

MONITORING THE EFFECTS OF CHANGING MANAGEMENT PRACTICE ON THE EVOLUTION OF A MIXED GRAVEL AND SAND BARRIER BEACH

Andrew P. Bradbury, Channel Coastal Observatory, UK

KEYWORDS: coastal monitoring, adaptive coastal management, barrier beach

Following the severe North Sea floods of 1953 many changes to coastal hazard management were introduced in the UK. Some of the management practices have since proven to be unsustainable. Recent changes in management practice have subsequently been made to restore habitats and naturally functioning geomorphological systems, sometimes at the expense of increased flood risk or loss of land by erosion. These adaptation changes have also been driven by conservation objectives arising from European legislation. The benefits of naturally evolving systems include both provision of valuable habitats and often sustainable and efficient dissipators of wave and tidal energy. Careful planning and detailed monitoring is required to minimise risks.

Maintenance of the Cley-Salthouse barrier, Norfolk, U.K has been withdrawn following fifty years of active management. The beach crest ridge has been managed at artificially high elevations, and on an artificially fixed alignment, during this period. Flood management now focuses on monitoring and flood warning systems rather than engineered defences. The impacts of changing management practice have been investigated by monitoring of the morphodynamic response of the barrier system.

As the beach alignment has been held artificially in a fixed position for over 50 years, and overwashing has been controlled during this period, there is some uncertainty related to the expected rate of change of the system. An extensive monitoring programme has been established to consider this adaptation. Recent changes to the evolution of the beach system are considered, by reference to storm conditions of varying magnitude, since 2005. Observations include beach responses derived from a series of LIDAR surveys, RTK beach measurements, wave and tidal measurements. The focus of the analysis is on evolution of the barrier over a temporal scale of several years. The implications are considered also in context with potential impacts on longer term decadal scale geomorphological evolution, flood risk and by reference to trends, monitored during the earlier management regime. This indicates that the total volume of the barrier is declining and that the frequency of overwashing events and rate of rollback of the barrier is likely to increase. Several processes are clearly changing during this transition phase, including profile response, sediment sorting and a localized increase in permeability. Modifications to management practice present new issues that may include the possibility of fragmentation of the barrier.

There is evidence that some parts of the barrier are already adapting and showing signs of evolution towards a naturally functioning system, following changes to the management regime; this is more clearly evident where the crest elevation is low or the barrier cross-section is relatively small.

*Proceedings of Coastal Zone 09
Boston, Massachusetts
July 19 to 23, 2009*

Channel Coastal Observatory
National Oceanography Centre,
Southampton, SO14 3ZH, UK
+442380598467
Andy.Bradbury@noc.soton.ac.uk