

# COASTAL EROSION AND BEACH NOURISHMENT IN SCANIA AS ISSUES IN SWEDISH COASTAL POLICY

## Skånes kusterosion och strandfodringars roll i svensk kustpolicy

by LOTTE E. BONTJE<sup>1</sup>, CAROLINE FREDRIKSSON<sup>2</sup>, ZILIN WANG<sup>3</sup>, JILL H. SLINGER<sup>1, 4</sup>

<sup>1</sup> Delft University of Technology, Faculty of Technology, Policy and Management, Multi-Actor Systems department.  
P.O. Box 5015, 2600 GA Delft, The Netherlands.

<sup>2</sup> Lund University, Faculty of Engineering (LTH), Department of Building and Environmental Technology, Division of  
Water Resources Engineering, Box 118, 221 00 Lund, Sweden.

<sup>3</sup> Tianjin Academy of Environmental Sciences, No. 17 Fukang Road, Tianjin 300191, China.

<sup>4</sup> Delft University of Technology, Faculty of Civil Engineering and Geosciences, Coastal Engineering.  
P.O. Box 5015, 2600 GA Delft, The Netherlands.



### Abstract

This paper discusses the dynamics of coastal policy change in Sweden, using erosion and beach nourishments as an example. The Multiple Stream Model is a theoretical model on agenda setting and policy change developed by the political scientist John Kingdon (1984, 2003). This paper applies Kingdon's model in describing and explaining coastal policy dynamics regarding coastal erosion in Sweden. Coastal protection is not a separate policy field in Sweden: interventions to protect the (common) coast form a component of spatial planning, which is largely the responsibility of the municipalities. Our analysis reveals that interventions to protect the coast are indeed organized at a local level, by landowners and the municipality, driven by a strong problem perception. This problem perception is articulated as a local voice seeking increased acknowledgement of the coastal erosion issue by the national government. Although the problem of coastal erosion has entered several regional and national policy agendas over the last decade, and the first implementation of a large scale beach nourishment has been experienced positively, this has not yet led to the opening of 'policy windows' for significant change on the regional and national levels.

*Key words* – Coastal policy, coastal management, erosion, beach nourishment, policy change, Scania, Ystad, Kingdon's Multiple Stream model

### Sammanfattning

I den här artikeln diskuteras kustpolicyförändringar i Sverige och deras dynamik, med stranderosion och strandfodring som exempel. Analysen baseras på *Multiple Stream* – modellen, som är en teoretisk modell för policyutveckling och agendasättning, utvecklad av samhällsvetaren John Kingdon (1984, 2003). Kustskydd är inte ett separat policyområde i Sverige; åtgärder för att skydda allmän kust är ofta en del av den fysiska planeringen som till största del är en kommunal angelägenhet. Vår analys bekräftar att kustskyddsåtgärder verkligen organiseras på lokal nivå, av markägare och kommuner som drivs av en djup probleminsikt. Denna probleminsikt ger också upphov till ett lokalt engagemang som verkar för ett större erkännande av kusterosionsproblemen på regeringsnivå. Även om kusterosionsproblemen under det senaste årtiondet har letat sig in på flera policy-agendor och erfarenheterna av Sveriges första storskaliga strandfodring har varit i huvudsak positiva, så har fortfarande inte något »policyfönster» öppnats som kunnat leda fram till någon betydande förändring på regional eller nationell nivå.

# 1 Introduction

During the seminar ‘Climate Change Adaptation in the Coastal Zone’ in Malmö April 5–6 2016 and in this related special edition of *Vatten*, many ideas for coastal policy are discussed. Yet, how are good ideas for the resolution of coastal problems incorporated into policy? This is a question for which many desire an answer, but which cannot unfortunately be answered in a straightforward and unequivocal fashion. The contexts in which policies are developed and applied, differ in different countries. However, a study of the development of a policy issue in a particular context can be undertaken to understand the dynamics of policy change within this context better. Accordingly, this paper focuses on how the issue of coastal erosion and the idea of beach nourishment have entered the policy agendas in the Scania region (Sweden), using the coast of Ystad as a case study (Figure 1). The Multiple Stream model of Kingdon (1984, 2003) is employed to analyse the policy change processes.

## 1.1 Structure of this paper

The first section introduces the study area and provides a background on the Ystad case and Kingdon’s multiple stream model. The research method is described in section 2. The result is presented in section 3 starting with an exploration of the policy development of coastal ero-

sion and beach nourishment in Scania, followed by insights into the dynamics of coastal policy change in Sweden. In section 4 the contribution of the analysis to the understanding of the coastal policy dynamics in Sweden is discussed together with highlights areas of further research interests, namely the genesis of policy windows.

## 1.2 Introduction to the Ystad case

Coastal erosion can be considered as “the process of wearing away material from a coastal profile due to imbalance in the supply and export of material from a certain section. It [...] results in coastline retreat and loss of land.” (Mangor, 2004, Marchand, 2010.) Although coastal cliffs can erode too, in this research we focus on beach erosion.

In Sweden, most of the sandy beaches are situated along the coast of the most southern part of the country, in the Scania County and Halland (Larson and Hanson, 2013). In Scania, sandy beaches form around 25% of the coastline (Malmberg Persson et al., 2014), while for the whole of Sweden this figure is a mere 3% (Norman and Erlingsson, 1988). In the project *Skånestrand* (Malmberg Persson et al., 2014), the Geological Survey of Sweden (SGU) mapped the geological situation and assessed the sensitivity to erosion along the Scanian coast. In accordance with the findings of Larson and Hanson (2013), Malmberg Persson et al. (2014) ob-

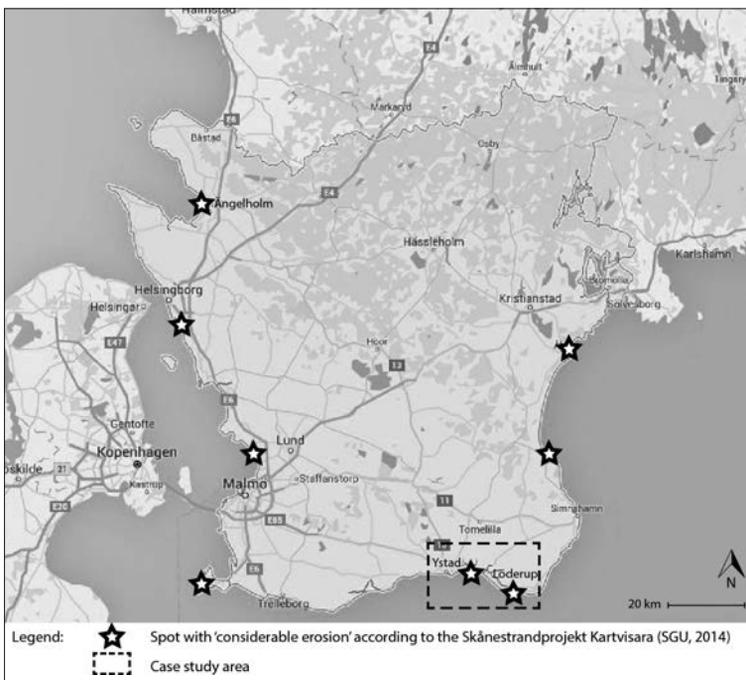


Figure 1. *Map of Scania (Google Maps) with erosion spots as found during the project Skånestrand (Malmberg Persson et al., 2014; SGU, 2014). From the beginning of this century, the municipality of Ystad has worked on the realization of a beach nourishment project in Ystad and Löderup (case study area) where hard structures previously had been implemented.*

Table 1. *Responsibility for coastal safety and position of nourishment in coastal policy in some other European Countries.*

Country	Coastline subject to erosion <sup>1</sup>	Responsibility coastal safety/erosion issues	Position of nourishment in coastal policy
Sweden	317 km – 3%	<b>Municipal and land-owner level</b> (Policy Research Cooperation, 2009d) (as explored in this paper)	Nourishments at the coast are slowly becoming accepted as a potential solution (as explored in this paper).
Denmark	607 km – 13%	<b>National, municipal and land-owner level</b> (depending on location) (Policy Research Cooperation, 2009b).	The Danish Coastal Authority mainly opts for beach nourishments or other soft defences (Policy Research Cooperation, 2009b).
The Netherlands	134 km – 11%	<b>National and sub-national level</b> (regional water boards) (Policy Research Cooperation, 2009e, Everts, 2015).	The preferred method to mitigate coastal erosion is sand nourishment (Rijkswaterstaat, n.d.).
United Kingdom (England)	3009 km – 16%	Depending on country For England: <b>Country level and local level</b> (Policy Research Cooperation, 2009f).	Beach nourishments are executed since 1950s onwards (Hanson et al., 2002). Coastal defence strategies are based on the ‘preferred technical solution’ which is location specific and can be sand nourishments (Environment Agency and Maritime Local Authorities, 2010).
Germany	452 km – 13%	<b>National and federal state level</b> (Policy Research Cooperation, 2009c).	Nourishments are frequently used in Germany to counter erosion. At the Baltic Sea side, however, the method is costly due to the limited availability of sand in the neighbourhood (Policy Research Cooperation, 2009c).
Belgium (entire coastline is part of Flanders Region)	25 km – 25%	<b>Federal state level</b> (Flanders Region) (Policy Research Cooperation, 2009a, Everts, 2015).	Nourishments have frequently been implemented in the past. The Master Plan for Coastal Safety contains both nourishments and hard measures (Delgado, 2013).

<sup>1</sup> Both protected and unprotected, all data from 2001 (National Institute for Coastal and Marine Management of the Netherlands (RIKZ) et al., 2004).

served erosion at several places along Scania’s coast (Figure 1). The beach erosion in Scania is further aggravated by a net increase in the mean sea level (Bruun, 1954, Bruun, 1962). In the rest of Sweden, sea level rise is still compensated by the post-glacial rebound (Persson et al., 2011). The case study area, Ystad municipality, has experienced the most serious beach erosion in Sweden for a long time (Malmberg Persson et al, 2014).

There are several potential threats associated with erosion, which are expected to be exacerbated with rising sea level (Leatherman et al., 2000). These include, for example, the increase of coastal flooding and damage to houses, infrastructure, nature, and cultural values (Bird, 1985). In some areas, erosion is tolerable, but in others, coastal protection needs to be implemented. Historically coastal protection has mainly comprised ‘hard’ solutions such as rock and concrete constructions, but has gradually shifted towards ‘soft’ solutions such as construction

with sand and vegetation (Hanson et al., 2002). Today sand nourishments are the preferred method for coastal protection in many countries, meaning that erosion is counteracted by the artificial addition of sand to the coastal system. Beach nourishment, putting sand directly onto the beach, is one of the ways to realize this (Stive et al., 2013).

Coastal management strategies and preferences for different protection methods vary across different countries, and sometimes within the different regions of a country (Table 1). In Sweden coastal protection is primarily the landowner’s or the municipality’s responsibility and hard construction has so far been the predominant solution.

The case study in Ystad municipality exemplifies the process of changing from hard to soft solutions in coastal management. From the beginning of this century, the municipality of Ystad has worked on the realization of a

beach nourishment project in Ystad Sandskog and Löderup Strandbad where hard structures previously had been implemented (left and right star, respectively, in the box with dotted line in Figure 1). As described in the work of (Wang, 2015, Wang and Slinger, 2015) the decision-making on this nourishment project was a rather difficult process. A permit for the actual nourishment was given in 2001, but the permit for offshore sand extraction was rejected several times. From 2011 onwards, it became possible to implement the project. In 2011, 80,000 m<sup>3</sup> of sand was nourished at the two spots. In 2014, it was followed by another 64,000 m<sup>3</sup>. Whereas Wang's research focused on the decision-making process of Ystad's nourishment project itself, this paper considers the coastal erosion issue and the idea of beach nourishment in a slightly broader context: as part of a policy change process on local, regional and national levels.

### 1.3 The Multiple Stream model to explain policy change

In general, policy change is considered to be a complex process. Over decennia, academics have developed theoretical models to study and explain processes of policy change. One of the classical models in the policy field is Kingdon's Multiple Stream model, that originally focused on federal agenda setting in the United States of America in the seventies (Kingdon, 1984, 2003).

Kingdon built further on the Garbage Can model of Cohen et al. (1972) that – instead of considering decision-making as a rational process – emphasised the irrational aspects of decision-making in organizations. This irrationality is explained by the concept of *organized anarchies*: “organizations that are characterized by problematic preferences, unclear technology [own processes are not understood by its members] and fluid participation” (Cohen et al., 1972, p.1). In organizations, decision-making is not necessarily a straightforward process moving from pointing out problems to evaluating alternative solutions. On the contrary, choice opportunities stimulate actors with their individual or collective resources to become involved, bringing their preferred problems and solutions with them (Cohen, 1972). According to this theory, a choice opportunity leads towards a *Garbage Can* in which actors deposit their problems and solutions. The content of the Garbage Can changes over time: what comes out as a decision is difficult to predict (Enserink et al., 2010).

In his model of agenda setting and policy change, Kingdon (2003) also considered the federal government as an organized anarchy. However, because he discerned structures and patterns in the processes, he emphasized *organized*. In his empirical research, he observed three

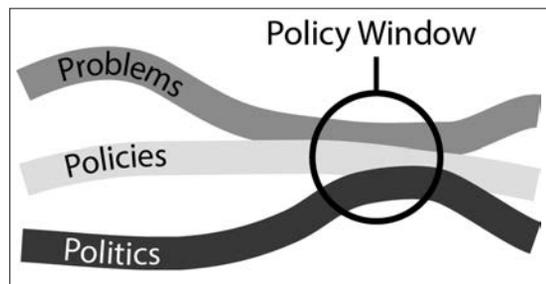


Figure 2. Visualisation of Kingdon's three streams (problems, policies and politics) and a policy window.

families of processes: the ‘streams’ of *problems*, *policies* and *politics* (Figure 2). First, he distinguished the *problem stream*, which describes the process of how some problems capture people's attention (and others do not). Indicators, focusing events and feedback about existing policy are mechanisms that bring problems to the attention of government officials. Next, the *policy stream* is seen as a stirred primeval soup full of policy ideas or solutions which sometimes become visible at the surface of the soup and then can disappear again. Finally, the *political stream* is “composed of such things as public mood, pressure group campaigns, election results” (Kingdon, 2003, p.145) and other political factors.

Although actors can be active in more than one stream, the three streams are considered to act independently. When, at a critical moment, the three streams are coupled or joined together, choices (for policy change) are made (Zahariadis, 2007). This critical moment is called a ‘policy window’ and it is an opportunity for policy advocates “to push their pet solutions, or to push attention to their special problems” (Kingdon, 2003, p.165), so bringing in their preferred problems and solutions (cf. Cohen et al., 1972).

In this article, coastal policy processes in the Scania region are studied from the perspective of Kingdon's Multiple Stream model. There is not one clear problem that can be solved rationally. In conversational interviews with several actors, a range of problem descriptions and potential solutions were collected. The study focus on the problems that actors experience, which solutions they consider and the political circumstances in order to understand how coastal erosion and beach nourishment move around on the Swedish policy agenda.

## 2 Method

The study is based on interviews complemented by a literature study of relevant articles, reports and policy documents. The project forms a component in a broader

Table 2. Overview of respondents.

Respondents	Position	Interview type	
		Block 1 Nov – Dec 2014	Block 2 Nov 2015
Respondent A	Project manager from a consultancy firm	x	x
Respondent B	Governmental official at national geotechnical institute	x	
Respondent C	Regional politician for Scania region, former local politician in Ystad	x	x
Respondent D	Local official at municipality of Ystad	x	x
Respondent E	Regional official at Scania region	x	
Respondent F	Regional official at county administrative board	x	
Respondent G	Project manager at national geological survey		x
Respondent H	Regional administrator (political) for Scania region	x	
Respondent I	Marine biologist from consultancy firm	x	
Respondent J	Marine biologist from consultancy firm		
Respondent K	Regional official at county administrative board	x	
Respondent L	Regional official at county administrative board		
Respondent M	(Former) local official, director at municipality of Ystad, (former) advisor of Land and Environmental court	x	
Respondent N	Professor at university and advisor	x	x
Respondent O	Local official at municipality of Ystad		x
Respondent P	Governmental advisor at national agency for marine and water management		x
Respondent Q	Researcher at institute for the marine environment		x
Respondent R	Local official at municipality of Ängelholm		x
Respondent S	Researcher at national geological survey		x
Respondent T	Regional official at county administrative board		x
Respondent U	Project leader at Scania's Association of Local Authorities		
Respondent V	Regional official at Scania region		
Respondent W	(Former) director at national geotechnical institute		x

research program on the realization of pilot-projects and their follow-ups as source of change in coastal management in which actor experiences and the role of narratives are central (Bontje and Slinger, 2014).

For this study, 23 interviews were conducted and analysed with interviewees representing different actors within coastal management in Sweden (Table 2). Two of the interviews had two respondents, and one of the interviews had three respondents (indicated in the first column of table 2). Four respondents were interviewed twice.

The interviews were carried out in two blocks by two researchers. The first block was in November–December 2014 and the second one in November 2015. In the first block 11 open, explorative interviews were conducted which were subsequently summarized for analysis. In the second block, the 12 interviews were designed in such a way that the respondents could reflect on the findings from the first series of interviews. This inter-

view structure, however, still provided space for the respondents to describe their own experiences. For each of the interviews, the interviewees were asked to verify the accuracy of the summaries or transcripts.

The interview transcripts were analysed qualitatively, using thematic coding based on characteristics from Kingdon's Multiple Stream model: problem perceptions, solutions, political issues and changes. Furthermore, relevant research and policy documents were reviewed for triangulation (Yin, 2003).

### 3 Results

#### 3.1 The problem stream: a variety of problem perceptions regarding coastal erosion

Not all of the actors in the case study consider coastal erosion to be a problem. Erosion is seen as a natural process, and an erosion *problem* only exists “where you

have man-made things” (Respondent K and L), or when infrastructure and houses are threatened (Respondent M). So, erosion is experienced as a problem when properties are in danger. In Sweden, the municipalities are responsible for the public infrastructure and public buildings. Home-owners and landowners are responsible for their own properties. Since the fifties, the coastal areas have developed as leisure destinations (Segrell and Lundqvist, 1993), so many of the houses close to the sea are summerhouses. A logical consequence of this situation is that coastal erosion is experienced as a ‘real’ problem by actors at the local level.

Several other actors contrast the Swedish erosion problems in relation to the situation in other countries. Compared with some other coastal zones in Europe, the Swedish coastal zone is not densely populated and the total value of properties that are threatened is relatively low (similar remarks by respondents K, L, G, P). There are actors that state that river erosion is a bigger problem in Sweden, because it can have bigger impacts (people could die, respondent B) and it is less predictable than coastal erosion. This opinion is reflected in the allocation arrangement of a fund of the Swedish Civil Contingencies Agency (MSB, an agency related to the Ministry of Defence) which supports measures against natural disasters. It is possible to apply for projects to counteract river erosion, but it is not possible to apply for projects to counteract coastal erosion. One can imagine that actors from the coastal region do not agree with this distinction (Respondents C, D, E, M).

In addition to the discussion on whether coastal erosion is a problem or not, there is another related issue, namely the potential consequences of climate change. On the national level, the Swedish Commission on Climate and Vulnerability (2007) identified several threats of climate change for Sweden, such as floods, landslides, extreme temperatures and several forms of erosion. Many actors from Scania emphasize the relationship between coastal erosion and climate change, claiming that sea level rise will increase erosion and coastal flooding (Respondent D, E, F, H, S, O). However, some actors are cautious of, or critical, about connecting coastal erosion explicitly to climate change, as illustrated by the quotation: “For Scania, it is mostly the sea level rise that is the problem. The thing with coastal erosion is [...] that it is also a natural process.” (Respondent U).

According to Kingdon’s theory, before policy change can occur, “people must first be convinced that there is a problem and that something needs to be done about it” (Brunner, 2008). In the Scania case, there is no unequivocal conviction that coastal erosion constitutes a problem for which structural policy change is necessary to its resolution. The most agreement amongst actors is found at local level, where measures against coastal erosion in

some municipalities have been undertaken for decades. These (partial) solutions for the Ystad case are discussed in the next section.

### 3.2 The policy stream: from ‘hard’ to ‘soft’ constructions and the Swedish doubts

As mentioned in the introduction, coastal protection is not a separate policy sector in Sweden. Private owners should protect their land themselves. Larger interventions to protect the (common) coast are considered as a component of spatial planning, a task of the Swedish municipalities, which have the so-called ‘planning monopoly’ (Storbjörk and Ugglå, 2014). The County Administrative Boards – the regional administrative bodies representing the government – have the task of approving the spatial plans of the municipalities and checking that they cohere rather than conflict with national interests.

Many interventions have been implemented to counter coastal erosion in the Ystad municipality. The first intervention was made after a coastal meeting in 1958 in the then autonomous municipality of Löderup. A breakwater was constructed with 800 wooden poles parallel to the beach for protection (Ystad Kommun, 2008b, Almström and Hanson, 2013). Shortly thereafter, four groynes were constructed in Ystad Sandskog, covered with wooden planks to function as piers for swimming. In Löderup, the constructions could not prevent the extensive erosion in the 1960s and 1970s, and a few houses fell into the sea (Ystad Kommun, 2008b). Private owners started to protect their property with large stones.

Since the mid-1980s, the municipality of Ystad is actively involved in erosion issues (Ystad Kommun, 2008a). With partial financial support from the Environmental Protection Agency (Ystad Kommun, 2008b) and house owners, rubble mound revetments, detached breakwaters and an additional groyne have been constructed along the coast.

Revetments, groynes and breakwaters are so-called ‘hard’ solutions that are increasingly criticized nowadays. A small private revetment, for example, can transfer the erosion to the down-drift side, shifting the problem and stimulating a neighbouring land owner to build a revetment as well. This happened in Löderup where the coastline gradually became dominated by hard defence structures. Similarly, the groynes in Löderup had a negative impact (Ystad, 2008b) by disturbing the natural sand transport from west to east. Figure 3 is an image of revetments making up part of Löderup’s coastal defence. The hard protection measures have saved houses from erosion in the short term, but have created a new series of problems in the longer term (Almström and Hanson, 2013).



Figure 3. *Examples of hard structures at the coast of Löderup (Photo: L. Bontje, November 2015).*

These negative effects motivate the preferences regarding coastal protection gradually shifting from ‘hard’ solutions to ‘soft’ coastal defence techniques in most European countries (Hanson et al., 2002, Mulder et al., 2011, Hanley et al., 2014). This preference fits with the paradigm shift as explained by Stive et al. (2013): “Where in the past the challenge was formulated to ‘fight’ the forces of nature [with hard structures, red.], today’s approach recognizes many issues other than protection against flooding, especially the multiple ecological forces that have to be accommodated and can help the processes of protection.” (p.1002). The present coastal management approach of the municipality of Ystad emphasizes the natural processes of erosion and accumulation and combines the existing hard structures with new soft solutions (2008a) – fitting the new paradigm.

Many of the new ‘soft’ solutions involve sand nourishment, although the effects on the seabed and the benthic communities are disputed (Hanley et al., 2014). Whereas in some countries, such as the Netherlands, Germany, Belgium and the United Kingdom (Hanson et al., 2002), sand nourishment rapidly developed towards a regular intervention method (see Table 1), in Sweden there were few initiatives for such projects. In 2000, the municipality of Ängelholm undertook a small sand nourishment when they transferred approximately 50,000m<sup>3</sup> of sand from the north side of the Rönne river mouth (where the sand was accumulating) to the eroding beach to the south (Ängelholm Kommun, 2013, Larson and Hanson, 2013). But Ystad municipality was

the first to propose a large scale beach nourishment project. The municipality of Ystad developed a plan to nourish at Ystad Sandskog and Löderup Strandbad using 340,000 m<sup>3</sup> of sand in four nourishment rounds. The large offshore sand deposit Sandhammar bank near Sandhammaren, east of Löderup became the proposed extraction area. The sand deposit is described in a study on the geomorphological development of Österlen (Erlingsson, 1990). It is a postglacial deposit (Swedish Geological Survey, 2011) in which eroded material from Ystad’s and Löderup’s beaches accumulates.

Ystad municipality’s plan of providing sand to the coastal system to counter erosion is in line with developments in coastal protection in other parts of Europe. However, as explained in the study of Wang (2015), several people connected to the permitting process were uncertain about the beach nourishment technique. They were concerned about the environmental impacts and the availability of sand resources. Wang concludes that the diversity of the perceptions of uncertainties and the communication about these uncertainties were underlying causes of the significant delay in the permitting process, which took almost 10 years (Wang, 2015, p. 49).

After the implementation of Ystad’s first two rounds of nourishments in 2011 and 2014 (Figure 4 provides an impression of the situation in 2015), it seems that the acceptance of beach nourishment as a method of coastal protection increased (Respondents T, U, V, R). One of the indications for this is the swift approval of Ystad’s application to the Environmental Court for beach nour-



Figure 4. (*Nourished*) beach and groyne at Ystad Sandskog (Photo L. Bontje, November 2015).

ishments in 2013: the application was approved based on existing laws without even a court hearing (Land and Environmental Court, 2013).

However, some actors remain cautious, as reflected in an article in the journal *Västerhavet* (Persson, 2015): “But even though beach nourishment is preferred over other methods [hard solutions, red.], the consequences of large-scale beach nourishment are not investigated” (p.15).

The *Västerhavet* article reflects the doubts about nourishments felt at the regional level in particular. Here, there is a preference for ecosystem-based approaches and there are still doubts whether, and how, nourishment strategies fit within this approach. Natural retreat of the coastline represents the ultimate form of ecosystem-based accommodation, but is not a realistic solution for places with valuable infrastructure. The County Administrative Board, together with Region Scania and Scanian Association of Local Authorities intend to apply for EU funding to test out different coastal interventions based on ecosystem based approaches (Respondents T, U, V, O). This shows that within the ‘policy stream’ efforts are still being made to come up with new viable solutions.

An interesting distinction can be made when comparing the dynamics in Kingdon’s policy stream at local and regional government levels. On the local level, where the municipality and its citizens experience the effects of coastal erosion most directly, beach nourishment strategies are seen as a promising method of countering erosion and preserving the local beaches. However, although the acceptance of beach nourishment at regional level is

growing, there are still doubts. On this level, there is a preference for ecosystem-based approaches rather than a focus on protecting and preserving beaches and infrastructure.

### 3.3 Political stream: Discussions about responsibilities

#### 3.3.1 Responsibilities for coastal erosion

Within the political stream, there is an ongoing discussion about the responsibility for coastal erosion. In Sweden, the main responsibility for protecting the coast lies within the local planning system at the municipal level. Actors that associate themselves with the local level would like to see the erosion problem further acknowledged by the national government. The reasoning behind their wish is that coastal erosion has become a regional problem over time and its impacts will increase in the future. They consider it unreasonable to expect that coastal municipalities will be able to finance the necessary protection measures by themselves.

The national government, however, is reluctant to take on more responsibilities. The County Administrative Boards are regional administrative bodies of the national government. They acknowledge that coastal erosion is a threat to several coastal settlements in Scania, but their agenda is determined by the national government and not the other way around (Respondents K, L, Government Offices, 2015).

In their ambitions to place the coastal erosion issue on the regional and national agenda, actors from the Scanian coastal region are trying to connect to these higher

government levels by informing officials and politicians about the eroding beaches and even inviting them to visit the area. Getting this acknowledgement is a long term process, because the appointments of officials and politicians are not permanent (Respondent F). A change of appointment can have significant consequences for the process of acknowledgement.

One of the successes of the group lobbying for acknowledgement of the coastal erosion problem is the appointment of a national coordinator of erosion. In 2003, the Swedish Geotechnical Institute (SGI) was assigned the role of coordinating knowledge about coastal and river erosion (Rydell and Lundström, 2013). However, this coordination is focused on knowledge sharing and so does not help the municipalities in realizing coastal protection measures directly.

In 2013, a motion was proposed in the national parliament to decrease the number of organizations interfering with coastal erosion and nourishment projects (Riksdagen, 2013). But the proposal was rejected by parliament and things stayed the same.

### 3.3.2 *Responsibilities for climate change*

Clearly, it is difficult to involve the national government in the issue of coastal erosion, but what about the broader issue of climate change adaptation?

Storbjörk and Ugglå (2014) studied the development of climate change adaptation policy in Sweden. Some national regulations were instituted in 2008 and 2010, when changes were made to the Planning and Building Act. Municipalities were required to deal with the consequences of climate change in their comprehensive plans, and their more detailed local development plans (Storbjörk and Ugglå, 2014; Glaas and Juhola, 2013; Johansson and Mobjörk, 2009). In addition, climate change aspects have become part of the permitting process for buildings. Another national regulation involved strengthening the role for County Administrative Boards in coordinating climate change adaptation within the regions (Storbjörk and Ugglå, 2014, based on Regeringskansliet, 2008; Glaas and Juhola, 2013; Johansson and Mobjörk, 2009). Glaas and Juhola (2013) argue that by assigning the coordinating role regarding climate change adaptation to the regional boards, “no national authority has been proved with the main responsibility for climate adaptation” (p264). Storbjörk and Ugglå (2014) agree with this standpoint when they conclude that in the current system, climate change adaptation indeed should take place at the lower administrative levels.

As explained by Wang (2015), actors at the local level in Scania want to scale up the coastal erosion issues. There must be said that in this research interviewees from ‘the national level’ mainly work for national agen-

cies rather than for ministries or the government. With this in mind, we state carefully that the higher administrative levels are reluctant to take on the responsibility for coastal erosion. By remaining passive they act to downscale the issue. Glaas and Juhola (2013) claim that climate change adaptation is de facto delegated to the lower levels. This means that both the responsibilities for coastal erosion and for climate change adaptation are allocated to the local and regional levels.

The question of whether these divisions of responsibilities will be maintained in the future, remains. Will coastal erosion become connected with climate change administratively? Will this lead to changes in the administrative and planning system? And will this perhaps open new policy windows?

## 3.4 Actualised policy windows: mainly problem-driven coupling of streams

A policy window, according to Kingdon’s model, is an “opportunity for action on given initiatives” (2003). The perception of problems, the proposals for policy solutions and political forces are coupled, but the outcome remains partly unpredictable (think about the Garbage Can of Cohen et al., 1972). Kingdon claims that streams can be coupled by changes in the political stream or by a change in problem perceptions, for instance because of ‘events’ that occur. He also claims that the policy stream does not influence the establishment of the coupling directly, but provides the alternative solutions that are under discussion when coupling occurs. In this section, a number of policy windows distinguished in this study are discussed further.

### 3.4.1 *The local agenda:*

#### *Problem-driven coastal policy change*

Although erosion is an ongoing and long term process, erosion damage from storms can have a major impact, particularly because it is most visible to local actors. In the municipality of Ystad, several policy windows were distinguished in which policies have changed, inspired by the deterioration of the local beaches and land (Table 3).

Because of the *problems*, there was a decision by the local government to intervene for the first time in 1958; via the wooden breakwater structure parallel to Löderup’s beach. Small groyne were constructed in Ystad. It was a *problem-driven* coupling in which the wooden breakwater and the groyne were the implemented *policy alternatives*.

Then, the serious erosion *problems* of the 1960s and 1970s opened a policy window for more and larger groyne. It is important to mention that from the eight-

Table 3. *Policy changes on erosion control at local level as identified in this research.*

Period	Type of change	Main drivers behind coupling	Problem-driven or politically-driven
From the 1950s	First interventions to counter erosion in Löderup (wooden breakwater) and Ystad (short groynes)	Erosion-problems threatened land and beaches.	Problem-driven
From the 1960s	More interventions (more hard constructions like groynes) to counter erosion in Löderup and Ystad	Erosion-problems were not solved.	Problem-driven
From the end of the 1990s	Towards more integrated approach, taking sand balances into account. Beach nourishment interventions in Ystad and Löderup.	Erosion-problems, exacerbated by hard constructions.	Problem-driven

ies onwards, some key actors, ‘policy entrepreneurs’ in Kingdon’s terminology, have helped to explain the erosion issue (Storbjörk and Hedrén, 2011). In this way, they have indirectly influenced the *problem perceptions* of people. They also acted to provide alternative policy solutions.

The *problems* of the 1990s, which were exacerbated by the earlier ‘hard’ solutions, provided an opportunity for the municipality to develop a more integrated *policy* on coastal protection, emphasizing the importance of the natural sand transport and soft construction alternatives. The nourishment project with its first two rounds in 2011 and 2014 is completely in line with Ystad’s last policy change towards a more integrated coastal approach.

In retrospect, two local, *problem-driven* policy windows for ‘hard’ coastal interventions were exploited. In addition, one change towards ‘softer’ and more integrated coastal policy could be distinguished (Table 3). However, it is too early to state that a structural policy change has taken place, with beach nourishments as standard protection measure in Ystad. Permission of the municipal council is needed for each round of nourishment.

These moments are choice opportunities: every time a beach nourishment is carried out, the funding has to be granted and could effectively be denied despite the existing policy. Another natural choice opportunity for the municipality will occur when the permits for the beach nourishment expire (2020/2021). It will be interesting to see whether these moments will indeed turn out to be a new window for further policy change or even whether the existing changes will be reversed.

#### 3.4.2 *The regional and national agenda:*

##### *Less clear coastal policy change*

On the regional level and the national level, policy windows and policy change with regard to coastal erosion are less clearly distinguishable. In this case, they involve the (re-)assignment of tasks, rather than concrete policy change (Table 4).

The local actors are striving for a national policy change to support municipalities in countering coastal erosion. From the municipal perspective this support could mean a simplification in the procedures for approving coastal protection measures and financial support for realizing these measures.

Table 4. *(Potential) policy changes regarding erosion and climate adaptation on regional-national level.*

Period	Type of change	Main drivers behind coupling	Problem-driven or politically-driven
2003	National erosion coordinator appointed	Pressure for acknowledgement of the problem from local/regional level	Problem-driven and politically-driven
2008	County Administrative Boards become regional coordinators for climate change adaptation	Elaboration of policy after signalling the need for climate change adaptation.	Problem-driven and politically-driven
2013	None. Policy window seems to be closed after rejected motion.	Group of concerned parliamentarians.	Problem-driven and politically-driven

The discussion about unclear responsibilities on national level resulted in a policy change in 2003, when SGI was assigned as national erosion coordinator. The coupling related to this change was caused by the *political* pressure for acknowledgement of the erosion *problem*, so the coupling resulted from a combination of *political-drivers* and *problem-drivers*. The appointment of SGI as national erosion coordinator served to create a forum for discussing coastal erosion issues. For instance, the annual Coastal Meeting, organized by SGI and a coastal municipality, provides a platform for coastal practitioners and researchers to discuss and exchange experiences regarding coastal erosion and other coastal issues (Respondent W).

Since 2008, the Country Administrative Boards are assigned to coordinate the climate change adaptation in the regions (after discussing the climate change *problems* and after decisions in the *political* stream). The Country Administrative Board of Scania acknowledged coastal erosion as a regional problem, but there is no change discernible other than the acknowledgement of beach nourishment as one of the potential solutions to the problem in a few places. Whereas the Country Administrative Board of Scania is the operational arm of the national government, the Region is an elected representative body for regional interests. In that sense Region Scania is maybe more flexible than the Country Administrative Board of Scania in getting involved in policy change. The policy fields for which they have a mandate, however, are not related to coastal erosion directly. Both the Country Administrative Board of Scania and Region Scania are concerned about the erosion problems and want to contribute to solutions, but do not appear to be actively involved in changing policy as yet.

The rejected motion in the Swedish parliament in 2013 (Riksdagen, 2013) shows that at times, coastal erosion is discussed at the national level. But real changes in the policy system have not yet been achieved. *Problem* perceptions at national level are insufficient to force change and till now the *political* dynamics also did not engender a change in national policy. Several actors attribute the weak problem perceptions and the limited political dynamics on the national level to the geographical and political distance (Remarks by respondents A, C, E, F, Q) between Scania and Stockholm and (closely related to this) the lack of knowledge about the coastal situation in Scania.

## 4 Conclusion and discussion

By applying Kingdon's Multiple Stream model in this study, we have garnered insights in the policy dynamics of coastal erosion issues at different governmental levels in Sweden.

An overview of the development of coastal policy on the local level, in the municipality of Ystad, is provided. The coupling of Kingdon's streams was mainly driven by strong problem-perceptions; namely that the coastal area (including its infrastructure, and as a destination for leisure activities) is in danger. The most recent policy change towards more integrated coastal protection will encounter a natural political discussion moment around 2020 when the existing permits expire. Only then, we will know whether the dynamics in the political stream will have strengthened or will have reversed the recent policy change.

This study has revealed that local actors try to raise the coastal erosion issues towards regional and national levels. Despite the local efforts to place this issue on the regional and national policy agendas, it is difficult to detect policy change in these higher government levels. The changes that can be distinguished involve the (re-)assignment of tasks: these are considered minor changes rather than real policy change.

In general, we conclude that at local level, Ystad municipality has developed its coastal policy during the last decades. At the national level – where the coastal erosion problem-perception is not very strong – we cannot distinguish the opening of 'policy windows' for significant change as yet. However, the local actors continue to hope that developments in the political stream can lead to a policy window for real changes at the national level, which will help the municipalities in Scania in countering their erosion problems.

So, from the local perspective, the struggle for acknowledgement needs to continue. It may be that connecting the coastal erosion issue with the climate change adaptation discussion administratively, will bear fruit in the long term. In the meantime, several municipalities need to prepare their coastal measures. Of interest is whether other municipalities apply for permits for beach nourishment and whether these permits will be granted. These developments will reveal whether beach nourishment is becoming an accepted solution for the coastal erosion problems in Sweden.

The study of interview material and documents through the lens of Kingdon's Multiple Stream model has provided insights into coastal policy development in Sweden over the last decades. However, it does not provide detailed insights into the mechanisms behind the coupling of streams – how policy windows open and how actors influence the coupling process. Of interest is the identification of policy windows that closed without being actualized. These represent a missed opportunity for policy change. Following Kingdon, it is also pertinent to focus on the role of policy entrepreneurs. Policy entrepreneurs "are people willing to invest their resources in return for future policies they favour" (Kingdon,

2003: p2014). During their effort to push their concerns and 'pet proposals', they can help in coupling the streams and creating policy windows. However, policy entrepreneurs always act in a network with many other actors. Further research will focus on experiences within the broader spectrum of actors and we will seek to analyse actor experiences in order to learn more about the genesis of policy windows.

### Acknowledgements

This work was supported by the Dutch Technology Foundation STW under Grant 12691.

The authors thank all interviewees in Sweden for welcoming us and sharing their experiences during the interview conversations. A special thanks to prof. H. Hanson of the Division of Water Resources Engineering of Lund University for his hospitality offered to the non-Swedish researchers in this collaboration.

### References

For respondent references: see Table 2.

- Almström, B. & Hanson, H. (2013) Strandfodringen i Ystad 2011 – bakgrund, uppföljning, framtid [Beach nourishment in Ystad 2011 – background, monitoring, future]. Malmö: Sweco Environment AB Kust och Vattendrag.
- Bird, E.C.F. (1985) *Coastline changes. A global review* New York: John Wiley and Sons Inc.
- Bontje, L.E. & Slinger, J.H. (2014) The Sand Engine as 'Iconic departure' or 'an unknown gift from on high'? Using narrative analysis in a biographical explanation of a pilot project *Interpretive Policy Analysis Conference 2014*. Wageningen.
- Brunner, S. (2008) Understanding policy change: Multiple streams and emissions trading in Germany. *Global Environmental Change*, 18, 501–507.
- Bruun, P. (1954) *Coast erosion and the development of beach profiles*. Beach Erosion Board Corps of Engineers.
- Bruun, P. (1962) Sea-level rise as a cause of shore erosion. *Journal of the Waterways and Harbors division*, 88, 117–132.
- Cohen, M., March, J and Olsen, J. (1972) A Garbage Can Model of Organizational Choice. *Administrative Science Quarterly*, 17, 1–25.
- Delgado, R. (2013) Shoreface nourishments as maintenance measure: a pilot experiment for a future strategy [oral presentation, powerpoint slides] ed. ^eds. *Making Waves*, Oostende, Belgium.
- Enserink, B., Hermans, L., Kwakkel, J., Thissen, W., Koppenjan, J. & Bots, P. (2010) *Policy Analysis of Multi-Actor Systems*, The Hague: Lemma.
- Environment Agency & Maritime Local Authorities (2010) *The coastal handbook. A guide for all those working on the coast*.
- Erlingsson, U. (1990) Geomorphological Development of the Bottoms Off Österlen, Southernmost Sweden. Uppsala University, Department of Physical Geography.
- Everts, M. (2015) Kustveiligheid in Oostende en Scheveningen: Wat zijn de verschillen en hoe adaptief is het kustbeleid? Universiteit Gent.
- Glaas, E. & Juhola, S. (2013) New levels of climate adaptation policy: analyzing the institutional interplay in the Baltic Sea Region. *Sustainability*, 5, 256–275.
- Government Offices (2015) *The Swedish Model of Government Administration* [online]. <http://www.government.se/how-sweden-is-governed/the-swedish-model-of-government-administration/> [Accessed Access Date 2016].
- Hanley, M., Hoggart, S., Simmonds, D., Bichot, A., Colangelo, M., Bozzeda, F., Heurtefeux, H., Ondiviela, B., Ostrowski, R. & Recio, M. (2014) Shifting sands? Coastal protection by sand banks, beaches and dunes. *Coastal Engineering*, 87, 136–146.
- Hanson, H., Brampton, A., Capobianco, M., Dette, H., Hamm, L., Laustrup, C., Lechuga, A. & Spanhoff, R. (2002) Beach nourishment projects, practices, and objectives—a European overview. *Coastal engineering*, 47, 81–111.
- Johansson, B. & Mobjörk, M. (2009) *Climate adaptation in Sweden. Organisation and experience*.
- Kingdon, J.W. (2003) *Agendas, Alternatives and Public Policies*, 2nd edition ed. New York: HarperCollins College Publishers.
- Land and Environmental Court (2013) *DOM M 2034-13*. Växjö, Sweden.
- Larson, M. & Hanson, H. (2013) Sweden. In E. Pranzini & A.T. Williams (eds.) *Coastal erosion and protection in Europe*. Routledge.
- Leatherman, S.P., Zhang, K. & Douglas, B.C. (2000) Sea level rise shown to drive coastal erosion. *Eos, Transactions American Geophysical Union*, 81, 55–57.
- Malmberg Persson, K., Nyberg, J., Ising, J. & Persson, M. (2014) *Skånes känsliga stränder – ett geologiskt underlag för kustzonsplanering och erosionsbedömning (in Swedish)*.
- Mangor, K. (2004) *Shoreline management guidelines: s.l. : DHI water and environment*.
- Marchand, M., (Ed) (ed.) (2010) *Concepts and Science for Coastal Erosion Management. Concise report for policy makers*, Delft: Deltareas.
- Mulder, J.P.M., Hommes, S. & Horstman, E.M. (2011) Implementation of coastal erosion management in the Netherlands. *Ocean & Coastal Management*, 54, 888–897.
- National Institute for Coastal and Marine Management of the Netherlands (Rikz), Eucc – the Coastal Union, Ign France International, Autonomous University of Barcelona (Uab), French Geological Survey (Brgm), French Institute of Environment (Ifen) & Electronics, E.S.D. (2004) *Living with coastal erosion in Europe: Sediment and Space for Sustainability*.
- Norman, J.O. & Erlingsson, U. (1988) Sweden. In H.J. Walker (ed.) *Artificial structures and Shorelines*. Kluwer Academic Publishers.
- Persson, G., Sjökvist, E., Åström, S., Eklund, D., Andréasson, J., Johnell, A., Asp, M., Olsson, J. & Nerheim, S. (2011) *Klimatanalys för Skåne län*.
- Persson, P. (2015) Skånes stränder krymper när havet stiger – Reträtt kan vara rätt [Skåne's beaches will shrink when the sea rises. Retreat may be right]. *Västerhavet 2015 – Aktuellt om miljön i Skagerrak, Kattegatt & Öresund*. Havsmiljöinstitutet.
- Policy Research Cooperation, (2009a) Country overview and assessment 1. BELGIUM. *The economics of climate change*

- adaptation in EU coastal areas. For the attention of European Commission – Directorate-General for Maritime Affairs and Fisheries.*
- Policy Research Cooperation (2009b) Country overview and assessment 4. Denmark. *The economics of climate change adaptation in EU coastal areas. For the attention of European Commission – Directorate-General for Maritime Affairs and Fisheries.*
- Policy Research Cooperation (2009c) Country overview and assessment 8. Germany. *The economics of climate change adaptation in EU coastal areas. For the attention of European Commission – Directorate-General for Maritime Affairs and Fisheries.*
- Policy Research Cooperation (2009d) Country overview and assessment 20. Sweden. *The economics of climate change adaptation in EU coastal areas. For the attention of European Commission – Directorate-General for Maritime Affairs and Fisheries.*
- Policy Research Cooperation (2009e) Country overview and assessment. 21. The Netherlands. *The economics of climate change adaptation in EU coastal areas. For the attention of European Commission – Directorate-General for Maritime Affairs and Fisheries.*
- Policy Research Cooperation (2009f) Country overview and assessment 22. United Kingdom. *The economics of climate change adaptation in EU coastal areas. For the attention of European Commission – Directorate-General for Maritime Affairs and Fisheries.*
- Regeringskansliet (2008) Regeringen beslutar proposition 2008/09:162 En sammanhållen klimatoch energipolitik [A joint politics for climate and energy]. In M.O. Environment (ed.).
- Rijkswaterstaat, n.d. *Beheer en onderhoud kust* [online]. <http://www.helpdeskwater.nl/onderwerpen/waterveiligheid/programma'-projecten/beheer-onderhoud/> [Accessed Access Date 2016].
- Riksdagen (2013) Motion till riksdagen 2013/14:C300 – Stranderosion. Anders Hansson.
- Rydell, B. & Lundström, K. (2013) Erosion vid kuster och vattendrag. Probleminventering och kunskapsbehov [Erosion on coasts and rivers. Problem Identification and knowledge needs]. Linköping: Statens Geotekniska Institut (SGI).
- Segrell, B. & Lundqvist, J. (1993) The attractive coast—context for development of coastal management in Sweden 1930–90. *Scandinavian housing and planning research*, 10, 159–176.
- Stive, M.F., Schipper, M.a.D., Luijendijk, A.P., Aarninkhof, S.G.J., Gelder-Maas, C.V., Vries, J.S.M.V.T.D., Vries, S.D., Hendrequez, M., Marx, S. & Ranasinghe., R. (2013) A New Alternative to Saving Our Beaches from Sea-Level Rise: The Sand Engine. *Journal of Coastal Research*, 29, 1001–1008.
- Storbjörk, S. & Hedrén, J. (2011) Institutional capacity-building for targeting sea-level rise in the climate adaptation of Swedish coastal zone management. Lessons from Coastby. *Ocean & Coastal Management*, 54, 265–273.
- Storbjörk, S. & Uggla, Y. (2014) The practice of settling and enacting strategic guidelines for climate adaptation in spatial planning: lessons from ten Swedish municipalities. *Regional Environmental Change*, 1–11.
- Swedish Commission on Climate and Vulnerability (2007) *Sweden facing climate change— threats and opportunities*. Stockholm.
- Swedish Geological Survey (2011) Ansökan om tillstånd enligt lagen (1966:314) om kontinentalsockeln för uttag av bottenmaterial vid Sandhammarbank [Application for a license under the Act (1966: 314) on the continental shelf for the abstraction of ground material at Sandhammar Bank].
- Swedish Geological Survey (2014) Kartvisare Skanestränd.
- Wang, Z. (2015) Uncertainties in Building with Nature along the Coast: A case study of a sand nourishment project in Ystad, Sweden. TU Delft, Delft University of Technology.
- Wang, Z. & Slinger, J.H. (2015) Building with Nature Uncertainty Matrix: An actor-based framework for uncertainty analysis in coastal management. Conference: *Decision Making Under Deep Uncertainty 2015*. Deltares, Delft.
- Yin, R.K. (2003) *Case Study Research. Design and Methods. Third Edition*. Newsbury Park: Sage Publications.
- Ystad Kommun (2008a) Policy för förvaltning och skydd av kusten [Policy for the management and protection of the coast]. Ystad.
- Ystad Kommun (2008b) Bakgrundsmaterial – Policy för förvaltning och skydd av kusten [Background material – Policy for the management and protection of the coast]. Ystad.
- Zahariadis, N. (2007) The Multiple Stream Framework: Structure, Limitations, Prospects. In P.A. Sabatier (ed.) *Theories of the policy process*. Second. ed. United States of America: Westview Press, 65–92.
- Ängelholm Kommun (2013) Policy för långsiktig och hållbar förvaltning av Ängelholms stränder [Policy for sustainable long-term management of Ängelholm beaches].

