



Governance context for coastal innovations in England: The case of Sandscaping in North Norfolk



Vera Vikolainen ^{a, b, *}, Jaap Flikweert ^c, Hans Bressers ^b, Kris Lulofs ^b

^a European Parliament, European Parliamentary Research Services (EPRS), Brussels, Belgium

^b Department of Governance and Technology for Sustainability (CSTM), University of Twente, Enschede, The Netherlands

^c Royal Haskoning DHV, Peterborough, United Kingdom

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ABSTRACT

Coastal management in Europe is shifting toward soft coastal protection strategies to deal with flood risk and erosion. In the UK, a sand replenishment in North Norfolk is planned to take place in the coming years, inspired by the Dutch 'Sand engine': a large-scale sand replenishment executed in 2011. Besides being faced with technical challenges, the initiative requires fine-tuning to the local conditions. In this article we present a theory guided assessment of the governance context for Sandscaping in England. We focus upon North Norfolk, where Sandscaping was included as an option to protect the Bacton Gas Terminal from cliff erosion. Our aim is to contribute to further elaboration of Sandscaping potential along other locations in England. The lessons we draw about implementing Sandscaping initiatives have emerged from real project experience and could therefore be relevant in other coastal contexts.

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1. Introduction

It is widely acknowledged that reliance on conventional 'hard' human-engineered infrastructure to manage water needs is capital intensive and often damaging to the ecosystems. Consequently, there is an emerging focus on 'green' infrastructure, soft engineering, ecological restoration and combined approaches are increasingly being used to manage coastlines (Palmer et al., 2015; Hill, 2015). A review of current coastal protection strategies in Europe (Pranzini et al., 2015; Pranzini and Williams, 2013) revealed that countries share a common trend toward replacement of hard defences with soft strategies, and the need for modern legislation and administrative solutions that enable integration in resource management. The trend is fuelled by the search for the added value of increasing costs of coastal defences. The legitimacy of investments appears to increase if they offer additional services to society besides flood risk reduction. One soft engineering approach that emerged as an alternative to hard infrastructure is 'Building with Nature' (Van Slobbe et al., 2013; de Vriend et al., 2015). The

Dutch Sand engine is an example of applying Building with Nature for flood protection in coastal environments (de Vriend et al., 2015; Aarninkhof et al., 2012).

The Sand engine is a very large, locally concentrated sand nourishment of 21.5 million m³, aiming to provide safety against flooding in combination with new spatial values (Stive et al., 2013). It was executed at Delfland coast in the Netherlands, between Rotterdam and the Hague, in 2011 (see Fig. 1). The design of the Sand engine integrates ecology, recreation, land use and other aspects of coastal management. Building with Nature projects like the Sand engine require a multidisciplinary approach (de Vriend et al., 2015) and their decision-making is no longer just a matter of coastal engineering, but one of integrated governance (Van Slobbe et al., 2013).

Since its implementation, the Sand engine has attracted the attention of coastal authorities worldwide. In the UK, there has been increased media interest in what flooded Britain can learn from the Dutch (Storr, 2014; Carrington, 2014; Van Klaveren, 2015; The Spectator, 2016). Against this background, the 'Sandscaping' initiative is an example of how the Dutch expertise could be applied to the British context. Sandscaping is inspired by the 'Building with Nature' approach, using the principles of the Sand engine in the Netherlands. As part of this effort, 19 high potential locations for Sandscaping were identified in England and Wales (The Crown

* Corresponding author. Square de Meeûs 8, 02Y077, B-1050, Brussels, Belgium.

E-mail addresses: v.vikolainen@utwente.nl (V. Vikolainen), jaap.flikweert@rdhvh.com (J. Flikweert), j.t.a.bressers@utwente.nl (H. Bressers), k.r.d.lulofs@utwente.nl (K. Lulofs).

Estate, 2015a; Flikweert, 2016).

In this paper, we aim to increase the understanding of the governance context for Sandscaping in England. We apply a Governance Assessment Tool (GAT) to identify the conditions that support or restrict the implementation of Sandscaping initiatives. We focus on Bacton Gas Terminal coastal defence scheme in North Norfolk, England, which is currently at the most advanced stage of decision-making among the 19 high potential locations identified. In this way, we aim to support the development of the Sandscaping concept further in England and to enable the transfer of the Sand engine concept to the UK. Based on the findings, we make recommendations on how to reduce restrictions and/or make use of opportunities present in the governance context. The lessons we draw about implementing Sandscaping initiatives have emerged from real (project) experience and could therefore be relevant in other coastal contexts. Alongside this practical contribution, our aim is to apply the GAT to coastal governance and thereby contribute to the literature on the governance of coastal areas. The central research question posed in this article is: what governance conditions in England prove supportive or restrictive for the implementation of Sandscaping in North Norfolk? Section 2 of the article introduces the Sand engine and Sandscaping concepts, section 3 sets out the theoretical framework and methodology used in this paper and section 4 details the coastal setting of Bacton and the reasons for selecting this case. The research results are presented in section 5, summarised and discussed in section 6 and final conclusions are drawn in section 7.

2. Sand engine and sandscaping

The idea of a large scale nourishment is to deposit a significant stock of sand in one location, which is then gradually redistributed across and along the shore by the wind and waves. By making use of natural processes to redistribute the sand, this approach aims to reduce the disturbance of local ecosystems (Aarninkhof et al., 2012). It is an alternative to 'hard' engineering (dams, reinforcement and acceptance of beach erosion) and defending the coast by

recurring small-scale nourishments (Van Slobbe et al., 2013). The largest application of this concept so far is the Sand engine Delfland (Stive et al., 2013; de Vriend et al., 2015), executed in 2011 between Rotterdam and the Hague in the Netherlands (see Fig. 1).

According to the Ministerial decision of June 2010 the policy goals of the Sand engine were (Rijkswaterstaat, 2013):

- to stimulate natural dune growth for coastal safety, nature and recreation;
- knowledge development and innovation;
- create additional nature and recreation possibilities at the Delfland coast.

Although the existing experiments and pilot projects show that the Building with Nature approach works, mainstreaming it still meets a number of obstacles, and the Sand engine design cannot simply be copied to other locations (de Vriend et al., 2015). The design should rather comply with the local situation, and take into consideration the local societal, ecological and morphological dynamics. UK's Sandscaping is inspired by the Dutch Sand engine concept, but has its own distinct characteristics. In the Netherlands, the Sand engine is narrated as an (iconic) innovation in coastal management by the actors involved, but also considered a stage in the incremental process of coastal development in the broader Dutch coastal community (Bontje and Slinger, 2017). In the UK context, on the other hand, flexibility and adaptability of Sandscaping compared to hard defences, which means it can be useful for buying time so that communities can adapt to coastal change, is a key distinguishing feature.

A wide range of public and private partners have been exploring the concept of Sandscaping in the UK (The Crown Estate, 2015b; Arup, 2014). The partnership is working closely with local authorities, the Environment Agency, coastal infrastructure managers, the academic community and industry experts to develop evidence and reach informed conclusions (The Crown Estate, 2015b). The partnership is applying the principles established in the Sand Engine project and believes that this could offer effective coastal



Fig. 1. Sand engine as of 16 February 2016.
Source: Rijkswaterstaat/Jurriaan Brobbel.

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