Shoreline management

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Introduction

Whilst there has been only modest progress in developing co-ordinated and comprehensive coastal zone management in the UK (despite the encouragement of an EU Demonstration Programme in Integrated Coastal Zone Management, 1999–2001), real advances in shoreline management have been achieved in recent years. Shoreline management concerns the physical management of the coastline, including beaches and cliffs. The advances and changes have been in the approaches to, and delivery of, the protection and defence of developed coastlines and how risks and threats, particularly of flooding and erosion, are dealt with.

Issues

Undoubtedly, the main advance over the past 10 to 15 years has been the adoption of a co-ordinated, strategically-based long-term ‘vision’ of shoreline management by both central and local government authorities. At the same time, there has been much more concern over the potential impacts of defence measures on coastal habitats; archaeological and historical sites; public amenity and landscape quality. Whereas, until recently, engineering criteria dominated decisions on how and where to defend shorelines at risk of flooding or erosion, environmental and social (and often aesthetic) factors are now given greater weightings.

Several issues have been responsible for this radical change in approach of which the more important are as follows:

(i) The failure of site-specific, short-term and often reactive approaches to ‘solving’ problems such as cliff and beach erosion and flooding of low-lying frontages. This has often been accentuated by the use of ‘hard’ engineering techniques (e.g. seawalls, revetments and dykes) which convert naturally dynamic coastal environments into inflexible, artificial shorelines that require constant maintenance.

(ii) The continuing development of the coastal zone for a wide range of land uses, but without sufficient reference to the exposure of people, property and infrastructure to hazards such as storm surges and cliff instability. The traditional ‘demand-led’ philosophy of providing coastal defences is not sustainable in this context, and requires a more rigorous set of engineering, environmental and economic criteria to decide on what assets can, and cannot, be defended. Calculations of this type need to equate the costs and benefits of providing protection, at least up to certain standards (e.g. the notional 1 in 50 year major storm). There is a complex

range of factors to take into account, which might vary from projected demographic change (e.g. need for new housing development) and investment in resort regeneration to the 'intangible' monetary values of habitat conservation and visual amenity. Traditional approaches concentrated on the direct economic issues.

(iii) The growth, particularly since the early 1980s, of widespread concern for the impacts of social and economic forces on the integrity of natural environments. The concept of sustainable development has become firmly established, and, in the context of shoreline management this has favoured 'soft' engineering as the preferred approach to defence and protection. Techniques such as beach recharge and re-cycling are now widely practised, with others, such as beach dewatering, mudflat recharge, saltmarsh and dune stabilisation and offshore breakwaters being promoted. It is ironic, however, that the majority of residents in threatened coastal communities almost always express a strong preference for 'hard' defences; there is clearly an unresolved issue here of a clash of public and professional perceptions or landowner and wider views.

(iv) Predictions of climate change and sea-level rise, due to the forcing effect of global warming, compel shoreline managers to take a long-term view (50–100 years) of likely coastline behaviour. Increased magnitude and frequency of major storms; wetter winters promoting more instability of landslide coasts; higher sea-levels producing greater water depths offshore, and therefore more beach erosion and accelerated shoreline retreat, are all widely-accepted scenarios. It is vital that the serious implications for most coastal activities are addressed now, and appropriate strategies adopted. Shoreline management has to make difficult and controversial choices between providing enhanced standards of protection (e.g. along urbanised coasts) and retreating the defence line, even withdrawing altogether (managed retreat). For some coastlines, there may be scope for compromise, the so-called accommodation option. This could include measures such as adapting building structures or introducing short-term leaseholds for new development.

Changing the institutional structure

Historically, going back to mid-Victorian times when sea defence became a public responsibility, the instructional structure of shoreline management in the UK has adopted a devolved ('bottom-up') approach. The initiative for identifying, designing and implementing schemes or projects has always been with the maritime local authorities. This remains the case today, with the current statutory system distinguishing between protection from erosion (the responsibility of local councils) and defence against flooding (the remit of the Environment Agency). This awkward division has not only encouraged lack of co-ordination, but has also meant that each local authority has focused on its own frontage without much reference to its neighbours. The most familiar outcome has been accelerated beach and cliff erosion

along shorelines starved of sediment because up-drift authorities have impeded longshore transport due to groyne construction. Just as significant has been the introduction of changes in the style, and standards, of defence structures at, or close to, local government boundaries. This has often seriously distorted natural pathways of sediment movement, giving rise to serious beach budget shortfalls.

Without intervention from central government, the problems thus created became progressively more acute throughout much of the twentieth century. The initiative for change came from the local authorities, on the realisation that mechanisms for co-operation were urgently needed. Thus, in 1986, the first regional coastal group was created, involving some 30 authorities on the south-central coast of England. This organisation, called SCOPAC (Standing Conference on Problems Associated with the Coastline) was (and is) an informal, non-statutory body dedicated to promoting coordinated management of the shoreline. It very quickly proved its value, and began to adopt a strategic view of the complex and varied coastline for which its constituent authorities have statutory charge. It engaged in political lobbying and also (through a subscription levy) commissioned research. The success of SCOPAC in providing a much-needed forum for consultation, co-operation and co-ordination between previously isolated operating authorities was evidenced by the rapid creation of ten similar coastal groups covering the rest of the coastline of England and Wales. In all cases, although their terms of reference are specific to shoreline management, other contingent issues are considered. These include offshore aggregate dredging, impacts of coastal recreation and water quality.

One of the main objectives of the regional coastal groups was to induce a major change of central government policy, in favour of a strategic policy based on improved understanding of shoreline geomorphology. A major concept that had been developed and was advocated as being a sustainable natural unit on which integrated management could be based is that of the ‘sediment cell’. This is a more or less self contained length of coastline in which all sources, transport and stores or sinks of sediment are linked. At this time, the role of central government was somewhat reactive, though it exerted influence through providing much of the financial support for local schemes. Within a remarkably short time (by 1993), the argument was won, and centrally-funded shoreline management plans (SMPs) were created.

Shoreline management plans

Between 1993 and 2000, 47 SMPs were completed for the coastline of England and Wales (those for Scotland and Northern Ireland are still in production, with somewhat different objectives). Each SMP coincides, as far as possible, with one distinct sediment transport cell. Many SMPs consist of a number of adjacent sub-cells, where there are some exchanges of sediment between units. Typically, one SMP involves four local authorities, the Environment Agency, English Nature and other local major coastal landowners. The latter might include commercial interests, privatised utilities (e.g. Powergen) and public agencies (e.g. Ministry of Defence). The remit, determined by guidance from central government, is to identify a sequence of distinct management units, based on criteria such as geomorphological character or dominant land-use. To each of these, one of a choice of four strategic policy options,

extending over a timescale of 20–50 years, is applied. These are: ‘hold’ the present defence line; ‘advance’ the line; ‘retreat’ the line; ‘do nothing’. The means by which the chosen option is implemented is not prescribed, but is justified on the basis of analysis of the hydrodynamic, biophysical and socio-economic character of each unit, as well as the coastline as a whole. Choice is also determined by satisfying basic criteria of economic viability, environmental sustainability and engineering integrity. Most SMPs are very substantial documents, often representing a major synthesis of previous knowledge, as well as being ambitious efforts of strategic thinking. However, it is important to emphasise that SMPs are *non*-statutory documents, even though all have been formally adopted by each contributing local authority. Thus they have the purpose of *informing* statutory policy, such as land-use planning, flood control and public health. They do not, therefore, provide a definitive future for every length of shoreline.

From their creation, it was intended that SMPs would be ‘live’ documents, periodically reviewed and updated, e.g. with reference to economic development or the latest predictions of climate change. In 2001, central government (now DEFRA, in place of MAFF) published a revision of its guidance. Apart from extending second generation SMPs to all estuaries, the main change is an expansion and re-wording of the strategic defence options. These are: ‘hold the line’; ‘limited intervention’; ‘managed re-alignment’; ‘advance the line’; and ‘no active intervention’. The second and third represent alternative ways of retreating from the existing line of defence, sometimes in the interests of restoring natural habitats. The last is a re-statement of ‘do nothing’, but might include a commitment to carry out monitoring. One other major change is a shift to time-dependant strategies, involving a switch from one option to another over a typical 50–100 year lifetime for specific management units.

Second generation SMPs are likely to begin to appear in 2006 or 2007, following sample trials in 2004-5.

Coastal defence strategy studies

SMPs are basically ‘broad-brush’ statements of policy. Their implementation requires more detailed research and more extensive consultation with stakeholders. This takes the form of strategy studies, usually limited to one distinct sub-cell, divided into very precisely-defined management units. These documents provide the basis for local authority and Environment Agency policy and detailed shoreline management.

The European Union

Shoreline management policy and practice has been strongly influenced by EU directives, notably those on Environmental Impact Assessment (1985, revised 2002) and Habitats (1992). The latter has been specially influential in strengthening national legislation on conservation. Perhaps its main significance has been to require shoreline managers to minimise impacts of defence measures on the integrity and diversity of beach, dune, marsh and lagoon ecology. Any unavoidable losses or sources of degradation have to be compensated. One EU-sponsored programme has led to the creation of CHaMPs (Coastal Habitats Management Plans), with six pilot or experimental plans completed between 2000 and 2003. Each attempts a relatively detailed assessment of habitat changes over the next 100 years in the context of predicted external environmental forcing factors (e.g. sea-level rise) and SMP/strategy study policies. They will function to inform future SMP policy, though it is currently uncertain when all parts of the UK coast will be covered by a system of CHaMPs.

The expansion of the role of central government

SMPs are not the only instruments of strategic planning relevant to shoreline management. The Environment Agency has produced a series of policy statements concerning risks from flooding and erosion, with targets for implementation. They are also primarily responsible for estuary management plans, which are, in effect, the equivalent of strategy studies for the open coast. Currently, DEFRA is involved in creating a new strategy for national policy on dealing with flood risk, which includes the shoreline dimension. Currently referred to as *"Making Space for Water",* and due for publication in 2005, it will attempt to define sustainable solutions to rising levels of risk and cost, extending over at least 50 years. This comprehensive policy statement provides an important framework for second, and subsequent, editions of SMPs.

The Office of the Deputy Prime Minister (as successor to one of the functions of the previous Department of the Environment) issues periodic planning policy guidelines (PPGs). Although the detail of orchestrating land use competition and conflict is conducted at local authority level, PPGs are influential in providing statements of central government principles and priorities. An example relevant to shoreline management covers development on unstable slopes, and argues strongly in favour of precaution. On balance, current government policy is to direct development away from undeveloped coastlines, but to encourage re-occupation of 'brownfield' sites. As these are associated with, for example, declining resort towns, there are clear implications for SMP policies. PPG25 concerns development in relation to flood risk on coasts and also rivers.

Conclusion

The adoption of a strategic view of policy alternatives for shoreline management, informed by much new research on sediment dynamics and coastal evolution, is a remarkable achievement of the past decade. Central government in particular, has become much more pro-active in its encouragement and support for this approach. Nonetheless, for managers to take fully-informed decisions, and adopt sometimes innovative approaches, will require much effort in wide-ranging public consultation. They will also rely heavily on further research on issues as diverse as predicted climate change, habitat dynamics, social values and future economic development.

A crucial element in the development of new frameworks and strategies has been the recognition of natural process and landform units as a basic component, and how they interact with economic, social and technical changes. This has been, and continues to be, a fertile field for research by both physical and human geographers.