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Knowledge Exchange Seminar Series (KESS)

Shoreline management planning in Northern Ireland

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Summary

Recent storms on the Northern Ireland coast have caused widespread flooding and coastal erosion. Erosion threatens buildings, roads, railways and other infrastructure, but is also a vital natural process that sustains beaches, and is essential to maintenance of a healthy coastal ecosystem. Societal responses to erosion include: (a) hard and soft protection works; (b) realignment or removal of infrastructure; or, (c) do nothing. Each has implications for the built and natural environment. Unusual among western European countries, Northern Ireland has no strategic approach to shoreline management. This means that there is much uncertainty regarding who holds responsibility, what powers they have and what constraints affect them. As a consequence, decisions are made individually, without any regional guidance, or understanding of the local or cumulative effects of such decisions. The default decision is to armour the coast; and a large amount of the coastline has been armoured already. This protects property, but requires continual maintenance, and ultimately damages coastal assets (beaches, landscape quality, ecosystem health) that are used by the whole population. This presentation looks at the need for a strategic approach in Northern Ireland, based on examples from research undertaken on a global scale.

Background

The Northern Ireland Coast is one of its most valuable assets. It is geologically diverse, has a wide range of environments and is a scenic resource that underpins a significant portion of the tourism industry. In addition, it is widely used for local recreation and contributes significantly to societal wellbeing. The coastal ecosystem delivers food resources, absorbs storm energy, filters water and provides a wealth of resources that humans enjoy. The long history of human activity at the coast is itself a valuable cultural resource.

Coastline change in Northern Ireland

All sand and gravel beaches adjust their shape in response to changing wave and tide conditions. In so doing they are able to absorb energy that is carried landwards by waves and they act as perfect natural buffers against storms. Usually the changes in a beach take place below the high water line and they are seldom noticed or remarked upon. During storms, however, soft cliffs and dunes that lie

landwards of beaches are occasionally eroded. This introduces extra sand or gravel into the beach and helps break the power of the storm. Sand dunes usually recover after storms, but over a period of months to years as sand is returned first to the beach and then to the dunes. Erosion is thus a natural and essential process that enables beaches to survive and fulfil their role as natural buffers.

Some Northern Ireland beaches have been stable for many years, accommodating storm energy and remaining in place. Others, notably on the south Down coast, have been experiencing slow, landward migration as sand is carried alongshore by waves, exposing the soft cliffs to wave action and enabling the sand to be replaced by fresh inputs from collapsing cliffs. Here, erosion is also a vital natural process that sustains the beaches.

When sea level rises, most beaches adjust by moving landwards. They survive rising sea level by transferring sand landwards or drawing in fresh sand from landward of the beach. Sea level rise poses no threat to beaches. Sea level in Northern Ireland has been broadly stable for several hundred years and its effects have not been seen. Recent tide gauge records suggest, however, that there is an upwards trend in Northern Ireland sea levels and future scientific projections of global sea levels indicate that Northern Ireland is likely to experience rapid sea level rise in the next century. As a consequence, many beaches that have been stable are likely to start moving landwards and those that have been moving landwards, will do so more quickly.

Shoreline change can also be caused by human activities like sand and gravel extraction and coastal engineering works.

The key challenges facing Northern Ireland are thus:

How to respond to periodic shoreline change caused by storms? and

How to respond to changes associated with rising sea level?

Management issues related to shoreline change

Erosion is transformed from simply a natural process to a 'problem' when infrastructure or property is affected by shoreline movement. Buildings, roads, recreational areas (mainly golf courses), car parks and commercial sites (caravan parks) are typical property that, when located too close to the shoreline is affected by shoreline retreat, whether temporary or permanent. *Note: the problem is created by the presence of property, not by the erosion.* Nonetheless, the issue of what to do has not been addressed in Northern Ireland at a strategic level and there is much misunderstanding of the consequences of the various responses. Shoreline Management Plans (SMPs) in Great Britain allow a consideration of each stretch of coast and the selection of an appropriate response to shoreline change. The decisions reached in the SMP process do not place any obligation on government or local authorities to fund defences - these are permissive activities, not statutory obligations.

Living with shoreline change

'Coastal defence' is an ambiguous term. Everyone can subscribe to it, but it means different things to different people. Most commonly it means defence of coastal property. Seldom does it mean defence of the coastal ecosystem and usually, as outlined below, defence of property is at the expense of the coastal ecosystem.

Broadly speaking there are two options for dealing with shoreline change. They are:

1. Hold the line. Using either hard defences (seawalls, groynes etc), or soft defences (artificial beach replenishment).
2. Retreat. This allows the coastline to adjust and can be proactive (relocating property at risk and taking care not to place property in areas that may be at risk) or passive (not interfering and permitting change to occur)..

Holding the line on a retreating shoreline using hard defences results in damage to and ultimate loss of the beach because it cuts off the sand supply from areas to landwards and it causes wave energy to be reflected seawards, carrying existing sand away. Ultimately beaches are destroyed and their services to society are lost. This undermines the sea defences and requires them to be reinforced. In many instances several generations of sea defences have been built. Many sea defences in Northern Ireland seem to have been built in response to winter storms which eroded dunes that would have recovered quite naturally by themselves. In the scenario of future sea level rise, holding the line by hard defences will require very extensive and substantial defences. These will have to be maintained and upgraded over time.

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Holding the line using soft approaches means replenishing sand on eroding beaches in order to hold them in place. This is an ongoing process that must be repeated regularly and is a permanent commitment if the shoreline is to be held. It creates a beach and provides recreational space but it is costly and requires an available sand supply.

Retreating means providing enough space for the shoreline to move and fulfil its natural functions. This preserves the functions of the coast and allows it to continue to deliver the services on which we rely. In a proactive sense if property is threatened this can be removed, either by demolition or by relocation. There are many examples of important landmarks including hotels, lighthouses and private homes being relocated and roads and railway lines being diverted in response to shoreline change.

In a passive sense, shoreline retreat can proceed by not defending threatened property and allowing it to be undermined. This will normally require the collapsed debris to be removed to avoid it becoming a hazard.

The Northern Ireland situation

For over 50 years coastal erosion in Northern Ireland has been addressed by means of the 'Bateman Formula'. This is based on a memo from the head of one (then) ministry in the Northern Ireland Government to all others, giving primary responsibility to whatever department's responsibilities most closely coincided with the property at risk from erosion. It was concerned solely with protection of that property and paid no heed to the consequences of any protection works. There is still a great deal of uncertainty regarding responsibility for responding to coastal change.

The now dated planning guidance urges that development not normally be permitted in areas subject to or at risk of coastal erosion. This guidance seems to be applied in an inconsistent manner, if at all.

With the advent of marine licensing, a more central role is played by the DoENI's Marine Division. All applications for works in the intertidal zone require a licence. This includes sea defences. Each application is considered on its own merits and it is a purely responsive approach. Almost all applications related to shoreline change are for defence works and there is no mechanism to explore alternative, sustainable options, nor to proactively remove damaging structures erected before licensing came into place. In the current dispensation, the only option available is defence and this would ultimately lead to a rim of concrete around the whole coast of Northern Ireland (at least that part with beaches and soft cliffs).

Large stretches of the Northern Ireland coast are being degraded by the proliferation of sea defences. Without a strategic vision, this will continue until much of the coast is rimmed by concrete.

What is needed?

In Northern Ireland there are clearly some areas where property and infrastructure must be defended at all costs. There are many others where it would be in the public interest to retreat and permit the coastline to adjust. There is, however, no strategic overview of that situation, nor is there a mechanism to allow retreat to be selected as an option. Retreat is, however, essential if the scenic beauty and values of the coast are to be preserved.

A deliberate and structured strategic approach, along the lines of Shoreline Management Plans is necessary in Northern Ireland. This would clarify the situation for property owners, developers, planners and the public. It would enable targeting of resources for sea defences where they are most necessary and it would enable the preservation of the coastal attributes for which Northern Ireland is renowned and which underpin significant economic activity.

A variety of mechanisms can be used to facilitate retreat. They include planning conditions, which can prevent ill-sited development in the first place. In the United States, systems called 'rolling easements' are used to permit development but do not allow it to be defended, thus allowing owners to make use of their land for a period of time. In other areas, compulsory purchase can be used to remove buildings at risk.

There is a great deal of misunderstanding about the nature of coastal erosion and the effects of coastal defence structures. It is essential that people are informed of the impacts of various options and that the social justice aspects of these decisions be addressed. For example, is defence of some private property behind a beach more important than

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maintenance of the beach for the enjoyment of the population as a whole? Is immediate defence of a car park more important than preservation of a beach for future generations?

