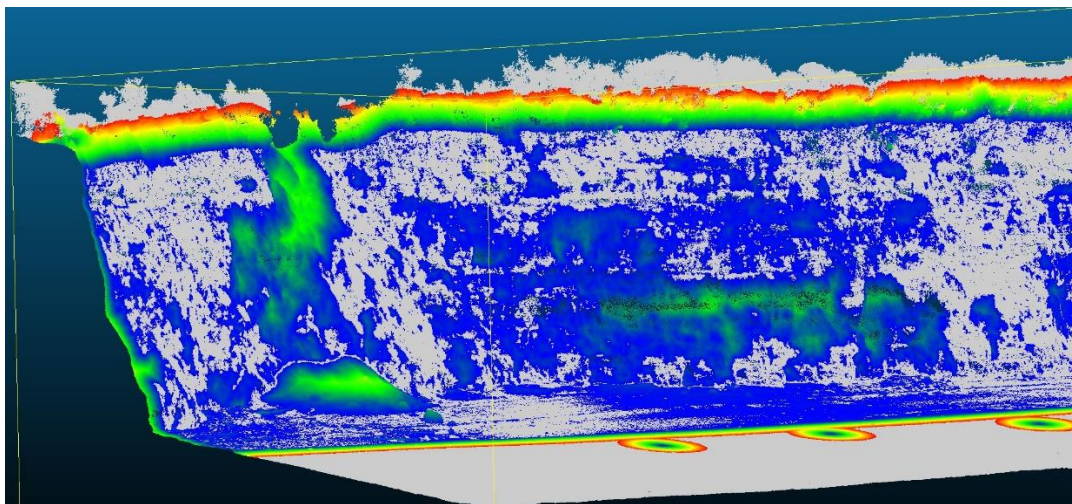


Figure 4 – Comparison between two cliff scans highlighting areas of change, with a recent cliff fall, associated cone of debris at the cliff toe and a band of weathering highlighted in green (the red through blue bands at the top and bottom of the cliff adjacent to the grey areas are an artefact of the comparison technique).

- 2.12 Natural Resources Wales have recently completed a [pan-Wales LiDAR survey](#) which is publicly available via DataMap Wales. The flights were delivered over several years with most of the Vale coastline captured down to mean low water springs. This data-set is generally coarser and slightly less accurate than the detailed baseline topographic surveys but provide an excellent baseline where that data has not been collected.
- 2.13 The entire Vale coastline benefitted from a multibeam survey co-ordinated through the Swansea & Carmarthen Bay Coastal Engineering Group in collaboration with the UK Maritime Coastguard Agency Civil Hydrography Programme in 2018 (Figure 5). Additional re-surveys were undertaken from

Jacksons Bay round to The Knap in 2022-23 to inform an assessment of the local sediment budget and potential evolution of the Knap barrier beach. The intention is to repeat these surveys again periodically in conjunction with topographic beach surveys to establish long-term trends in the overall volume of material at key locations around the coastline.

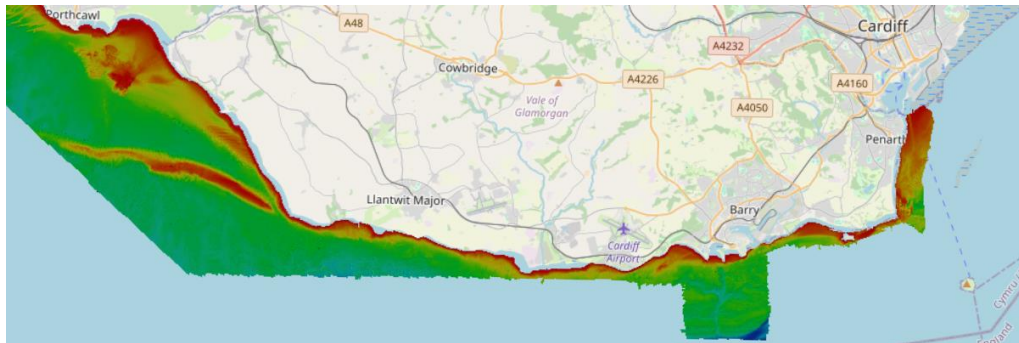


Figure 5 – Multibeam bathymetry coverage 2018

- 2.14 Fixed aspect photography is collected and submitted by the public at [CoastSnap](#) sites at Penarth (Figure 6) and Whitmore Bay. Although a relatively recent initiative the initiative allows residents and visitors to the area to get involved as citizen scientists. Images are automatically rectified and used to generate a time-lapse video available to the public. Over time the images will also build up a visual record of changes in the beach with the potential to extract key information on beach levels and the interface with structures currently being explored.



Figure 6 – Penarth promenade CoastSnap installation

- 2.15 Wave and water level data has been collected from the end of Penarth Pier on a continuous basis since March 2017, with data available via the [National Network of Regional Monitoring Programmes real-time data portal](#).
- 2.16 Visual inspections are also undertaken around the coastline on both a routine and reactive basis, including the collection of photographic records for subsequent comparison. These inspections are often in response to reports of cliff falls or concerns about the stability of coastal defences.
- 2.17 Future monitoring of the underlying geology in key areas such as the Knap and Whitmore Bay is also planned, subject to budget availability, to improve our understanding of the volume of material within the local sediment budget and how it may react to future changes in sea level and wave energy.

3. How do proposals evidence the Five Ways of Working and contribute to our Well-being Objectives?

- 3.1 **Long term** – The collection of coastal monitoring data helps inform a long-term and sustainable data-driven approach to managing flood and coastal risk around the coastline.

- 3.2 **Prevention** - Helping to prevent inappropriate development in high-risk areas, through the shoreline management plans and links to the Local Development Plan. Also assisting with the response to more immediate risks, e.g. cliff falls and managing the risk to public safety.
- 3.3 **Collaboration** – Working collaboratively with the WCMC will enable more efficient collection and analysis of data. By supporting and hosting the WCMC the Vale has helped foster collaboration with academia and other risk management authorities resulting in a state-of-the-art and also more efficient monitoring programme despite relatively low funding compared to contemporary programmes, for example in England. Hosting the WCMC within the Council has also allowed the transfer of knowledge and skills helping improve the delivery and interpretation of local monitoring data. It has also allowed for stronger collaboration with the local coastal groups, with a coastal officer employed by the Swansea and Carmarthen Bay Coastal Engineering Group currently working alongside the WCMC team which has led to improved knowledge sharing and productivity within the group.
- 3.4 **Integration** – Monitoring data is used to inform ongoing flood and coastal risk management activities around the Vale coastline at a variety of temporal and spatial scales. The collection of data is integrated with the SMP action plans helping facilitate delivery of the SMP policies. In turn this helps inform our wider response to change on the coast, for example informing the LDP.
- 3.5 **Involvement** – Through citizen science projects, such as Coast Snap, local communities are encouraged to contribute to monitoring of the coastline. Better visibility of data through the WCMC data platform and indirectly through the use of data to inform future community engagement over coastal adaptation

4. Climate Change and Nature Implications

- 4.1 Monitoring of the coastline and nearshore environment will help inform an evidence-driven strategy for adapting to the impact of climate change on the coast and in the long-term the Council’s ongoing response to the Climate Change and Environmental Emergency declaration

5. Resources and Legal Considerations

Financial

- 5.1 The WCMC is entirely Welsh Government grant funded and the Council is party to a collaborative legal agreement sharing the financial risks as grant recipient and host authority for three full-time staff with Gwynedd Council, Conwy Council and the WLGA.
- 5.2 It is recognised that the Council’s financial position is extremely challenging and is likely to remain so. Therefore, all forms of external grant funding will be investigated to support monitoring of the coastline, particularly via the WCMC.

Collaboration with local universities and the wider academic community, facilitated via the WCMC will help the Council secure additional monitoring of the coastline, often utilising state-of-the-art monitoring and research techniques and at no cost or a significantly reduced cost relative to commissioning on the open market

Employment

- 5.3 There are no direct employment issues arising from the activities detailed within this report. Visual inspections and limited topographic surveys are currently undertaken utilising existing resource within the Engineering Environment team.
- 5.4 The WCMC is entirely Welsh Government grant funded and the Council is party to a collaborative legal agreement sharing the liability and risk of acting as host authority and employer for three full-time staff members with Gywnedd Council, Conwy Council and the WLGA.
- 5.5 There is a future aspiration to undertake more topographic and UAV based surveys using internal resource, subject to staff obtaining the necessary qualifications, knowledge and experience.

Legal (Including Equalities)

- 5.6 There are no direct legal implications arising from the activities detailed within this report, but activities undertaken in response to the climate change emergency will be consistent with duties under the Environment Act and the Well-being of Future Generations Act

6. Background Papers

None