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Potential Implications of Climate Change and Sea-Level Rise on Coastal Waste Sites

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Abstract

Waste, directly and/or indirectly, is one of the biggest challenges of urbanisation worldwide. Many countries strongly rely on landfill as a major route of waste handling (e.g., Osmond, 1982; Basel Convention, 1995; Wilson and Smith, 2005), and for instance in the UK, landfills represent by far the largest waste disposal strategies (MWW, 1995; Williams, 1998; Wilson and Smith, 2005). Despite the efforts spent in waste minimisation, re-use and recovery, the amount of waste disposed in landfills has increased dramatically over the last century leading to the development of a large number of waste disposal facilities. Not surprisingly, many of these sites were often located in low-lying coastal areas during the time when management policies and practices were carried out without today's knowledge of the environmental challenges under the pressures of a changing climate. Hence, coastal waste sites could be affected by extreme flood events and/or coastal erosion, which could lead to increased risks of environmental damage. Release of pollutants from landfills could occur by a variety of methods such as leaching during floods, or the physical removal of waste material via erosion. Climate change and sea-level rise will only exacerbate these issues, and many coastal landfills are potentially threatened during the 21st Century: this is true more widely around European and the world's coasts.
In strategic terms, the response of coastal managers to the potential impacts of climate change and sea-level rise could either be to hold or advance the line (e.g., protection via sea dikes or nourishment) or to allow the shoreline to retreat (e.g., managed realignment) (e.g., Leafe et al., 1998; DEFRA, 2006). However, when landfills are part of the coastal land use, although they may not be valued in financial terms, they might present important environmental and ecological threats which must be considered in long-term shoreline management. Moreover, as 'holding the line' is becoming more and more difficult as defences are increasingly threatened and becoming costly to maintain under extreme climates, coastal waste sites may present major management issues when 'realignment' and other strategic responses allowing more coastal dynamics are considered. Hence, many existing landfills may need to be protected and/or removed during the 21st Century, and this would present added challenges. As such, landfills will probably be an important issue for shoreline and coastal management in the future, but this is not yet widely appreciated. There is also very limited assessment of these issues, and yet waste sites in coastal areas have the potential to provide significant risks in the future, and hence be a major control on coastal management planning practices in years to come. This paper explores these issues using a case study in South-East England (i.e. Hampshire, Sussex and Kent counties), and a detailed case study of an eroding coastal site at Pennington (Hampshire). The implications for sites in the Theseus Project will also be made.

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