Protecting the South Wales coastline - extending the impact of OWWL

SWEEP Impact Summary

Drawing on the success of the first SWEEP Operational Wave and Water Level (OWWL) model developed for the Environment Agency, SWEEP's team - **Professor Gerd Masellink, Dr Tim Poate and Dr Kit Stokes from the University of Plymouth's Coastal Processes Research Group** - have developed a suite of additional bespoke, localised OWWL models for a variety of wider partners. The following impact summaries highlight the benefits being delivered, both for the public and private sector.

£300k new funding secured
2 jobs and contracts for **>5** survey companies

80 people and organisations benefiting from increased coastal forecasting capacity

Fast-tracked stakeholder engagement work by more than **>6** months

Ways of Working

Innovative Knowledge Provision | Effective Collaboration | Capacity Building | Tailored Decision Support

Why it mattered?

Overtopping and coastal flooding is a significant problem along the South Wales coast with an estimated 44,000 dwellings being at risk of coastal flooding.

Natural Resources Wales (NRW) is responsible for flood risk management in Wales, supported by key organisations such as the Welsh Coastal Monitoring Centre (WCMC).

WCMC is developing a strategic approach to coastal monitoring as part of the National Strategy for Flood and Coastal Erosion Risk Management (FCERM). It aims to identify the most vulnerable coastline locations, and strengthen management strategies through more robust risk based-decision making, underpinned by greater scientific evidence.

WCMC approached SWEEP to develop a bespoke Operational Wave and Water Level (OWWL) model for the South Wales coastline, taking advantage of the new topographic data available to them and the innovative OWWL science.

What we did

Working in close collaboration with WCMC, and wider beneficiaries such as NRW and local South Wales coastal authorities, the SWEEP team collated a new database of 30 coastal profiles, topographic data and sea-defence information for South Wales. This was used to feed a new bespoke version of the OWWL model that automatically generated daily wave overtopping forecasts for different areas along the South Wales coastline.

Alongside project partners, the team disseminated information and access to the OWWL model and forecasts, delivering direct training and support in their use, before monitoring and evaluating the usefulness, uptake and impact through partner interviews and feedback.

Caswell, Wales

Chosen profile

Aerial photographie from 2017
0   250   500 m

Impacts & benefits delivered

Knowledge/Capacity
Delivered innovative knowledge and capacity: SWEEP's freely available forecasts deliver accurate 5-day in advance wave and water level data for the South Wales coastline, at a greater precision (1 km resolution) than previously available. Training, and awareness raising, has been delivered for more than 80 beneficiaries, resulting in more collaborative and effective ways of working in relation to tackling coastal flooding management.

Attitudinal/Capacity
Influenced attitudes and perceptions with key beneficiaries:
- **Welsh Coastal Monitoring Centre (WCMC)** – building consensus for more specific, localised coastal hazard forecasting, as well as a more joined-up national forecasting approach for Wales.
- **Natural Resources Wales (NRW)** – stimulated new thinking about how cutting-edge science approaches such as OWWL could be used to strengthen national policies and practice for coastal flooding forecasting in Wales.
- **Coastal flood managers** – OWWL forecasts are now a key part of the 'go-to' best practice drawn on to improve decision making and mitigate the impact of coastal overtopping.

Organisational Function
Strengthened various aspects of WCMC's work e.g.:
- OWWL forms a key part of WCMC's suite of innovative science-based coastal monitoring tools, which has enabled the centre to demonstrate the value of its work and secure further funding.
- Enabled WCMC to better support coastal authorities with more localised, accurate forecasting data, leading to more effective coastal management decisions that enhance coastal safety, and reduce damage, disruption, and costs. See Vale of Glamorgan OWWL case study.
- New, stronger, regional and national networks of stakeholders working more collaboratively to tackle coastal hazards.
- Informing and strengthening the future direction of WCMC's work through better understanding and prioritisation of areas most at risk along the South Wales coastline.

Policy & Legislation
Natural Resources Wales recognise the value of OWWL and the opportunities SWEEP's forecasts provide for improvements in coastal flooding safety and cost-savings.
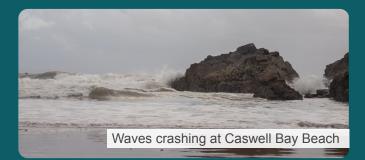
Financial & Economic
Contributed to WCMC successfully leveraging £300k over 5-years to extend its work, supporting 2 FTE jobs and employment contracts for more than 5 survey companies per year.

> *Without SWEEP WCMC absolutely wouldn't have been able to offer local coastal authorities this brand new product and approach to accurately and timely deliver site specific local overtopping forecasts and alerts."*

Gwyn Nelson, Welsh Coastal Monitoring Centre Programme Manager

> *I use the SWEEP OWWL forecast frequently and find it valuable not only for corroborating other sources, but sometimes serving as the best early warning system for hazardous wave and water conditions. This will have a significant impact on improving preparedness for big flood events."*

John Buttivant, Chair of Severn Estuary Coastal Group

Waves crashing at Caswell Bay Beach

> *The collaboration with SWEEP and the extension of the OWWL model to South Wales was invaluable in helping WCMC showcase what the centre could do in terms of delivering added value around coastal flooding management data. We're delighted that this has contributed to funding success with our next five year phase."*

Gwyn Nelson, Programme Manager WCMCGroup

> *I believe the modelling approach taken by SWEEP OWWL would be considered to inform any future wholescale review of NRW's coastal forecasting model."*

Neil Counsell, Specialist Advisor, Flood forecasting NRW

Coastline at Caswell, Wales

Looking to the future

Building on the strong partnership between the SWEEP team and WCMC, further impact is anticipated into the future, both extending the benefits of this project, and establishing new collaborative work.

National Resources Wales are interested in working with the SWEEP team to explore the value OWWL forecasts provide from more localised, dynamic beach profiles, and using this to better understand the accuracy and validity of their existing system. This could potentially contribute to a national review of coastal forecasting.

Greater and wider benefit from OWWL – is expected following further extreme storm events that most effectively demonstrate its value. In the meantime, a growing number of stakeholders are benefitting from SWEEP-OWWL forecasts, e.g., the National Trust's Coast and Marine Advisor, Tony Flux, who sees OWWL as an important part of the data they use, benefitting ops teams with accurate advanced warning of problematic overtopping and potential coastal flooding.

For more information contact sweep@exeter.ac.uk

Caswell, Wales

Organisation we worked with

WCMC
Wales Coastal Monitoring Centre

Underpinning NERC Science

- NE/N015525/1 - Physical and biological dynamic coastal processes and their role in coastal recovery (BLUE-coast)
- NE/M004996/1 - Impact of sequence of extreme storms during 2013/14 winter on South West coast of England
- EP/H040056/1 - New understanding and prediction of storm impacts on gravel beaches (NUPSIG)

About SWEEP

The South West Partnership for Environmental & Economical Prosperity (SWEEP) is a partnership between the University of Exeter, the University of Plymouth, and Plymouth Marine Laboratory. Funded by the Natural Environment Research Council and stakeholders together to solve key challenges faced by those working with our natural resources. **www.sweep.ac.uk**

UKRI
Natural Environment Research Council