

# Understanding Barrier Beaches

Technical Summary: FD1924

## Joint Defra / EA Flood and Coastal Erosion Risk Management R&D programme

### Background to R&D project

Barrier beaches around the UK are important, not only in terms of defences against flooding but also in their own right as important coastal geomorphological features. A lack of detailed understanding of how these beaches evolve and of models to predict their performance as flood defences, together with constraints on acceptable methods of intervention, make the successful and cost-efficient management of barrier beaches a challenging task for coastal managers. The need for better management of such beaches as both flood defences and natural heritage areas will inevitably increase in the face of rising sea-levels.

The essential feature of a “barrier beach” is that it has a distinct crest separating the seaward beach face and a well-developed back-slope. In many cases, such beaches have (or once had) an area of water on their landward side. Tools for managing barrier beaches are generally weak, primarily as a result of uncertainty with regard to process understanding. In particular there is limited capability associated with flood-forecasting arising from either overwashing or breaching.

This research project has collated and summarised the state of the art understanding of barrier beaches both in terms of relevant processes and management practices. Barrier beaches have been defined, their geomorphological classification reviewed, and current understanding of structural and morphological characteristics has been outlined. A suggested framework for further research has been presented. This framework is expected to redress the shortage of tools available to coastal managers who are charged with managing barrier beaches, and to provide guidance on the use of those tools and management of the beaches.

### Results of R&D project

The Risk Assessment of Flood & Coastal Defence for Strategic Planning (RASP) and Performance-based Assets Management Systems (PAMS) research programmes have pioneered the concept of addressing flood-risk in a performance-based manner. Through an examination of barrier beach performance in the context of the Source-Pathway-Receptor model, and consideration of the review of the dynamic processes, it is apparent that there are shortfalls in the understanding of processes relating to barrier beaches. The Scoping Study has highlighted the gulf in understanding between those processes occurring on sandy coastlines and those occurring on coarse- and mixed-sediment coastlines.



Evidence from the case histories and issues raised through review and consultation indicate that pathway component process understanding is not in line with “end-user” requirements. Major deficiencies in the predictive tools used have also been highlighted. It is suggested therefore, that a first-phase research programme be established which concentrates on examining the processes of barrier beaches through experiment and monitoring. A second phase of research into developing robust and reliable numerical predictive tools could then be embarked upon.

Since the majority of barrier beaches around England and Wales consist of coarse- and mixed-sediments, recommendations for further research are focused solely around these barrier-types. A consequence of this proposed research would be the evolution of a sound set of management guidelines.

## R&D Outputs and their Use

The main output from the research was R&D Technical Report FD1924/TR. This report describes in detail the background to the study, and sets out its aims and objectives. It provides a review of current barrier beach process understanding, drawing on research experience from around the world. An assessment of tools used to study barrier beach processes and the application of such tools is made. A series of case histories was selected which represented the varying nature of barrier beaches around England and Wales. Management practices are then examined in a more generic manner. The report draws conclusions and describes a future research framework. The report is intended to be used by both coastal scientists, and coastal managers, and will usefully inform the Environment Agency’s Sustainable Asset Management research theme.

A mapping of barrier beaches around England and Wales was undertaken. To facilitate such a task, and to assist in the dissemination of findings from the scoping study, a dedicated website ([www.barrierbeaches.org.uk](http://www.barrierbeaches.org.uk)) was set up. This web-site will serve a first port of call for anyone interested in barrier beaches, from school children to coastal managers. In addition, a short paper was presented at the Defra Flood and Erosion Risk Management Conference 2007.

This R&D Technical Summary relates to R&D Project FD1924 and the following R&D output:

**R&D Technical Report FD1924/TR – Understanding Barrier Beaches.** Published Feb 2008.

Publication Internal Status: Released Internally

External Status: Released to Public Domain

Project Manager: Dr Stuart Stripling (HR Wallingford)

Research Contractor: HR Wallingford, Channel Coastal Observatory, University of Southampton

The above outputs may be downloaded from the Defra/EA Joint R&D FCERM Programme website ([www.defra.gov.uk/environ/fcd/research](http://www.defra.gov.uk/environ/fcd/research)). Copies are also available via the Environment Agency’s science publications catalogue (<http://publications.environment-agency.gov.uk/epages/eapublications.storefront>) on a print-on-demand basis.

PB 12984 TS

Further copies are available from:  
Defra Flood Management, Ergon house,  
Horseferry Road, London SW1P 2AL

Tel: 020 7238 6000

Info-fm:[defra.gsi.gov.uk](mailto:defra.gsi.gov.uk)  
[www.defra.gov.uk/environ/fcd/research](http://www.defra.gov.uk/environ/fcd/research)

