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**Managed retreat:
transformations in the government of coastal environments
in Germany and New Zealand**

Dissertation

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1. Introduction

At the turn of the year 1854/55, a series of storm surges eroded the seaward fronting dunes of the sandy barrier island Wangerooge in the German North Sea. On New Year's Day of 1855, the forces of the sea eventually broke through the dunes that protected the village from the sea, and the catastrophe took its course.

The sea rose higher and higher with the incoming tide, and it sent the surges through the dune breaches over the low-lying island. Eerily, the church bells were ringing for New Year, the islanders came in large numbers to the service to pray for the mercy of the almighty God and begged for help in the imminent emergency. Short was the service, as nobody knew what was still to come (Lübbing 1951: 130, translation JS)

During the following high tide, 21 of the 75 houses in the village were destroyed. The gardens and the surface soil, a result of yearlong cultivation and labor, were washed away or covered with sand. The wells were soon filled with upwelling salt water. After the water withdrew, the island had broken in three pieces. Many of the 80 families had fled their houses and looked for shelter on higher grounds. Against all odds, nobody had died (ibid). The coastal resort, which had been established on Wangerooge by the Grand Duchy of Oldenburg in 1804, and which had brought the nobility and wealthy merchants from cities like Oldenburg, Bremen, and Berlin to the island, had been destroyed (ibid: 126).

After the devastating flood it was unclear what would happen to the islanders and their village, as they were depended on the income of the tourist resort. In June 1855, a delegation of the administration from Oldenburg arrived on the island, eventually ordering the local population to settle over to the mainland, as the reconstruction of the bathhouse was considered too expensive. The administration promised a relocation allowance and provided a site for resettlement on the mainland (ibid: 135). Soon after the visit of the delegation, the islanders prepared their belongings for shipment. Two-thirds of the 342 people living on the island moved to the mainland, many of them founded a new settlement called Neu-Wangerooge, which still exists today (Radio Bremen 2014). Some people who stayed on the island started to build a

new lighthouse and a new settlement in the eastern part of the island, which also still exists today and forms the core of the current settlement.

The resettlement of the people of Wangerooge is just one example of many other relocations from the coast. For the German North Sea coast, there are numerous historical accounts especially from the Middle Ages, where coastal settlements were destroyed, and people were forced to flee the floods. Hundreds of thousands died in storm surges (NLWKN 2007: 42–43; Behre 2008). Next to the forced escapes due to flooding, more recent examples of relocations followed a certain degree of planning and preparation. McGlashan provides examples from the UK and US, where during the 19th century lighthouses and hotels were relocated from the eroding coastline (McGlashan 2003). Zimmermann (2007) discusses different techniques of relocating wooden buildings in North America and Europe, which involved the construction of hydraulic lifts, anchor winches, and railway tracks for the uplifting and transportation of buildings. In the case of Wangerooge, the relocation ordered by the administration was rather an *ad hoc* decision due to lack of financial funds for the reconstruction of the bathhouse, as well as the fear that the islanders would become impoverished due to a shortened income, and would be in need of poor relief funds (Jürgens 2015: 73–77). According to the historical sources available, the decision to relocate the village was made on the basis of a few visits by the administrative delegation, and a guided walk around the island (ibid: 74). This is an interesting detail, as it stands in contrast to the extensive scientific research that goes into decision-making in coastal management today. And it also suggests that it was feasible for the administration *to order* a relocation at the time.

However, the relocation commanded by the administration has not resulted in the abandonment of the island. Soon after the destructive storm, a new lighthouse was built, and the remaining population resettled further in the east. There was a growing interest from the administration to maintain the island, as a seamark for shipping, but also to stabilize the waterway of the river Jade, which is important to the military port of Wilhelmshaven (Kunz 1996). With the foundation of the German Reich in 1871, a plan for the protection of the island was commissioned, and shortly after, a number of hard protection measures were established (Lüders 1951; Witte 1970: 70–75). Ever

since, Wangerooge has been a populated island and a tourist resort, with a growing number of hard engineering structures protecting the island from erosion and migrating eastwards.

The relocation of people from Wangerooge is an early example of a state administration getting involved in the resettlement of people away from a coastal hazard. At the time, financial interests of the administration, and the safety of the people were important for the decision. Since the 1980s, the notion of relocating people, infrastructures, agricultural usage, and capital assets away from erosion and flooding, commonly called managed retreat or managed realignment, has gained increasing political urgency (Rupp-Armstrong and Nicholls 2007; Tol et al. 2008; Esteves 2014a). This more recent approach differs from relocations in the past, as it goes along with a range of new rationalities of governing coastal spaces, as well as the application of specific planning tools that were not present in the 19th century. Managed retreat is closely connected to diverse developments in coastal sciences, different assessment methods, and new ways of understanding coastal processes (Leggett et al. 2004; Pilkey 2005). As I will show in my work, the notions of coastal hazard risk (particularly for urbanized sandy beach coasts) and environmental compensation and natural restoration (for low-lying diked coasts) are central categories in these debates. They are important overarching conceptual frameworks for the assessment of coastal processes and the implementation of managed retreat.

My argument is that the emergence of managed retreat is not just about the *ad hoc* relocation of people and infrastructures out of harm's way, but it is a more strategic and long-term approach that builds on a range of shifts in the way coastal processes are assessed, new scientific knowledge is used, and questions about a desirable coast are discussed. Managed retreat implies a rethinking of the role of the state in coastal hazard management, as the state is particularly important in land-use planning, the collection of taxes, the provision of safety and prevention of harm, the functioning of a private property market, and the aggregation and mediation of expert knowledge. Therefore, managed retreat needs to be analyzed in connection with the way the state intervenes in and shapes the making of coastal environments. Managed retreat is then a considerable change in the way coastal spaces are governed.

1.1 Managed retreat as a new approach in coastal management

The 20th century witnessed an enormous straightening and armoring of the world's coastlines, and the dominant approach has been to protect urban developments and human usage with hard engineering. Seawalls, revetments, groins, and dikes are common structures that can be found on most coastlines around the world. These structures are either intended to protect property and infrastructures from being destroyed due to erosion, or to protect the land from being flooded (French 2001; Pilkey and Cooper 2014b). In most coastal cities, engineering works harden the coastline to allow for a stable construction and usage of the urban infrastructure, and in many rural areas dikes and embankments prevent the land from being flooded and permit an uninterrupted usage of the land. However, more recently these conventional strategies of hold-the-line and blocking off the sea have increasingly been criticized, and alternative coastal management strategies and development paths were sketched out (Howard et al. 1985; Peart 2008; Pilkey and Cooper 2014a; Reise 2015).

Managed retreat has always been a contested term (Pethick 2002), and there is an ongoing controversy about its different meanings (Esteves 2014c), but in general it stands for the removal or relocation of defense structures, properties and infrastructures away from an eroding coastline or a coastal hazard to achieve a range of different objectives (Neal et al. 2005). It is referred to as "a radical departure from the history and traditions of coastal management (...), where the sea is often seen as a cruel enemy to be fought at all times" (Rupp-Armstrong and Nicholls 2007: 1418). Instead of, or in addition to, fighting the sea with larger seawalls and strengthened dikes, the concept of managed retreat relates to ideas of making space for water (Defra 2004), of moving assets away from the hazard (Turbott and Stewart 2006), working with nature (Cooper and McKenna 2008; Gesing 2016), and building a more resilient coastline in the face of climate change and sea level rise (Reise 2015). Managed retreat stands for the idea that humans need to act pre-emptively to the overall threat of climate change, to improve the protection against flooding, and to recreate intertidal habitat and a more natural coastline (Burd 1995; Esteves 2014a). In many cases,

managed retreat is portrayed as an adaptation measure to sea level rise (Dronkers et al. 1990; Tol et al. 2008). Other authors discuss it in relation to the loss of coastal habitat and the phenomenon of “coastal squeeze” (Doody 2013), as well as the negative effects of coastal defense structures on beaches, salt-marshes and other coastal environments (Cooper and Pilkey 2012; Reise 2015). Even though there are other tools and technologies in coastal management today, such as beach nourishment, dune planting, artificial reefs and others, managed retreat is the most radical measure as it breaks with the concept of hold-the-line, and aims for a rearrangement of people, built structures, and an alteration in the use of the coastal space.

Since the 1980s, there is an increasing number of scientific publications, planning documents, government reports and laws that discuss, elaborate and prescribe the concept of managed retreat (Howard et al. 1985; Department of the Environment, UK 1992; Burd 1995). Despite the different characteristics of the discussion in each country, it is important to note that in most industrialized countries around the world there have been increasing concerns about coastal issues since the 1970s and 80s, and conceptualizations around managed retreat have been emerging across the globe. A debate about managed retreat has unfolded, among others, in the UK, USA, Australia, New Zealand, Germany, France, and the Netherlands (Ford 1977: n.p; Howard et al. 1985; Titus 1990; Brooke 1992; Goeldner-Gianella 2007; Stronkhorst and Mulder 2014).

As an example, in 1985 a decisive argument for the need of retreat was made in the US context, when the *Second Skidaway Institute of Oceanography Conference on America's Eroding Shoreline* published a *National Strategy for Beach Preservation*. The document was one of the earliest efforts that not only criticized the prevailing practices of coastal developments, urbanization, and hard engineering, but that clearly voiced the need for a “strategic retreat”, accompanied by a list of recommendations for different government bodies. The opening words portray an assessment of the situation:

Sea level is rising and the American shoreline is retreating. We face economic and environmental realities that leave us two choices: (1) plan

a strategic retreat now, or (2) undertake a vastly expensive program of armoring the coastline and, as required, retreating through a series of unpredictable disasters. (Howard et al. 1985: 1)

This distinct illustration of two different options was one of the first statements that clearly pronounced the necessity of a marked shift in government actions. It implied that a retreat would be the reasonable political strategy to choose, and that a hold-the-line approach would initially be very expensive and fail eventually. The document detailed suggestions for different government bodies, such as the end of state expenses in infrastructures that benefitted private coastal developments, the removal of incentives for private developments in areas at risk, the acquisition of undeveloped land for conservation purposes, and the prevention of the construction of hard defense structures (ibid). Importantly, many of the suggestions are still being discussed today, as I will show in my research. In a different context, in 1991 the Esbjerg declaration for the protection of the Wadden Sea in Denmark, Germany, and the Netherlands, indicated the option of managed retreat for the North Sea coast. The policy paper contained the principles of translocation ("translocate activities which are harmful to the Wadden Sea environment to areas where they will cause less environmental impact") and restoration ("parts of the Wadden Sea should be restored (...)") (Minister of the Environment Denmark, Germany, Netherlands 1991: 3). Further, it stated that next to the protection of salt marshes and dunes, policy should "aim for the restoration of salt marshes by opening summer dikes, provided that it fits into the ecological target of the region" (Minister of the Environment Denmark, Germany, Netherlands 1991: 3). The opening of summerdikes on low-lying marshy coastlines is an option that will be discussed further and that is commonly referred to as managed realignment.

A large proportion of the academic literature on managed retreat originates in the UK, and within this body of literature it is commonly argued that the first managed retreat scheme worldwide was implemented on Northey Island on the English Southeast coast in 1991 (French 2001: 275; Wolters et al. 2005: 40). Since then, many more projects have followed. In 2015, 64 managed realignment schemes were implemented in the UK (ABPmer 2015: 1), and almost 10 on the open North Sea coast

in Germany (ABPmer 2018). These projects do not only include managed realignment schemes, where foredikes are breached or removed, but also regulated-tidal exchange projects, where sluices allow for a controlled inflow of the tides in a dedicated area behind the dike. Next to these projects, there are more realignment schemes in the estuaries, as well as further upstream of the rivers. In this work I will focus on open-coast managed retreat schemes in Germany and New Zealand.

In recent literature, it is common to portray three different management options for retreating coastlines: protection, accommodation, and managed retreat (Rupp-Armstrong and Nicholls 2007: 1418; Tol et al. 2008: 435). This tripartite of management options was established by the newly founded Intergovernmental Panel on Climate Change (IPCC) in 1990, when the Coastal Zone Management Subgroup published *Strategies for Adaption to Sea Level Rise*. This publication had a strong impact on the coastal management literature and debates about managed retreat. The publication gives "Reasons for concern" and proposes possible "responses". The presented options are "protection" and "accommodation" as well as "retreat" (Dronkers et al. 1990: iv). In this publication retreat is described rather passively, in that it would involve "no effort to protect the land from the sea. The coastal zone is abandoned, and ecosystems shift landward. This choice can be motivated by excessive economic or environmental impacts of protection. In the extreme case, an entire area may be abandoned" (ibid). Since then, the definitions of managed retreat have changed, and it has also become clear that retreat is not simply an abandonment, but that it involves a decisive shift in the way coastal processes are evaluated, how expert knowledge is used by state authorities in the planning and allocation of assets, and what kind of incentives state authorities must give to allow for a withdrawal of human usage.

A large part of the scientific literature on managed retreat is by geomorphologists, physical geographers, and ecologists, and it is investigating the ecological, vegetational, and geomorphological development of managed retreat sites before and after the implementation (French 1999; Townend and Pethick 2002; Atkinson et al. 2004; Barkowski and Freund 2006). Other authors have provided a more conceptual approach, giving an overview of different managed retreat schemes, developing the definition of managed retreat further, and providing best practice advice for the

implementation of managed retreat projects (Burd 1995; Leggett et al. 2004; Esteves 2014a). Next to this majority of literature, there are publications by planners and engineers, who discuss different legal questions, as well as economic incentives for the implementation of managed retreat (Brooke 1992; Turbott and Stewart 2006; Britton et al. 2011; Blackett and Hume 2011). Moreover, some contributions by economists and sociologists mostly use quantitative methods, standardized questionnaires, and psychological models to understand and measure public acceptance of managed retreat (Goeldner-Gianella 2007; Alexander et al. 2012; Clément et al. 2015), or aim to quantify the economic risks and benefits from hold-the-line vs retreat policies (Fankhauser 1995; Daniel 2001). Next to this growing body of literature, there is a whole range of government documents and consultancy reports commissioned by state agencies that deal with coastal hazard management and managed retreat from the perspective of the administration (Defra 2002; Ministry for the Environment 2008; Shand 2008; KCDC 2010).

With respect to coastal management in general, there are only a few publications from the social sciences that use a qualitative approach, and that pose questions of power, agency, and competing concepts of coastal natures (Collins 2009; Bruzzone 2013; Gesing 2017). Collins discusses the contestedness of property development in coastal New Zealand (Collins 2009), Kearns and Collins use interview material to understand the emotional attachment to coastal places (Kearns and Collins 2012), and Haughton and White debate the creation and contestation of hazard lines on maps as a tool for raising risk-awareness in coastal New Zealand (Haughton and White 2017). However, no research on managed retreat has used qualitative research methods to specifically focus on questions of power, expert knowledge, and the role of the state in reshaping coastal policies. In this sense, my work fills a gap as it presents a reading of recent developments in managed retreat, and analyzes the power dynamics, the role of the state, and the importance of expert knowledge in two specific case studies from Germany and New Zealand. In the following section I will detail my theoretical and methodological approach.

1.2 Theoretical approach and methods

In my work I am interested in understanding the techno-scientific assessment practices that are at the heart of the managed retreat approaches, as well as the role of the state in aggregating and coordinating these practices. I propose to understand managed retreat as a *government program in the making* (Rose and Miller 1992). The government program of managed retreat does not necessarily break with conventional strategies of dealing with coastal erosion and flooding, but it problematizes a range of different issues on the coast and introduces new ways of seeing and understanding socio-environmental processes. The transformation of coastal spaces in the face of increasing coastal risks is regarded as a huge challenge by national and local government agencies, as well as planners and scientists. I am interested in analyzing the political rationalities that make managed retreat appear to be a response to a variety of coastal problems, as well as the shifting power relations that this entails.

In New Zealand, hazard maps are essential for analyzing the potential hazard risk of erosion and inundation, and hazard lines play an important role as a government tool for categorizing coastal areas in safe spaces and risky spaces (Haughton and White 2017). Hazard lines are thought to provide management guidance for the allocation of new subdivisions, for the location of future urban growth, but also for areas where investments are to be reduced and properties and infrastructures are considered to be relocated in the future. The production of hazard lines is based on complex scientific expert knowledge and the work of private consultancies that produce these hazard risk assessments. In the analysis, I will pay attention to the way the methodology works, how it frames coastal processes and hazard risks, but also how the methodology as well as the hazard lines are criticized and contested by property owners and the media. In a similar way, the implementation of managed retreat in Germany rests on a complex techno-scientific assessment process, where different environments are being categorized in biotope types and value levels. The valuation of biotopes is key to the concept of compensating environmental assets that are being degraded or lost during a construction project. As most managed retreat schemes in Germany are being implemented due to compensation requirements

stemming from larger infrastructure projects, it is important to understand the way the assessment and balancing of environmental assets and biotope value levels work. Next to analyzing the techno-scientific practices of environmental compensation, I will contextualize the procedure in the larger power dynamics of coastal protection management in Germany.

Building on scholarship in State Theory (Jessop 1990; Poulantzas 2014), Political Ecology (Robbins 2008; Loftus 2018), and Governmentality Studies (Dean 2010; Walters 2012; Lemke 2016), I am interested in the interrelation of techno-scientific knowledge practices, expert knowledge, and the role of the state in coastal hazard management. The goal is to develop a theoretical framework that allows me to analyze recent changes in the government of coastal environments, namely managed retreat. Key is the role of the state, and its role in the shifting of coastal management strategies towards a managed retreat concept. I will discuss the notion of the *Environment making state* (Parenti 2015), and other historical-materialist approaches, as a fruitful approach for studying the state as a central actor in the accumulation of capital, the brokering of environmental knowledge, and the *making* of coastal environments. Further, I will focus on the notion of *government*, developed by Michael Foucault (2007, 2008) and others, which encompasses a wide range of practices with an emphasis on the “the conduct of conduct” (Lemke 2002: 50–51). As Dean explains:

Government is any more or less calculated and rational activity, undertaken by a multiplicity of authorities and agencies, employing a variety of techniques and forms of knowledge, that seeks to shape conduct by working through our desires, aspirations, interests and beliefs, for definite but shifting ends and with a diverse set of relatively unpredictable consequences, effects and outcomes. (Dean 2010: 18)

Of importance are the reflections on strategic governmental practices that are characteristic for managed retreat. This approach emphasizes less the state as a central actor, but rather the variety of government technologies and political rationalities that navigate and direct modern rule. I am interested in what Foucault called the *art of government*, that is “the reasoned way of governing best”, or the “reflection on the

best possible way of governing” (Foucault 2008: 2). How do planners, council staff, elected members, and consultants describe particular problems, and what do they propose to do about coastal erosion, flooding, and sea level rise? What do they perceive as accurate and necessary options for dealing with these problems? How is managed retreat positioned as a governmental intervention that leads to a better usage of coastal spaces?

I complement these assumptions with the notion of “problematizations” (1992: 181), which was coined in the work of Nikolas Rose and Peter Miller. The authors argue that government is fundamentally a “*problematizing* activity” (ibid, emphasis in original). The inner motive of government is inherently related to the issues it deems concerning, and the shortcomings it aims to correct. “If the conduct of individuals or collectivities appeared to require conducting, this was because something in it appeared problematic to someone” (Miller and Rose 2008: 14). Thereby, the analysis is not necessarily limited to the publications of government agencies, but problematizations are brought forward by a series of different actors, such as scientists, planners, businesses or other interest groups. In some instances, these concerns are taken up by government agencies or transported into the political process through expert reports.

Miller and Rose propose to analyze political power and changes in policies “by asking how this rendering of things problematic occurred” (Miller and Rose 2008: 14). Instead of adhering to the notion of a *problem*, such as sea level rise, they would suggest analyzing the practices of problematization as a process that removes the “self-evidence of the term ‘problems’”. It suggested that ‘problems’ are not pre-given, lying there waiting to be revealed. They have to be constructed and made visible” (ibid). In addition to this, Bäckstrand (2004: 703) suggested that environmental problems “are not ‘out there’ in a pure and unmediated form, but various techniques, procedures and practices construct and produce these fields in such a way that they become both objects for knowledge and targets for regulation.” This is to say that different actors problematize conditions and circumstances on the coast in such a way that they can become knowable and governable by ways of framing and ordering a certain situation. Problematizations such as coastal erosion, sea level rise, or beach

degradation then build on an ensemble of complex knowledge practices, but also entail reflections about proper government of the coast, as well as normative statements about how the coast should look like and how it should be used (Dean 2010: 19).

Political power is closely related to specific knowledge practices, and governing people and environments depends on expertise, as well as ways of ordering and representing knowledge. Thomas Lemke traces this argument to Michel Foucault's writing on governmentality, in which Foucault developed his "working hypothesis concerning the reciprocal constitution of power techniques and forms of knowledge and of regimes of representation and modes of intervention" (Lemke 2007: 44). Lemke continues:

Government defines a discursive field in which exercising power is 'rationalized'. Ways in which this occurs include the delineation of concepts, the specification of objects and borders, and the provision of arguments and justifications. In this manner, government makes it possible to address a problem and offers certain strategies for managing or solving the problem. (ibid)

The main argument here is that government rationalizes its own doings through the definition of a set of problems it seeks to address, as well as the determination of a particular knowledge, measurement, and assessment practices that seek to alleviate the problem. The design of government programs and the invention and elaboration of government strategies are key procedures in the management of any problem, and they commonly entail a detailed description of what the problem is, how it should be addressed, as well as an implicit assumption about how the circumstances should rather be. Building on these theoretical considerations, which will be further elaborated in chapter four, my goal is to analyze ways of framing concerns about the coast to better understand the problematizations that managed retreat is related to.

This work entailed an extensive document analysis, as well as detailed fieldwork in New Zealand, Germany, and the UK.¹ I have conducted 50 interviews with Council staff members, Councilors and mayors, planners and coastal consultants, coastal scientists, as well as farmers and property owners. Most of my interviews took place in a professional environment, as I was interested in the way state agencies produce, frame, and use expert knowledge to bring about changes in coastal management. Even though I have investigated five case studies during my fieldwork (Langeoog and Langwarder Groden in Germany, Kāpiti Coast and Hawke's Bay in New Zealand, Medmerry in the UK), I have decided to focus my attention on a detailed analysis of two case studies, the Langwarder Groden in Germany, and the Kāpiti Coast in New Zealand. Next to the interviews, I have conducted an extensive document analysis of government reports, laws, planning documents, media articles, scientific publications, as well as material produced by local action groups.

Even though my approach was guided by case studies, I intend to develop a broader perspective on managed retreat and put these rather recent conflicts in a larger historical context of regimes of practice in coastal protection strategies. Germany and New Zealand are two paradigmatic cases with many differences in the history of settlement, the construction of coastal defenses, the development of coastal protection institutions, and coastal morphology. Whereas New Zealand has a rather recent history of coastal urbanization, and large parts of the coast are beach coasts, people in Germany have built dikes for about 1000 years, and the coastal low-lands have been settled for even longer. The New Zealand government system has been influenced by the UK, and coastal protection is a discretionary and not mandatory task for state agencies (Environment Agency n.d.). Risk and uncertainty play an important role in planning in New Zealand, whereas in Germany the state is bound to maintain the protection structures, and with respect to coastal management it is “a protective state” (Krieger 2013: 244). This contrast is helpful in order to analyze the differences

¹ I was able to conduct my dissertation research as part of the DFG-funded international research training group INTERCOAST at Bremen University, and the University of Waikato.

and similarities between the two countries and how they implement managed retreat. It is fruitful in analyzing a broad field of differences how managed retreat is being applied and contested.

1.3 Outline of chapters

The work is structured as follows. Chapter two begins with an analysis of the current *Coasts in crisis* discourse that has emerged over the past two decades. During my research, I have noticed that the coast as a place to live, as an ecosystem, as an economic zone, and as a supposedly stable border between two different spheres (land and sea) has been increasingly problematized. Government agencies, planners, scientists, and media outlets portray the coast *as in crisis*, where climate change, sea level rise, continuous urbanization, and environmental degradation is leading to ecological, economic, and social perturbations. In this part, the notion of problematizations as a situated, knowledge-driven expert practice is important, and the coasts in crisis discourse should be understood as a broader framework in which the notion of managed retreat is being developed, negotiated, and contested. In the second part of chapter two, I trace the emergence and historical development of the managed retreat concept in the UK, and the context of its development in Germany and New Zealand. One goal is to analyze the similarities and differences of the concept in these countries.

Chapter three situates the two case studies in Germany and New Zealand and provides a closer reading of the historical development of coastal protection measures, institutions, laws, and organizations that have developed over time and are currently in place. It describes the current situation of coastal management and shows in how far managed retreat has been implemented and discussed. This chapter is also meant to provide a more nuanced context for the two empirical case studies that follow in chapter six and seven.

Chapter four discusses the theoretical framework for this work. As managed retreat involves spatial planning, zoning of coastal areas, and decisions about the allocation of settlements and conservation areas, it is closely related to responsibilities of the

state. I will discuss different approaches to conceptualizing the state, and particularly how the state is involved in the making of environments. A historical materialist approach to the state-environment nexus, as well as arguments from Governmentality studies will be debated.

Chapter five presents methodological considerations about the relation between Governmentality studies and qualitative research methods, as well as the use of documents and interviews. I will present a detailed description about the methods I used in the empirical research in New Zealand, Germany and the UK.

Chapter six and seven present and discuss the material gathered and produced during my empirical research. To a large degree it builds on the interviews conducted during my fieldwork. Chapter six focuses on the case study of the Kāpiti Coast in New Zealand, where an ongoing conflict about a coastal hazard assessment has evolved since 2012, and 1800 coastal properties have been affected by hazard lines that were resolutely fought, eventually forcing the Council to backtrack on its implementation plans. The chapter begins with an analysis of recent (re)framings of coastal management and coastal processes in New Zealand, of which managed retreat is an important part. It continues with a detailed description of the conflict about hazard lines on the Kāpiti Coast and dissects the methodology of hazard lines in detail. At the end, the chapter tracks some more general debates among coastal scientists and planners about different ideas of how managed retreat could be implemented, how it could contribute to an improved protection of New Zealand's beaches, and how the allocation of new urban areas further inland could offset the cost for a managed retreat approach.

Chapter seven deals with the managed retreat measure Langwarder Groden in Germany. It begins with an analysis of the connection between the construction of the deep-water JadeWeserPort and the conservation measure Langwarder Groden. It details the different interests that were at play when the foredike of the Langwarder Groden was breached in order to fulfill legal requirements of a compensation measure, but also to realize a project many conservationists advocated for to achieve a coastal nature that resembles an image of a natural dynamic of coastal processes. In this chapter I will dissect the legal procedure of compensation measures and the impact

mitigation regulation, as well as the techno-scientific knowledge practice of environmental valuation and the biotope value method. At the end of the chapter I discuss competing ideas of coastal natures, how the local farmers oppose the concepts of the conservationists, and in how far the reproduction of natural coastal processes are deeply embedded in an administrative and technocratic process that is strongly guided by legal aspects.

My argument is that managed retreat is not only a contested concept, but it also highly differs in its conceptualization and application in Germany, New Zealand, and the UK. Managed retreat is not a simple abandoning of coastal settlements and protection structures, but rather a strategic, controlled, and spatially confined transformation of coastal areas tied to specific interests. The role of the state is important in the administrative organization, and funding of managed retreat schemes. The problematizations that are tied to the coasts in crisis discourse, and particularly the prospect of climate change and sea level rise, have led state agencies to increasingly be involved in the assessment of coastal hazard risks and the allocation of areas of urban divestment.

2. Managed retreat – the emergence of a government program

This chapter deals with the emergence and development of managed retreat as a government program. In 2.1 it starts with an analysis of the “Coasts in crisis” discourse, which is constituted by a range of problematizations of recent developments in coastal areas. Government agencies, planners, coastal consultancies and scientists, as well as the media have advanced a series of concerns about life in the coastal realm, ranging from climate change and sea level rise, erosion, inundation, loss of biodiversity, to a rise of coastal hazard risks and increasing public expenditures. In many instances these problematizations are closely related to proposals of a managed retreat approach, and it is argued that the problems could only be addressed with managed retreat. It is important to lay out and analyze the way these problematizations work in order to better understand managed retreat as a government intervention.

In section 2.2 I will provide a reading of the historical development of the managed retreat concept, and how it has changed since its first appearance in the UK in the late 1980s to early 1990s. Additionally, I will discuss different concepts such as set-backs, managed realignment, outbanking, regulated tidal exchange, and salt-marsh restoration, and how they have developed in Germany, the UK and in New Zealand respectively. One goal is to outline some of the differences and similarities in the way managed retreat has developed as a concept, but also to point out what managed retreat means in each of the countries. The following chapter three will then situate the case studies that are discussed in chapter six and chapter seven, and it will delve into the situation of coastal management in Germany and New Zealand more in detail. Methodologically, the following two chapters are largely based on a document analysis and literature review of government reports, scientific journal articles and media publications.

2.1 “Coasts in crisis” – problematizing coastal environments

“Coasts in crisis” was the headline of a press release announcing a public lecture at the University of Auckland in 2018. In the press release it is argued that the world’s

population in coastal areas is rapidly growing, but that “our enthusiasm for living by the sea coincides with a projected rise in risk to the coastal environment” (University of Auckland 2018). The proclaimed rise in risk is constituted by an increased population, extreme weather events that will occur more often, and climate change induced sea level rise. It is argued that today most coastal cities worldwide already face hazards such as storm surge, subsidence, erosion and inundation. The speaker of the lecture, a senior scientist from a US-based university, contends that even a reduction of greenhouse gas emissions may not be enough to mitigate sea level rise, and to avoid increased loss of coastal assets. Rather, it is said that in some areas the conventional approach of protecting the built environment with hard defense structures is not a viable long-term solution, and that a drastic change in the way of governing coastal spaces is needed. The press release ends with a quote of his: “In some of the most at-risk areas, managed retreat might be our only option no matter how unpopular it might be” (ibid). The emergence, negotiation, and contestation of managed retreat as a government program that is gaining more and more political weight for addressing the coasts in crisis is the topic of my dissertation.

“Coasts in crisis” has become a common and recurring theme over the past decades.² Climate change and sea level rise, coastal erosion and inundation, urban sprawl and environmental degradation as well as rising costs for the construction and maintenance of defense structures are common topics in the media, among scientists, planners and coastal managers. Thereby the narrative of coasts in crisis is often linked to the concept of managed retreat. Media articles entitled *Should coastal Britain surrender to the tides?* (Barkham 2014), *Water’s edge, the crisis of rising sea levels* (McNeill et al. 2014), *Fears beaches could vanish forever* (White 2017) and *Our eroding nation: battle for the dunes* (Collins 2003) elaborate on a variety of coastal issues

² The influential UK’s Royal Society for the protection of birds (RSPB) has recently conducted a charity appeal under the heading “Coasts in crisis”, where they advocated for managed retreat. Additionally, there is a recent book by Griggs (2017), entitled “Coasts in crisis: A global challenge”. Moreover, there is an older publication by Williams et al. (1990) called “Coasts in crisis”, as well as a book by Hinrichsen (2016) with the title “Our common seas: coasts in crisis”, which was initially published by the UNEP in 1990.

around the globe, and contribute to a perception that the current way of living in coastal areas is increasingly problematic. Other examples of popular publications that problematize coastal life are Cornelia Dean's (1999) *Against the tide: The battle for America's beaches*, Karsten Reise's (2015) *Kurswechsel Küste: Was tun wenn die Nordsee steigt?*, Raewyn Peart's (2009) *Castles in the sand: What's happening to the New Zealand coast?*, as well as Orrin Pilkey's and Andrew Cooper's (2014b) *The last beach*.

In this section I will briefly analyze the common social, ecological, economic, and political problems that are articulated in government and planning reports, scientific articles, and the media, and that constitute the discourse of coasts in crisis. The short overview is focused on industrialized countries, mainly Germany, the UK, as well as New Zealand and the USA. I am interested in how the problems are framed, as well as how they are ordered and put into context, to better understand managed retreat as a governmental intervention that is closely related to these concerns. I will analyze the problematizations in two different settings, first paying attention to concerns that are common for "open-duned coasts subject to traditional 'new world' low density" housing developments (Healy and Soomere 2008: 456), as we find them in New Zealand, Australia and the USA, and that I will summarize under the heading *Property, seawalls and beach loss*. In the second setting I will deal with low-lying, marshy coastlines that have a long history of diking and settlements, where concerns are voiced about *Coastal squeeze, habitat loss and flood risk*. Here the focus is on Germany and the UK. In both cases overarching concerns about climate change and sea level rise play an important role.

This distinction is useful, even though at times blurry and overlapping, as the different morphologies of the coast feature quite particular coastal processes and ecologies, but also different human usages, which in each case entail distinct problematizations. Moreover, there have been different ways of constructing coastal defenses, namely coastal protection structures that "describe measures taken to prevent the land from being eroded", which relates to sandy coasts, and "flood or sea defences", which are "structures used to prevent the land from being flooded by the sea" (French 1997: 56), which relates to low-lying coasts. Following this distinction, I will first deal with coastal protection structures, such as seawalls, groins, and

revetments, that aim to protect the coast from erosion, and in a second step I will analyze the problematizations around the flood defenses such as dikes. This distinction also correlates with the distinction that has developed over the past 15 years in the terminology of managed retreat. Today it is common to use the term managed retreat with respect to coastal protection structures such as seawalls, as well as with property that is behind the walls. Whereas the term managed realignment has developed especially in the UK with respect to the relocation of flood defenses such as summerdikes, foredikes, or main dikes.³

Property, seawalls, and beach loss on sandy coasts

Especially on sandy coastlines that have witnessed unprecedented urban development in the 20th century, there have been growing concerns about coastal hazard risks, erosion and inundation, as well as a continued rise in property values and its ramifications for urban planning. Next to the rise of hazard risks, which are commonly assessed by a combination of hazard occurrence and potential damage, there are concerns about environmental degradations that stem from the construction of hard defense structures, which are often built as a response to the hazard risk. The problematizations are commonly embedded in a narrative that today's problems arise from unhindered urban development in the past. In this admittedly Western centric discourse, the "global rush to the beach" (Cooper and Pilkey 2012: xi) is described to have occurred in different phases in the second part of the 20th century, and to be closely related to the economic growth in many industrial countries after the Second World War, as well as changes in lifestyle, mobility, and the perception of the coastline as a desirable place to live. Private owners, investors, and government agencies had constructed and invested in holiday homes, tourist resorts, and permanent beachfront residencies including all sorts of related infrastructures such as roads, sewerage

³ Summerdikes are smaller dikes outside of the main dikes that mostly protect the land during the summer months, whereas winter storms may overwash the dike. Foredikes by contrast, at least as the term is being used in Germany, are higher and even hold off winter storm surges. A synonym for summerdike is polder dike, whereas the word polder describes the area that is protected by the dike.

systems, parking lots, and shoreline armoring. For New Zealand, Peart (2009) has argued that this urbanization of coastal areas was due to a growing population, an increase in family income and leisure time, as well as a greater affordability and accessibility of cars, which “opened up a whole new world of recreational opportunities” (ibid: 92). It was increasingly desirable and affordable to have a holiday home on the beach, and to spend the free time fishing and surfing. Similarly, Cooper and Pilkey describe the situation for Europe, where over the past decades there have been enormous coastal developments not only in Spain, France, and Portugal. This development was exacerbated when travelling by air became more accessible and inexpensive (Cooper and Pilkey 2012: xi). The growing affluence, an increase in mobility, the emergence of mass tourism, and a general desire for coastal lifestyles have led to an unprecedented development of the coastlines, which has also increased the need for protective measures.

The urbanization of coastal areas is commonly related to a range of different social and environmental problems. In New Zealand, as in many other countries, for the construction of beach houses the dunes were bulldozed for “uninterrupted views” (Collins and Kearns 2008: 2914) of the sea, which in turn reduced the dunes’ “natural buffering role in storm conditions” (Peart 2009: 126). The attractiveness and value of beachfront property was higher, the closer it was built to the shore. But, as Cooper and Pilkey (2012: xi) sarcastically put it, the “problem of course is that if you can see the sea, the sea can see you.” This is to say that once the dunes were altered and the settlements were growing, especially the built environment close to the shore was vulnerable to coastal erosion and inundation. In recent years it has been acknowledged in science (Finkl and Walker 2005: 152) and by state agencies that much of the urban development in the past has occurred too close to the shore. The Ministry for the Environment in New Zealand portrays the issue as follows:

Most coastal hazard problems have been caused by coastal development and subdivision being located too close to the existing shoreline to accommodate natural changes and trends in shoreline movements.
(Ministry for the Environment 2008: 3)

As more than 70% of the world's beaches are eroding (Defeo et al. 2009: 4), there are several issues that are coinciding. One concern is that eroding coastlines will lead to a rise in public expenditures. The authors of an older oversight study for Europe found that in 2001 the "public expenditure dedicated to coastline protection against the risk of erosion and flooding has reached an estimated 3,200 million Euros (compared to 2,500 million in 1986)" (Eurosion 2004: 2–3). These rising expenditures would challenge policy makers to investigate alternative strategies of managing coastal areas that bring a halt to rising costs.

Another problematization has linked the notion of coastal properties and infrastructures being more vulnerable to sea level rise to the fact that in most places around the world, property prices have massively increased in recent times (Freeman and Cheyne 2008; Hanks 2016; Corderoy 2017). This rise in value has not only attracted new investments in urban developments but has also put enormous pressure on local and regional state agencies to act and construct defense structures, as these public agencies are commonly in charge of coastal management, urban planning, and coastal protection. It has been pointed out that state authorities are trapped in a situation where they either "face the prospect of litigation from reducing property values today, if they implement a policy that bans development; while if they ignore the long-term risks of SLR, the council could be facing an even larger liability in the coming decades" (Alexander et al. 2012: 412). The management of coastal property is a delicate matter. As other researchers have argued with respect to the situation in Australia, "there are no examples where large numbers of owners of assets at risk have worked with authorities in a meaningful and non-litigious manner to relocate multiple private assets away from the foreshore" (Gibbs et al. 2013: 75).

With regards to coastal governance in New Zealand, Blackett and Hume argue that "local development pressure or private property interest tend to win out over protection of beaches", which may either "be due to power and financial resource imbalances between applicants and local communities or the fact that the Local Council is driven to increase its rating base" (Blackett and Hume 2011: 29). As I will argue, this finding also applies to other countries, where a skewed balance of interests exist between investors, the building and tourist industry, as well as the local Councils.

In many places the interests of investors, and the paradigm of urban growth has prevailed, which has led to more urbanization and hard defense structures (Howard et al. 1985; Peart 2009: 108–113). Cooper and McKenna make a similar argument: “The money to be made and the short-term economic benefits of construction in job creation and ancillary professions makes local governments look favorably on [the construction of seawalls].” The authors continue: “Even where local groups and NGOs protest against environmental degradation, there is a grotesque mismatch in financial (and usually political) muscle between them and the powerful development lobby.” (Cooper and McKenna 2009: 536). The construction of hard defenses would also cement the idea that urban development in coastal areas was a viable long-term option, and that the state would cover the cost in case coastal hazards threatened the built environment.

A glaring example for the connection between capital investment, coastal degradation and the increase of hazard risk is the urbanization of Florida. In a recent study, entitled *Come heat and high water: Climate risk in the Southeastern US and Texas*, it is argued that no other US-state has more property at risk of inundation and erosion, and that it is likely to rise dramatically over the coming decades. “By 2030, \$69 billion in coastal property in Florida could flood at high tide that is not at risk today (...). That amount is projected to climb to \$152 billion by 2050” (Staletovich 2015). It is argued that the real estate industry has not been interested in sea level rise and climate change related threats, and the state authorities have not been able to introduce a change in policy. Florida is a prime example of coastal urbanization, degradation, and rising hazard risks, and it is often mentioned alongside places like the Spanish Costa del Sol, Australia’s Gold Coast, Dubai, or Rio de Janeiro (Pilkey and Cooper 2014b).

A key assumption that underlies these problematizations is the well-established argument that hard defense structures can have negative effects on the beach, and that a long-term protection with hard engineering is not a viable option. As Finkl and Walker maintain:

Traditionally, coastal armoring structures such as seawalls, breakwaters, and groins were relied upon to reduce wave energy approaching the

shore or to catch sediment moving across or along the shore, and thus provide protection from coastline retreat. Engineering works, however, provide only partial protection and in some cases actually exacerbate the problem they were designed to cure. (Finkl and Walker 2005: 147)

The notion that engineering works may have negative effects and even increase the problems of erosion has been a delicate subject. Orrin Pilkey and Andrew Cooper (2012), in their edited book *Pitfalls of shoreline stabilization – Selected case studies*, make a commanding case for how these engineering projects can fail and lead to increased erosion, which in turn increases the need for new protection measures that eventually deteriorate the character of the coastline. Concerns about the adverse effects of seawalls and other structures on the coast are common nowadays, with many studies giving evidence from around the world (Pilkey 1988; Airolidi et al. 2005; Stancheva et al. 2011; Hanley et al. 2014; Flitner et al. 2018). A key concern is that seawalls increase the rate of erosion and contribute to a lowering of the beach level in front of the wall (Peart 2009: 173). This may then have negative effects on the functionality of the wall itself, as it leads to “increased erosion of the beach at the structure’s base”, which eventually results in “undermining and/or failure of the defence” (Ministry for the Environment 2009: 18). But it also may have negative impacts on the social and economic prosperity of the coastal community because a deteriorated beach can have adverse effects on the life of residents, and it may negatively affect tourism and the local economy. Pilkey and Cooper even argue: “On a generational scale, on developed shorelines, the world’s recreational beaches are doomed” (Pilkey and Cooper 2014a: 431). They maintain that within the next 50 years, most beaches on developed shorelines will have disappeared, and that “promenading on the top of seawalls will be the principal activity of tourists” in coastal resorts (ibid: 435).

A common policy response to coastal erosion in front of high value property is a combination of seawalls and beach nourishment. Beach nourishment describes the technique of pumping sand from an offshore sand reservoir onto the foreshore. The sand spreads along the coast, widens the beach, and at least for some time diminishes the erosion problem. In the USA the first beach was nourished in 1922 on Coney Island

(Finkl and Walker 2005: 147), and in Germany the first nourishment project was undertaken on the island of Norderney in 1951-52 (Kramer 1958). Since then, nourishment has become a widely accepted and common defense strategy. However, many scientists have also criticized this invasive method, as the process of dredging and dumping the sand from the seafloor has adverse effects for animals, microorganisms and vegetation (Speybroeck et al. 2006; Brock et al. 2009; Pilkey and Cooper 2014b: 83–89).

In the following I will move my attention away from property and seawalls on sandy coastlines towards the marshy shorelines on the North Sea coast, where people have settled and constructed dikes for centuries. On these low-lying coastlines climate change and sea level rise are important and some of the concerns are shared, but due to the different morphology of the coast and the existing protection structures in place, many concerns are different and other measures are discussed to alleviate them.

Coastal squeeze, habitat loss and flood-risks on low-lying, diked coastlines

The low-lying coastal areas on the German North Sea coast and the Netherlands, as well as the estuaries in the UK, have a long history of land claim and dike building (Bruun 1972). For these coastal areas most problematizations focus on the combination of climate change and sea level rise with the negative effects of a fixed line of defense (Reise 2017). Some areas are densely populated, such as many parts in the Netherlands and Germany. Other areas are mostly used as agricultural land, and especially for these areas, managed retreat has been discussed over the past two decades. For the densely populated areas, with some of them being below sea level, state authorities have invested in strengthening the dikes in recent decades. In Lower Saxony, the government has spent about €3 Billion since the 1950s (NLWKN 2017). The large investments and relatively high safety standards for dikes have led most residents, planners, and politicians to trust in the defense structures in place, and to rely on the engineered solutions for protecting the land and the capital assets. In Germany and in the Netherlands coastal protection is generally framed as a “safety discourse” (Lange and Garrelts 2007: 269; Scheve 2017), and for Germany in particular, state authorities only reluctantly take part in a problematization of the prevalent

coastal protection strategy; which is a holding and strengthening of the existing defense structure. In the UK the situation has been different, as state authorities have also pointed out for rural areas that a continuation of the defense strategy may have to be reconsidered and managed retreat to be implemented (Department of the Environment, UK 1992).

Many problematizations of low-lying coastlines that are defended with linear structures run under the heading of “coastal squeeze”, which describes the process

where rising sea levels and other factors (...) push the coastal habitats landward. At the same time in areas where land claim or coastal defence has created a static, artificial margin between land and sea (...), habitats become squeezed into a narrowing zone. (Doody 2013: 34)

On coastlines that are protected with a dike, coastal squeeze causes a narrowing of coastal habitats as well as the foreland of the dike (Pontee 2013: 206), which has raised a range of concerns among conservationists and planners. Especially for areas where the protected land is below sea level and the dike defends densely populated areas, it is commonly ruled out to relocate the line of defense further landwards, and thus to counter the squeezing of the foreland by giving it more space. One problematization that is particularly viable for the Netherlands, Germany and Denmark is the threat of a “drowning of the Wadden Sea” (Mohaupt 2015). All three countries are home to one of the largest Wadden areas in the world, which has been declared as a UNESCO world heritage site, and which is recognized “as a unique, ecologically rich and diverse ecosystem of outstanding natural value” (Walsh 2017: 2). As sea level rises, the Wadden areas are inundated more often and for longer time periods, which threatens many species that make the Wadden Sea special.

In many coastal areas it is practically impossible to develop the coastal zone further towards the inland. The sea is therefore trapped in a girdle of fixed coastlines. This situation is exacerbated by the rising sea level. From a rise in sea level that is too fast results a sediment deficit that leads to a loss of the typical nature of the Wadden Sea, because the Wadden

are permanently covered with water. (Michael Otto Stiftung 2010: 19, translation JS)

A shrinking of intertidal areas that are also inundated during low-tides has fatal consequences for seals, migratory birds, and other animals, as these are not able use the areas for rest and for feeding (ibid: 23). Next to the Wadden there are salt-marshes as a distinct habitat that is also highly affected by coastal squeeze and human intervention. As about "50% of salt-marsh area worldwide has already been lost or degraded" (Mossman et al. 2012: 1446), it is a big concern that due to sea level rise and human intervention, these areas are further decimated, and may even disappear entirely. This would have devastating effects on the typical vegetation of salt-marshes, as well as a reduction of habitat for insects and coastal birds. It is observed that salt-marshes "are starved of sediment because of catchment modification and coastal engineering, or exposed to erosive forces, which may be of natural origin or reflect human interference" (Adam 2002: 39). Human interference in salt-marshes dates back several thousand years, and it has encompassed a variety of human practices and their effects, ranging from livestock grazing, land claim and diking, draining, aquaculture, insect control, pollution and others (ibid: 44–48).

Next to these ecological concerns that include a fear of loss of biodiversity and loss of habitat, there are problematizations that point towards increasing issues with securing the integrity of the defense structures, which is paramount for the overall safety of the settled land behind the dikes. It is a common claim in coastal management that dikes need a foreland; a strip of land that is normally not inundated at high tide. This strip is ideally about 50 to 100 meters in width (Ahlhorn and Kunz 2002a: 21–22). In case of a storm tide the wave-energy is dissipated, and it is reduced once it reaches the dike foot.

The foreland reduces the wave load of the maindike by wave-breaking, protects the foot of the dike, increases the safety of the dikes with regard to dike breaching and provides clay material for urgent dike-repair (Ahlhorn and Kunz 2002b: 366)

Once this foreland is disappearing and the high tides regularly reach the foot of the dike, the dike is more prone to erosion and is more likely to fail in the case of a storm surge. In this case, constructional measures like revetments are built to prevent an ongoing erosion of the dike. However, these measures do not just distort a widespread ideal of the cultural landscape that is shaped by green dikes, but it also massively increases the costs of maintenance (Michael Otto Stiftung 2010). All these concerns point towards a general lack of sediment that causes coastal squeeze (Eurosion 2004: 3), and that is generally related to human interventions, as linear defense structures cut off the sediment reservoirs further inland.

Another problematization that stems from the linear protection strategy that has been practiced in Germany, the Netherlands, and many parts of the UK, is the sinking of the diked land. Due to the fixation of the linear protection structures that have been in their current position for decades or even centuries, there is an increasing height differential between the foreland of the dike and the protected hinterland (Reise 2015: 16). For several centuries, sedimentation has only happened in front of the dike, leading to a gradual elevation of the land, whereas the diked marsh has been sinking. This difference in height is a security problem, as in case of a dike breach the seawater could pour onto the low-lying areas behind the dike. Additionally, the height differential reduces the options for using the sluices (*Siele*) in the dike to drain the hinterland of stormwater, which has been practiced for long time. Increasingly the stormwater has to be pumped, which is not only a financial burden but also an ecological concern (Ahlhorn and Meyerdirks 2010). Next to the differential in height, the dike is also problematized because it closes off most rivers from the sea. Many smaller rivers are regulated with sluices or barrages to control the incoming tide and to prevent the flooding of the hinterland. This closing off of the coast is especially concerning for migratory fish and other animals (Interview with Frank Willms, Andreas Fischer).

In summary, I have shown that for low-lying as well as sandy coastlines problematizations are driven by the prospect of climate change and sea level rise, as well as the related effects of storm surges, erosion, and inundation. In both cases, scientists and planners suggest that urban development and coastal armoring in the

past is partly responsible for the problems that policy makers face today. The higher the value of properties and infrastructures at risk is, the more urgent the problematizations are, but also the more probable it is that state authorities will decide on investing in hard defense structures. The rising public expenditures for maintaining protection structures are a common concern, as well as the environmental degradations that result from urbanization and the protection structures. The coasts in crisis discourse suggests a global phenomenon of erosion, inundation and hazard risks, but there are also regional differences and particularities. Whereas on sandy coasts there is a stronger focus on the interplay of coastal hazards and their effects on property, as well as the negative effects of seawalls on the natural character of the coastline, on low-lying marshy shores there is a bigger concern about ecological degradation, the loss of habitat and biodiversity. In Germany and the Netherlands, the dependency on the dike is high. The coastal landscape is predominantly a cultural landscape that has been shaped by human intervention for centuries. Already in the 17th century, territorial princes have influenced coastal management and state-like institutions were developed (Allemeyer 2006). For decades there has been a "safety discourse" (Lange and Garrelts 2007: 269; Scheve 2017) prevailing, and the modern state administration focuses on strengthening the main dike that is supposed to protect the entire settled coast to an equal level. This circumstance may explain why in these countries problematizations are far less often brought forward by state authorities, but rather from conservationists and scientists. Any change to the prevailing coastal management strategy, including managed retreat, would have to take into account a large area that is below sea level, or it would have to invest large amounts into the construction or renovation of a second dike line that would parcel the hinterland into smaller areas. If the dike failed on low-lying coastlines, it would potentially have devastating effects for large areas of settled land. Therefore, some authors propose to shift the policy from a single line of defense to an area-oriented defense strategy that would allow the sea to enter the land behind the dike. This will be elaborated in the next section.

2.2 The development of the managed retreat concept

In the following I will analyze the emergence of the managed retreat concept and how it has developed in the UK, Germany, and New Zealand. I will begin the analysis with the development in the UK, as it was there where the term was first used, and where the first managed retreat project was implemented in the early 1990s. Since then, the terminology and the concept has changed in the UK, and it has traveled to other countries. In New Zealand, the term is being used in government reports and it is part of national legislation, even though it has a different meaning than in the UK. In Germany by contrast, the term is uncommon, albeit there are about a dozen schemes that have been implemented since the 1990s. However, even though there are conservationists and scientists that advocate a particular form of managed retreat, the circumstances under which managed retreat has been implemented is considerably different than in the UK and in New Zealand.

Managed retreat is a government intervention that is closely related to the problematizations discussed above. As the problematizations are different in each of the three countries, the concept of managed retreat has also developed differently. In this section I am interested in some of the rationalities behind managed retreat and the way government agencies, planners and scientists develop and frame their approaches of managed retreat. As the concept has changed significantly over the past decades, and still is, I propose to understand managed retreat as a *government program in the making*, as it transports ideas and norms about attempts to govern people and coastal environments in relation to the aforementioned problematizations.

Set-backs, Rückdeichung, and managed realignment: a short history of concepts

Much of the literature on managed retreat originates in the UK (Rupp-Armstrong and Nicholls 2007: 1419), where in the early 1990s conservationists and scientists started experimenting with the breaching of dikes, and the restoration of intertidal habitats. The first project was situated on Northey Island in the Blackwater River estuary. The scheme was only 1ha in size, and the embankment was removed in 1991. This pioneering project was followed by two larger sites at Tollesbury and Orplands, where an intertidal area of 20ha was restored in 1995. All three sites are situated on

the UK's east coast (Grant n.d.). Initially, the Northey Island project was called a set-back, and only some years later termed managed retreat (Institute of Estuarine and Coastal Studies 1992; Pethick 1993). In the early 1990s, some defense structures in the UK, especially in rural areas were "reaching the end of their design life", and they only provided "little more than the minimum standard of defence" (Brooke 1992: 151). However, the idea of giving back land to the sea was highly contested in the UK. "In the early 1990s notions that we should (or could) give up land to the sea were an anathema to many, especially in the field of engineering" (Doody 2004: 135). The coastal scientist John Pethick said:

The public perception of a policy for the restoration of reclaimed intertidal areas may be summed up in the words of a former Government Environment Minister, who publicly stated that "not one square foot of England will be given back to our old and implacable enemy the sea!" (Pethick 2002: 436)

The proponents of an alternative approach to coastal management argued that the maintenance of dikes in rural areas was economically not feasible in the long-term, and they had growing concerns about environmental degradation of coastal habitats, especially in estuaries. In one of the earliest documents about managed retreat that was published in the UK, the environmental consultant Jan Brooke (1992) referred to the first publication of the recently founded IPCC. She argued that the projected sea level rise may aggravate the coastal defense issues in the UK, and more urgently poses the question "whether the country should continue to defend areas of agricultural land which currently have little or no national economic value" (ibid: 151).

Brooke showed that for most of the 20th century until the 1980s, a lot of effort had been invested in the intensification of agricultural productivity and the extension of agricultural land. This had led to massive land claims, especially in the estuaries, where intertidal marshland was transformed into arable land. This expansion of arable land had resulted in a loss of intertidal land, and a massive extension of rural dikes. However, in the 1980s, due to the rise in agricultural productivity there was less pressure on this land, and even a decrease in value of agricultural land had occurred.

Brooke pointed out that up until then, the profit of the agricultural production had justified a continued maintenance of rural dikes that protected agricultural land. However, by the mid-1980s, this had changed and the economic interest in the maintenance of rural dikes was diminished (ibid). This change in perception of the value of agricultural land was also reflected in one of the earliest government publications about managed retreat. In 1992, the Department of the Environment (UK) states in a *Planning policy guidance*:

In low-lying, undeveloped coastal areas, options for coastal defence may include a policy of managed retreat. In such areas it should not be presumed that it will be economically justified to maintain the existing coastal defence. Planning policies should take this into account. It may be appropriate to restrict development in such areas pending decisions on coastal defence, so that options remain open. (Department of the Environment, UK 1992: n.p.)

The Department advised local government agencies that for rural areas a managed retreat option should be considered, as it was not “economically justified” to maintain the defense structures. At the time, it was increasingly argued that the expenditures for the maintenance of coastal defenses had to be related to the value of the land that it protected (House of Commons, Environment Committee, UK 1992: 77). Because of the high costs for the construction and maintenance of defense structures, it was increasingly scrutinized whether the protected land was economically worth the protection. This led some planners to the conclusion that peripheral agricultural land that was once claimed from the sea should not necessarily be protected, and that a managed retreat option should be considered.

This view coincided with efforts from conservationists and scientists interested in the recreation of salt-marshes and the expansion of intertidal habitat that had previously been lost due to human intervention and was increasingly threatened by sea level rise. For decades, there had been “so-called unmanaged retreat sites” (Pethick 2002: 434), which were „sites where flood embankments have broken through during storms or due to lack of maintenance and where intertidal areas have, therefore, been

restored to tidal conditions" (ibid). In some cases, the defense structures were not repaired, the breach was left open, and the flooded area was left to the forces of the tides. Some of these sites were then studied (Burd 1995: 6), and these sites made conservationists, ecologists, and coastal scientists interested in the potential of human-induced restorations of intertidal habitats.

Natural or unmanaged retreat is not unknown in the UK. In parts of East Anglia, for example, flood defences have failed and agricultural production has effectively been abandoned. In some cases, natural processes have created a habitat of substantial environmental interest. (Brooke 1992: 152)

Brooke gives an example of Suffolk, where since 1902 several flood defenses had failed and where a large area of grazing marsh was transformed into intertidal mudflats. "The site has become extremely important for nature conservation, being notified as a Site of Special Scientific Interest (SSSI) and designated under the terms of the Ramsar Convention" (ibid). This interest for ecological developments in areas that were unintentionally transformed from agricultural land into intertidal land still plays an important role today. The first managed retreat schemes in the UK were then also experiments as to how the process of inundation and ecological restoration could be optimized, as in some instances the natural process of an unmanaged retreat would not yield the envisioned outcome.

Brooke cautions that an unmanaged retreat would not automatically lead to an "interesting" site, referring to cases where dikes breached by non-human forces would not initiate significant "ecological gain". She argues that the "development of interesting sites such as these [with high ecological value] should not, however, be regarded as 'automatic'" (ibid), and explains:

If the level of the land relative to sea is too low, a sub-tidal habitat might develop where a salt-marsh or mudflat would be considered to be of greater ecologic value. Elevation is therefore one of a number of important parameters which play a role in determining whether or not the resource that develops following failure is likely to be of particular

significance. If the creation of an environmentally desirable habitat is to be promoted, these parameters must be identified and carefully controlled. (ibid)

Inherent in these considerations are assumptions and desires to create an environment that resembles an ideal that can be found elsewhere. It is argued that the creation of a sub-tidal habitat is of less ecological value than an intertidal habitat such as a salt-marsh or a mudflat, as these types of habitat would occur on an unaltered coastline in these particular locations. It is implied that the elevation of the land determines the frequency of submergence with salt water, and thus has a significant impact on the development of different types of vegetation and habitats. In the first managed retreat scheme on Northey Island, the *Institute of Estuarine and Coastal Studies (IECS)* of the University of Hull conducted detailed studies and monitor programs of sediment movement, topographical as well as hydrological changes over time, and of the development of a creek system at the study site (Institute of Estuarine and Coastal Studies 1992). Based on these studies, the notion of *managing* the sites became even more important, as they revealed that several centimeters of difference in elevation could have a significant impact on the way an intertidal landscape would develop. Since then, the impact of elevation has been studied further, and other parameters have also been introduced as important, such as soil characteristics, the local wave regime, site history, tidal prism, sediment budget and others (ComCoast 2007: 8). In the German case of the polder opening in Langwarden, these parameters have also played an important role and will be examined further in chapter seven.

In the early 1990s, the technique of breaching a dike and deliberately allowing the tide to flood the protected area were "largely experimental" (Burd 1995: 6). Notably, the usage of the terminology in the monitoring reports by the ICES published from 1991 until 1996 slowly changed: the initially used term set-back was replaced by managed retreat. The second report was called the "Northey Island set-back scheme" (Institute of Estuarine and Coastal Studies 1992: 1), and by the time the sixth report was published, the terminology had changed to "managed retreat" (Institute of Estuarine and Coastal Studies 1996: 1), and the term set-back had disappeared. This replacement of terminology went hand in hand with the development of more

sophisticated monitoring programs and management concepts of these sites, more scientific knowledge generation, and the idea that this newly developed concept could also be applied to other sites. By the late-1990s, managed retreat had transformed from an experiment into *a government program in the making*.

The shift in terminology is not only a replacement of “a pejorative phrase” (Pethick 2002: 431), but it marks the development and sophistication of a scientific-political program that would soon be applied and implemented widely, and in much larger size, throughout the UK. One step in the progression of the managed retreat concept was the publication of *Managed retreat: A practical guide* by Fiona Burd (1995). In this widely quoted brochure, the author provided the first guidance manual for the implementation of managed retreat and built on the gathered field data and experiences from managed retreat sites that had been implemented since 1991. This publication aggregated and synthesized data and experiences and provided recommendations for the implementation of future managed retreat schemes.

Since the mid-1990s, the UK has become a frontrunner in scientific research on managed retreat, as well as in the realization of managed retreat projects. The number of sites has grown significantly. In 2015, 64 managed retreat schemes were implemented in the UK (ABPmer 2015: 1), with no other country having a comparably high number of sites. At the same time, the sites have become larger. Whereas the first sites were only some hectare in size, the last schemes that were implemented were 183ha in Medmerry (McGrath 2013) and up to 670ha on Wallasea Island (Davies 2015). Colin Scott, employee at the environmental consultancy ABPmer in Southampton, sees two reasons for this development: “In part, this is because they are driven by a need to create sufficient areas of compensatory habitat but also because the lessons learned from past schemes have given coastal managers greater confidence in the requirements for, and efficacy of, this approach” (Scott 2007: 2–3). Over time, and especially with respect to the EU Habitats directive and Birds directive, the UK was increasingly obliged to recreate intertidal habitat as a compensation for infrastructure projects. With respect to the Wallasea Island project, Scott explains that the project’s aim was

to provide compensatory habitat following port developments at Fagbury Flats (Port of Felixstowe) and Lappel Bank (Port of Sheerness) undertaken in 1988 and 1994 respectively. Subsequent legal action by the RSPB relating to the process for notifying habitat under the EC Birds Directive (79/409/EEC) led to a judgement against the UK Government by the European Court of Justice in 1996 (C-44/96) and an ongoing threat of infraction proceedings and fines if compensation was not provided. (ibid: 4)

As we will see in chapter seven, the obligation for environmental compensation is a key driver for managed retreat in Germany as well. Next to the growing need for compensation areas, Scott argued that the schemes also increased in size because planners had greater confidence in the efficacy of the schemes. Interestingly though, Scott found out that the increase in size of the realized projects over time did not lead to effects of economies of scales, which would mean a relative decrease in costs. Scott states that the larger schemes have even led to higher unit costs (ABPmer 2015: 3). He indicates that reasons were the “rapidly rising land values”, and “greater costs [that are] being incurred for associated licensing, assessment, engineering and mitigation requirements” (ibid: 2).

The professionalization that came with many new sites and an increase in size coincided with a general shift in how managed retreat was being framed. By the late 1990s and early 2000s, the term managed retreat was replaced by managed realignment, at least in the UK (Defra 2001), and the concept developed further. A comparison and narrow interpretation of two definitions of managed realignment is elucidating, because it shows in how far the complexity and conceptual depth of the strategy has increased from the 2000s up until today. In the publication *Coastal and estuarine managed realignment – design issues* from 2004, Leggett et al. defined managed realignment as “the deliberate process of altering flood defences to allow flooding of a presently defended area” (Leggett et al. 2004: 23). Whereas this definition is rather descriptive, a definition by Esteves from 2014 is more complex:

Managed realignment is a relatively new soft engineering approach aiming to maximise environmental and socio-economic benefits by creating space for coastal habitats to develop. The natural adaptive capacity of coastal habitats (i.e. the ability to dynamically adjust to changing environmental conditions) and the ecosystem services they provide (...) are key to the concept of managed realignment. (Esteves 2014b: 2–4)

Managed realignment has now become a complex strategy interwoven with economic considerations and a particular view of coastal natures and their adaptive capacities. Managed realignment is about a maximization of environmental and socio-economic benefits. Another important point is the introduced idea of an adaptive capacity of coastal habitats that must be harnessed to provide benefits and services. Coastal environments are described as adaptive, dynamic and changing. This dynamic is now less seen as a problem, but more perceived as a chance. Esteves argues that managed realignment promotes a sustainable coastline “by creating opportunities for the realization of the wider benefits provided by the natural adaptive capacity of coastlines that are allowed to respond more dynamically to environmental change” (Esteves 2014c: 28). Here again, managed realignment is seen as a strategy that provides space for a natural coastal dynamic to unfold and to be able to realize its adaptive capacity. The way the state or any statutory agency is involved in realizing these coastal transformations are not explicitly developed any further. What is added to the definition, though, is the notion of *managing* the managed realignment, which “refers to take purposefully actions, to plan, implement and monitor projects” (ibid). This implies a technocratic approach where particular knowledge is favored in order to plan for, set the targets, and assess the success of a project. The benefits that the coastal ecosystems provide are conceptualized as ecosystem services. These services would be enhanced with managed realignment and a more natural coastline. They are, among others: “Food provision”, “water quality regulation”, “coastal protection”, “climate and weather regulation”, “symbolic and aesthetic values” as well as “recreation and tourism” (Esteves 2014b: 15). This conceptualization of coastal environments providing ecosystem services is common today, as is the policy of

managed realignment. More than 25 years after the first set-back scheme was initiated, managed realignment is a widely promoted and implemented policy in the UK.

Interestingly though, with the rebranding of managed retreat to managed realignment the debate in the UK is also narrowly focused on the realignment of dikes in rural areas, and the restoration of intertidal land. The term managed realignment eclipses any debate about the relocation of houses and private property at risk from erosion, which is also a pressing issue, especially on the cliff coast in East Anglia (Barkham 2014). This is relevant because in the literature there is a bias towards rural and tide-dominated coastlines, and the relocation of private property is deemed to be “not feasible (...) because of the high capital losses involved” (Healy and Soomere 2008: 456). Similarly, Peter French contended that a relocation of a dike is less difficult to implement than the relocation of property (French 2001: 273).

As we will see in chapter three as well as in chapter seven, the situation in Germany shares some aspects of the debate, as some conservation agencies and scientists problematize coastal squeeze, the environmental degradation of coastal habitats, as well as the looming risks of climate change and sea level rise. However, due to a much shorter coastline and massive public spending on the maintenance and strengthening of the main dike line since the 1950s, the situation is different. The government does not endorse managed retreat in any way and the official policy is holding and defending the current line of defense. The term managed retreat itself, as well as the translated form, is uncommon in Germany. However, the term *Ausdeichen* or *Rückdeichen*, meaning “outbanking” (Common Wadden Sea Secretariat 2010: 19), has been in use for long time.

Despite the general neglect of managed retreat as a policy option in Germany, there have been about a dozen projects realized on the German North Sea coast since the early 1990s (ABPmer 2018). The first project was the *Salzwiesenprojekt Wurster Küste* (Salt-marsh project Wurster coast), situated between Bremerhaven and Cuxhaven. The project’s name does not speak about retreat, set-back or outbanking, but it features as a salt-marsh project. One reason was that the project was realized as a regulated tidal exchange, which involves the construction of a sluice in the dike that

allows the tidal waters to enter the area. A regulated tidal exchange is thus one particular technique of managed retreat, which does not involve a breach or complete removal of the defense structure, but rather a controlled inlet of salt-water through the sea defense (Esteves 2014c: 25). Another reason was that the goal of this pioneering project was less a relocation of the existing line of defense further landwards, but rather to investigate the transformation from an agriculturally used area to a brackish habitat, as well as to test a range of management forms with different intensity of usage, such as different intensity of grazing as well as mowing (Rachor 2003). The project was driven by different conservation agencies and the county, and another aim was to investigate potential solutions for the conflict field of coastal protection and conservation interests, as well as options for a sustainable usage of salt-marshes for grazing (Ahlhorn and Kunz 2002a: 47). The project was intensively monitored, and since then, other managed realignment projects followed. One large project was situated on the barrier island Langeoog, where in 2004 a summerdike was breached and the polder area of 218ha was reconnected to the intertidal space. The summerdike was initially constructed in the 1930s and had since then held off most of the tidal action. The scheme was accompanied by a research project that aimed to monitor the botanic and sedimentological changes, as well as geochemical and physical processes in the ground (Barkowski and Freund 2006). Some of the methodology, which was then also used in the Langwarder Groden project that was studied more in detail for this work, will be examined in chapter seven. Here again, the terminology in German is not similar to managed retreat or managed realignment, but the emphasis is on renaturation and restoration of a salt-marsh in a summer polder (*Renaturierung des Langeooger Sommerpolders*) (ibid). In general, the German projects were more driven by science and conservation interests, and less by the consideration to replace disintegrating dikes that only protected less valued agricultural land. The need for managed retreat was less driven by economic considerations, which was highly relevant in the UK as we have seen above.

In New Zealand there have been a range of cases where “retreat has been forced on individuals of communities by coastal processes” (Turbott and Stewart 2006: 16). In these cases, houses, roads and urban infrastructures had to be abandoned, were

destroyed or relocated further inland. A considerable number of people have lost their land or their houses due to erosion or inundation, and there has established an industry of house and building movers (just two examples are <https://centralhousemovers.nz/>, and <https://brittons.co.nz>). Also, in Muriwai near Auckland, a parking lot has been relocated further inland, and on the Kāpiti Coast, 13 New Zealand railway houses were removed in the early 1980s, as they were expected to be affected by erosion (de Lange n.d.: 24). However, despite these examples of occasional relocation, or loss of houses and infrastructures, managed retreat has not become a seriously considered policy option until the 2000s. Important publications for the shift towards risk-based management and managed retreat were the Guidance manual by the Ministry for the Environment (2008), as well as the second New Zealand Coastal Policy Statement (Department of Conservation 2010). Especially the Coastal Policy Statement introduced managed retreat into the legal framework of resource management and spatial planning. This is not to say that managed retreat has not been debated among coastal planners and scientists before (Jacobson 2004; Turbott and Stewart 2006; Healy and Soomere 2008). However, even in 2008, the Ministry for Environment said:

At present, relocation of properties tends to occur on a case-by-case, occasional basis, with no council having yet developed a district or region-wide strategic approach to reducing coastal hazard risk this way. (Ministry for the Environment 2008: 70)

The terminology of managed retreat has been part of national legislation for about a decade now. However, so far, no case has appeared where larger numbers of properties have been relocated, even though several Councils have tried to implement a managed retreat approach, such as on the Kāpiti Coast, in Hawke's Bay, and in Christchurch. Opposition from property owners was fierce and have led the Councils to rework their strategy. I will detail the conflict on the Kāpiti Coast further in chapter six. As the term managed retreat is being used in New Zealand today, it has a different meaning than it used to have in the mid-1990s in the UK, even though the term has traveled from the UK context to New Zealand. Whereas in the UK managed retreat was

about the breaching of dikes and the deliberate flooding of agricultural areas, in New Zealand the term has been used in relation to properties and infrastructure at risk from erosion. This transformation of terminology is accompanied by the replacement of managed retreat with managed realignment in the UK, which mainly stands for the relocation of dikes in low-lying areas.

One important difference is that in Germany as well as in the UK private property has not been involved in the implementation of a scheme. Managed retreat has not involved the relocation of private property, and most cases were implemented on public land. In New Zealand, by contrast, managed retreat would always involve the relocation of private property, as it is this particular aspect where most problematizations focus on. In short, managed retreat schemes in Germany have been implemented, but the state authorities do not talk about them. In New Zealand by contrast there is a lot of contentious talk about managed retreat, and national legislation prescribes managed retreat in risky circumstances. However, so far there has only been a small number of houses being relocated, and managed retreat is not a widely implemented policy. In the UK the terminology has changed from managed retreat to managed realignment, and there is a narrow reading of the concept and a bias towards the restoration of intertidal habitat.

Managed retreat as a broad category

The previous discussion leaves open the question of how to understand managed retreat in this work. I propose a rather broad understanding of managed retreat as a term that encompasses many different governmental approaches of transforming the usage of coastal areas, considering a range of ecological, economic, social, and political problematizations. I will speak of managed retreat as a concept, and a discourse, but also a strategy of socio-environmental government, or a program of intervention. Building on the notion of government developed by Foucault (2007, 2008), I intend to circumvent a simplistic narrative that would portray managed retreat as a planning policy brought forward by the state, but rather analyze the way particular phenomena emerge as problematic, are being ordered and systematized, and how they are seen to be solved. By emphasizing different aspects, I intend to portray the

complex realities surrounding the current transformations of coastal spaces. Only speaking of managed retreat as a planning policy would neglect the variety of power struggles regarding scientific methodology, questions of property, as well as participation, and it would imply an easy and self-explanatory applicability of a policy to a range of socionatural phenomena. It would also suggest the state as the sole driver for a managed retreat strategy, which it clearly is not, as we will see in the chapter on the German case. Managed retreat is not a politically neutral response to an obvious problem, but both the problem and the response should be analyzed in a larger matrix of power relations, competing descriptions of the world, and their associated body of knowledges and tactics of government.

By developing a rather broad approach of managed retreat I am less interested in definitional particularities that concern the morphology of the coast, or the concrete processes of engineering. Terms such as regulated tidal exchange, micro-retreat, backstop wall, dike realignment, breach, development setbacks, and others are important for specifying the way a managed retreat scheme is being implemented. But my approach to managed retreat rather emphasizes what Silvia Bruzzone has termed the “anthropologically interesting practice” (Bruzzone 2013: 2002) of deliberately transforming the coastal realm due to specific problematizations, and according to concrete utopian norms and ideals. Managed retreat is then a deliberate and planned form of spatial transformation that is related to an increased influence of state regulation, and that develops strategies to work on the future, by changing the spatial arrangement of people and things. The notion of working on the future is evoked in many policy plans, particularly in New Zealand. The Ministry for the Environment (2009) published a report entitled *Preparing for coastal change: A guide for local government in New Zealand*, and the Parliamentary Commissioner for the Environment (2015) released *Preparing New Zealand for rising seas: Certainty and uncertainty*. On the Kāpiti Coast, a document was entitled *Kāpiti Coast: Choosing futures. Coastal Strategy* (KCDC 2006).

Such an approach emphasizes the similarities, rather than the differences, between managed retreat projects in Germany, New Zealand and the UK, and points out that many government agencies around the world have started to develop concepts for an

alternative way of coastal government and advanced the notion of managed retreat over the past three decades. Instead of highlighting the conceptual differences between the application in Germany, New Zealand and the UK, I rather want to point out the peculiarity of government agencies reverting common coastal management strategies such as hard engineering and hold-the-line. Another goal of a broad definition is to be able to put the practices of summer polder openings in Germany in connection with the discussions about devaluation in hazard zones in New Zealand. It allows me to put two quite different processes into perspective and in comparison. In short, despite the conceptual differences between managed retreat, managed realignment, the restoration of intertidal habitat and salt-marshes, and the hazard risk assessment and building provisions for a line of beachfront properties, I propose to understand and analyze these practices together under the category of managed retreat, in order to understand how and why state agencies, planners, and other actors are eager to transform the government of coastal areas.

This immediately is tied to another important point, which is the increased “statization” in coastal areas. Statization is a term that can be defined “as the intensification of the symbolic presence of the state across all kinds of social practices and relations” (Painter 2006: 758). Over the past decades, the state has increasingly been involved in the management of coastal areas, but with managed retreat this presence reaches a new level, as state agencies put more emphasis on predictive studies, risk surveying, regulatory activities, and preemptive planning.

Decision makers and communities world-wide are familiar with paying for the ‘victims’ of climatic disasters, and systems are largely in place to do that after the ‘fact’. There is less familiarity with anticipatory planning that is dynamic in nature and which can operate and implement transformative change where deep uncertainty exists. (Lawrence et al. 2018: 101)

Managed retreat is still a *government program in the making*. It works with a range of concepts such as economic and environmental projections, hydrodynamic models of coastal processes, cost-benefit analyses, risk assessments and other tools that are meant to generate data about environmental and socio-economic processes and

future development scenarios under uncertain conditions. These tools are increasingly important for state agencies in their decision-making process, and in the legitimization of their practices.

On a conceptual level, managed retreat is indeed a break with conventional coastal management approaches, but in reality, it often goes hand in hand with hard engineering. In the literature, managed retreat is contrasted with conventional strategies such as hold-the-line and hard engineering, and it is described as a new approach in coastal management and soft engineering (French 2006; Esteves 2014b: 2). I argue that managed retreat is not new in the sense that it replaces a common regime of practices, but rather adds a level of complexity to the wide range of management options. Hard engineering is still the most prevalent way of combatting erosion and flooding. It is no exaggeration to say that the armoring of the world's coasts is under full speed. At present, several unprecedented engineering projects are underway, such as a 400km long seawall in Japan (Stone 2015), or the planning for an entire new waterfront district in the sea to defend Jakarta from flooding (Sherwell 2016). But also in Germany, large parts of the dikes are currently being strengthened (NLWKN 2010). And these are just some examples from coastal engineering projects worldwide. Importantly, managed retreat often goes hand in hand with hard engineering. In many instances, such as the Langwarder Groden in Germany and the Medmerry project in the UK, the opening of polders is preceded with large scale upgrades or new developments of hard engineering structures. In Medmerry, a large new dike was built, and in Langwarder Groden the existing dike was considerably strengthened. In most cases, managed retreat is accompanied by hard engineering and thus should not be seen as a strategy necessarily opposing it. Instead of completely replacing the hard engineering paradigm, it rather adds a layer of complexity to the existing regime of practices. Moreover, the envisioned natural dynamic of the project is spatially confined to a certain area, whereas other adjacent parts of the coast are kept under the traditional regime of practice.

3. Situating the case studies – managed retreat in Germany and New Zealand

In this chapter I will provide a more nuanced view on the two countries that have played a central role for this study. For Germany and New Zealand, I am interested in the historical and cultural context in which managed retreat has developed. I will discuss the way managed retreat has been debated and implemented, as well as the role of the state in coastal management more general. I am interested in the institutions that have developed, as well as the predominant defense strategies and coastal management strategies that are in place.

3.1 New Zealand – The iconic coast, rising property prizes, and a fear of loss

The coast plays a central role in the imagination of New Zealand as a nation. There are numerous authors who organize their narratives about New Zealand by invoking its coastal characteristics. Peart (2009: 52) claims that “New Zealanders are largely a coastal people”, Hayward (2008: 47) maintains that New Zealand is a “small country with a big coastal ‘attitude’”. Collins and Kearns (2008: 2916) say that New Zealand “is a strongly coastal nation”, not only because it has a coastline that is almost 20000km in length, but also because “five of its six largest urban regions are coastal, and the beach features prominently in national identity and culture.” Especially in the second part of the 20th century, the beach has become an important place for recreation, which in turn “has also fueled demand for staying at the beach – for opportunities to reside at coastal locations, either as a camper or as a ‘bach’-owner” (ibid). Countless narratives constitute the notion of New Zealand having a special beach culture, mostly originating in the post-war era that was marked by national prosperity and economic and urban growth. The affordable and relatively modest beach house, also called bach or crib, plays an important part in those narratives, and is being fed by countless holidays and encounters that evolved around BBQ, surfing, fishing and other recreational activities on the beach (Peart 2009: 52–92).

Even though many people still practice the Kiwi lifestyle of spending holidays in the beach house and on the campsite, there is a growing tension that stems from urban developments in coastal areas, as well as rising property prices.

There is currently widespread public anxiety in New Zealand about coastal property. Underpinning this concern is a perception that coastal landscapes imagined as public, democratic, and relatively unspoiled are being transformed into elite and privatized spaces with a heavy human imprint. This is due primarily to residential housing development. (Collins and Kearns 2008: 2914).

Due to increased property prices and growing pressure for redevelopment, it is less affordable for a growing proportion of people to own a beach house. In many places the simple and modest baches were replaced with larger, more luxurious and expensive beach houses. When in the past owning a beach house was relatively affordable, this dream has vanished for many people, which results in a diffuse feeling of loss. Increased demands for property close to the beach have led to constant redevelopment and upgrading of the building stock to profit from the rise in land prices. As Collins and Kearns (2008: 2917) have shown, in six coastal settlements the median sales prices have increased between 125% and 240% in the years from 1999 to 2004. Other data shows that between 2001 and 2006, the national median house sales prices increased by 74%. This is to say that on top of the general high increase in sales prices nationally, the prices for coastal settlements have risen even faster. After a downturn during the financial crisis in 2008, the years after 2010 witnessed a repeated rise in prices. And even when in 2018 some sources claim that "New Zealand's house price boom is over" (Global Property Guide 2018), private property is still expensive, and prices for beachfront properties are at a very high level.

Anxiety about not being able to afford to own a beach house, or even to spend holidays on the coast, is paired with a general feeling of unease about a degradation of the coastal environment due to urban development and seawalls, as well as the prospects of climate change and sea level rise. This is to say that coastal erosion and the effects of urban development are a much stronger and widely spread public

concern nowadays than they were in the past. The relation of urban development, engineering structures and loss of natural character beaches are a common topic in the media. The article *Fears beaches could vanish forever* (White 2017) in the Hawke's Bay Today, *The good, the bad and the ugly* (Peart 2014) in the New Zealand Herald, and *Homes at mercy of the ocean* (Rilkoff 2014) in the Taranaki Daily News, are just some examples of recent media articles that speak about different developments and how they are concerning the local population. It is argued that common housing developments drastically alter the feel of the coast as they visually impair the otherwise "unspoilt coastline" (Peart 2014: n.p.). It is argued that housing developments should stay further back from the coast and should be fitted in the coastal topography.

New Zealand has a recent history of massive environmental change. The landscape had already been transformed by Maori, but deforestation, urbanization and other land use changes have drastically increased after the colonization of white settlers and amplified farming activities in the 20th century. The transformation of the environment in New Zealand happened at a remarkable speed and scope: it took less than 1 million people only about seventy years to clear an area almost as large as Great Britain, and convert the forest into pasture and agriculture land (Peart 2009: 45). Next to the forest clearings, another massive environmental change was the transformation of wetlands.

Around 90 percent of wetlands nationwide (both inland and on the coast) have been destroyed. This is a very high proportion when compared to the 60 percent thought to be lost in the much more densely populated Netherlands and United Kingdom and only 10 percent of wetlands lost in France. (ibid: 48)

Another crucial transformation in coastal areas was the modification of coastal dunes in the 19th and 20th century. After an initial deforestation of the dune areas that led to lose sand covering agricultural fields and settlements, much effort was invested in stabilizing the dunes with replantation of marram grass. Other modifications resulted from extensive sand mining and urban developments (ibid: 48–50). As a result, current estimates say that "less than 10 percent of the country's sand perimeter now resembles anything like its original state. (...) Pristine examples of dunes can now be

found only in remote areas such as Spirits Bay in the Far North and on Stewart Island” (ibid: 51). As a concluding remark, Peart argues:

Seven hundred or so years after humans first set foot in the country, very little of New Zealand’s coast could be classified as pristine. The coast has undergone profound transformation during the successive waves of human exploitation and settlement. The original forest cover and wetland habitats have largely disappeared, being replaced by pasture and urban development. Most dune systems and estuarine areas have been significantly modified. (ibid)

Despite these changes, the “natural character” (Auckland Regional Council 2000: 1) of the coast is still something many people highly value (Dahm 2002), and it is also a characteristic that government agencies set out as a condition to be worth protecting. It is therefore helpful to understand concepts such as natural character and the pristine coast as flexible categories that are being adapted to advance an argument and to reinforce an interest. These concepts are relative terms that do not speak about an absolute condition of a system or landscape, but rather are normative assertions that imply a particular idea about how the coast should look like and how it should be used. In that sense they are closely connected to ideas about an ideal government of people, the built environment, and coastal processes. Even though these landscapes have already been highly modified, the natural character is an ideal that is being invoked to prevent new developments.

The environmental changes depicted above were closely related to the ongoing urbanization, which in New Zealand mainly took place in coastal locations. For most of the 20th century, there were little or no restrictions on the positioning of houses built on the coast. Once public land was set free for subdivision, such as between 1906 and 1923 between Paekakariki and Waikenae on the Kāpiti Coast, the foredunes were removed and the houses were built as close as possible to the beach. In case of signs of erosion, railway iron seawalls were installed and eventually upgraded with wooden walls (Gibb 1978). The urbanization of the coast has happened mainly in two phases, the first starting after the Second World War, and the second, even more intense,

starting in the 1990s, which “lasted for more than a decade until the financial and property markets fell into recession in the late 2000s” (Peart 2009: 92). These urban developments involved the construction of basic infrastructures such as roads, sewerage systems, water supply, the modification of dunes etc. Moreover, the urbanization also entailed the construction of coastal protection structures. Peart showed the extent and magnitude of these human built structures. For the Wellington Region alone there are currently “1038 coastal structures along the coastline, including 362 stormwater outfalls, 239 boat ramps and boatsheds, 228 seawalls and 17 sewer outfalls” (ibid: 44–45). This extent of human modification of the coastal environment has on the one hand brought convenience and comfort, but on the other hand it has been criticized for destroying the very reason why the beach has been so popular in New Zealand culture. Human-made structures are increasingly regarded as alien elements in the coastal environment. This argument will be explored further in chapter six.

Management of the coast today

In New Zealand the Resource Management Act (RMA), which has been in effect since 1991, forms the central legal framework for environmental and resource management. It aims at a sustainable management of the environment and natural resources. With the RMA, many political responsibilities were devolved from central government to Regional and District Councils.

Within this institutional framework, local government makes decisions on land-use activities, natural hazard management, infrastructure and urban development. The locus of functions and power between central and local government has evolved from a highly centralised management regime with significant funding transfers from central government for flood and coastal protection up to the early 1990s, to the current highly devolved regime based on the subsidiarity principle (Lawrence et al. 2013: 5–6)

District Councils are responsible for land-use planning, subdivisions and zoning, as well as hazard management and resource consents, and would thereby also be mainly responsible for the implementation of a managed retreat approach. Under the RMA

there is a hierarchy of responsibilities. The RMA requires central government to provide guidance with respect to climate change, as well as a statutory Coastal Policy Statement that provides objectives and policies for the government of the coastal environment, the New Zealand Coastal Policy Statement (NZCPS). Regional and District Councils then “are responsible for regional policy, regional plans, district plans and resource consents which operationalise those policies” (Rouse et al. 2017: 185).

Under the RMA, the Department of Conservation (DOC) is responsible for “national policy leadership in the coastal environment” (ibid: 186). The DOC has published the first NZCPS in 1994, which clarified that Regional and Local Councils should “recognise the possibility of a rise in sea level, and should identify areas which would as a consequence be subject to erosion or inundation” (Department of Conservation 1994: 9). However, this Policy Statement did not build on a risk-framework for the government of the coastal environment, and it did not elaborate on or propose a managed retreat strategy. By contrast, the reworked NZCPS published in 2010 prescribes in objective 5 that coastal hazard risks should be managed by “locating new development away from areas prone to such risks”, and “considering responses, including managed retreat, for existing development in this situation”, as well as “protecting or restoring natural defences to coastal hazards” (Department of Conservation 2010: 10). In Policy 24, 25, and 27, more detail is given about the “Identification of coastal hazards”, and the “Subdivision, use, and development in areas of coastal hazard risk”, as well as “Strategies for protecting significant existing development from coastal hazard risk” (ibid: 23–24). With the NZCPS 2010, managed retreat has found its way into the legal framework in New Zealand.

Lawrence et al. say that this political framework “has created potential for councils to become more proactive in adapting to climate changes.” However, they argue that “progress across scales of government has been slow in identifying the effects of climate change nationally or locally, or in developing adaptive responses to them”, which they explain mainly with “the slow 10-year cycle of plan reviews” (Lawrence et al. 2013: 6). As the main planning tool for District Councils is the District plan, which is to be reviewed every 10 years, but which is sometimes delayed, the uptake of new climate change legislation is rather slow. The authors further explain that those

Councils that had reviewed their District Plans prior to the NZCPS 2010 were not obliged to give effect to it until the next review 10 years later.

Moreover, the spatial segmentation of jurisdiction creates different responsibilities for Regional and District Councils, which are divided at the Mean high-water spring mark. This strict boundary is however dynamic and fluid in the coastal environment and thus has created ambiguity and vagueness in the government process. Also, the powers of District Councils are important in delivering coastal hazard management, and they do so mainly through the lengthy process of crafting the District Plan, which is about regulating land use, zoning, and building provisions. However, this has led many Councils throughout the country to all “design its own wheel”, which as a result was regarded as an “inefficient use of their limited resources” (ibid). Other critical points with respect to the coastal hazard management are that District Councilors have an election cycle of 3 years, and it has been questioned whether they are capable of long-term risk management. Another point is that District councils cannot remove existing use rights of privately held land titles, which creates hurdles in the effective management of coastal hazard risk. Both points will be elaborated further in chapter six.

Due to the legal requirements from the NZCPS 2010 as well as a further professionalization of coastal hazard risk management, government agencies have increasingly aggregated scientific expert knowledge on coastal processes either in house, through externally commissioned expert reports, or by the help of a Crown-Research Institute such as the National Institute of Water and Atmospheric Research (NIWA). This is evident in a range of publications from the Department of Conservation (2017), the Ministry for the Environment (2009, 2017a, 2017b), the Parliamentary Commissioner for the Environment (2014, 2015), as well as Regional and District Councils (KCDC 2006, 2010; Waikato Regional Council 2011; Hawkes Bay Regional Council 2014). This is to say that coastal hazard management has been vastly growing in importance for state authorities and planners. But what has been the role of managed retreat in coastal management?

Managed retreat as a long-term strategy of minimizing coastal hazard risks

In New Zealand managed retreat has been a widely discussed topic over the past decade. The conceptualization of managed retreat has also changed slightly over time, whereas the core of most definitions focuses on the reduction of coastal hazard risks through the relocation of property and infrastructures away from the hazard zone, like in this earlier definition:

Managed retreat is a term used to describe the approach that aims to manage hazard situations by shifting assets and activities away from the coastal processes threatening them (...) (Turbott and Stewart 2006: 1)

The common emphasis is on the reduction of the aggregated value of properties and infrastructure assets in the coastal zone that is increasingly regarded as being at risk from coastal hazards. In another definition, the notion is expanded and the practice of preventing new urban developments in coastal hazard areas is also part of the concept (Jacobson 2004: 116). Unlike the way the concept is framed in the UK or in Germany, the emphasis in New Zealand is less on problematizing coastal squeeze, ecological degradation and habitat loss, but rather on the reduction of coastal hazard risks, and the negative effects of seawalls on the aesthetics of the coast. As hazards cannot be stopped, the idea is to reduce values in the hazard zone in order to minimize the risk. Underlying is the idea to separate human values from the destructive forces of the sea, whereby the motivation is mostly economical.

Managed retreat generally implies a long-term, strategic decision to allow the shoreline to migrate inland in response to sea-level rise and attendant erosion, and proactive management of the removal of affected assets, rather than protecting the existing shoreline. This is intended to limit economic costs associated with ongoing and increasing protection, to reduce the risk of protection failures during storm events, to preserve important ecological habitats, and to maintain recreational spaces and visual amenity of the coast. (Reisinger et al. 2015: 293)

Even though Reisinger et al. mention the preservation of ecological habitats, this definition puts more emphasis on the removal of assets, and it is rather an exception among other definitions. In New Zealand, the term managed retreat also includes concepts such as setbacks, which are zonings with building provisions for existing settlements, as well as backstop walls. Thus, managed retreat encompasses more than just the relocation of built structures further inland, but it is a long-term strategy of disinvestment in the hazard zone, which aims at a transformation of the coastal margin. The Department of Conservation explains that managed retreat also involves the construction of a backstop wall, which is a seawall buried in the dunes on the private section of the property owner. The wall provides the security that the house is not immediately at risk from erosion, but it is also mostly not visible and does not impede with the aesthetics of the beach (Department of Conservation 2017: 72). Moreover, the backstop wall is on private land and thus does not influence the access to the public beach. One expert called this approach managed retreat, as it allowed the seawall on the beach to be removed, while at the same time securing control over erosion. The backstop wall is only exposed after a heavy storm, but it will mostly be buried by natural processes again. This approach may in some cases involve a micro-retreat, where a house is relocated on the plot further landwards, in order to install the wall. These micro-retreat projects, as they were realized for example on the Coromandel Peninsular, were negotiated on an individual level with each property owner (Interview with Josh Brown). This shows that managed retreat so far has been a piecemeal endeavor where in each District the Councils, coastal consultants, and planners have worked with property owners individually. In the 2000s, managed retreat was mostly debated for areas that are only sparsely populated and where the property prices are comparably low, e.g. Muriwai or Mokau (Turbott and Stewart 2006). The Kāpiti Coast was the first case where more than 1000 high value properties were affected by a hazard risk assessment.

Coastal protection has never been a completed project in New Zealand. The way local councils have installed seawalls or have consented the construction of seawalls by private investors is quite heterogeneous and sketchy. Managed retreat is not a decidedly coordinated shift in coast management that encompasses the country as a

whole. Managed retreat is also sketchy and incomplete, due to the devolved powers to District Councils and the governance issues mentioned above. Other problems Councils face, and the strong influence of property owners on the political process will be expanded further in chapter six.

3.2 German North Sea coast – Dike security, and the recreation of coastal environments

Even though people have built seawalls and dams in the Far and Middle East for thousands of years, Per Bruun (1972) locates the first durable and still effective coastal protection works in the low countries in northern Central Europe. The coastal region stretching from the southern part of the Netherlands, along the German North Sea coast up to Denmark, has witnessed massive social and environmental transformations over the past millennium, and can arguably be seen as the region with the oldest and continuously existing culture of coastal protection (Bruun 1972; Behre 2008). For thousands of years, the colonization of the coastal lowlands was largely determined by natural circumstances and the transgression and regression of the sea. After several advances and recessions of settlement activities, people were able to start settling in the marshes again around the 8th century, and have since then been able to sustain an ongoing colonization, despite many devastating floods (Brandt 1992).

The coastal lowlands are formed by sand and mud deposits from former ice ages, the sedimentation processes of the large rivers, and the influence of the tides. These processes have formed large intertidal mudflats and salt-marshes, where life for humans was hard and dangerous. The Frisians had first built mounds from clay and mud to protect their settlements from the daily tides and seasonal storm surges. The Dutch pioneer of modern coastal engineering, Johan van Veen (1962: 14–15), provides a vivid description of life in the “soaking wilderness”:

We can imagine the population of a village bearing willow baskets or hand barrows in a long procession, carrying the clay from the marshes into their villages, raising them gradually, throughout 12 centuries, to keep their families, cattle and farms above the level of the highest floods. These

floods seem to have risen higher and higher in the course of a thousand years. There is mud in their baskets, into mud their trudging feet sink, and another kind of mud is used to dry them in the evening. Mud was their fate, since they chose to live permanently on the open marshland near the sea. (ibid)

Life was dominated by the tides, hard physical labor on the fields, and the existential need to improve the defense structures with mud and clay. In the 11th century, people started to build small ring dikes to defend the agricultural land around the mound, which initially were not more than small walls made from clay, the material that was immediately available to them. In the 13th century, in the area that is Lower Saxony today, people were able to link the existing dikes to a larger ring dike that closed off the sea (Behre 1999). This allowed the farmers to expand their agricultural activities, and the natural landscape was more and more transformed into cultivated land. However, it is important to note that this transformation was not only slow and built on many generations of hard physical labor by the farmers, but was also accompanied by tragic storm surges that killed hundreds of thousands of people (van Veen 1962; NLWKN 2007: 42–43).

Today, 85% of the low-lying German North Sea coast is backed by a dike (Sterr 2008: 382). The coastal area is densely populated and for the two states Lower Saxony and Bremen, the dikes protect an area of almost 7000km², in which about 1.7 million people live (NLWKN 2007: 8). The general coastal policy approach is to maintain the current line of protection and enforce all existing dikes. The dikes play an important role in the prevention of flooding, but also in the imagination of the way people have cultivated and gained the land from the sea. There have been many devastating floods over the past centuries, but people have always reclaimed land and built higher dikes. The relationship between humans and the sea has often been described as a "battle":

As a result, there is a strong sense among the North Sea coast population that the sea is a bitter and cruel enemy - this is reflected in its nickname for the sea: "bleak Hans" (Rupp-Armstrong and Nicholls 2007: 1420).

The sea has been considered an enemy for long time, and people have invested hard labor, public and private funds, and sometimes their lives in claiming new lands and constructing the dikes. Over time, there were technological advances that led to more security and stronger belief in the human potential to master the threats from the sea. Today, there is a high professionalization with respect to the maintenance and strengthening of the dikes, the processes are highly institutionalized, and there is a strong belief in the security of the dikes as a means for protecting the land. As one interview partner from the Lower Saxon Wadden Sea National Park Authority told me: "There is a change in the mentality of people, that nature has to be mastered, and there is the ambition that the dike has to be secure. That is expected... People who live in Wilhelmshaven, when there is a storm surge, they are not afraid when they go to bed. They will say 'the dikes are secure. Good night'" (Interview with Frank Willms, Andreas Fischer). As the last devastating flood on the North Sea was in 1962, many people today have no living memory of a dike breach. Moreover, the state agencies suggest safety through their pursued strategy of engineering solutions and the strengthening of the existing dike (Scheve 2017).

The technological evolution of improving the security in coastal areas was mainly achieved through a larger size, and a different shape of the dike. Especially in the second part of the 20th century, the gradient of the slope on the seaward and landward facing side has become less steep. It was found that a flatter dike face is less prone to failure, because the wave energy is dissipated, the face is less susceptible to erosion, and the increased depth of the structure is more likely to hold off the pressure of water. With this technical innovation of a less steep face, as well as an increased mechanization of the construction process, the overall strength of dikes was increased significantly. Today most dikes on the North Sea coast are between 6 and 10 meters high, and often more than 100 meters wide. The public expenses of Lower Saxony to maintain the 610km long dike line is between €60 and 70 million per year (NLWKN 2007: 20). In order to avoid flooding of the land, the dikes must be maintained and must have a similar height. This is constitutionally backed, in Lower Saxony by the Lower Saxony Dike law, and in other states by the Water laws.

Management of coast today

Due to the long history of dike construction, a complex network of institutions, responsibilities, legal duties, and control mechanisms has developed around the maintenance of the dikes. All matters concerning the dike fall in the jurisdiction of the federal states Lower Saxony and Schleswig-Holstein, as well as the city states Bremen and Hamburg along the German North Sea coast. In Lower Saxony alone, which will be focused on in this work, there are 22 dike associations. All property owners who own land that is protected by the dike are compulsory members in a dike association, and they are obliged to pay a levy. The association in turn is responsible for the up keeping of the dike, e.g. in form of a yearly dike inspection (Deichschau), regular clearing works after storm tides, and observational and emergency measures during a storm surge. Most dike associations are old institutions (ibid: 31). The responsibility for constructions and strengthening projects that are more extensive, rests with the *Lower Saxony Water Management, Coastal Defence, and Nature Conservation Agency* (NLWKN), which is a sub-department of the Ministry for Environment. Among other things, the NLWKN is responsible for coastal protection, conservation, and flood control along the rivers. It administers funds for coastal protection works projects, and pools expertise on the construction and design of coastal protection structures.

The NLWKN publishes the *Generalplan Küstenschutz* (Masterplan Coastal Protection), which is the main guidance document for the future upgrading and strengthening of the dikes, revetments, and sluices on the Lower Saxon coastline. The Generalplan provides an overview of different segments of the dike, sorted by the 22 dike associations, and indicates the height and state of the dike, as well as the sections that need upgrading. In Lower Saxony, 125km out of the 610km total length of the dike is currently in need of strengthening, which amounts to an estimated construction cost of €520 million. In Bremen, around 74% of the dikes have to be strengthened, which amounts to €100 million (ibid: 33). The Generalplan is therefore an important planning document as it bundles all information about the height of the dikes, as well as the long-term planning goals. Dike building is an expensive and lengthy operation, and it will take decades to process and strengthen all the dike sections that are earmarked for an upgrading. The first Generalplan was published in 1973, more than

10 years after the devastating flooding on the North Sea coast. A completely revised second edition was then published in 2007, focusing on the mainland, as well as 2010 with a focus on the East Frisian Islands. The state Schleswig-Holstein also prepares a Generalplan (Ministerium für Energiewende, Landwirtschaft, Umwelt und ländliche Räume des Landes Schleswig-Holstein 2013).

The dike associations are responsible of periodically assessing the condition of the dikes. The NLWKN is charged with reassessing and reinforcing the dikes, revetments, and storm surge barriers, for them to meet the mathematically assessed target height. This target height (*Bemessungshöhe*) is worked out and documented in the Generalplan, and represents the summation of several factors, including the highest high tide ever measured, and the expected sea level rise for the next 100 years. The calculation of the target height is complex, and there are several calculation methods (NLWKN 2007: 27). In the current issue of the Generalplan, coastal protection is described as a “vorsorgende Aufgabe” (ibid: 13). This German term implies not only the precautionary approach that is taken, but also the providing task of the state. Coastal protection is thus not only concerned with planning for the future and preventing potential flooding events, but protection efforts are depicted as a fundamental provision of a public service. Further, the document states that coastal protection „is essential for the protection of the livelihood of the people in their living and working environment. The protection against flooding and the necessary measures to provide this safety has highest priority” (ibid, translation JS). Unlike New Zealand or the UK, where coastal protection is a discretionary and not mandatory task for state agencies (Environment Agency n.d.), in Germany the state is bound to maintain and strengthen the protection structures. This is also evident in the Generalplan of Schleswig-Holstein, where a strong notion of the state having to provide public services and basic safety for the integrity of settlements, is transported.

Life and the integrity of people is the highest good in a society. The settlement is the focal point of the residents. Its protection is therefore of central importance for the fulfillment of the basic needs. The protection also needs to be secured if other usages and interests oppose the measures of coastal protection. Any impairment suffered will be

compensated according to law. (Ministerium für Energiewende, Landwirtschaft, Umwelt und ländliche Räume des Landes Schleswig-Holstein 2013: 8, translation JS)

Coastal flood protection and the strengthening of the protection structures has the highest priority. However, coastal protection practices often come in conflict with conservation interests, and as the construction of dikes is an invasive procedure where a lot of material is needed and transported, the conflicts with conservation agencies have been strong. Thereby, a common principle is “As much coastal protection as necessary, as much conservation as possible” (“Soviel Küstenschutz wie nötig, soviel Naturschutz wie möglich”) (Ahlhorn and Kunz 2002a: 60, translation JS). This principle again reaffirms the primacy of coastal protection over conservation. Conservation projects are possible, but only if they do not interfere with or hamper the interests of coastal protection. By contrast, coastal protection measures are always implemented when necessary, but their impact is tried to be mitigated. The oftentimes charged opposition between coastal protection and conservation has admittedly changed significantly over the last decades. However, the general power asymmetry remains. This will be further elaborated in chapter seven, as it is also important for the way managed retreat projects are implemented in Germany.

Managed retreat: Hold-the-line, summerdikes, and restoration

Grasping the issue of managed retreat on the German North Sea coast confronts us with several challenges. First, when we consider the official policy from the authorities in charge of coastal protection, there are no hints of or advocacy for managed retreat. The official policy of coastal management is to hold-the- line of defense, and to strengthen the existing dikes in their current location (NLWKN 2007; Ahlhorn and Bormann 2015). The legitimacy of the hold-the-line policy is backed by an argumentation that people have claimed and diked land for 1000 years, and that this policy builds upon and continues this successful creation of a cultural landscape that provides many people a place to live and work (Scheve 2017). Nevertheless, since the 1990s there have been around a dozen realignment schemes that have been implemented on the North Sea coast (ABPmer 2018). Most cases involved the breach

or removal of a summerdike or foredike, and in some cases a regulated tidal exchange was realized. In all cases the main dike was not realigned, but rather strengthened before the breach occurred. This is to say that the managed retreat projects in Germany have not involved a relocation of the main dike, but rather focused on the restoration of summer polders. Moreover, all the managed retreat schemes implemented in Germany have not questioned the linear defense approach but were rather designed in accordance with a strengthened main dike.

A second important point is that most of these schemes resulted from legally binding compensation requirements that originated in large scale development projects, such as the construction or expansion of ports, the construction of gas pipelines in the Wadden Sea, or dike strengthening measures. Compensation requirements under the Federal Nature Conservation Act (BNatSchG) are key for the legal requirements and implementation of managed retreat projects in Germany. This will be expanded on in chapter seven.

Next to the official policy of hold-the-line and the range of projects that were implemented, there is a third level of complexity that needs to be considered. There are scientists, conservationists, and planners that have formulated alternative ideas about the management of the coast (Markau 2003; Hofstede 2007; Sterr et al. 2008; Michael Otto Stiftung 2010; Reise 2015, 2017). Common problematizations such as coastal squeeze, sediment deficits, rising costs for protection structures, as well as a drowning of the Wadden were already mentioned. Another point of critique is that a linear regime of coastal protection with only one main dike is problematic and should be augmented with additional protection structures further inland. The proposed alternatives vary considerably, but some authors imply a stronger water management behind the dike that would allow salt water to enter the protected area behind the dike through sluices. This area-oriented approach (*flächenhafter Küstenschutz*) (Schwalfenberg 2013) implies a shift from a linear protection regime, where a single dike line protects the low-lying area behind it, towards a spatially diverse area, where additional dike lines further landwards provide additional safety, and salt water is deliberately allowed to enter land that is now closed off. A publication by the Michael Otto Foundation has elaborated on this concept. The authors propose a strategy that

would include adaptation to climate change and sea level rise, and it would allow more water to enter the protected area. This would allow the tidal waters to transport sediment behind the dike, and it is hoped that the marsh behind the dike would grow and decrease the height difference to the foreland (Michael Otto Stiftung 2010: 32–35). This strategy would create new habitat, but also new options for economic activities in tourism, energy production, and a diversified agriculture behind the dike (ibid: 38–45). Overall, the aim is to alleviate the problems that stem from the fixed dike, and prepare the low-lying areas for sea level rise due to a range of different adaptation strategies and an attempt to grow the land with the sea (ibid: 34). This strategy would include a stronger risk-based perspective, as it would move away from the current perspective where the same level of safety is provided for the entire coast, to a more spatially segregated approach, where urban areas are more protected than rural areas (Scheve 2017).

In summary, in Germany the understanding of managed retreat does not imply the relocation of the current line of defense further inland, but rather is about a change in the configuration of defense structures and human usages in the hinterland, and the creation of a lagoon land behind the dike (Michael Otto Stiftung 2010). The current main dike is not part of the discussion to be relocated. Settlements would have to be protected separately, or adjusted to an incoming sea, and agricultural areas would have to be adjusted to a stronger influence of salt water.

4. The government of coastal environments – theoretical considerations

This chapter develops a theoretical framework that aims to grasp the changes in coastal management that come along with managed retreat. As managed retreat involves the spatial allocation and regulation of land use, strategies for urban development, the installation of conservation areas as well as normative ideas about an aesthetic beauty of coastal landscapes, it is closely tied to questions of collective action, administrative procedures, law, public services, and property. Managed retreat comprises a designating, rearranging, and transforming of coastal spaces, and it encompasses the redrawing of borders between areas of natural dynamic and human activity, risky spaces and secure spaces, spaces of desired urban developments and spaces for nature conservation (Haughton and White 2017). As I have shown in the previous part, managed retreat does not just prescribe the spatial relocation of built structures away from the coastline, but it is closely related to a way of seeing and knowing the coast and coastal processes, and normative concepts of how humans should live by the coast.

My argument is that to understand the importance and consequences of managed retreat, it is fundamental to analyze the transformations in the government of coastal spaces, and the role of the state in producing, aggregating, and mediating techno-scientific knowledge. Many publications about managed retreat, as I have detailed them in the previous two chapters, mute questions about power, expert knowledge, and questions about the state, as they either focus on technical, ecological, or financial aspects, without considering who is interested in managed retreat, and how relevant knowledges and truth claims are produced. Questions of agency and counter-action are commonly faded out, and there is a hidden assumption that somehow managed retreat can be or cannot be implemented, depending on the characteristics of the coast and the settlement (Healy and Soomere 2008). However, the way the state is involved in the negotiation and implementation of managed retreat has not been analyzed in any scientific publication so far.

The modern state is commonly associated with the allocation of basic infrastructures, the maintenance of a property regime, the development of new subdivisions as well as the prosperity of the population (Painter 2000: 364). The state is, to different degrees, expected to provide for the well-being of people and the security of their property, either behind the dike or close to the beach. There are many different and, in many ways, conflicting and incommensurable approaches of conceptualizing the state and political power. This chapter reviews some approaches.

4.1 Conceptualizing the state

Many accounts of the state begin on a problematizing note that the state is "difficult to grasp" (Bridge 2014: 118), that it is "notoriously slippery" (Painter 2006: 755), or a "messy concept" (Mann 1984: 187). The state poses a problem of conceptualization, which to some extent might be grounded in a paradox formulated by Bob Jessop (2007b: 7), according to whom the state is only one institutionalized social collective amidst many others, but at the same time has a particular role in that it is "charged with overall responsibility for maintaining the cohesion of the social formation of which it is merely a part" (ibid). The paradoxical location of the state "as both part and whole of society" (ibid) has troubled many state theorists, and is reflected in definitions that see the state as a somehow overarching and in itself powerful sphere that is distinct from society, but at the same time forms a part of society. This problematic conception of the state and society as two separate entities, sometimes described as the "separate sphere assumption" (Painter 2006: 753), will be discussed in the following.

Questions about the nature of the state have a long and complex history. Commonly, the state is characterized either by its institutions or its functions in relation to a specific territory. Michael Mann, following a definition of Max Weber, argues that the state consists of four elements:

- a) a differentiated set of institutions and personnel embodying
- b) centrality in the sense that political relations radiate outwards from a centre to cover
- c) a territorially-demarcated area, over which it exercises

d) a monopoly of authoritative binding rule-making, backed up by a monopoly of the means of physical violence. (Mann 1984: 187–188)

According to this definition, the state is a centralized entity that consists of several specific institutions that hold the control over a defined territory, backed by a monopoly to potentially apply physical violence to enforce the rule. Similar to this definition, other approaches either stress institutional, functional or spatial aspects, and as a result suggest the existence of the state as such (Giddens 1985: 20; Jessop 2007b: 9). The state is often treated as a powerful and cohesive actor that controls and influences society through its policies and regulations.

In Political Ecology, the state has played an important but somewhat ambiguous role as well. In a recent paper, Loftus has reviewed the different conceptualizations of the state. He argues that Political Ecology has not lacked a theorization of the state, as it is sometimes maintained, but that these conceptualizations with theories of the state have “often pulled in very different directions” (Loftus 2018: 2).

Making a case for the importance of state-environment relations is not difficult. With most environmental regulation being traced back to the state, and with the relations embodied within the state appearing central to a variety of environmental conflicts, it seems crucial to take this ‘actor’, this ‘scale’, this ‘relation’ or this ‘institutional form’ seriously. (ibid)

By referring to an earlier publication by Robbins (2008), he summarizes that the state in Political Ecology has been conceptualized as “a territorial strategy of simplification and abstraction”, “an actor within global political economy”, as well as “a knowledge system, capable of prioritizing certain ways of knowing over others” (Loftus 2018: 2). All these different approaches can be contradictory, as empirical analysis have shown. For my work, the first and the third conceptualization would be the most accurate and fruitful understandings of the state. In Political Ecology, many scholars have been influenced by historical materialist conceptions of the state, which shall be briefly explained in the following section.

A historical materialist theory of the state

A materialist theory of the state, in the most elaborate form worked out by Nicos Poulantzas, often touted as “the single most important and influential Marxist theorist of the state” (Jessop 1985: 5), assumes the material existence of the state (Belina 2013: 161), and credits the state with a persistence, and a “relative autonomy” (Poulantzas 2014: 127). In his last work *State, Power, Socialism* that was published in 1978, Poulantzas famously proposed to understand the capitalist state, not “as an intrinsic entity: like ‘capital’, it is *rather a relationship of forces, or more precisely the material condensation of such a relationship among classes and class fractions*” (ibid: 128, emphasis in original). With this understanding of the state as *a material condensation of a relationship of forces*, Poulantzas differed from previous Marxist theories of the state, which conceived the state as a single entity that could enforce the interests of the ruling class. Poulantzas can be credited with the insight that the state in its function does not simply create the conditions for the accumulation of capital. He is, among Bob Jessop, the proponent of a relational understanding of the state that criticizes a reification of the state (Painter 2006: 758), and thereby confronts a common view in Marxist state theory. Rather, he describes the state as a place of struggle, where different groups of the power bloc fight for their interests. The state is credited with a material form and described as a relationship of different forces, where social problems are struggled over, and the bourgeoisie organizes its domination (Demirović 2010: 59). The state is not a subject nor a single actor, but rather an arena where the political struggle is fought out and the power of the bourgeoisie is organized. For Poulantzas, the state is not an overarching entity that steers society from above, but it is rather a specific layer within society that on the one hand has a relative autonomy from society, but on the other hand is an arena where power struggles are fought out (Demirović et al. 2010: 13).

This admittedly cursory description of Poulantzas work is not meant to discredit his insights and achievements, which have had large influence on many state theorists (Wissel 2007; Demirović 2007; Jessop 2017). However, his work has also been criticized, and this critique (Hall 1980) has resonated with my own work and theoretical considerations, especially after a close engagement with the work of Michel Foucault,

the literature in Governmentality Studies, and most importantly with the empirical case studies I have conducted in New Zealand, Germany, and the UK. In my view Poulantzas overemphasizes the importance of the state and social classes, which at least for my empirical work, has not resulted in a fruitful theoretical framework.

Timothy Mitchell (1991: 94) accused Poulantzas of developing a “structural approach” of the state that took the structurally conditioned separateness of the state and society for granted. Mitchell developed an understanding of *the state as an effect*, which was strongly influenced by the work of Foucault (2008: 77), and which I will detail in the following section. The Geographer Joe Painter, who has also written extensively on conceptualizations of the state, argued that despite Poulantzas effort to not understand the state as an entity that acts upon society, failed to do so because he “wished to hold on to a notion of the unity of the state”. By contrast, Painter argued “to restrict the idea of the unity of the state to refer to the symbolic unity of the state understood as an imagined collective actor” (Painter 2006: 759). This subtle difference is important, as it either purports the existence of the state as a unified sphere that acts upon society, or it proposes to understand the state rather as an, indeed very powerful, imagined actor, which only has a symbolic unity. This notion of the state, which on the one hand side is a powerful imagined actor, but which in reality does not exist, has been influenced by the writing of Philip Abrams (1988), who argued the state is not a “reality which stands behind the mask of political practice. It is itself the mask which prevents our seeing political practice as it is” (ibid: 82).

The state as an effect

An insightful critique against the reification of the state has been developed by Timothy Mitchell (1991). Mitchell tackled the question of the state from its limits, or rather its boundary with society, which to him “appears elusive, porous, and mobile” (Mitchell 1991: 77). He argued that the “the elusiveness of the state-society boundary needs to be taken seriously, not as a problem of conceptual precision but as a clue to the nature of the phenomenon” (ibid: 78). For him the difficulty of clearly demarcating the state/society boundary was telling and should be the focus of analysis to understand the nature of the state. It is thus not a question of finding a definition that

overcomes the fuzzy limits of the state, but rather he is interested in understanding how the separateness of the state from society comes into existence in the first place.

Mitchell contends that “the state-society divide is not a simple border between two free-standing objects or domains, but a complex distinction *internal* to these realms of practice” (ibid: 90). For Mitchell, the state is not like for Giddens (1985: 13) “the pre-eminent form of [a] power container”, in which power is stored and extends out into society. Rather, it is itself a result of a variety of processes that reproduce and redraw the imagined boundary between the state and society. Importantly, it is “the apparent separateness of the state [that] creates the abstract effect of agency, with concrete consequences” (Mitchell 1991: 91). This is to say that the power of the state is an effect of the (re)drawing of the state/society boundary. Mitchell is mindful to mention that the agency of the state “will always be contingent upon the production of difference – upon those practices that create the apparent boundary between state and society. These arrangements may be so effective, however, as to make things appear the reverse of this. The state comes to seem a subjective starting point, as an actor that intervenes in society” (ibid). For Mitchell, the task is not to find a more precise definition of the state, but rather to empirically analyze the processes of the emergence of the state as a powerful actor. The state is understood as an effect of a range of processes, but not a thing that exists in the first place. In conclusion, the author proposes to think of the state as

an effect of detailed processes of spatial organization, temporal arrangement, functional specification, and supervision and surveillance, which create the appearance of a world fundamentally divided into state and society. The essence of modern politics is not policies formed on one side of this division being applied to or shaped by the other, but the producing and reproducing of this line of difference. (ibid: 95)

I take from this that the state cannot be the starting point of an empirical analysis, as it would reify the concept of the state as a unified actor. The state “should be examined not as an actual structure, but as the powerful, metaphysical effect of practices that make such structures appear to exist” (ibid: 94). As a consequence, an

empirical analysis could not describe the state as such, it could not point out the differences in the way the state functions in different countries, or how the state conducts coastal management. The state, according to Mitchell, would always have to be understood as an effect of various practices and it would have to be the endpoint of analysis.

Even though this is a profound criticism of essentializing the state, I would contend that the state as an effect can and should be analyzed and empirically researched. In my view, Mitchell focuses too much on seeing the state as an endpoint (effect) of practices, and he marginalizes the powerful agency that arises from the effect of stateness in everyday life. As the concept of the state is such a powerful idea, it cannot be denied that this imagined actor does have immediate influence on everyday practices.

In summary, when the notion of the state is used in this work, it should be clear that it is indeed an effect of a variety of historical developments, administrative practices, written texts, institutions, buildings, people, wars, imaginations etc. The list could go on. The state should be understood as an effect of all these processes and practices. However, it is also important to simultaneously understand the state as “an imagined collective actor”, which itself has real and powerful effects on socio-ecological processes. As Painter says: “The use of ‘imagined’ here does not mean that relationships and processes involved are illusory: social imaginaries can have very real effects” (Painter 2006: 758). This is to say that the state as an effect can itself be productive, even though this seems to be an illogical assumption and a complicated makeshift. However, this somehow double-tracked approach is the only way to account for the powerful effects of the state, and at the same time avoiding an essentialization of the state. In that sense, the reification of the state is not an effect of my theoretical approach, but it is a social issue that can and should be taken seriously. The idea of the state is real and powerful, even though, theoretically, it cannot be easily accounted for.

With these theoretical considerations in mind, I will move on to an interesting paper by Christian Parenti, who has wrestled with the important nexus of the state, nature and value. Even though Parenti paints an unquestioned picture of the state as a

powerful actor, as I will criticize at the end of the next section, his considerations are nevertheless fruitful for the purpose of this work, and to understand the relation between the state and the *making of environments*, which is key for managed retreat in coastal areas.

4.2 The Environment making state

There is a wide range of publications that deal with the nexus of the state and nature (Harvey 1996; Whitehead et al. 2007; Whitehead 2008; Smith 2008; Robertson and Wainwright 2013), which I cannot resume at this point. Rather, I will deal with one paper more in depth. In the publication *The Environment Making State: Territory, Nature, and Value*, Christian Parenti (2015) begins his argument with a claim:

The fast approaching social and economic dislocations of climate change will force a return of the state. Climate change will bring extreme weather and attendant emergencies of a scale that are too large, chaotic, and destructive to be addressed primarily by the private sector (...) it is the state that is called forth because only the state has the economic capacity and political legitimacy to respond at an appropriate scale. (ibid: 829)

Parenti aims to conceptually link the territory of the state with the value of nature. His argument is that the capitalist state, as a territorially defined entity, is deeply involved in the making of environments. He claims that historically “the capitalist state has always been an ‘environment making’ institution. Managing, mediating, delivering, and producing the environment is a core and foundational feature of the modern, territorially defined, capitalist state.” (ibid: 830). In particular, he maintains that the state is crucial in harnessing “the use values of non-human nature to the process of capital accumulation” (ibid: 829). If not through the state, capital would not be able to access the use-values of non-human nature, as the state controls the surface of the earth where all these values are located. The state renders this nature legible and accessible. The author identifies three areas in which the state operates and makes nature accessible: “through its place-based property regimes; its production of

infrastructure; and its scientific and intellectual practices that make bio-physical reality economically legible and accessible" (ibid: 830). According to Parenti, the state as territory, controlling the use values on the surface of the earth, makes environments by rendering nature accessible to capital.

The author exemplifies his argument with the state-financed construction of the Erie Canal in the USA at the beginning of the 19th century. At the time, the canal would not only connect the growing coastal metropolis of New York City with the hinterland, but also open large areas of rural land to urban centers and to world trade. Parenti draws a connection between the way the state makes environments and the development of modern capitalism. He claims the importance of the state "in developing and reproducing the metabolic arrangements that are capitalism". He argues:

the canal shows us how states make ecologies. It reveals the connection between non-human nature's use values, state geo-power, and the expanded reproduction of capital. Famously, the canal connected Atlantic trade circuits, via New York City to the Great Lakes, the Mississippi River, and thus the whole interior West and South. New York City became the pivot point of a huge international network of financial and biological flows and as such became the capital of American finance, and thus later world finance. (ibid: 840–841)

Once the canal connected New York City with large parts of the Midwest, it not only meant the rise of New York as a hub for trade and finance, but also drastic environmental changes for large parts of the continent. "Completed in 1825, the economic, and therefore ecological, effect of the Erie Canal was massive; the cost of moving a ton of freight dropped by 95%. This is the state making a regime of nature unintentionally but very directly and forcefully" (ibid: 842). One economic side effect that would more than offset the costs of building the canal for the state was the increase in value of the rural land that was now connected to the urban centers. Soon afterwards in the coastal state of New England, farming was abandoned, and large areas were reforested, as farming shifted towards the newly accessible regions further

inland. There, the Iroquois and their farming practices were forcefully replaced by that of the white settlers. The state opened the continental interior with the construction of the canal, and thereby created new environments.

[It] tied these regional metabolisms to broader markets. Gone was selective burning, in came forest clearing and the monocropping of wheat and other grains. Isolated subsistence farmers now became wheat exporters, and in the process developed new types of 'nature'. Monocropping would soon invite fungal disease and pests like the midge and Hessian Fly (ibid: 842–843)

The state-built canal not only initiated a range of social, economic, and environmental developments and transformations, but literally *made* a range of new environments, such as the reforested area along the coast and large expanses of agricultural land in the Midwest, each entailing a highly altered or even new composition of animals, plants, and pests. Even though Parenti's argument continues, I want to pause at this point and debate in how far the notion of the environment making state would be a fruitful concept for understanding managed retreat.

Critical discussion on the environment making state

Managed retreat clearly aims at a transformation of the coastal environment, and it involves a variety of domains that are conventionally associate with the state, such as land use planning, provision of well-being and safety to citizens, as well as construction and maintenance of basic infrastructure. As I will show in my analysis, to a large extent the work regarding the implementation of managed retreat is realized in expert groups, closely tied to the state apparatus and administrative processes. When polders are opened and agricultural land is transformed to salt-marshes, it is a making of environments.

Parenti makes several important observations. Economic development and ecological change are closely connected. The capitalist state enables the use, extraction, and processing of nature's use values by the construction of basic infrastructure as well as the maintenance of a property market, which in consequence fundamentally alters, produces, and makes environments. Similar arguments were

made by Neil Smith (2008) in his work *Uneven Development*. Capitalism is dependent on the extraction of resources and the alteration of environments, and as the state is intrinsically connected to the development of capitalism (Corrigan and Sayer 1985), the state is making environments. Next to the notion of capital expansion, resource extraction, and environmental degradation, another point is that in recent times the state has also expanded its administrative apparatus and regulatory framework in such a way that it regulates, restores, and in some cases prevents alterations to the environment. Paradigmatic are the installation of National Parks, the taxing of CO² emissions, or precisely the discussions about managed retreat. Parenti would argue that the state has a monopoly on any of these questions, as it is the institution that controls territory, but also because it has the financial capacity to implement expensive measures.

However, the critical question is, also with respect to the prior discussion on the state *as an effect*, whether it is a convincing argument that it is *the state* that is making environments, or whether there is a better way to conceptualize socio-environmental change? When Parenti argues that the state is the “ultimate landlord” (2015: 836), his argument has an undeniable appeal. Isn’t it the state that holds control over land, in form of a cadaster, through land use planning practices, or most notably in the forceful appropriation of land? And does not the state organize and provide disaster relief in case of flooding? My argument is that, similarly to Poulantzas work, Parenti overemphasizes the agency of the state, suggesting that the state as an entity unequivocally acts on the environment. This notion is too simplistic, as it neglects the contradictions and cracks within state practices. For Parenti, the state is at times a “political membrane” (ibid: 829), and in other places the author stresses the “enforcement power of the state” (ibid: 830). The author clearly essentializes the state, which is problematic, because it loses sight of the many conflicts and contradictions within state practices. An alternative view on *government practices* will be discussed in 4.3. However, if I wanted to define the state, I would contend with Margo Huxley, that it is a “heterogeneous, contingent and unstable, conflicting and converging, assemblage of institutions, regulations, practices and techniques of rule” (Huxley 2008: 132).

Further, Parenti argues that non-human nature provides use values to the accumulation process that, once harnessed in the production process, are “converted into exchange value”, and finally into social wealth (Parenti 2015: 832). Similarly, David Harvey states: “At the basis of Marx’s conception of the world lies the notion of an appropriation of nature by human beings in order to satisfy their wants and needs. This appropriation is a material process embodied in the acts of production and consumption” (Harvey 2006: 5). With a close reading of Marx, Parenti contends: “The seizure of external nature’s utilities is at the heart of the valorization process” (Parenti 2015: 833). Parenti uses the image of a waterfall, which provides the energy needed for the production process, as well as the strength of wood, which provides the use value for the construction of buildings.

Despite its appeal, I find this theoretical framing a narrow understanding of nature, always already thinking it in the mode of valorization. I do not neglect that the common logic of capitalism produces the narrow view of *nature as resources*, as if the world consisted only of resources to be harvested. And it may also be true that nature provides specific use values to humans. However, it seems to be too narrow to equate nature with use values to be valorized, as these use values are not that straightforward, they are not intrinsic in the thing itself, they may be unknown, forgotten, or bound to change. Nature’s use-values are rather contingent, cultural, and contested. This argument becomes particularly apparent in the chapter on managed retreat in Germany, where environmental valuation is highly conflictual.

To make my point, I want to provide an example from the coast that concerns the changing cultural meaning of swamps (Walker 1973). For a long time, swamps were considered dead landscapes that had to be removed to care for the people’s wellbeing. Today, there are numerous projects to recreate swamps on a large scale. Interestingly, Walker argues:

It is ironic that wetlands have traditionally been drained for many of the same reasons they are now being preserved: public health, flood control, aesthetics, and productivity (agricultural), for instance. (ibid: 77)

That is to say that the utility of nature is changing, it is contested, and it is anything but straightforward. In relation to this, Walker has insightfully argued that the term wetland is relatively new, and that it has replaced the term swamp, mostly for reasons of political interests.

The creation of the new category of “wetlands” in place of “swamps” is a response to a new perception of these environments and the need to bring them all under the aegis of a unified, non-pejorative term. The word “wetlands” is useful both for its positive symbolic value and its ability to be stretched to cover a broad range of environments which may have little in common naturally, but have one thing in common socially: various people would like to preserve them. (ibid: 76)

Interestingly, this rebranding of swamps to wetlands shows some resemblance with the rebranding of managed retreat to managed realignment in the UK (Pethick 1993). The rebranding of a landscape for political and administrative reasons cannot simply be explained with the use values that suggestively stem from the natural characteristics themselves. As we see here, cultural, political, technical, as well as economic developments are important in the way nature is perceived, understood, and used. Non-human elements of nature may provide use values for humans, but these use values do not necessarily directly stem from the characteristics of the element in question. The characteristics of the element itself are subject to a historical contingent process of knowledge production and social struggles. As I will show for the New Zealand coasts, the beaches and their management are not simply a pre-existing natural use value, but rather a highly contested terrain, where different interests are being negotiated.

A final point of discussion is concerned with the highly important concept of capital in Marxist scholarship, which is on the one hand highly productive, but on the other hand problematic, as it often suggests that capital is an agent of its own, plowing through the world and conquering new spaces, environments and markets (Smith 2008: 7–8). However, I content with Robertson, that

capital does not simply expand into nature as if pushing beyond a frontier, it engages scientists and bureaucrats in redefining what counts as nature and how it is known, in ways that make it more amenable to fiscalisation, governance, commodification and the disciplining of subjects (Robertson 2012: 398).

Robertson calls attention to the process of knowing nature, and that nature doesn't exist as such, but is rather a contested category that is being made and remade by a number of actors for a variety of different purposes. This will also be important in the empirical chapters.

In summary, I want to suggest that the *environment making state* is a powerful and useful approach for explaining environmental change, but the concept is in danger of essentializing the state as a coherent and omnipotent actor. An empirical analysis would have to be open to the contradictions, cracks, and circularity of state practices. The state must be revoked of its theoretical omnipotence, and rather be understood as a powerful effect of a variety of practices, which forms a *symbolic unity of an imagined collective actor*. This imagined actor can then be a fruitful theoretical approach for understanding changes in coastal management. However, in the following section I want to develop my theoretical approach further and shift the attention from an environment making state towards the *government of coastal environments*, which is closely related to the work of Michel Foucault and the Governmentality studies.

4.3 The government of coastal environments

In the two lecture series at the Collège de France in 1977-79, Michel Foucault (2007, 2008) turned his attention to an analysis of political power and the state, which is commonly subsumed under the term Governmentality, and which has had tremendous effects on social and political theory. The so-called Governmentality Studies have developed a rich and fruitful discussion about power and rule in modern societies (Burchell et al. 1991; Lemke 2002; Watts 2003; Dean 2010; Bröckling et al.

2011; Walters 2012). It is beyond the scope of this work to resume the debate in detail. I rather want to perform a selective reading of the government concept.

In the lecture series, Foucault turned his attention to broader political relations that provoked him to talk about the notion of the state, even though in previous work he had avoided it. However, he wanted to analyze the state

not by trying to wrest from the state the secret of what it is, like Marx tried to extract the secret of the commodity, but by moving outside and questioning the problem of the state, undertaking an investigation of the problem of the state, on the basis of practices of governmentality.
(Foucault 2008: 77–78)

Defining governmentality, this “ugly word” (Foucault 2007: 115), is not a straightforward task. The term derives from the French word “gouvernemental”, meaning “concerning government” (Lemke 2016: 3). Walters argued that in the most general sense, governmentality “is a heading for a project that examines the exercise of power in terms of the ‘conduct of conducts’” (Walters 2012: 11). Brady suggested that the term referred to “a historically specific way of thinking about ruling that emerged in the 18th century, and more specifically an approach to governance that attempts to ‘conduct the conduct’ of others based on an understanding of their intrinsic nature” (Brady 2014: 19). Importantly, governmentality is an approach that starts with the observation that “governance is a very widespread phenomenon, in no way confined to the sphere of the state, but something that goes on whenever individuals and groups seek to shape their own conduct or the conduct of others” (Walters 2012: 11). This is to say that government is not limited to state practices, but it is a widespread social phenomenon.

Foucault traced the notion of government back to the thirteenth and fourteenth century and showed that it had a much wider meaning than it has today. He diagnosed a development starting in the 16th century, where questions of government became important, and social misfortunes were formulated through a problematization of questions of government. Government ranged from the government of oneself, to the government of children, of the souls, and the government of the state (Foucault 2007:

88). The political meaning government has today has only emerged in the 18th century. Before, it was a term discussed not only in the political context, but also "in philosophical, religious, medical and pedagogic texts. In addition to management by the state or administration, government also addressed problems of self-control, guidance for the family and for children, management of the household, directing the soul, and other questions" (Lemke 2007: 45). In that sense, Foucault gave the term a broad meaning, generally referring to the conduct of conduct.

Foucault's concern was that the state was not a coherent actor that could be used as an explanation for any social developments. Rather, the state "is nothing else but the mobile effect of a regime of multiple governmentalities" (Foucault 2008: 77). Foucault maintained:

To pose the problem in terms of the State means to continue posing it in terms of sovereign and sovereignty, that is to say in terms of law. If one describes all these phenomena of power as dependant on the State apparatus, this means grasping them as essentially repressive (...). I don't want to say that the State isn't important; what I want to say is that relations of power, and hence the analysis that must be made of them, necessarily extend beyond the limits of the State (Foucault 1980: 122)

In his analysis of power Foucault maintained, unlike Poulantzas, that the state would not extend its reach to all existing power relations, but would on the contrary "only operate on the basis of other, already existing power relations" (ibid). Foucault was adamant to avoid approaching his research interests through an analysis of the state as such. He wanted to stay away from state theory, "as one can and must forgo an indigestible meal" (Foucault 2008: 76–77). The state appeared only as a way of ordering and organizing social relations.

By contrast, Foucault emphasized the notion of government, which dispersed the concept of the state, "first, by dissolving the assumed fixed entity of the state into the multiplicity of institutions, procedures, analyses and reflections, calculations, and tactics that secure its activities; and, second, by thoroughly historicizing the assumed transtemporal identity of the state" (Saar 2011: 39). Instead of beginning an analysis

with the state, Foucault was interested in the “political technologies and governmental rationalities” (Lemke 2007: 45). A focus on government would not begin the analysis with the state, but rather focus on the practices that make the state appear to exist, and the practices that constitute political authority. In the following section I will discuss some insightful ideas about government, and how this concept enriches the theoretical framework for the analysis of recent changes in coastal management.

Government is directed towards the possible options of conduct

Foucault was clear that “[t]hose whom one governs are people” (Foucault 2007: 122). However, government is never directed towards individuals. “The captain or pilot of the ship does not govern the sailors; he governs the ship” (ibid: 123). This is to say that government focuses on the “indirect and reflexive determination of possible options of action. It is the way in which the actors perform their action ('conduct of conducts') that is the object of government” (Lemke 2016: 18). Foucault argued that to govern means to “structure the possible field of action of others” (Foucault 1982: 789–790). This is a fruitful approach for an analysis of modern political authority, as it sensitizes for the various political programs, governmental technologies, and political framings that do not work on the basis of the law, prohibition, and constraint, but it opens the perspective for subtle interventions that use incentives, categorizations in desirable and harmful conduct, as well as various other ways of framing and expertise.

By introducing the notion of government as conduct, Foucault could not only correct his former conceptualizations of power through notions of war (Foucault 1995), but also develop a nuanced set of tools for the analysis of the positive and productive characteristics of power. He argued that the two different meanings of the verb *to conduct* would be helpful to conceptualize power relations, as it means “at the same time to ‘lead’ others (...) and a way of behaving within a more or less open field of possibilities”. He continued:

The exercise of power consists in guiding the possibility of conduct and putting in order the possible outcome. Basically power is less a confrontation between two adversaries or the linking of one to the other than a question of government. (Foucault 1982: 789–790)

Questions of government are then not limited to the state but are distributed throughout the social sphere. Government as a conduct of conduct is a useful concept for analyzing power relations, as it sensitizes for how-questions. As Dean remarks, "government entails any attempt to shape with some degree of deliberation aspects of our behaviour according to particular sets of norms and for a variety of ends" (Dean 2010: 18). Government is to be understood in plural, as there are many different agencies and actors that are governing themselves and others. The norms and interests that are underlying political rationalities and governmental technologies are then the focus of analysis.

Utopian and moral aspects of government

Mitchell Dean (2010: 44) insisted that government has utopian and moral elements. Those who govern assume that people and things can be governed differently, they assume that the arrangement of things and behavior of people can be changed in ways that alleviate the problems assessed. "From the perspective of those who seek to govern, human conduct is conceived as something that can be regulated, controlled, shaped and turned to specific ends" (ibid: 18). He argued that to govern means more than to exercise authority. Rather, it holds a firm belief that it is desirable "to re-form human beings", and that it is possible that "we can draw upon and apply forms of knowledge to that task, that we can gain a secure knowledge of the world and of human beings in that world, that we can 'make things better', improve how we do things" (ibid: 184). Dean continued that it is "necessary for an analytics of government to extract this utopian aspect" (ibid). I propose to call this utopian element of government the *will to improve*, which was evident in my research, and which I will debate further in the empirical chapters six and seven.

Next to the utopian aspect, government is also a highly moral practice, as policies "presume to know, with varying degrees of explicitness and using specific forms of knowledge, what constitutes good, virtuous, appropriate, responsible conduct of individuals and collectives" (ibid: 19). Next to the conduct of individuals and groups, I argue that government also implies wishes, ideas, and moral standards about the environment, the organization and aesthetics of landscapes, as well as the use and

spatial distribution of settlements, defense structures, or ecosystems. Government is not only limited to the conduct of people, as it may appear in some of the writings in Governmentality studies. I would disagree with Foucault and Dean (2010: 18), that government is limited to human conduct, as this would exclude the myriad ideas and attitudes to morality that government agencies have towards the environment. Government is also occupied with implicit and explicit assumptions and wishes about the distribution, behavior, and development of landscapes, animals and sediments (Braun 2014). This will be particularly evident in chapter seven, where state authorities, conservation agencies, and farmers struggle over different understandings of coastal natures, and how the coast should be maintained and fostered. In how far the government of human and non-human elements differ, and what an extended notion of government beyond the sphere of humans would entail, is beyond the scope of this work. A promising starting point was delivered with the notion of a "Government of things" by Thomas Lemke (2015), as well as the work of Richie Nimmo (2008, 2011).

To end this chapter, I want to caution that government is not straightforward or clear-cut. Bruce Braun contended that even though government entails some level of reflection and rationality in the sense of detecting and describing a problem and then developing strategies and technologies for coping with and managing these phenomena, in many cases it contains elements of uncoordinated efforts and contradictory strategies. "Against understandings of 'government' in terms of a totalizing plan from which new practices and technologies usher forth", he argued for the "ad hoc, and ex post facto nature of 'government' as a set of diverse and loosely connected efforts to introduce 'economy' into existing relations in response to a perceived 'crisis'" (Braun 2014: 49). Government oftentimes contains weakly correlating actions that seek to oppose, order and improve a perceived crisis, such as *the coast in crisis*. But government is never a finished project, as different government programs overlap or oppose each other. Miller and Rose make an even stronger argument that government "is a congenitally failing operation. The world of programmes is heterogeneous and rivalrous (...). 'Reality' always escapes the theories

that inform programmes and the ambitions that underpin them” (Miller and Rose 1990: 10–11).

4.4 Chapter summary

With these theoretical considerations in mind I propose to understand managed retreat as an emerging government program, in which the state, understood as an “imagined collective actor” (Painter 2006: 758), plays an important role in the making of coastal environments. Of importance for the empirical analysis are the political rationalities and governmental technologies that are immediately connected with managed retreat.

A state-perspective is a handy simplification, it allows speaking about a complex world in larger categories, and subsumes a wide variety of practices, materials, and struggles under one term. A key problem of a state-perspective is its static and assumptive character. It limits the scope of the analysis, as it puts everything into relation to the state. The state is usually considered as an overarching entity, and it is prescribed with a hidden source of power. A Marxist state theory is, as I would call it, a strong theory in the sense that it may well explain a wide range of social realities and inequalities, but mainly because it works with a set of assumptions. The notion of class and capital are fundamentally important in explaining social realities. By contrast, the notion of government is “not a theory in any strong sense of the word. It does not offer the user a causal explanation of societal change, still less an overarching philosophical interpretation of such change. Nor does it harbour aspirations to predict the future” (Walters 2012: 2). Instead of assuming a stable state, I am rather interested in tracking the emergence of problems to become political, of the diverse powers interested in creating a political space for discussion, and steering the discussion to reach certain ends. This reverberates also with Lemke’s observation that the idea of government “underscores the specificity and the relationality of politics. Politics is not a given, stable and self-evident entity; rather, its contingent boundaries and material conditions come to the fore” (Lemke 2015: 16).

An important point about the concept of government is:

This toolbox equips us to do something important and quite novel: to understand governance not as a set of institutions, nor in terms of certain ideologies, but as an eminently practical activity that can be studied, historicized and specified at the level of the rationalities, programmes, techniques and subjectivities which underpin it and give it form and effect.
(Walters 2012: 2)

This quotation should be a guidance for the interpretation of my empirical material, and the theoretical framing of my work. Instead of explaining the role of capital and the state in coastal management, I rather want to use how-questions to develop a detailed description of government practices, rationalities, and tools in recent shifts in coastal management (Jessop 2007a: 40).

5. Researching government – Methodological considerations

As I have suggested in the previous chapters, the state as an imagined collective actor is important in the elaboration on and implementation of managed retreat. There has been an increased *statization* of coastal management. Coastal issues have increasingly been problematized and approached either directly by state agencies, or indirectly through commissioned work done by private consultancies that have assessed, elaborated on and contributed to the coast in crisis discourse, and proposed ways to remedy these concerns. In this chapter I will discuss some methodological considerations about how to research administrative practices and the way state agencies problematize and frame solutions that are related to managed retreat. As I am interested in ideas and concepts to govern coastal environments *differently*, such as through the removal of houses away from coastal hazards instead of constructing a seawall, the analysis is focused on document analysis of important texts, as well as semi-structured in-depth interviews, mostly with professionals, elected council members, planners and consultants.

In the first section of this chapter I will elaborate on the relation between governmentality studies and qualitative research methods. As documents of all sorts were an important source of material for my work, I will think about the relation between documents, state administrations and government. In the last part I will talk about the interview process and recount my extensive empirical work in Germany, New Zealand and the UK. In chapter six and seven, where I will discuss the case studies, I am interested in analyzing concrete conflicts, and I follow a case-study approach that researches the emergence and development of a localized conflict about managed retreat.

5.1 Governmentality and qualitative research methods

The relation between governmentality studies and qualitative research methods such as interviews is complex. Most governmentality studies, and Foucault's work in particular, has built on archival work, document analysis, and it has been dedicated to a genealogical methodology (Dean 2010; Walters 2012: 110–140). Foucault's work

spanned large historical timeframes, and he was not interested in analyzing actual governing, but rather the rationality behind government, or the “art of government”.

I have not studied and do not want to study the development of real governmental practice by determining the particular situations it deals with, the problems raised, the tactics chosen, the instruments employed, forged, or remodeled, and so forth. I wanted to study the art of governing, that is to say, the reasoned way of governing best and, at the same time, reflection on the best possible way of governing. That is to say, I have tried to grasp the level of reflection in the practice of government and on the practice of government. (Foucault 2008: 2)

This methodological description in *The birth of biopolitics* sets out his research agenda, and stands in contrast to ethnographical methods such as in-depth interviews, extended field research, and a case-study approach. Foucault’s work was not actor centered, it was not interested in the development of concrete historical conflicts, but rather jumped from one document to another, and from one event to another. In that sense his work was quite different from the work of many historians. And my methodological approach also differs considerably, because I strongly relied on in-depth interview, my research has only spanned a relatively short period of time, it was actor centered, and I was interested in understanding concrete developments of conflictual situations and the way government agencies organized and framed their intervention. Despite the differences, as I have also argued in the previous chapter, it has been fruitful to use the notion of government.

In recent times, there have been attempts to introduce ethnographic methods to Governmentality studies. Michelle Brady argued in her paper *Ethnographies of Neoliberal Governmentalities*, that her research would less depend on “archival sources or publicly available documents”, but would rather incorporate ethnographic methodologies such as “observation of everyday life, interviews, and the collection of documents on the ground” (Brady 2014: 13). She criticized that scholars in Governmentality studies, who only worked with archival material, would tend to “bracket out” the importance of “multiplicity and complexity” (ibid: 13–14) of the social

world. This in turn, argued Brady, would lead to an overstatement of a particular political rationality, in this case neoliberalism, and it would assume that this rationality was homogeneous and stable. Rather, Brady argued, ethnographic methods were helpful to call attention to “the dynamics of social life”, and the “processes through which political alliances are formed, as well as resistances to such alliances and new programs of governance, and the failures of various plans” (ibid: 14). The author claimed that ethnographic methods would help to “avoid polemic generalities that render neoliberal rationalities always and everywhere the same” (Brady 2014: 14). Brady maintained that only ethnographic methods would be able to parse out the contestation of dominant political rationalities. The author described the *Ethnographies of Neoliberal Governmentality* as a “primarily interview-based” approach that entailed “detailed, in-depth description of everyday life and practice” and an understanding of the “cultural context within which decisions and choices are made and actions unfold” (ibid: 27). The approach would “engage deeply with a particular site or set of sites, in turn developing rich, deep pictures that push against assumptions about what neoliberalism is” (ibid: 28). The author was interested in providing a detailed narrative of government actions and counter-action that would challenge any broad brushed accounts of political rationalities, and that would neglect the asserted existence of a uniform neoliberalism that she claimed many governmentality studies were guilty of proclaiming.

Even though this is a noble suggestion, and I would relate my own methodological approach closely to Brady’s characterization, her argument does not accurately portray most of the Governmentality studies it criticizes. Mitchell Dean wrote a comprehensive response, where he rejected most of Brady’s claims. Dean criticized that only ethnographic methods would put researchers closer to reality. Dean disapproved

the claim that a particular methodology or approach (whether it be ethnography, phenomenology, social history, or for that matter discourse analysis) has a special access to the real in the form of “actual people” and “actual processes.” Aside from the naivety and epistemological imperialism of such a claim, it adopts a posture completely at odds with Foucault himself (...) (Dean 2015: 359)

Dean criticized that Brady would invoke “the authority of Foucault to resurrect a realist social science that claims to be able to know ‘actual practices’ and ‘the actual processes’” (ibid: 360). Rather, as Dean argued, Foucault was “not seeking to access the complexity of everyday life but the conditions under which we form a knowledge of and seek to govern such domains as everyday life” (ibid: 359). And this is a vital difference between the claim that Brady made and that Foucault, in the words of Dean, was seeking to address. On a conciliatory note, Dean contended that the problem was not to combine the program of governmentality studies with ethnographic methods, but rather “the epistemological imperialism of her claims for ethnography” (ibid: 360).

I found it indeed difficult to combine qualitative research methods with the concepts and tools from Governmentality studies. For one, because most studies pursue archival work, but also because Governmentality studies are focused on the reconstruction of the emergence of regimes of truths and power/knowledges, and less in the reconstruction of particular historical events and disputes. However, my interest is not in criticizing the methods scholars of governmentality studies have used, but rather to combine both approaches in a fruitful manner. My argument is that interviewing experts, professionals, and in some cases authors of important documents can be an enriching methodological approach, without claiming that qualitative methods are bringing the researcher closer to “actual practices”, like Brady claimed. My aim was to productively combine a theoretical approach that is close to the governmentality studies, with qualitative methods that also allow a detailed description of recent events, as well as an analysis of how the involved actors frame the problematizations and government interventions.

5.2 Documents and government

As I am interested in the changes of government of coastal areas, I have paid attention to documents and how state agencies portray the necessity of changing the management regime, and how it should be done. I have analyzed programmatic texts that point out future development plans for the coastal areas, and I was interested in texts that lay out an analysis of problems on the coast and how these problems should be regulated. Finally, I analyzed expert reports that were used by government agencies

in the planning process and that played an important part in the implementation of a managed retreat project. In this section, I discuss the relation between documents and government interventions. What is the role of documents in government?

Nicos Poulantzas has written about the special relation of the capitalist state and writing, which he termed "state writing" (Poulantzas 2014: 59). He maintained that the state has always had a close relation with writing.

But writing plays a quite specific role in the case of capitalism, representing, still more than the spoken word, the articulation and distribution of knowledge and power within the State. In a certain sense, nothing exists for the capitalist State unless it is written down - whether as a mere written mark, a note, a report, or a complete archive. (ibid)

The written word, either as part of a law, a guidance manual, a report, minutes of a meeting, or in any other form, is one of the main tools of organizing and structuring the administrative work of the state apparatus. It is a way of conveying information and guidance, but it is also a vehicle of intervention, to mark and chart out hazard maps as an example, and to impose restrictions. The state only accepts and sees things when they are written. "The massive accumulation of paper in the modern state organization is not merely a picturesque detail but a material feature essential to its existence and functioning" (ibid). For Poulantzas, state writing is about the articulation and distribution of knowledge and power. This is a point where he has most notably been influenced by Foucault's notion of power/knowledge (Hall 1980). However, different from Foucault's idea, where power is not centralized or being structured by a single entity, for Poulantzas the state is the central field from where power is generated and spread through the production of knowledge. Poulantzas is quick to add that different from the pre-capitalist state, the capitalist state does not hold a monopoly on writing, but rather is interested in spreading the ability of reading and writing (Poulantzas 2014: 59). Still, Poulantzas assumes a privilege of the state in the ability to produce documents that are binding for everyone. Even though it is true that only state authorities are privileged with the production of some sort of documents, such as laws, cadastral maps, or guidance manuals for other state agencies, non-state

actors are closely involved in these processes through external assessments and consulting assignments, or through protest documents that may gain strong influence in the political process. Plus, as I will argue shortly, documents are always embedded in a set of other documents that they refer to, and thus the boundary between state writing and the countless other actors that also produce documents is blurry.

But how to use documents in an empirical analysis in conjunction with interview data? Glenn Bowen (2009: 29) argued for the use of document analysis as a qualitative research method, because documents can provide "data on the context within which research participants operate". This understanding of documents as a source for context is common. The author emphasized the "function of documents as a data source" (ibid: 27) within the qualitative research process, and that a document analysis is a useful method for the triangulation of primary research data with secondary data. Drawing from the work of Angers and Machtmes, who have supplemented their ethnographic case-study research with a document analysis, Bowen took up their argument for "the need to triangulate the study methods (which also included observations and interviews) so as to validate and corroborate data obtained during the study" (ibid: 29). Following this understanding, documents serve as a validation tool for other data that was obtained during the research process, either through interviews or observations.

This understanding is problematic. Even though it is true that documents, such as policy reports, can provide the researcher with a general understanding of the context of the research case, it would be a missed opportunity to merely use a document analysis as a means to "validate and corroborate" other research data. This would reduce the document analysis to a mere fact-checking endeavor, in which the interview and observation data would be compared and validated against the depiction in the documents. This approach is not particularly fruitful, as it would deny the importance of documents as an artifact in the process of government.

Rather, I see documents as artifacts of administrative procedures that "are 'effects of practice'", but that also "have 'effects in practice'" (Weisser 2014: 53). This is to say that documents are being produced in a variety of professional and administrative settings and processes, and that they also have in turn effects on a wide range of

governmental as well as wider societal practices. The document analysis that I suggest focuses on the framing of a government intervention, the arguments that are used to justify and explain a regulatory tool, and the introduction of expert knowledge to justify a particular approach. This is different than to say that the document analysis is about validating facts that were obtained in interviews.

Another important aspect is the relation between government, the practices of state agencies, and the production and circulation of documents. As Freeman and Maybin argued: "Government is unthinkable, impracticable, not feasible, without documents (Freeman and Maybin 2011: 155). They contended that "policy does not exist until a file exists" (ibid: 161). The production and circulation of documents is a means of government, as they can be used as vehicles for spreading information, narratives, and framings about an issue in question. But the production of documents also structures governing itself. As an example, which I will discuss further in chapter six, are the District Plans in New Zealand, which by law must be updated every 10 years. The pressure on Councils for reworking their District Plans has immediate effects on local politics and was also highly important in the implementation of managed retreat on the Kāpiti Coast. The reworking of the District Plan was directly linked to the emergence of a big conflict.

Even though some authors advocate to participate in the production process of documents as a form of participant observation (Weisser 2014), my take on documents is not focused on the process of their production. I have not participated in the production of the documents. I am more interested in the role of documents in the planning process, as well as in public debate and dispute. I have interviewed several people who were the lead authors or have participated in the writing and publication process of key documents. These documents included government programs, consultancy reports and assessments, as well as laws. It was fruitful to interview these authors and ask them about conflicts of interest during the production phase, or how the documents were being discussed after their publication. In this sense an archival method, such as it is commonly used in Governmentality Studies, was supplemented with an additional narrative of the production and usage of the documents.

Freeman and Maybin (2011) argued that policy only comes into being once a document is created. The creation of a document is already an act of government, as it gathers disparate information, it sets out an agenda, and it describes a problem.

Policy does not exist until a file exists. It is the creation of the file, the aggregation of disparate notes and documents into a single, physically bounded object, that identifies and denotes a topic or domain as a recognised and legitimate object of government attention and activity. (...) The document ordinarily and somehow magically combines and reduces information from several different sources into one (ibid: 161)

Because documents draw together a range of other documents, and once published, they trigger the production of new documents, it is reasonable to speak about an ensemble of documents that forms "a set of mutually intelligible communications" (ibid: 162). The authors argue that the document as an artifact evokes practices and actions, and in turn these practices and actions are structured by the documents.

Artefacts and practices entail each other, they are mutually constitutive: practices generate artefacts, which in turn structure practices. (ibid: 165).

I add to this that documents that entail and provoke action, also lead to the production of new documents. This was the case when local action groups would produce websites, leaflets, submissions, and protest letters to the local councils, which in turn triggered new documents by the Council, and vice versa.

The document analysis for my dissertation focused on a range of different official publications from state agencies and government bodies, but also publications by the local action groups opposed to the managed retreat projects. In the following, there is a selected list of documents that were part of the document analysis. For Germany important documents for understanding coastal management, and particular the way the state organizes coastal protection, were the Generalplan Küstenschutz (NLWKN 2007). Key for the case study Langwarder Groden were the planning approval document (*Planfeststellungsbeschluss*), and more particularly the

Landschaftspflegerischer Begleitplan (LBP), which includes the detailed planning for the Langwarder Groden conservation measure (Wasser- und Schifffahrtsdirektion Nordwest 2007; Planungsgruppe Grün 2013a). This document was thoroughly analyzed as it was key for understanding the techno-scientific practices of the compensation measure that was important for the managed retreat scheme Langwarder Groden.

For New Zealand of importance was the second New Zealand Coastal Policy Statement (Department of Conservation 2010), as well as the publication *Coastal Hazards and Climate Change. A Guidance Manual for Local Government in New Zealand* by the Ministry for the Environment (2008). These publications provide the legal and planning framework for all Regional and District Councils, but they are also indicators for the way the administration develops a risk-based approach to coastal management. Next to these documents, there were a number of case-study related documents on the Kāpiti Coast published by the Kāpiti Coast District Council that gave insights into the way the Council perceived coastal hazards and wanted to implement managed retreat (KCDC 2006, 2010). Key for the empirical analysis was the analysis of the scientific hazard risk assessment of Coastal Systems Ltd. that was hotly debated on the Kāpiti Coast (Shand 2008) as well as the consecutive reviews (Allan and Fowler 2014; Carley et al. 2014). Moreover, I analyzed a range of different submissions by coastal residents (Tortell 2012; Weir 2013; Arnold 2013; Ruthe 2014; Coastal Ratepayers United 2014).

5.3 The interview process

In my dissertation, I used semi-structured interviews with a range of different people and actors. I researched and contacted most of my interview partners based on the case study I was investigating, and most of the interviewees were involved in the case study, either as an affected resident, as a consultant, elected politician, or scientist. In some cases, I received the contact information through a previous interview, but most interview partners were easily contactable by email or telephone, as their contact information was accessible on the website of the involved agency or institution.

Overall, I have conducted 50 interviews with residents and farmers, mayors and councilors, consultants and scientists, staff of Councils and conservation agencies, as well as planners. 15 of the interviews took place in Germany, 28 in New Zealand, and 7 in the UK. Four of these interviews were, for different reasons, not recorded, and thus do not appear in the list (appendix). In the first interview I did not feel the situation was appropriate to be recorded, in the second the permission for recording was denied, and the last two interviews were longer telephone conversations of which a recording was not possible due to technical issues. The interviews were conducted in different time periods, ranging from Mai 2013 until June 2015. I started the process with interviews in Germany, where most of the interviews took place between Mai 2013 and late October 2013. Most interviews were concerned with the case study Langwarder Groden, and where geographically located in the community of Butjadingen itself, or in Wilhelmshaven, Oldenburg or Bremen.

Next to the 50 interviews, I also conducted a range of short telephone calls, to insurance companies in Germany, as I was interested in their policies on flood related insurances, and to real estate agents in New Zealand, as I was interested in their take on the conflict about hazard lines on the Kāpiti Coast. These interviews were not recorded, nor do they appear on the interview list. However, these conversations have enriched my understanding of the situation. As an example, none of the five real estate agents in New Zealand wanted to talk to me after I introduced myself, stated my research interest, and asked whether the hazard lines affected their work at all. None of the conversations lasted longer than a minute. Later during my research, someone told me that real estate agents usually are affiliated with a larger corporation, but they usually work as freelancer. There was no general manager who I could have talked to, and the agents were not interested in talking to me.

My main research stay in New Zealand was from November 2013 until mid-May 2014. In this period, I conducted 28 interviews between February and May 2014. Some of these interviews took place in Hamilton, others involved a day-trip to other places nearby, and there were two longer research stays on the Kāpiti Coast and in Hawke's Bay. The first was a two-week long stay on the Kāpiti Coast in early March 2014, and the second was a one-week long stay in Hawke's Bay in early May 2014. In the

subsequent analysis, my focus shifted towards the case study on the Kāpiti Coast, which is also why most of the used interview material was from the Kāpiti Coast.

All interviews in the UK were conducted during a one-week long stay from June 15, until June 19, 2015. During this research stay, I was based in Bognor Regis, a small city on the English south coast. All the interviews took place in the closer vicinity of Selsey on the Manhood Peninsula in southern Sussex, where the managed realignment scheme Medmerry is located. Some interviews were in other cities along the coast, such as Southampton. In the subsequent process of writing the dissertation, I decided to not further elaborate on the UK case study, as it would have exceeded the scope of the dissertation.

The duration of the interviews ranged from about 30 minutes to over three hours, but most of the interviews were between one and two hours long. Many interviews were conducted in a professional environment at the workplace of the interview partner. In many instances, I visited the interview partner in the office. Other interview locations were public cafes, at someone's private house, in a library, or in an art gallery. But there were also several interviews that took place outdoors. In Hawke's Bay, one interview took place during a walk on the beach, and several other interviews that took place at someone's private house including a visit to the beach. During two different interviews, my interview partner and I visited the Langwarder Groden and took extensive walks around the area. These interviews were particularly interesting, as they permitted me to ask a range of questions that arose while being at the place. Five interviews were telephone interviews and they were recorded after permission for doing so was granted by the interview partner.

All interviews that were recorded were also transcribed. After the transcription of my interviews, I coded the text for different purposes. Similar to Saldana's (2009), who maintains that coding is a cyclical method, I revisited the interview transcripts several times. One purpose of coding was the seemingly trivial need for reconstructing the many different events that took place during the several years of conflict. This is to say that one goal of coding involved the triangulation of narratives about when and where different things happened. Another aim of coding the interview material involved the

capturing of how different actors framed the conflict, but also how they described the ramifications of managed retreat and other conflicts.

In this sense, coding was used as a heuristic, as a way of discovering and exploring interconnections, themes, problems, and topics (Saldana 2009: 8). Coding the interview material was a way of examining and organizing the material, summarizing larger sections with codes, but also developing my ideas about what was important. Coding allowed me to see and develop interconnections between different interviews, but also to triangulate different narratives.

Interviews as a moment of thought on governing

Mitchell Dean argued that government is a rational and thoughtful activity. It is something that requires thinking, assessing, and contemplating. However, it is "important to underline that 'thought' is something relatively rare. It has a particular time and place and takes a definite material form (a graph, a set of regulations, a text, etc.)" (Dean 2010: 42). Whereas Dean emphasized the material output of "thought" on government, such as graphs and regulations, in which ideas and norms about conduct would find their expression, I would like to expand the notion of "thought" about government to the interview process. Thinking about government may also take the material form of an interview transcript. Even though the interview is not expressively targeted at governing, it is an instance of reflection on government. During the interview process, I confronted my interview partner with questions about government: what are the problems, how do you assess the problem, what would be an ideal situation, what kind of measures could alleviate the problem, and how to engage with criticism against these measures? The situation of the interview has oftentimes led my interview partner to think about questions of governing, and it has occurred in many of my interviews. I could tell that some interview partners also wanted to convince me of their ideas about the best way of handling the situation. They wanted to show me that their ideas about governing on the coast was best. In that sense, the interviews were moments of thought about government, and they were highly productive in providing a detailed picture about the *art of government* in coastal management.

6. Beachfront property, coastal erosion, and hazard lines in New Zealand

Over the past two decades, a range of planning documents have appeared in New Zealand about the government of coastal hazard risks (Auckland Regional Council 2000; Ministry for the Environment 2008; Department of Conservation 2010; Ministry for the Environment 2017a; Department of Conservation 2017). The contradictory situation has developed, where beachfront properties have risen dramatically in value and climate change induced sea level rise is becoming a growing threat. As a consequence, spatial planning in coastal areas is increasingly driven by the notion of hazard risk, and managed retreat is brought up as a desirable political strategy (Lawrence et al. 2013; Haughton and White 2017). In this context, risk is generally conceptualized as the “result of the interaction of physically defined hazards with the properties of the exposed systems”. More specifically, risk is the “combination of an event, its likelihood, and its consequences” (KCDC 2010: 7). The notion of risk expresses the probability of the occurrence of a hazard event, such as a series of storms (short-term) or sea level rise (long-term), multiplied by the vulnerability, or potential damage, to a given system. The vulnerability is expressed quantitatively by the number of residents, residential buildings, as well as infrastructures in a given area subject to the hazard (Ministry for the Environment 2017a: 19). This is to say that different values with different levels of measurement (number of residents and property values in Dollar) are aggregated and combined. Thereby, the scale of analysis may vary, from a national or regional perspective to a localized risk assessment, as it was done on the Kāpiti Coast. Among planners and scientists, coastal hazard risks are perceived to pose increasing challenges for policy makers, and the concept of managed retreat is more often related to the management of these risks.

For the analysis of my empirical material from the Kāpiti Coast, I propose a slightly different understanding of risk. I follow the argument by the Geographer Anna Stanley, who says that risk is “neither a condition of geographical insecurity nor a self-evident or neutral heuristic for explaining the occurrence of harm, but a situated, political, and highly contingent way of framing geographical relations (...).” This understanding of

risk is then “more closely associated with notions of chance, probability and randomness than with danger, harm, or unfortunate events” (Stanley 2013: 7). Stanley’s approach situates risk less in a realist perspective that assumes the danger of a geographical situation, and rather shifts the attention to the practices that frame geographical relations in a particular way: through analytical calculations, expert knowledge, and specific representations that combine different entities and processes into one concept. In that sense risk is captured by the various problematizations that I discussed in chapter two, and that I will further elaborate on in this chapter.

The French philosopher Francois Ewald, by whom Stanley has been influenced, maintained:

Nothing is a risk in itself; there is no risk in reality. But on the other hand, anything *can* be a risk; it all depends on how one analyses the danger, considers the event. (Ewald 1991: 199, emphasis in original)

Building on this notion of risk, my analysis consequently focuses on the way coastal scientists, planners, and state authorities assess, calculate, and frame coastal processes as hazardous, and aggregate different data and processes into hazard assessments. Thereby, hazard maps for settled areas, as well as the identification of properties and infrastructures, are important tools for the calculation and representation of coastal hazard risks. Understanding the way coastal hazard risks are produced and negotiated is fundamental for understanding managed retreat in New Zealand, as managed retreat is intrinsically connected with a specific way of framing geographical relations in coastal areas.

In 5.1, I will present three important ways in which coastal processes and living in coastal areas has been reframed, which can be understood as a general framework in which the case study on the Kāpiti Coast is situated. In 5.2, the focus is on the case study on the Kāpiti Coast, where managed retreat has been publicly debated and disputed over the past years. I will recount some of the events that took place since 2012, and then look more closely at the methodology for calculating the hazard lines. I will debate the different interests in these kinds of hazard assessments and how the Council is using them, as well as some common criticism. Towards the end of the

chapter I will discuss different ideas by council staff and planners about how managed retreat could be implemented.

6.1 (Re-)framing coastal processes

Managing coastal hazard risks is a “significant challenge”

In 1959, the coastal engineer L. S. Donnelley published one of the earliest scientific articles about coastal erosion on the Kāpiti Coast. Next to the history of coastal erosion on this stretch of the coast, and the detailed description of the defense structures constructed by property owners and by the county, the author ended on a concluding remark:

It should be emphasized that the types of works described will not permanently prevent beach erosion, or hold back the forces of nature. However, they have proved most effective and will last a long time if given regular maintenance. The cost in both cases is extremely reasonable for coastal protection works, and it is within the financial ability of most local bodies to carry out work of this nature. These protective works have the effect of delaying the erosive action so long as they are maintained, and it is to be hoped that the present stage may prove to be a cycle in the course of nature, and be reversed to produce accretion again as in former years. (Donnelley 1959: 52)

At the time, Donnelley was optimistic that with proper maintenance the defense structures in place could be sustained, and that it was financially feasible for the county to hold-the-line. He argued that the structures delayed the erosive processes and was hopeful that soon the process of erosion would be replaced by accretion (the seaward movement of the coastal boundary). The general optimism by Donnelley for the long-term feasibility of seawalls is far less prevalent today. Based on my interviews with planners, council staff members and scientists, I will show that there is a widespread skepticism about hard defense structures and concerns about their detrimental effects on the beach, as well as an anxiety about the long-term effects of climate change and

sea level rise on coastal settlements. When Donnelley's assessment is put in contrast to the way the Ministry for the Environment describes today's challenges, it becomes clear that there has been a shift in the perception of the threats of coastal erosion. In the introductory words of a Guidance Manual, the Ministry describes the current situation and the future challenges as follows:

A high proportion of New Zealand's urban development has occurred in coastal areas. Some of this development has been located in areas that are vulnerable to coastal hazards such as coastal erosion and inundation. In recent years, coastal development and associated infrastructure have intensified, and property values have increased enormously. As development and property values in coastal margins increase, the potential impacts and consequences of coastal hazards also increase. Managing this escalating risk over the coming decades now presents a significant challenge for planning authorities in New Zealand. (Ministry for the Environment 2008: vii)

The difference between these two accounts is striking. Donnelley focused on the protection structures, attributed them effectiveness in the delay of the erosion process, as well as long-term economic feasibility. For him, it was a reasonable argument that one could hope for a shift in the coastal processes towards accretion. He did not problematize the houses that were built close to the shore, nor did he consider climate change and sea level rise at the time. By contrast, almost 50 years later the Ministry emphasizes the urban development of the past as producing the problems of the present. The focus is on the vulnerable location of the settlements in areas that are witnessing an increased occurrence of coastal hazards. The factors that are escalating the risk are the intensification of urban development and the rise in property values. Both taken together would increase the potential impact of coastal hazards. Throughout the Ministry's publication, climate change and sea level rise play a major role in problematizing the future development of the coast. Most importantly, the perspective has changed that it is not the maintenance of the defense structures, nor the individual houses that needed to be managed, but it is the *risk* that is described

as the most challenging aspect for government authorities. This is to say that coastal hazard risk has emerged as the main object of governmental intervention over the past decades. The reduction of risk is the main objective of political rationality in coastal areas.

Coastal processes are naturalized

A second important way in which coastal processes are reframed can be found in the publication *Coastal hazard strategy* by the Auckland Regional Council (2000). In the opening section of the report, the Council contends:

Coastal processes are a critical part of the natural character of the dynamic coastal environment. As with any system, the coastal environment oscillates through a range of conditions, and occasionally experiences extremes. These fluctuations and extremes help develop the characteristics of the system, and are a natural part of them. (Auckland Regional Council 2000: 1)

It is argued that coastal processes, such as erosion, are an integral part of the natural character of the coast. Especially the fluctuation between different extreme conditions is described as part of the nature of the coastal system. Consequently, coastal erosion is naturalized and not only portrayed as inevitable, but also as a desirable condition for the coast. Only these changing extreme conditions of the system make the coast to what it is. The argument continues:

Natural hazards arise from the interaction of such processes with human use, property, or infrastructure. Left to its own devices, there is nothing inherently "hazardous" about the coast. The risk imposed by hazards is the result of this nature/human interaction, and the effect of these dynamic and variable processes on the rather less dynamic and more static human resources of the coast. (Auckland Regional Council 2000: 1)

Risk arises only at the interplay between the dynamic coastal processes and the "more static" human-built structures on the coast. This distinction between the natural dynamic of coastal processes and the static character of human settlements is

common and an important rationale for coastal management approaches in New Zealand (see also Ramsay et al. 2012: 7). It implies a deficiency of human settlements that are somewhat inferior to the dynamic nature of coastal processes, and it connects to a trope that has been around for decades. An often-quoted phrase by Soucie from 1973 gives evidence for the persistence of this notion: "The real conflict of the beach is not between sea and shore, (...) but between man and nature. On the beach, nature has achieved a dynamic equilibrium that is alien to man and his static sense of equilibrium" (Soucie 1973: 56). This way of framing coastal processes as natural and desirable, and contrasting them to a static way of organizing human settlements on the coast, also condenses into ways of advancing new ideas about a better way of governing coastlines.

Living with coastal processes, influencing people, controlling existing use rights

The publication by the Ministry for the Environment quoted earlier contains a schematic entitled "The paradigm changes required to enable successful and sustainable management of the impacts of coastal hazards". This schematic portrays several shifts in management that are considered desirable, and it is a good indicator for what Foucault has termed the "art of government", or "reflection on the best possible way of governing" (Foucault 2008: 2). The schematic opposes a "Historical or prevailing paradigm" to a "Changing paradigm". The color code as well as the arrows suggest a development from the old to the new paradigm, whereby red is indicating danger or a system in emergency, while green is indicating hope for a better future.



Figure 1: "The paradigm changes required to enable successful and sustainable management of the impacts of coastal hazards" (Ministry for the Environment 2008: 4)

Among the changes, there are three aspects that I would like to point out, as they are important for my argument; the first, the third and the last point in the list, which are the paradigm changes from (i) "Hazards such as coastal erosion viewed as 'abnormal' coastal behavior" to "Living with coastal erosion as a natural cyclic process that helps shape the natural characteristics of the coastal margin", (ii) "Managing coastal processes" to "Influencing people", and (iii) "Little control over existing use rights" to "Increased control over existing use rights" (ibid).

The first point was just elaborated on with reference to the way the Auckland Regional Council describes coastal processes as natural. The schematic expands this notion by arguing that the new paradigm involves and demands the "living with" with coastal erosion in order to sustain the natural character of the coastline. A related argument was made by Bruce Braun in a paper entitled *A new urban dispositive?*

Governing life in an age of climate change, where the author talks, among other things, about recent concepts of governing the coastline of New York City in the face of climate change. Braun's argument can only be described in a shortened form. He argues that "acting on nature to protect society is nothing new. What is new is that one acts on nature not to change or stop natural processes, but rather to allow natural processes to occur" (Braun 2014: 59). He gives examples of soft coastal engineering projects such as the installation of wetlands, new islands, and oyster racks in the near-shore areas that ought to protect the city from inundation. The idea is to design coastal landscapes and processes in such a way that they, in their interrelation, provide a range of services to people, such as flood protection. Interestingly, Braun argues that the "'naturalness of nature' appears as an object and means of government" (ibid: 60). This is an important point that I also want to make about coastal hazard management in New Zealand, where the "naturalness of nature" has become the goal of government intervention, but also the legitimizing means for introducing government regulations. Next to risk, the naturalness of nature is an important means and object of government intervention in coastal management.

The second point is important, as it indicates a shift away from managing coastal processes to managing people. In Europe and the US, this notion is not necessarily new, and has been pointed out by Peter Ricketts, who has written about coastal hazard management in the UK and USA. He maintains:

The concept of the coastline as a battleground between man and the sea is receding, and with it the rigid desire to fight that battle with an ever growing armory of engineered weapons. Coastal erosion is now seen as part of the whole framework of management within the coastal zone, in which sometimes man's activities have to be controlled and regulated to allow for the vagaries of the natural coastal system (Ricketts 1986: 219).

Ricketts indicates an increased focus on the regulation of human activities, which is justified with the functioning (the "vagaries") of the natural coastal system. However, unlike the schematic by the Ministry above, I would argue that there is no complete shift from managing coastal processes to influencing people, but rather that human

activities are now to be managed *in concert with* natural processes, whereby the natural coastal system is to be granted its own right of existence. This reflection on how coastal management has changed, resonates with Michel Foucault's argument about the way modern government is about "the right disposition of things that one arranges so as to lead them to a suitable end" (Foucault 2007: 98). Foucault argued that "the end of government is internal to the things it directs (...); it is to be sought in the perfection, maximization, or intensification of the processes it directs" (ibid: 99). This is to say that the purpose of government rests in the (re)arrangement of humans, infrastructures, and environments in such a way that the "things" it directs, which can be humans as well as non-humans (Lemke 2015: 9–10), are directed according to their internal nature. The coastal processes and humans are managed in relation together, and according to their intrinsic needs.

The third point, which talks about an "increased control over existing use rights", is highly contested among planners and lawyers, and concerns the way state authorities like the Regional or the District Council may achieve a stronger influence over the legally granted right for private house owner to hold onto their property. Existing use rights enable "a landowner to continue to carry out an activity which was lawfully established in terms of the district plan rules which applied at the time indefinitely provided the character, intensity and scale of that activity is the same or similar to that which was originally established" (Berry and Vella 2010: 13). This is to say that a lawfully constructed house on a subdivided plot cannot easily be removed by state authorities, even if it is affected by coastal hazards. In the final part of this chapter, I will elaborate on this problematic and the way some planners argue that a managed retreat approach would not necessarily work through increased state control based on restrictions, law, or even expropriation. Rather, ideas are being developed about an increased influence of market-based instruments and risk-related valuation of properties that would *nudge* house owners to selling their property and eventually moving away from the hazard area. This approach ties back to an approach that is more focused on influencing people. Thomas Lemke showed that neo-liberal forms of government "characteristically develop indirect techniques for leading and controlling individuals without at the same time being responsible for them." He continued:

The strategy of rendering individual subjects 'responsible' (...) entails shifting the responsibility for social risks (...) into the domain for which the individual is responsible and transforming it into a problem of 'self-care'. (...) It [the neo-liberal rationality] aspires to construct prudent subjects whose moral quality is based on the fact that they rationally assess the costs and benefits of a certain act as opposed to other alternative acts. (...) the consequences of the action are borne by the subject alone, who is also solely responsible for them. (Lemke 2001: 201)

This aspect of responsabilization is evident in many approaches to the management of coastal hazard risks, and it is fundamental to managed retreat, as we will see in the remainder of this chapter. Private property owners are educated about coastal hazards and they are often left with an individual consideration of their costs and benefits of living in a hazard zone, as they are transformed into *risk aware citizens*.

Using these reformulations of coastal processes as a framework, in the following I will pay attention to the way a recent dispute about managed retreat and hazard lines has played out on the Kāpiti Coast.

6.2 Hazard lines on the Kāpiti Coast

Even though in some areas in New Zealand coastal hazard zones and setback lines have been in effect for a while (Turbott and Stewart 2006: 10–11), and there have been a few historical examples of relocations of houses (ibid: 16–19), the discussion about coastal hazards and managed retreat that started in 2012 on the Kāpiti Coast has been unprecedented in terms of scale and intensity. The Kāpiti Coast District is situated in the southwestern part of New Zealand's North Island. It belongs to the Greater Wellington Region, it is largely mountainous and the population of around 50.000 people lives in coastal settlements condensed on the narrow coastal plain that is wedged between the sea and the Tararua Ranges. The District possesses an approximately 40km long, mostly sandy coastline, of which around 25km is "having urban development directly adjacent to the coastal edge" (KCDC 2010: 4). The flat coastal plain is only slightly above current sea level, and it is divided by a number of

streams and rivers with steep catchments, “all of which present varying levels of flood risk to the settlements which have grown up around them” (KCDC 2010: 4). This makes flooding, next to coastal erosion, liquefaction and tsunamis, a relevant hazard and a challenge for District planners.

According to Statistics New Zealand, in 2013 the population of the Kāpiti Coast District was just short of 50,000 inhabitants. Especially in the 2000s, the District was among the fastest growing areas in New Zealand, and between 2006 and 2013 the population increased by 6.3 percent (Statistics New Zealand 2013). The low-density urban settlements have witnessed a substantial urban growth over the last decades. The small towns of Paekakariki, Raumati South, Raumati Beach, Paraparaumu Beach, and Waikanae Beach are all lined up on the coast and have grown from small villages into considerable urban areas. The contentious discussion about coastal erosion has mostly focused on the southern part of the coast, where the beachfront properties are built on top of the dunes and relatively close to the shore, and where over the past decades coastal erosion has been an ongoing issue (Gibb 1978). The southern part of the coast is, except from the Queen Elizabeth Park, mostly armored with a variety of protection structures, ranging from rock seawalls to wooden walls and dysfunctional remnants of old brush walls. Some of the protection structures were built by private property owners and other walls are Council-built. Most of the Council walls are still maintained today, and the construction of seawalls by private owners is not permitted anymore. Further to the north of the District, there are larger parts of the coast that are unsettled, and the smaller villages and the town of Otaki Beach have witnessed longer periods of accretion.



Figure 2: Southern part of the Kāpiti Coast, photo taken by JS in March 2014

The Council has repeatedly discussed coastal hazard issues and addressed the need for a managed retreat approach, such as in a Discussion document entitled *Natural Hazards & Managed retreat* (KCDC 2010). In their *Asset Management Plan*, the Council argued: “Managed retreat from natural hazards and relocating existing development away from known hazard risks is a key method of risk reduction which is being considered as part of the District Plan Review” (KCDC 2012c: 18). However, it was not until 2012 that the issue reached strong public interest.

A letter from Council

In late August 2012, about 1800 property owners on the Kāpiti Coast received a letter from their District Council. The letter, captioned with “New coastal hazard information to be included in LIMs” (KCDC 2012a), marked a turning point in debates about managed retreat in New Zealand, and provoked a heated public dispute for

years to come. The letter informed the recipients about the results of a coastal hazard assessment that was prepared by the consultancy Coastal Systems Ltd (CSL), and that had just been finalized. It stated that the hazard assessment, later just called the *Shand report* named after the author, “predicts where the shoreline is likely to be along Kāpiti Coast within 50 and 100 years” (ibid: 1). The letter continued: “Around 1,800 properties – including most beachfront properties in the district – are at likely risk of significant erosion or inundation (flooding) within 100 years. Up to 1,000 of these may be affected within 50 years” (ibid). Included in the letter was a map with three to four different hazard lines that showed the vicinity of the property. The map below is an excerpt of a map that property owners in North Paekakariki received. It shows three different lines: the *50-year managed line*, a *50-year unmanaged line*, and a *100-year unmanaged line*. The managed line assumes a continuous maintenance of the defense structure in place, and the two unmanaged lines assume a discontinuation of the defense structure currently in place.

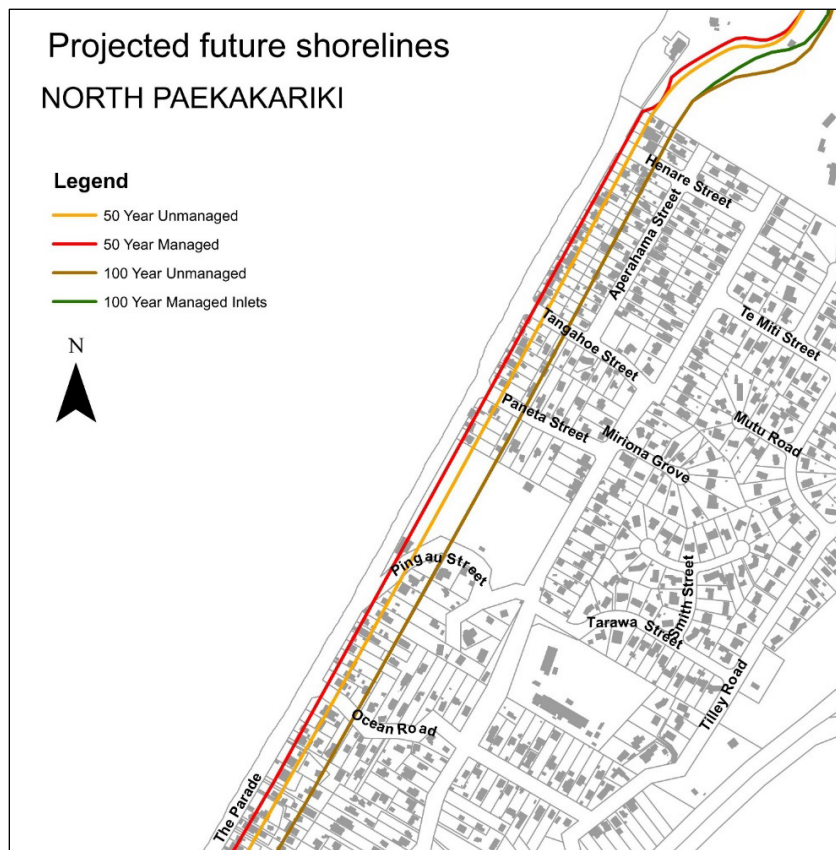


Figure 3: Projected future shorelines, North Paekakariki (Shand n.d.: 25, extraction from map)

For many property owners I talked to, the letter was a shock, and the maps with the hazard lines crossing their property was upsetting. The most distressing part was that Council argued that it was obliged to include the hazard information in the LIMs. The letter states: "Any future LIM requests for your property will include a neighborhood map of predicted shorelines, and a close up of the property" (KCDC 2012a: 1). A LIM, short for Land Information Memorandum, is a report issued by the Council on request. This report contains historical and current information about a particular section or property, including zonings or building restrictions, rates, notices, and hazard information about potential flooding or erosion (Wellington City Council n.d.). A LIM is commonly obtained in the process of selling or buying a property, and it is considered to be important in determining the value of a property. When property owners received the letter, many of them feared that this information would impact their property value, and that it would restrict their options of selling the property (Interview with Mark Fisher; Interview with Peter Anderson; Interview with Andrew King).

The potential drop in property value was then also the dominating theme in the media and the public debate in the following days. The local newspaper *Dominion Post* published several articles on the issue. One was entitled "Kāpiti erosion risk may devalue 1800 homes" (Blundell 2012a). In another article, an owner of a local real estate company is quoted: "It is scary. It will have an effect on values immediately because of the perception it creates" (Blundell 2012b). In the same article, a Community Board chairman is quoted: "They [the property owners] will think their properties will be washed away imminently and it is all doom and gloom. (...) People's property values will inevitably go down and they will be looking for lower rates payments" (ibid). The Council was criticized that it had devalued 1800 properties overnight, and that the affected owners were deprived of their capital assets (Blundell 2012a). The combined value of the 1800 properties was estimated at NZ\$1.2 billion to NZ\$1.6 billion, or even more (KCDC 2012b), and this number was used to criticize not only the way the Council had handled the process, but also to discredit the scientific methodology that formed the basis of the hazard risk assessment. Over the following

months the debate increasingly shifted towards a contestation of the scientific methodology.

In September 2012, only weeks after the letter was sent, the local action group *Coastal Ratepayers United* (CRU) was founded and soon became the deciding factor of the protest by affected property owners. The group launched a several week-long media campaign with large ads in a local newspaper. CRU was able to not only articulate the concerns of some property owners, but they would also considerably engage in the negotiation process and force the District Council to react towards their statements. They handed in submissions in behalf of the community group (Coastal Ratepayers United 2014), and encouraged other owners to hand in submissions (Tortell 2012; Weir 2013; Arnold 2013; Ruthe 2014), they organized protests at different public meetings in the Council, they wrote numerous letters to Councilors, staff members and experts (Ruthe 2012; Moller 2013; Allin 2014), as well as to the media (Padamsey 2013), and they supported a local resident who took the Council to the High Court.

During my interviews with members, I found CRU to be a loosely connected interest group of residents with different views and opinions, different grades of engagement in the group as well as with activities geared towards the Council. Despite the heterogeneity of the group, they shared a disbelief and anger with the way Council had not informed them enough and that they would not take their concerns seriously. One owner argued that they wanted to manage the risk together with the Council, but that they felt to be chased away:

This is a shared problem. People are sharing it with the council. We need a shared solution. The council should not be putting all its emphasis on determining where these famous lines should be, because in many ways, this is fiction. (...) the focus should be on identifying the risk and then managing that risk. And we are prepared to manage our risk with the advice of the council. We would like not to be penalized for living there. Because if we move away we're not going to abandon it, we're going to sell it. If we sell it somebody else will replace us, which is ridiculous. If you really want managed retreat then buy the entire coastal strip, demolish the

houses, give them a place somewhere else, and then it becomes a reasonable and practical solution (Interview with Mark Fisher)

The house owner was clear that the Council had chosen the wrong strategy, and that it rather should have engaged with the affected owners earlier. He insisted that he had legally bought the property and that he would have existing use rights, which could not be taken away. During my interviews in March 2014, there was still a lot of anger, anxiety, and uncertainty about the situation. To many owners it was unclear which provisions were legally binding, what the Council would do next, and how the hazard lines would affect the value of people's property. Even councilors and staff members were uncertain about how the process would develop further.

There were many events that took place after the letter was sent out, and it is beyond the scope of this work to recount them in detail. I will focus on the most important events and pay attention to the policies and provisions in the Proposed District Plan (PDP) that was publicly notified in November 2012. These policies and provisions provide an insight in how the Council framed the coastal hazard risk, how they wanted to manage it, as well as how they thought about implementing a managed retreat strategy. My argument is that Council did not just stumble over the strong opposition by the property owners, but also over procedural errors, which forced the Council to back down from their planning process and eventually withdraw the hazard lines from their PDP in 2014 (Maxwell 2014). This ties back to earlier considerations about practices of government, which can be perceived as fairly ad hoc and erratic, and that proceed "in a relatively aimless fashion, introducing 'management' into diverse sites and practices in a piecemeal and contingent way in response to a dynamic and changing world" (Braun 2014: 51). The introduction of a management plan is then an effort to establish a way of framing coastal processes, as well as an attempt to organize a state response to an environment that is increasingly perceived as volatile and hazardous. These government interventions are spatial in nature, as they analyze and assess coastal hazard risks in their potential spatial occurrence, and further organize particular government regulations in the coastal realm through the production of hazard maps.

The review process of the District Plan

The Kāpiti Coast District had been involved with coastal hazard risk management for some time. In 2003, they had commissioned the coastal expert John Lumsden (2003), who prepared a report entitled *Strategies for managing coastal erosion hazards on the Kāpiti Coast*. At the time, this report was publicly circulated and the local community was able to hand in submissions (KCDC 2013: 7). In 2004, Council staff recommended an additional peer review to be undertaken, and in 2005 Roger Shand, head of Coastal Systems Ltd. (CSL), was commissioned with preparing a reassessment of the Lumsden report. In 2008, the Kāpiti Coast District had started a review process of their District Plan. All District Councils are obliged to periodically review their District Plan. The District Plan is the central planning document for local Councils that, among other regulations, includes building restrictions, zonings, and planning provisions. The coastal hazard assessment that CSL was commissioned to prepare was meant to form the scientific basis for planning provisions with respect to coastal hazards. However, when Council received the report by CSL in 2008, it was not made public, as national government was in the process of redeveloping the New Zealand Coastal Policy Statement (NZCPS), which all District Plans must give effect to. The reworked NZCPS was published in 2010 (Department of Conservation 2010). Since the adoption of this new national legal framework, District Plans need to manage coastal hazard risks and must provide an extended planning horizon of 100-years. CSL updated the report to include the new requirements of the extended timeframe and made it available to the Council in August 2012 (KCDC 2013: 1). Subsequently, the Council sent out the letter to the property owners, as the Council was under the impression that they had a legal obligation to put this hazard information in the LIMs and to inform all affected owners.

In a newspaper article, the Sustainable Development Manager of Council argued that the report had been peer-reviewed and that council was legally obliged to put the information in the LIM reports. The manager is quoted: "If council had held this information and did not put it on LIMs, it would be open to legal challenge from any purchaser who bought a property that council knew to be subject to coastal erosion" (KCDC 2014: 10). Here, the manager addresses a concern that has also been voiced in the scientific literature: Councils are in a conflictual situation in which they likely must

deal with legal challenges. If Councils are in possession of hazard information about private property, they may be obliged to make this information publicly available. On the other hand, the production and circulation of hazard information may also put the Council in a position where they face litigation by property owners, as they may argue that the information devalues their assets (Alexander et al. 2012: 412).

Despite protests by residents, in November 2012 the Council publicly notified the Proposed District Plan (PDP). The PDP included a chapter 4, entitled *Coastal Environment*, which contained a part on *Coastal Hazard Management Areas*. This section stated policies and provisions for the management of coastal hazards, and it was contentious, as it was meant to build on the hazard assessment by CSL. In the chapter, the Council took close reference to the relevant policies in the NZCPS, and argued that it must identify coastal hazards, take climate change and sea level rise into account, and manage the risk in a 100-year timeframe (KCDC 2014: 8–10). It is stated that based on the Shand report, three Coastal Hazard Management Areas (CHMA) were “identified in the District Plan maps to address the management of development in relation to coastal erosion hazard risks” (ibid: 10). The two CHMAs that are most important for the following analysis are the *no-build urban CHMA* and the *relocateable urban CHMA*. The third zone concerns rural areas (KCDC 2014: 10). Next to the CHMAs, several policies provided details about regulations and provisions, and I will analyze them in some detail, as this gives an indication of how the Council approaches and frames coastal hazard risks, as well as the potential relocation of properties.

In Policy 4.12, it is stated that subdivisions and developments in the no-build zone need to be managed to “avoid any increase in the exposure to hazard risk, including by avoiding any new buildings and any increase in the existing scale and intensity of development within this area”, to “progressively reduce risk exposure over time” and “encourage reliance on natural dune protection and progressively reduce reliance on existing hard protection structures” (ibid: 14). It is explained that the no-build zone is the first zone closest to the shore, situated between the shoreline and the unmanaged 50-year hazard line. In this zone, any changes to the footprint of the built structure are not allowed, and it would not be permitted to enlarge the structure or add another building. This is to say that the no-built zone is an area where existing structures are

temporarily tolerated, but that over time the aim is to reduce the number of structures in this area. The construction of new buildings and an upgrading of existing buildings is perceived to increase the risk and is not permitted.

In Policy 4.13, it is stated that the second CHMA, the relocatable zone, aims “to ensure that the current level of hazard risk is not exacerbated by inappropriate subdivision and development, and to recognise that over time buildings and infrastructure may need to be relocated landward of the area” (ibid). The relocatable zone is situated landward of the no-build zone and demarcated on the landward side by the 100-year hazard line. The rationale of the implementation of this zone is “to ensure that development is able to be relocated if or when erosion occurs that threatens the buildings in this area, to minimise the property damage and prevent loss of life as a result of coastal erosion risks.” And further it is argued: “This policy will be implemented by rules which restrict subdivision but allow development, including additions to existing buildings, that is able to be relocated if it is threatened by erosion” (KCDC 2014: 14). In this zone, new subdivisions would not be allowed, and any new building added on an existing plot would require a resource consent, and the building would have to be technically relocatable (Interview with Margret Cooper, Olivia Marshall).

Policy 4.9 states that the use of hard defense structures is actively discouraged, and any new structures on public land should be avoided. It is mentioned that Council seawalls in the south of the District would be maintained but not upgraded, and that due to sea level rise they “will eventually become ineffective and need to be removed” (KCDC 2014: 12). Of interest is also Policy 4.15, which states that an adaptation strategy would be developed for the no-build zone, where hard engineering structures currently protect houses, “to progressively reduce the current exposure to coastal erosion hazard risks, and to recognise that over time buildings and infrastructure may need to be relocated landward of the area” (ibid: 15). As an explanation it is argued that due to the long-term character of the hazard risk, properties in the no-build zone may not experience erosion in the next 30 years, but that it would be necessary to not allow alterations to the buildings as this would “lead to an expectation of continued and increased protection for these properties, which is considered to be unsustainable,

both in terms of cost and effects on natural systems” (ibid). This shows that the policy is not just aimed at working on the future, but that it also is about influencing the expectations of property owners.

All these policies are not of interest because they are in effect now, but rather because they give an idea of how the Council thought about the management of coastal hazard risks, and how they attempted to implement a managed retreat approach. It can be mentioned right away that the quoted passages were not legally binding, and after an external review the Council was advised to withdraw these sections from the PDP, which they did in 2014. The withdrawal of the relevant sections was the result of ongoing public pressure, and two different external reviews. In 2013, the Council had commissioned a scientific expert panel to review the science, as well as a legal review of the planning process. In June 2014, Council received the two reviews entitled *Coastal Erosion Hazard Assessment for the Kāpiti Coast: Review of the Science and Assessment Undertaken for the Proposed Kāpiti Coast District Plan* (Carley et al. 2014) and *Independent Review of the Kāpiti Coast Proposed District Plan* (Allan and Fowler 2014).

The key finding of the Science review panel was that “the hazard lines recommended by CSL are not sufficiently robust to be incorporated into the Proposed District Plan” (Carley et al. 2014: 3). Next to a series of technical recommendations the panel gave to Council, it argued that the findings by CSL as well as the earlier report by Lumsden “should be considered by KCDC in the development of more robust hazard lines to be included in their District Plan” (ibid). In other words, the science panel gave a series of technical advice and recommended to rework the scientific methodology and hazard lines, but at the same time to take the findings from CSL and Lumsden into account. In return, this approach was criticized in a submission by a resident, who pointed out the apparent contradiction that on the one hand side the panel report criticized the methodology CSL used and concluded that the hazard lines were not fit for purpose, but on the other hand the report praised the quality of the work in several sections, and it recommended to use the data as a basis to move forward (Allin 2014: 6–8).

The report by Allan and Fowler looked at the legal implications for the planning process, weighted different scenarios, and proposed four different options for Council to proceed the process. In accordance with the report, in July 2014 the Council decided to follow the recommendations by the authors and to continue with the PDP process, but to withdraw and modify parts of the Plan. This "Option 4", as it was recommended by the report, allowed the Council to withdraw the contentious coastal hazard provisions from the PDP and rework them over a longer timeframe, include new scientific findings, as well as "make use of important input from submitters. It allows engagement with submitters while withdrawing contentious provisions like the coastal hazards provisions" (KCDC 2017: n.p.). With this action, the Council had bought itself time to do more research on the coastal hazard science, and to address the numerous criticisms from residents. With withdrawing the coastal hazard provisions, the Council committed "to a two-to-three year programme of scientific and engineering research" and to "form a Coastal Advisory Group (CAG) comprised of statutory agencies and community representatives to guide Council's future work programme in consultation with the community" (ibid), as it is explained on the Council's website. At the time of writing this dissertation, this process was still ongoing. It should be added that over the period of two to three years after the letter was sent, there was a high turnover rate of Council staff members and officers as well as councilors, whose resignation or redeployment was closely connected to the turmoil around the hazard assessment. The entire process has been stressful and upsetting, not just for the Council staffers, but equally so for residents (Interview with Todd Arnold, Sally Finch; Interview with Mark Fisher; Interview with Margret Cooper, Olivia Marshall).

In the following section I will look more closely at the methodology of hazard lines, as well as different criticisms towards the calculation of the lines and how they are being used in the public debate. In addition, I will ask the question how the Council justifies the production and usage of hazard lines, and why they are interested in this kind of expert knowledge about coastal hazards.

The calculation of hazard lines

Coastal Hazard lines first emerged in New Zealand in the 1970s, and have since then become an increasingly important instrument in coastal hazard management. Hazard lines are lines on a map that delineate areas potentially affected by coastal erosion. Most commonly, the lines are based on different (50 and 100 year) scenarios, and define the area potentially affected by erosion in these timeframes (Gordon 2015). According to Healy (2005), the first hazard assessment was done for the setback of new subdivisions in the Bay of Plenty, in 1976. Terry Healy, who was part of the advisory board at the time, was coastal scientist and Professor at the Waikato University in Hamilton. The terminology of describing the different elements and processes of the coast, as well as the methodology for calculating the lines, were largely developed in coastal science, and have then been adopted by consultancies and planners, and increasingly found their way into policy making and coastal management. The relationship between basic research conducted at Universities, and applied science from consultancies is strong, even though there is a considerable tension (Interview with John Stone).

From the 1970s up until the 2000s, hazard lines were commonly calculated for the placement of new subdivisions, which resulted in specific planning provisions and development setbacks, if erosion was anticipated. In the case of anticipated erosion, the buildings needed to be placed further inland. Development setbacks have been in effect in the Waikato Region since the 1980s (Environment Waikato 2002: 10). However, as Healy argues, the "methodology may also be applied to existing subdivisions, in which the setback zone becomes a zone of non-further development" (Healy 2005: 713). In recent years, hazard lines have been increasingly assessed for existing developments, and the Kāpiti Coast has been the biggest and most controversial case so far in New Zealand. Importantly, hazard lines are not just linear boundaries on a map, but they encompass an area between the high-water mark and the line itself, which is then defined as a specific spatial unit that is in itself consistent, and that is attributed with particular characteristics; and eventually can be assigned with restrictions and provisions. In the example of the Kāpiti Coast, as I have shown above, two different hazard lines result in two zones, the no-built area and the

relocatable area, which are two distinct zones or spatial units that have concrete planning policies attached to them.

With respect to the methodology for the calculation of the lines, Healy remarks that the mathematical equation has, since the 1970s, contained four parameters: the long-term erosion trend, short-term dune fluctuations, the expected sea-level rise effects, and the dune stability factor (ibid). Despite some alterations, changes in the terminology, and the addition of another factor, many current hazard risk assessments, such as the Shand report, still operate with the same equation, supplemented by a factor of a combined uncertainty. The summation of these four or five factors result in the spatial allocation of the hazard lines. In the following schematic, the effect of these four parameters are shown on a simplified shoreline, and it gives an idea of what the parameters are intended to calculate. The schematic shows that the short-term erosion and dune stability parameter form the current coastal erosion hazard zone (CEHZ), and may have immediate effect, whereas the long-term recession and sea level rise parameter form the future CEHZ and are mathematically projected for a given timeframe in the future.

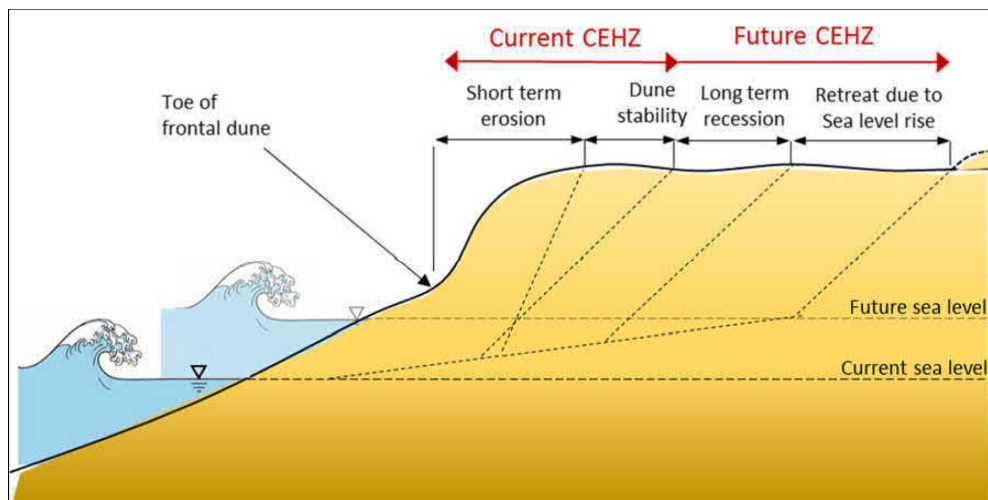


Figure 4: Open coast coastal erosion hazard zone (CEHZ) (Tonkin & Taylor Ltd 2017: 30)

The methodology of the Shand report differs in some details and with respect to the terminology, but the general idea is the same, and it is explained in the following.

The methodology of the Shand report

The calculation of hazard lines is a complex process that builds on cadastral maps and aerial photographs, statistical analysis, as well as historical shoreline data. The key piece of the Shand report is the equation, based on which the so called *cross-shore erosion hazard distances* (CEHD) are being calculated. The CEHD describe the potential shoreline retreat under different scenarios, and they represent one procedural step before the hazard lines are being assessed. The equation is reading as follows: “CEHD = LT + ST + SLR + DS + CU” (Shand 2008: 11). The five components of the equation are: *Long-term historic shoreline change* (LT), a component derived with statistical analysis “from cadastral maps and aerial photographs”, the *Shorter-term shoreline fluctuation* (ST), a component derived from statistical analysis of the historic shoreline data, the *Shoreline retreat associated with sea-level rise* (SLR) based on recent data on sea level rise estimates, the *Dune stability* (DS), a component that “accounts for scarp retreat to achieve a stable slope following storm erosion of the foredune”, and the Combined uncertainty (CU), which “refers to the safety margin derived by combining the *measurement error* (...), together with a range of *other factors* (...)” (ibid, emphasis in original). The summation of these discrete parameters resulted in the CEHD, and eventually in the determination of the hazard line position.

Over the length of 38km of the Kāpiti Coast, there were 68 coastal measurement sites where CEHD were calculated (see map below). The methodology used three different scenarios, which resulted in three different CEHD per measurement point, and consequently in three different hazard lines. The first scenario was “Seawall hold” that assumed the existing seawalls were being maintained for the entire period of 50 or 100 years, and that their functionality was guaranteed; the second scenario was “Seawalls are repaired” that assumed a timely repair of any wall failure with a moderate wall maintenance; and the third scenario was “Seawalls are removed”, which included a total wall failure with a subsequent removal of the wall (ibid: 12). The first scenario resulted in the “managed” hazard line, and the other two scenarios in the “unmanaged” hazard lines, as they were depicted in the map at the beginning of this chapter. The argument was that with these three scenarios the Council would have

been able to see the potential effects and could have chosen between the three options.

The following map is an extract from a larger map from the Shand report, only showing the southern part of the Kāpiti Coast. The map features the urban areas situated right on the shoreline, as well as the seawalls that are in place. On the left-hand side, the different measurement sites are shown, with the number indicating the distance (in km) from the most southern point of the Kāpiti Coast, the Fisherman's Restaurant, which functioned as a reference point.

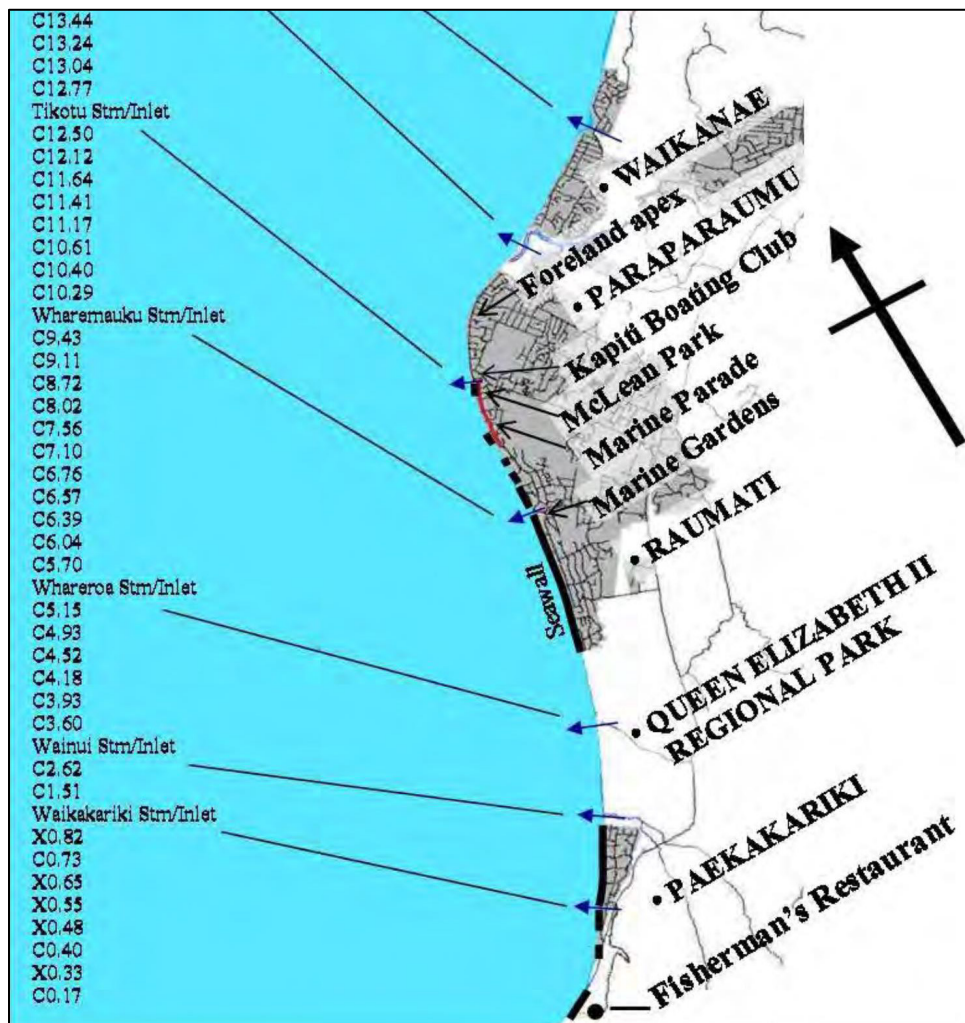


Figure 5: Map of the Kāpiti Coast with measurement sites (ibid: 9, extraction from map)

The used methodology in the Shand report has been widely criticized for using a dated methodology, for assuming a worst-case scenario, for not taking accretion into account, for being overly conservative, and for being intentionally precautionary (de

Lange n.d; High Court of New Zealand 2013: 3). In the following, I will provide a selective and brief reading of some of the criticism and extend the perspective on concerns about hazard lines in general.

Even though this approach has been around for decades and, as the author proclaims, it is “widely used in New Zealand for coastal erosion hazard assessment and is considered to be industry best-practice” (Shand 2008: 11), there is increasing criticism about this kind of hazard assessment on several levels. There are methodological concerns, but also criticism about the nature of hazard lines, what they represent and how they are perceived. With respect to the methodological concerns, Tom Shand et al. have argued in a conference paper that the NZCPS 2010 demands the use of a risk-based approach and the consideration of “both the likelihood and consequence of hazard occurrence. (...) Such a requirement is at odds with traditional techniques where single values are produced with limited understanding of the likelihood of occurrence or the potential uncertainty of the prediction” (Shand et al. 2015: 1). The Shand report has not included a calculation of the probability of a hazard, nor has it quantified the potential damage of a likely hazard event. Tom Shand et al. continue to explain that conventional approaches have “typically applied deterministic techniques, separating and evaluating discrete components of the coastal erosion issue before combining them, often with an additional factor of safety or measurement error allowance, to produce an erosion hazard distance”. The authors say that these approaches “have advantages in being easily understood, interpreted and updated in the future as additional data is collected. However, the methods can result in conservative (large) values (...)” (ibid). As a result, the hazard zones would extend further landwards and would include more properties in the zones, which would then lead to more properties being subject to building provisions and potential loss in value. This is to say that the discussions about the methodology has immediate effects on property owners, but also on the Council and their asset management.

The debate among planners and scientists circles around the question whether the approach should use a deterministic or a probabilistic methodology. A probabilistic approach is briefly explained by Tom Shand et al.:

The concept of using stochastic simulation for prediction of coastal processes has been developed over the last decade. This technique uses a distribution of values for each parameter to account for expected variation, or uncertainty, rather than single values. Parameters are then combined by a monte-carlo technique to produce a probabilistic forecast of the relevant process. (ibid: 2)

A probabilistic approach is computation-intensive and requires advanced mathematical and statistical knowledge. It also requires high-detailed field data, and it in effect results in hundreds of different hazard lines that each have a particular probability of occurrence. This methodology is particularly advocated by scientists and some consultancies. However, as I will show shortly, the political decision makers and Council staffers are not particularly interested in these kinds of results, but rather in single hazard lines to be put into the District Plan.

With respect to what hazard lines represent and how they are perceived, in my interviews I heard numerous times that the common representation of hazard maps is problematic. A NIWA staff member said:

I think coastal hazard lines give a very false impression to people. If you're talking to communities, coastal hazard lines have people think they're safe there [behind the line] and in danger there [in front of the hazard line]. Well that's not the case, there's just a higher chance that you'll be at risk there than you are there. (Interview with Josh Lowry)

The problem is that once the line is drawn on the map it invokes the feeling of safety or danger, even though the methodological implications of what the lines represent and how it is being calculated is barely understood. As a staff member from the Kāpiti Coast District Council has maintained, the hazard lines are not a prediction of the future shoreline, but rather a spatial projection of possible erosion risk: "The line doesn't represent a future coast, and that's what people think it means. They think it's a prediction about where the coast will fall. It's not. It's about the extent of the risk in any particular area but we don't know which areas, so it has to be averaged" (Interview with Margret Cooper, Olivia Marshall).

This leaves the question how the hazard lines should be used in the public debate. A reasonable argument was made in the *Interims judgement of the High Court*, which was a court case between KCDC and Mike Weir/CRU. In this interim judgement, Judge Williams questions the way the hazard lines were represented in the LIMs and in the information letters from 2012. He argued that it was obvious that all the nitty-gritty assumptions and methodological questions could not be addressed in the document, but could only be summarized and refer to the original reports. The judge acknowledged that the Council had many different options with respect to how it represented the hazard information on the LIMs. However, Council should also have considered that the lines could potentially affect the value of many coastal properties. "That consideration ought at least to sharpen the obligations of accuracy and fairness. After all, across 1800 properties there must be many millions of dollars at stake. It would be a callous Council indeed that was unmindful of that potential impact" (High Court of New Zealand 2013: 20). In addition, the judge stated his bewilderment with respect to the "the stark simplicity of the prediction lines". He continued:

None of the many and important conditions and assumptions contained in the Shand Reports are obvious in the graphic. To understand what they really mean one must go through the five pages of relatively densely written material. With respect to the Council, those five pages are hardly an exemplar of clear communication of the big points that a potential purchaser must know in order to properly understand the meaning of the lines. (High Court of New Zealand 2013: 21)

This interims judgement is not particularly charming with respect to the quality of the Council's work. This should be taken seriously, as most of the adversarial public debate was about the scientific methodology and whether the hazard lines were properly calculated. However, as I contend with the appraisal of one of my interview partners, the debate about the right science and where the line should be distracts from the more profound question of what to do in the future and how to go about the erosion risk. My interview partner argued that the exact location of the lines was not so important, but rather that it was acknowledged that some coastal areas are

witnessing coastal erosion and that something has to be done about it: “The coast is eroding, something has to happen. That’s where they need to start. It’s more about the adaptation plan as to where the line actually is” (Interview with Emily Wilson). Unfortunately, far less time and effort were invested in discussing ideas about a potential adaptation plan as to how the Kāpiti Coast will deal with continued urbanization and sea level rise in the future.

Hazard lines as a technology of simplification and legibility

In the last section I have recounted some of the criticism towards hazard lines in general, and the Shand methodology in particular. But so far, I have not discussed why Councils are interested in hazard assessments. When we take away the obvious point that District Councils are legally obliged to apply a risk-based approach for planning in coastal areas due to national legislation (NZCPS 2010), it is still of interest how the Council frames the advantages and the need for such a hazard assessment. My argument is that Councils have an intrinsic interest in easy to use, clear and scientifically robust expert knowledge that helps them to discern potential hazards and provides them with certainty and legitimacy for any contentious planning purposes, such as managed retreat. That the Shand report has not provided this, is not entirely attributable to its shortcomings. Any other report would have also likely caused upheaval and contentious debates among affected property owners and Council, and even a more robust scientific assessment could have ended up in a court case. Coastal management on an urbanized coastal area with expensive private property is most likely conflictual (Alexander et al. 2012).

The advantages of a probabilistic approach, as some scientists and planners advocate, is not necessarily shared by Council staff members and policy makers. As one NIWA staff member remembered a conversation with Council planners:

We talked with the planners and we thought about a fuzzy line kind of approach where you could give some kind of probability, and they said in a planning sense that that’s not gonna work. For surety, you still need a line. [A line that indicates the area that is safe from erosion]. (Interview with Pete White)

The Councils are interested in obtaining particularly tailored reports and information that they can use for the planning purposes. They rely on scientific expertise that can withstand legal challenges, but that is also fit for purpose in the District Plan process. One of the staff members from the KCDC told me why they chose CSL.

We purposely chose practitioners who were experienced in this work. So, they understand the Resource Management Act, whereas a scientist is saying this is the science. That is fine. At the end of the day there is so much uncertainty out there with climate changes. But because this is a District Plan process, it is a legal process... So, all of the practitioners that we have used are well versed in the RMA. (Interview with Wayne Hamilton)

The application of a probabilistic approach would not contradict this requirement voiced by the Council staffer. The coastal expert could use a probabilistic approach and at the same time be familiar with the planning requirements and the Resource Management Act (RMA). However, the Council is not necessarily interested in an approach that may be more scientifically sound, but that would also be more difficult to implement into a District Plan. The Council is interested in a few hazard lines on a map that distinctively discern and single out the properties and infrastructures at risk. In case of a probabilistic approach, there would be many different lines with different values of probability, but in the end, it would be a more difficult political decision to decide on the level of acceptable risk, and whether to put the boarder of the no-build zone at 70%, 40%, or 10% probability of occurrence. This approach would enhance the complexity for decision makers.

In Political Ecology, research has focused on the numerous ways the state apparatus has attempted to create legitimacy and reduce the complexity of the world by using maps, charts and other forms of representation (Robbins 2008). Single hazard lines on a map allow the Council to reduce the complexity and attach concrete planning provisions to the different hazard zones, which then provide a timeframe for planning purposes (50 or 100 years). As James Scott (1998) argued in *Seeing like a*

state, this is commonly done by “state simplifications” or “projects of legibility” (ibid: 80).

State simplifications such as maps, censuses, cadastral lists, and standard units of measurement represent techniques for grasping a large and complex reality; in order for officials to be able to comprehend aspects of the ensemble, that complex reality must be reduced to schematic categories. (ibid: 77)

For Scott, these simplifications are essential for the existence of the state, and in part constitute the power of the state. Legibility is achieved by creating distinct categories, in which a phenomenon can be grouped, and which then renders a phenomenon calculable and ready for management. In the case of the Kāpiti Coast, this would be the attempt to extrapolate current coastline trends into the future and put it in a rather simplistic form of a map, to achieve some form of order and operability of planning processes. The Council’s overall aim is to reduce the risk in the form of potential damage to public infrastructure and private properties, but also to halt an uninhibited densification in the immediate coastal areas and the further construction of hard defense structures. The last point is immediately tied to the goal of preserving and recreating more natural coastlines that are not built-up with seawalls.

However, Scott also argues that in many instances these strategies of simplification do not work as anticipated. He contends that simplifications are “never fully realized. The data from which such simplifications arise are, to varying degrees, riddled with inaccuracies, omissions, faulty aggregations, fraud, negligence, political distortion, and so on”. He then adds: “A project of legibility is immanent in any statecraft that aims at manipulating society, but it is undermined by intrastate rivalries, technical obstacles, and, above all, the resistance of its subjects” (ibid: 80). Even though I would not claim that the hazard lines are a project of “manipulating society”, I would emphasize the internal conflicts in the Council that occurred between elected Councilors and staff members at the time. Some of my interviews with Councilors (Interview with Thomas Harris; Interview with Randell Thomson) as well as the newspaper columns by the

Councilor K Gurunathan, who became mayor of the Kāpiti Coast in 2016, give evidence (Gurunathan 2012a, 2012b, 2014a, 2014b). Gurunathan was particularly critical of Council staff members and officers, who did not inform the Councilors about the legal process and some actions that were taken. And even more important for the failure of the project was the successful mobilization of residents that some members of CRU were able to achieve. But these two points do not warrant to allege the state with a coherent strategy and oppose it to the society as a whole, like Scott suggests. The state is not a coherent actor that is opposed to its subjects, but rather there are alliances as well as competing interests crisscrossing the suggested border between the state and the civil society. My argument is that the Kāpiti Coast District Council, and especially the staff members, were in most part interested in an uncomplicated and reliable approach to differentiate the coastal space in a safe and a risky space to make it legible and governable, and also to attain a certain degree of legibility through an external risk assessment.

In retrospective, the process that started with the letter to the owners and that is still ongoing today, has showed that the Council was overwhelmed by the public pressure and had trouble with managing and communicating the process, and that the implementation of a managed retreat strategy is highly contested. The scientific methodology was discredited in such a way that CSL later published a statement and called the process a “nationally unprecedented resident-driven media criticism” (Shand 2015). One property owner described the complex situation in early 2014 as follows:

the Shand report didn't say it was likely and if you read it it's clearly not likely because he's taken a worse case and added a worse case to worse case. So, in fact his lines are extremely unlikely. But the letter we got from the council said this was likely to occur, it's becoming more urgent, we've got to take action. I think what happened is that they [Council staff] misunderstood the Shand report, they thought that his lines were lines that were likely. And if his lines were likely to occur in the next 50 years, they bloody well should be thinking about managed retreat. I mean it was

just like a misunderstanding on top of a misunderstanding (Interview with Linda Hathaway)

The main point of the discussion was about the methodology of the hazard lines and the potential devaluation of properties. The nitty-gritty of the conflict and the discussion about the methodology distracted from the initial aim of Council to manage coastal hazard risks and to implement a managed retreat approach. In that sense I contend with Rutherford, who argued that “governing does not arise as a fully realized project, but is debated, revised, fine-tuned and continuously in need of re-articulation” (Rutherford 2007: 300).

In the following section I will move away from the conflict on the Kāpiti Coast and draw mainly from several interviews with senior advisers and Council staffers from the Waikato Region, who have worked on the Coromandel Peninsular. These interviews did not focus on a particular conflict, but rather dealt with concepts and ideas of how Councils could implement a managed retreat strategy and what the main problem with an urbanized coastal area was.

6.3 Value of the beach: managed retreat as a strategy of shifting values inland

As I have shown in the discussion above, the aggregated value of properties potentially at risk from erosion has been an increasingly strong argument for different state authorities to start developing strategies of managed retreat. For New Zealand, the Ministry for the Environment assessed the amount of capital assets situated in coastal hazard areas. According to the study, for areas less than 1.5m above sea level, 68,170 buildings are at risk, which amount to a replacement cost of NZ\$19 billion (Ministry for the Environment 2017b: 11). Older figures from 2009 suggest for Australia a replacement cost of AUS\$63 billion with respect to property at risk of inundation from 1.1m sea level rise (Abel et al. 2011: 281). These aggregated numbers, often visualized on maps, are key drivers for government action, and are often used as an argument for new policies.

Especially local Councils face the dilemma that the attractiveness of the coastal environment is on the one hand a strong factor for economic and urban growth. Property prices for many coastal areas are rising. For the Kāpiti Coast, the most recent valuation of 25,599 properties has shown that the total rateable value in the District is NZ\$15.08 billion. This amounts to an average property value of \$541,500, which is an increase of 37% over the past three years. "The updated rating valuations should reflect the likely selling price of a property at the effective revaluation date" (Cutting 2017).

The proximity to Wellington makes the Kāpiti Coast a highly desired place to live, and the spatial limitation of the District makes planning difficult. The District is on the one hand aiming to preserve and enhance the natural character of the coast, and on the other hand it pursues a strategy of urban growth (KCDC 2006).

In an article entitled "The Kāpiti key to Wellington's growth" (CBRE 2012) by the largest commercial real estate investment companies in the world, CBRE, it is argued that the District is likely to see more urban growth in the near future. Opportunities for growth and business demand are met by a general political willingness to pursue a path of growth. In the article, the then-mayor of the District, Jenny Rowan, is quoted that the Council is in favor of further economic development: "Our vision is all about attracting and retaining business and economic growth opportunities into our community. We are open for business, looking for conversations with business and already experiencing real results" (ibid). She goes on to say:

Our airport is now taking three flights into Auckland every day, rail is double-tracked into Wellington and we are awaiting the development of the expressways into the district. All of these factors will enable the flow of people and trade into our district. (ibid)

The continuous growth of the District would potentially increase property prices, but it would also exacerbate the pressure on new urban developments. The desire for beachfront property would potentially increase as well, as new affluent residents would move to the District. An implementation of managed retreat would not become easier.

The District benefits from the increased property prices, as it represents the attractiveness of the District and forms the basis for the rates, but on the other hand it also raises the pressure to establish a safe and prosperous environment. It increases the pressure on the Council to act and construct defense structures in case of erosion. Several staff members argued that the rise in property prices made it more difficult for them to manage coastal erosion and to attain a sustainable coastline in the face of sea level rise and climate change. One planner observed that the ramifications of the financial crisis in 2008 had a positive effect on his work. "I think the financial downturn helped a lot. It took the heat out of the demand, but eventually if we don't have another financial meltdown, the demand will grow again." (Interview with Pete White).

A rising demand drives up property prices and lets people forget about coastal risks that are associated with beachfront properties. But it also changes the expectations in the property and the willingness to engage in legal battles with Council. One asset manager from Hawke's Bay said that over the last 10 years he witnessed a considerably stronger engagement of property owners with planning questions, and that his job has become more difficult. "There is a greater awareness amongst the public. They are probably much more quick to engage their own expertise, whether it be legal or scientific, or engineering, or whatever" (Interview with Sam Rogers). A related argument is that beachfront property owners are described as wealthy and influential people. For the Kāpiti Coast, one councilor describes the CRU members as an "intelligentsia" (Interview with Thomas Harris). A council staffer from the Thames Coromandel District describes the owners on the Coromandel Peninsular as follows:

I'm not trying to demonize the beachfront property owners but of course, they're very adept at putting their case, articulating their position. They haven't got where they've got today by sitting on their thumbs and keeping quiet, if you understand what I'm saying. (Interview with Ron Johnson)

In addition to the in parts well-organized opposition Council faces from beachfront property owners, they also need to deal with the constant cycle of redevelopment. The

construction of seawalls stabilizes property values, as it fosters expectations in a stable investment, and hard engineering may also encourage new developments. This new development then demands a strengthening of the protection structures, once a storm threatens the property. This self-perpetuating process is acknowledged and problematized by the Ministry for the Environment (2008: 3) as the “development – defend cycle”. A council staffer from the Coromandel Peninsular explains:

Once you’ve built a seawall it’s very difficult to remove it. And of course, if it becomes increasingly capitalized to a greater extent, you’ve got to build a seawall bigger and higher. You’re getting into a never ending cycle. You’re sort of building a spiral effect; you build a seawall therefore you can build a bigger house and then a big event has a go at the seawall. You’ve got to, then, build your seawall higher and before you know it, where was your beach? Why did you actually come here in the first place? Because you’ve got a house and huge seawall and not much beach left.
(Interview with Ron Johnson)

Many interview partners described the widespread idea that rising property prices would imply the need to regularly renew the building stock. As the property value for beachfront property is closely associated with the land value, a renewal and expansion of the building can exponentially raise the overall value of the property. If someone is willing to pay a large sum for a beachfront property that only consists of an older bach, it is quite likely that the bach will be demolished and replaced by a larger and more modern house. A planner from Hamilton says:

I found it quite interesting talking to one of the developers. Our building act says that you’ve got to think about a lifespan of 50 years, and in his mind you’re only thinking about 25 to 30 years and then the house goes and you rebuild because the property is so expensive that you need to keep renewing the building stock. That’s a good developer’s perspective, isn’t it? [laughs] (Interview with Rebecca Smith)

A similar situation is described by Cooper and McKenna (2009: 533–534) for the British Islands: “The situation rapidly arose that the footprints of houses were worth more than the buildings themselves; consequently all around the British Isles, houses were demolished and replaced with multiple units a few years after initial construction.” The inherent logic of the property market highly values properties at risk, which commonly already have building restrictions in place, so that under current law the construction of the building would not be allowed. In an email conversation with a staff member of a property valuation firm, I was told that properties at risk are generally seen as a scarce commodity, as it cannot be replaced. He continued: “I recall a noted architect in NZ commenting on the coastal property market that ‘peril is a luxury’” (Leary 2014). As investment capital is abundantly available, coastal properties at risk would find a steady market.

However, there is some change, as risk-based information is increasingly available to a range of actors, who become aware of the problematic, and discuss how coastal hazards may change the way properties are commonly financed and insured. The details of this question may pose a problem for government agencies to ensure a stable property market and to provide the opportunity for residents to purchase and finance private property. It has recently been debated whether insurance companies may soon withdraw their activities from areas where coastal hazards are to be expected (Science Media Centre 2017). This would have ramifications for property owners and banks, as Storey et al. explain:

Climate change could precipitate home loan defaults because of the maturity mismatches between residential insurance and mortgages. Insurance is a requirement for residential mortgages in New Zealand and failing to maintain insurance can trigger default. While mortgages are often granted with repayment periods spanning decades, insurance contracts are renewed annually. Insurers are thus able to completely exit an insurance market within 12 months, while a lender may still have decades before their loans mature. Insurance retreat could leave some lenders with a portfolio of assets in technical default. Whether banks experience material losses will depend on the number of houses made

uninsurable, the geographical concentration of the bank portfolio and the pace at which banks can divest themselves of mortgages on uninsured properties. As a consequence, bankers expect that in the future they may lend to owners of coastal property less often, or require more equity or higher interest rates. (Storey et al. 2017: 8)

Insurance companies are more flexible and may withdraw their activities more readily, whereas banks are involved for longer terms in financing home mortgages. One of the co-authors of the report comments that “government may step into this market to replace the private insurers, but we don’t know whether and how that will happen” (Science Media Centre 2017: n.p.), and continues: “if the government does not intervene, the cost is likely to be borne mostly by the owners whose properties will not be marketable anymore” (ibid). The author suggests that it is going to be a “very chaotic transition” unless it can be prevented, and “the earlier we design policy and legal tools to do that, the easier it is going to be to enact them” (ibid). This challenges government to develop new strategies and policies for sharing the burden of costs that may come in and start a debate about who should pay. A series of considerations related to managed retreat have engaged with these questions and will be debated in the following sections.

The economic value of the beach

The valuation of environmental assets is a common concept nowadays (Daily et al. 2000), and more specifically there have been numerous research articles on the relation of beach quality and property values (Pompe and Rinehart 1995) as well as studies that examine the way beach-goers value their experiences at the beach (Tunstall and Penning-Rowsell 1998; Dahm 2002). Several Council staff members and environmental consultants shared the view that the construction of seawalls would degrade the value of the beach, but that it was very difficult to convince property owners and councilors about the negative effects of seawalls. They said that their arguments had a better chance to be heard when there would be a stronger economic perspective on the value of the beach. A staff member of the Waikato Regional Council proposes to understand the beach as an infrastructure with an economic value, just

like a road or a sewerage facility. He argues that there is not only a built infrastructure, but also a natural infrastructure. For a built infrastructure it is commonly accepted that it has an economic value. Regularly, the value is assessed, which then forms the basis for property rates and other taxes. But his argument is that it is equally important to understand the beach as an infrastructure with an economic value.

People need to be educated, told the value of the beach, how it is a significant asset, a natural asset for their community just like the sewerage plant is. And I would talk in that language. I would say: this is natural infrastructure – the beach. Here's your shops and your hall; that's built infrastructure. (...) Just like your built infrastructure you need to look after the beach and maintain it. They all have economic value. (Interview with Fred Collins)

He reasons that the Council should look after the beach like it maintains the basic infrastructure that supports the shops. The beach is in many cases the reason why people moved to the area in the first place. It plays an important part in the routines of people, as a scenic background for their lifestyle, or as a source of income.

Collins uses the notion of a brand to describe the value of a beach to a coastal community. Once the beach is in a degraded state because of the seawall, the brand has taken a hit: "The beach brand is eroded. It's not just the beach that's eroded but the amenities eroded and the brand is eroded and the public's perception of that location as a desirable place to visit slowly gets eroded too" (ibid). For him, it is inevitable to put an economic value to the beach to make its value visible, and to measure the value's decline in case the seawall that protects private properties has detrimental effects on the value of the beach, which is a public infrastructure. "I think the way we'll get it through to councilors, through the political process, is by presenting it in terms of the economic benefit of beaches" (ibid). He says with respect to the financial benefits for the town, people would not visit a coastal community for the shops, but for "the naturalness, the amenity. So that is the selling point. That's the economic driver for that locality, and if you're gonna start degrading the quality of

that experience, you're actually degrading the value of your place" (Interview with Fred Collins).

Collins argues for a monetary value related to a beach, also because in many planning processes a cost-benefit analysis is becoming more important. Even though he is not comfortable with economic valuation of beaches, he says: "I honestly think we have no choice" (Interview with Fred Collins). He sees it more as a tool to protect the beach, and not necessarily as a method to tell the truth about the value of the beach. Mocking other financial predictions in urban planning, where public money is spent (on Rugby or race car events) with the argument of overall public benefit, he acknowledges that these economic valuations are "wildly wrong". But he would have no regrets "producing something which we know is probably wrong when [it is in the] right orders of magnitude" (Interview with Fred Collins); and when it helps the cause of protecting the beach by preventing the construction of seawalls.

In a similar vein, a senior coastal consultant argues for a valuation of beaches, even though he is generally skeptical about economic valuation of coastal environments. He criticizes economic assessment methods for not being able to perceive and quantify aesthetic and environmental values. When I ask him whether it would be a good idea to put a value to the beach, he answers:

No, I don't, 'cause ultimately you can't, but I think it's a very good movement in the sense that it's getting people to think in economic terms. Instead of just calling environmentalist tree huggers, they suddenly understand no, what these people are talking about is protecting an economic asset. So, from a banker's point of view, a beach is an economic asset... The ecological value of the beach wouldn't mean anything to him.
(Interview with Josh Brown)

Brown argues that the way people value a property is closely related to the state of the beach. He has worked with many beachfront property owners in his professional career, and he mimics a conversation with one of the property owners he has worked with:

“Why are you here? Why did you pay \$2 million for this house?” “Well, it’s a nice beach. It’s lovely, I like walking along it.” Well, those values that you enjoy, that you paid for this house, they are inherent in that beach. When you cover that with rock and you say, “I protected my property,” then you’ve also destroyed something that brought you here. You’ve destroyed some of the values that you love and let alone what other people love.
(ibid)

He describes the paradox of hard defense structures: on the one hand, a seawall leads to believe that the property is safe. On the other hand, the seawall takes away the aesthetic beauty of the beach that are highly valued by many people. He implies that hard defense structures destroy the natural value of the beach, and that this eventually would degrade the monetary value of the property as well. He continues:

The economic value of your property depends on those beach values being maintained. If those beach values get run down the chances are your property value will go down with them because people will say, “Well hell, we don’t wanna live there, what a dump. We’ll go live somewhere else” (Interview with Josh Brown)

This problematic situation urges coastal planners to run information campaigns with property owners in which they talk to them about the relation of the state of the beach and the value of the property.

A Council staff member of the Coromandel Peninsular I quoted earlier argues that some people are beginning to understand the necessity to look after the assets that bring people to the area in the first place:

If you’re looking to buy a place with high natural character, you won’t buy at a place where you’ve got seawalls. By degrading the very asset which you’re seeking to utilize as part of a destination economy, over time, you start to rundown property values and of course people don’t visit, they don’t invest, they don’t come to live. Over time you’re starting to impact

on the sustainability and the resilience of your communities. (Interview with Ron Johnson)

All three experts have in common that they argue for the preservation of the beach to protect not only the beach itself, but also the monetary value of the properties in place. However, this poses a problem, when the property is at risk from erosion, and only a seawall would protect its integrity in the current position.

Devaluation of property at risk by internalizing potential damage in sales prices

Therefore, one aspiration shared by some experts is to achieve a more appropriate valuation process of property at risk that would also include property that is currently protected by a seawall, which may not be sustained in the long-term due to the detrimental effects it creates for the beach. Josh Brown is convinced that a steady devaluation of coastal property at risk would influence potential buyers and make beachfront property less attractive as an investment. A steady decline in property values would then also facilitate Councils and consultants to convince people to move to a different place that is not affected by coastal hazards. For Brown, there are several things that this strategy would consist of. It would demand for better and more transparent information about the potential coastal hazards for the individual property, as well as a comprehensive evaluation of how these hazards will develop in the future. Moreover, it would demand District Councils to be stricter about the future construction and maintenance of seawalls, either by the Council or private initiatives.

We're trying to get to [the point] that people who own those properties, gradually you're internalizing the risk. So those properties get very high values at the moment because people buy them according to the amenity of the property and they assume they can do whatever they like to protect it. Once they understand they can't do whatever they like, that there are other interests that have to be taken into account, they will say, "Okay, can I protect that property? Yes I can up to this point," and then they will be more realistic in how they price those structures. (Interview with Josh Brown)

This is again where the concept of managed retreat is taking shape. According to Brown, managed retreat as a long-term planning strategy is about informing property owners about the risks to their property, as well as a reduction of rights to the owner. He says that it would be appropriate to tell property owners that one day they will lose their house, and to increasingly reduce property rights over time. He proposes to develop a buy-out plan that presents a high incentive for owners to sell their property sooner than later.

“Look, in the short term we’re gonna bail you out, we’ll share your losses. In the longer term you’re on your own and we’re gonna give you this sort of information. You can decide, you wanna stay there? We’ll probably buy at a reasonable cost and let you stay there, build that into the cost. But at a certain trigger point you have to go whether you like it or not. The house goes, and you go and that’s the end of it. We take the rocks and rubbish out and the beach comes back.” (ibid)

Brown proposes a fund from different sources that could buy out property owners, and that the buyout sum would decline over time. The owner could take x amount today, half the amount in 10 years, and by the time a trigger point of erosion was reached, the owner would have to vacate the property without any compensation. A demolition order is usually issued by the District Council (Harris 2016). The trigger point could be a well-established physical mark on the plot, such as a boundary stone. Once the erosion would reach this mark, the house would have to be vacated. And if the trigger point was never reached, the owner could stay in the house. An important requirement for this strategy would be a constant monitoring of erosion. Brown argues that if the risk was internalized in the property value, people could make a better choice on whether to buy a house or not, or whether to move out or not. He says that this approach would take the risk away from the tax payer and it would closely tie it to the property owner, who could make a well-informed decision.

This suggestion would take away the political pressure from the Council to decide about properties that are immediately affected by erosion. It would also give home owners a clearer perspective on what to expect from their property. However, this

position is conceptual in nature and not implemented in any policy plan or practiced among Council staff. I would assume that there would be a general animosity of tax payers who would realize that some property owners were offered buyouts, and other would not, or that they had to pay for someone who had bought a second-home that was worth several million dollars. The credo of buyer beware is common in New Zealand. Presumably there would also be a contested debate about the science that the hazard projections are based on. As we have seen from the Kāpiti Coast, the implementation of hazard lines is contentious, especially because the scientific evidence on regional sea level rise, the frequency of storm surge events, as well as the associated short-term and long-term erosion rate is contested, and coastal processes are generally difficult to project over longer time periods.

Managed retreat to recreate new values

Another conceptual idea is that a managed retreat approach could be designed in such a way that a buyout would not demand extra public funding, but that the approach would be cost-neutral.

So if you had a managed retreat approach you could say strategically, because of high risk locations, we're going to, over time, purchase these properties and remove them, and that will create an open space that currently isn't there for a park, an amenity, but also a view shaft that people can actually see they're at the beach and this is a coastal community. (Interview with Fred Collins)

The creation of a park, or the recreation of a beach by removing a seawall, would enhance the value of brand, as Collins argues. It might cost NZ\$50 million to buy out a particularly vulnerable stretch of houses, but the community would get "a semi-permanent fix around coastal hazard, plus the benefit of amenity that you're getting and the branding that you're getting" (ibid). Collins advocates a sharing of costs, either through a targeted rate that could be allocated among all property owners of the District, or a rate for a smaller group in the community that would benefit from the reserve. By spreading out the costs for buying up property, Councils could bear the costs. He argues: "\$50 million to you and I sounds like a lot but for a council it's not

because a council can spread it over 50 years” (ibid). Currently, he argues, most coastal communities take the beach for granted, and they do not realize the risk they take when an ongoing urbanization decreases the value of the beach. Similar arguments can be found in the literature and were also discussed in chapter two (Pilkey and Cooper 2014a, 2014b).

In a recent publication by the *Columbia Center for Climate Change Law*, covering the legal aspects of managed retreat in the USA, Anne Siders formulated arguments for a buyout program of properties at risk. The author lists the advantages of a buyout program: “Reduce the exposure of people to dangerous conditions. Reduce future disaster response costs by removing buildings and structures from the path of flooding. Restore natural buffers such as wetlands to a natural state in order to reduce future flooding levels. Eliminate the need to maintain and repair flood control structures” (Siders 2013: 109). Additionally, the author argues similarly to the notion described above, that a buyout program provides the chance “to use the acquired space to create a natural buffer.” She continues:

Developing public parklands provides not only intangible social benefits but also a potential economic investment. Development is often considered the best use of land, as it raises property values, but development also requires expenditures and provision of public services, which may be more expensive than the increase in property value. Parks themselves may actually increase the value of existing developed properties. Homes near green spaces have a higher value – potentially a full third higher – than their more distant neighbors. (Siders 2013: 109–110)

Siders argues, similarly to Collins, that the recreation of a park or a beach may increase the value of existing properties. Managed retreat is then a strategic approach that over time removes several properties close to the shore to maintain and increase the value of the properties that would remain in place. The rational is to remove the properties potentially at risk and simultaneously enhance the aesthetic appeal of the area. The environmental enhancement not only funds the relocation of the properties,

but it also increases the value of those properties that will remain in place. Managed retreat implies a strengthening of the concept of private property and it aims at a controlled economic and urban growth in areas that are deemed safe from erosion.

Shifting values inland

In the last section I will draw from an interview with two Council staff members on the Kāpiti Coast, I which I asked how the Council would deal with the loss of value that would incur by the implementation of managed retreat. It was my assumption at the time of the interview, that the forced relocation of beachfront property would create an overall loss of rateable property value for the District. The two staff member argued that for individual owners there would be a loss or a gain, depending on where their property was situated. They were alluding to the fact that there is a relatively steep decline of property value from the beachfront further inland to the second, third, and fourth row of houses. The beachfront houses are by far the most expensive properties, and the second row of houses is already less expensive. Just some rows further back the proximity to the beach has lost its impact on the price and the property can be as expensive as one further inland. One of the staff members argued: "There might be short term increases. If you happen to be the group of houses that's sitting up on the dune, and maybe you've lost one in front that was a real blocker of your view, short term you have a huge increase in value potentially before you are actually pushed back as well" (Interview with Margret Cooper, Olivia Marshall). They point out that once the first row of houses would be removed, the second row of houses would take over and be in the prime location. The second row would then adjust in price and replace the value of the first row.

A similar argument, where the consecutive rows of houses assume the prices of properties that were removed in front of them, has been made in a scientific publication by Yohe (1991). Yohe proposes a "hypothetical value gradient", where the property value is related to the distance to the beach. For illustration, the author assumes a price of \$100.000 for the first row, \$90.000 for the second row, \$75.000 for the third, \$55.000 for the fourth, and \$50.000 for all subsequent rows of houses. Yohe argues:

Were the sea to rise so that the first lot were lost, then the second lot would become a shoreline lot and assume the US \$100000 value originally attributed to the first. The value of the third lot would climb to US \$90 000, and so on. The community would, in effect, lose the economic value of an interior lot located initially more than 500 feet from the shoreline. The true economic loss would be the equivalent of a US \$50000 lot instead of the shoreline US \$100000 lot; there would be a distributional effect, to be sure, but the vulnerability measure of net social loss would be US \$50000. (Yohe 1991: 239)

The approach assumes that once the beachfront properties are removed, the second row of houses rises in value, as do all other houses further inland. Property values would progressively shift inland, and the overall loss would not be the net value of the beachfront properties, but rather the value of an inland property (see also Kirkpatrick 2012: 12).

My interview partners argue that “for the individual property owner it’s a loss or a gain, but for the district it will probably remain pretty much the same overall” (Interview with Margret Cooper, Olivia Marshall). In addition to the notion that the property values would shift inland, there is also a strong desire to offset any financial risk for the Council with the creation of new subdivision further inland, and a densification in existing settlements that are deemed safe from coastal processes. The creation of new values in other parts of the District would compensate for the loss of beachfront houses due to coastal hazard risks. One of the staff members argues:

For the individual who owns that property, yes, at the end of the chain there is a loss of value. But for the community presumably you’ve created some value over here – there will be new properties created to compensate. It’s probably just a shift of value from there to there. For the individual, yes, there are always losers around that. But then the people immediately behind who will have the increase in value – winners and losers. The whole system is set up around that. (Interview with Margret Cooper, Olivia Marshall)

By now, we were at the end of our interview and one of the two Council staff members had to leave the meeting and resume other tasks. After a small pause, my interview partner continued, and added pensively:

If you assume that the value is finite, which is a pretty tricky concept... We don't actually assume the value is finite. We assume that the value is going to increase exponentially; god knows why but we do. But the piece of land is still the piece of land or the house, whatever it is. Its dollar value may increase but it's still just that piece of land. When you lose it, yes, you've lost the absolute, the underpinning of that value (ibid)

This was an interesting point in our conversation, as it was clear that my interview partner had reflected on what was said earlier, and that she wanted to add to it. She argued that the Council would assume an infinite growth in value, for example by subdividing new plots and allowing the allocation of new investments in houses further inland. However, she realized that this assumption was misleading, because the land in the District was finite, and that the value was inherently connected to the land. When the land of the plot was eroding, it would not only reduce the value because it diminished the options of reselling it. Erosion of land is threatening the absolute value of the property. This argument would then also question the assumption developed earlier, that a large-scale shifting of property values inland was an option. The finiteness of land should at least caution any concept as developed by Collins, or Yohe, that a shifting of property values inland was unproblematic.

6.4 Chapter summary

In this chapter, I argued that risk is currently one of the most important objects of government in coastal management in New Zealand. State agencies are increasingly interested in a reduction of coastal hazard risks. The technology of hazard maps plays an important role for the creation of legibility of the slow and uncertain processes of coastal erosion. The delineation of coastal spaces in risky and safe spaces is considered a problematic but necessary policy measure. Councils are interested in simplistic but scientifically robust visualizations of hazard lines to relate their spatial planning

according to these spatial differentiations. The goal is to produce knowledge where the accumulation of capital assets is desirable, and where further urban developments are to be located.

Next to risk, the *natural character* of the coast is an important aspect in the development of managed retreat strategies, as it is considered an important cultural, ecological, and economic asset that needs protection. A relocation of properties and infrastructures is considered to avoid the continuous urbanization and fortification of coastal areas. Thereby, increasing property prices and the desirability of beachfront property aggravates the problems for District and Regional Councils. Councils do not see individual property owners as the object of their policies, but rather the aggregated property value in relation to the probability of the occurrence of hazard events. This deserves a critical revision, as property owners oftentimes feel overlooked by the Council, and their propositions of managing coastal hazard risks together with Council are neglected (Arnold 2014; Interview with Mark Fisher).

In general, my analysis has shown that the state is blind towards the individual property owner that may be affected by coastal erosion. Councils are not affected by the fate of individual owners. Rather, they are interested in the overall growth of the district and the functioning of the property market. They want to maintain the rating base for future infrastructure projects. Conversely, it would be misleading to say that managed retreat is neglecting the concept of private property. The hazard assessments are an encroachment of the state in private matters. Why not leave the people alone? Why care about the possibility of some houses being washed away? I argue that the logic of value and property demands the state to intervene. The state needs to maintain its legitimacy, and private property is a strong cultural value. People aspire a private home, and the state is pressured to give up public land for new subdivisions, and to manage and maintain the overall value of the existing properties.

Property owners often rail against the Council, arguing that they would be “blighting their property”, and that they would be “coming in over the top of private property rights” (Interview with Ron Johnson). Despite the individual loss, my argument is that Councils are defending the concept of private property. Councils are interested in maintaining the integrity of those properties that are not at risk from

erosion and expanding urban settlements further inland. Managed retreat as a policy is not questioning property, but rather a strong affirmation of the dominant social relations of property (Keenan 2010). By producing hazard assessments and devaluing properties at risk, the rest of property is revalorized, and the idea of property is strengthened. In that sense has managed retreat, which is a transformation of government in coastal areas, not challenged the deep-rooted concept of private property, but rather altered the configuration of the spatial arrangement of property and spaces of natural character.

7. Environmental compensation and the (re-)production of a coastal landscape in Germany

In this chapter, I analyze the development of a managed retreat scheme on the German North Sea coast, the polder opening of the Langwarder Groden. The managed retreat scheme in the coastal community Butjadingen contained the breach of a more than 80-year-old foredike, and the intensive landscaping of the polder area with the aim to transform a grassland into an intertidal landscape. As the maintenance of coastal defense structures is a high priority on the German North Sea coast, it is important to understand this managed retreat scheme in close connection to the construction of the deep-water port JadeWeserPort in Wilhelmshaven, and to analyze the diverse conflicts that evolved around the breach of the dike, as many residents and farmers were opposed to the conservation scheme. The polder opening Langwarder Groden was part of a bureaucratic procedure of administering, balancing, and producing a coastal landscape and environmental values. My main interest is to understand how environmental values are administratively handled and produced, and how the conception of different understandings of coastal landscapes clashed in this conflict. At the heart of this chapter is a description of the bureaucratic procedures and the wide range of techno-scientific practices that produce and process environmental valuations to make natural values comparable and exchangeable. The valuation of diverse assets allows to reduce complexity, and to make things tradeable, comparable, equivalent, and substitutable.

In this chapter, I will go into details of the Federal Nature Conservation Act (BNatSchG), and especially the Impact Mitigation Regulation (IMR). This regulation prescribes that the loss of environmental assets that have occurred during a development project have to be compensated with a restoration measure. Most managed retreat projects in Germany were implemented as part of compensation requirements that stemmed from larger infrastructure projects. I will argue that it is of interest to understand the way the highly standardized and bureaucratized procedure of assessing environmental loss and compensation works, to understand managed retreat in Germany.

Of high importance for coastal management on the German North Sea coast is the Wadden Sea National Park, which has been founded in 1986, and which in Lower Saxony is 2.777km² in size (Martin 2006: 4). The general principle for the National park stems from the Federal Nature Conservation Law, which states that National Parks pursue the goal to ensure a "largely undisputed process of natural events in their natural dynamic" (BNatSchG: §24(2), translation JS). The natural dynamic of coastal processes is a guiding principle for the National Park. And as the Park has been a UNESCO World Heritage Site for about one decade, the natural dynamic has been of high political importance. However, a natural dynamic also stands in conflict with many established coastal management practices such as agricultural use of salt-marshes, fixation of the foreland with brushwood fences and other measures that aim to stabilize the coastal foreland. Moreover, the southern North Sea is a highly modified landscape, it is densely populated, with many infrastructure networks and strong shipping and trade activities. With the ports of Wilhelmshaven, Bremerhaven and Hamburg, there are three large ports, plus a range of smaller ports. The three rivers Ems, Weser, and Elbe are highly modified and deepened. Also, the tourist industry plays an important role, as not only the East Frisian Islands, but also many coastal communities on the mainland are dependent on tourism. But also, for residents the coastal landscape plays an important role as a cultural heritage, a place of belonging, and a place for recreation. All these things combined produce many land-use conflicts and stand in contrast to the guiding principle of a natural dynamic. The compensation requirements that ensue from large infrastructure projects such as the JadeWeserPort are an additional factor in the conflicts about coastal spaces. The main interest groups that are competing for space are trade and industry, especially the port and shipping industry, the conservation agencies and the National Park authority, the coastal protection agencies, the tourism industry, and residents. It is therefore important to understand and analyze the development of the managed retreat scheme in the Langwarder Groden in this multi-faceted situation.

7.1 A deep-water port, and a recreated salt-marsh

The Langwarder Groden is located on the northern tip of the coastal municipality of Butjadingen in Lower Saxony. The Groden, which is another word for polder or diked area, is 142ha in size, and surrounded by a 4.2km long foredike. The Groden is situated just outside the main dike, which is much higher than the foredike. The foredike was constructed in 1933 as a provision of work measure under the National-Socialist regime. At peak times, around 1150 workers, mostly recipients of social benefits, were forced to construct the dike, using simple tools like spades and small wagons. The working conditions were poor (Peters and Sprötge 2015: 82). During and after the war, the flood-proof area was used for grazing and agriculture. The foredike was only overwashed during the big storm surges in 1962 and 1976, and the rest of the 80 years of its existence it held off the sea from the polder area. On the one hand, this has created a grassland that had very little influence from the salt water, and thus it showed characteristics of an inland grassland. On the other hand, it has been a recurring argument from local farmers and residents, that a removal or breach of the foredike would increase the risk of flooding for their farms and housing behind the main dike, and that it would destroy a coastal landscape that they had accustomed to (Bultmann 2011).

Since 1986, when the Wadden Sea National Park was established, the Groden had been part of the so-called Protection Zone II, which means it was only used for extensive grazing and it was subject to a range of environmental restrictions. Until 2013, there were 12 to 16 farmers using the land extensively for grazing and mowing. In September 2014, the foredike was breached on a length of about 900m of its 4.2km, and the Groden that had been taken from the influences of the sea, was exposed to the tides again. In order to achieve the aim to recreate a salt-marsh in the polder, the land had to be excavated and lowered, and a massive amount of earth had to be moved. Some of the excavated material was also used in the strengthening of the main dike, which had to be accomplished before the foredike was breached. The polder area is owned by Lower Saxony, and administered by a regional domain agency, which was also a reason for choosing this area for the compensation measure.

The Langwarder Groden restauration scheme is one of the main measures to compensate for the environmental damage caused by the construction of the JadeWeserPort in Wilhelmshaven, plus a compensation for two smaller dike enforcement schemes from the 1990s and early 2000s. The dike strengthening projects in Cäciliengroden (1995 - 2000) and Augustgroden (2000 - 2004) both produced environmental degradation in the adjacent salt-marshes, and thus needed to be offset (Planungsgruppe Grün n.d.). However, the main driving force for the opening of the Langwarder Groden was the port construction.

The history of the JadeWeserPort in Wilhelmshaven goes back to the early 1990s, when first ideas about the construction of a deep-water port were discussed. In 1998 and 2000, two feasibility studies analyzed the potential of a deep-water port, and its competitive situation with the two other ports in Bremerhaven and Hamburg. In 2001, the *JadeWeserPort Entwicklungsgesellschaft* (JadeWeserPort development company) was founded, and in 2003 the *JadeWeserPort Realisierungsgesellschaft* (JadeWeserPort implementation company). The latter company was responsible for the implementation of the port construction, and it was the project applicant in the formal planning procedure. It was a company with limited liability, owned in parts by the *Länder* Lower Saxony and Bremen. Board members were among others the Minister for Economy, Labor, and Infrastructure of Lower Saxony, state secretaries and higher members of different ministries. It is fair to say that the planning and realization of the port was strongly politically controlled. Already in the early planning phase, the project was advocated by Social-Democrats like Sigmar Gabriel, Gerhard Schröder, and Frank-Walter Steinmeier, who would pursue political careers in national politics afterwards (Lucius 2012). The main interest of the politicians and the project developer was to realize the port, whereas the compensation requirements in the Langwarder Groden were only a cumbersome side issue. In 2007, the planning permission for the port was granted, and in May 2008 the construction started with the hydraulic fill of the created port area. Finally, in 2012 the port was opened (JadeWeserPort n.d.).

The main aim to construct a deep-water port was to be less dependent on the tides. In Bremerhaven and Hamburg, which both have ports situated in an estuary, the largest ships cannot enter the harbor fully loaded, or during low tides. The

JadeWeserPort was intended to be navigable for the largest ships under full load, and independent of the tides. Ships up to 16.5m draft and up to a length of 430m can navigate into the harbor. The port is designed for a handling capacity of 2.7 million standard containers (TEU) per year (Schmidt et al. n.d.: 13). For the area just in front of the quay, the water depth is being maintained with constant dredging at about 20m water depth. The quay is 1725m in length, which allows several ships to be loaded and unloaded simultaneously. The overall costs of the port was more than €900 million (ibid: 22). The entire port was constructed in open water near to the shore. By hydraulic filling, about 48 million Cubic meter of sand was pumped in a square of sheet piling walls, which forms an area that is 360ha in size (ibid: 14). The newly reclaimed land would then present the area for the port, the containers, warehouses, and other infrastructure. For the construction of the JadeWeserPort, there were several different compensation requirements implemented in the project application. Next to the renaturation of the Langwarder Groden, which was the largest compensation requirement, there were other measures in Warnsath and Ovelgönne that included smaller conservation measures. Overall, the construction of the JadeWeserPort was one of the largest infrastructure projects in Germany in the past decades, and it has enormous environmental effects. The managed retreat scheme in the Langwarder Groden is located on the other side of the Jade Bay, which is only about 10km away by linear distance, but about 70km away on land. In the following section, I will recount some of the conflictual events that occurred before the managed retreat scheme was implemented in 2014.

Complete removal vs. two-hole solution: Conflict about the procedure

The dispute in the community of Butjadingen about the managed retreat scheme started with the publication of the planning approval in 2007. The planning approval (*Planfeststellungsbeschluss*) is the official document that is legally binding, and that determines the rights of the project developer to implement the construction project. The document stands at the end of a lengthy planning process and is written by the planning approval authority, which was in this case the *Wasser- und Schifffahrtsdirektion Nordwest*. During the planning process, many different actors

were involved: the project developer, two dike associations, the Wadden Sea National Park Authority (NPV), the NLWKN, the planning approval authority, the conservation organizations that commonly have a right of collective action, the planning consultancies, as well as the local interest group *Förderverein Langwarder Groden* that was founded in 2010. A key point of conflict was the question whether the foredike should be removed completely, or whether it should be breached at one or at two locations. According to Peters and Sprötge (2015), for a long time during the planning process there was a consensus that the foredike should only be partially opened. Neither the NPV, nor the conservation agencies demanded the complete removal of the dike. Only the district government of Weser-Ems argued in 2004 that the dike would have to be removed in order to compensate for the degradation of the environmental asset *landscape*, which was considered to be negatively affected by the cranes of the port (Peters and Sprötge 2015: 86). The argument was that the removal of the dike, which was considered an anthropogenic encroachment into the landscape, would compensate for the construction of the cranes, which were also considered an intrusion in the landscape.

When the planning approval for the JadeWeserPort was published in 2007, it stated that the dike was going to be removed completely (Wasser- und Schifffahrtsdirektion Nordwest 2007: 390), which alarmed the dike associations and the residents. As a consequence, shortly after a working group was founded to find a compromise, which consisted of the NPV, the NLWKN, the conservation agencies WWF, BUND, and NABU, as well as the dike associations (Peters and Sprötge 2015: 88). The aim of the working group was to portray a solution to the project developer how to solve the conflictual situation, and how the planning approval could be changed that the legal requirements of compensation would be fulfilled. The working group came up with a scenario to breach the foredike at two locations, at one point in the west and one point in the east, at about 300m to 500m length respectively (ibid). Moreover, the tidal creek system outside the foredike was to be connected with the polder, to allow the tides to enter the polder area. This so called *two-hole solution* was accepted by all members of the working group.

However, in 2010 a local interest group was formed with the objective to prevent the opening of the polder altogether. Residents and farmers argued that the opening would increase flood risks, the measure would be too expensive, and the cultural landscape would be destroyed. The *Förderverein Langwarder Groden*, which could be translated as friend's association of the Langwarder Groden, had a statute that described the aims of the association with the "promotion and preservation of the Langwarder Groden", which was an "important cultural possession". The Groden served "for the protection of the land" (Förderverein Langwarder Groden n.d.: 1). A leaflet produced by the group was entitled with "We fight for the preservation of our home". Goal of the association was that the residents banded together and worked towards the preservation of the site, which they had accustomed to and which had influenced the area for 80 years. A key concern often publicly raised by the group was the increased flood risk that would stem from the removal of the dike. Even though this fear was not warranted, as the main dike was going to be strengthened beforehand, there was a vague angst about the deliberate breaching of a dike (Bultmann 2011). As one newspaper article stated: "Outbanking – for the people on the coast it is the epitome of dismay" (Meiners 2010: n.p., translation JS). In May 2010, the association published a document in which they criticized the proposed two-hole solution and developed an approach that would foresee a regulated tidal exchanged for a controlled inflow of tidal water. This option would have left the dike intact. Plus, they proposed a land claim project in the Jade Bay to offset the compensation requirements for the JadeWeserPort. In this case, the reclaimed land would have been transformed into an intertidal area (Förderverein Langwarder Groden 2010).

The publication criticized the categorization of the Groden as intensive grassland, it argued that the area was only used extensively, and that the biodiversity was higher than it was initially assessed in the planning approval. It was contended that the environmental benefits of a transformation into a mudflat were less than expected, because the land was not to be classified as intensive grassland, but rather mesophilic grassland, which commonly has a higher biodiversity. I will explain the details of the different biotope valuations in the next section, as these are important technicalities that took a center stage in the public debate. It was an important argument from the

project developer to enhance the biotope from relatively low value to a high value, whereas the local action group argued that the status quo of the biotope was higher than assessed by the project applicant, and that a managed retreat project could even have negative effects for the local environment. This would have questioned the compensation calculation that formed the basis of the Langwarder Groden managed retreat scheme (ibid: 6).

Moreover, the authors lamented that the compensation scheme would take away land from the farmers, and that this would have serious financial ramifications for them due to recent changes in the EU agriculture policies, according to which farmers would lose access to payments from the EU when their agricultural area was diminished (*Flächenprämie*). The authors criticized the extensive construction measures that the two-hole solution would entail and pointed towards the negative effects the construction would have on the birdlife and biodiversity in the Groden. Moreover, they criticized the measure for its effects on coastal protection as well as on the local tourism industry, which would depend on the Groden as a tourist attraction. And finally, they argued that the very idea of outdiking would be outrageous. "There are still people alive that have at the time constructed the dike under hard labor. For them a destruction is inconceivable. The local population perceives the foredike as an enrichment of the region and typical for the landscape". The authors continued that they could not understand how the planning approval addressed the dike as a disturbance. "Especially in times of climate change and increased sea level rise it would be a wrong signal to destroy a dike" (ibid: 8).

The main aim of the Förderverein was to prevent the polder opening. In 2010 and 2011, the involved parties continued to discuss different options, and the conflict was particularly strong between the conservation agencies and the Förderverein (Peters and Sprötge 2015: 89). From the perspective of the conservation agencies the situation was rather clear. The area was property of the Land Lower Saxony, and the Land, who was owner of the project developer JadeWeserPort, had a legal obligation to implement a compensation scheme in the Langwarder Groden. In an interview with a member of WWF, who was in charge of the group of conservation agencies involved, it became clear that the goal was to achieve "as much natural dynamic as possible".

My interview partner pointed out that their strong position in the negotiations was only possible because of their right of action (Interview with Beate Schiller). The environment associations have an important role in the planning process, as they are able to litigate. My interview partner pointed out that the project developer would not provide the compensation voluntarily, but that the possibility of a managed retreat scheme was dependent on the legal instrument of right of action by the conservation agencies. Only this right of action allowed the conservation agencies to verify and enforce the environmental law and their strict observance. Otherwise, she said, “nobody would do it because nature does not have a strong lobby” (ibid). Their aim was to gain as much compensation as possible, which would ideally result in a complete removal of the foredike. The conservation agencies and the NPV argued that salt-marshes were a scarce biotope that needed to be preserved and restored. The green pasture that could be found in the Langwarder Groden was not typical for a coastal location, but could be found anywhere further inland, whereas salt-marshes could only grow in intertidal areas (ibid).

However, there was an increasing time pressure, and in 2012 the construction had to begin, to avoid legal implications for the project developer. As the conflicting parties could not agree on any solution, it was decided to go ahead with the still binding planning approval from 2007, which legally established the obligation of the complete removal of the foredike. In late 2011, the planning for the complete removal was finished and the project developer started to prepare the construction measure (Peters and Sprötge 2015: 89). However, the Förderverein continued to fight the plan, and their protest increasingly led to the involvement of the politicians on the level of the federal state. A key figure was the local politician Björn Thümler, who was originally from the area, and who was the party leader of the conservative party in the state parliament of Lower Saxony. He was increasingly involved and worked towards a reconciliation of the conflict (Interview with Fred König).

A compromise was eventually found, when representatives of the local interest group, dike association, and conservation agency met with high ranking politicians, including the Federal State Minister of Environment, and Federal State Minister of Economic Affairs in the state parliament in Hannover in February and March 2012.

According to an interview with a consultant involved, the politicians on the federal state level were interested in a compromise in order to appease the conflictual parties. As he explained:

There was a state election [in January 2013] coming up and all parties in the area tried to come to an understanding with the action group. It was really interesting because you could see that the politicians wanted the JadeWeserPort, but they did not want what was connected with it (Interview with Michael Willers, translation JS)

Just from a legal perspective it would have been possible to stick to the planning permission as it was granted, and remove the foredike, but the local and regional politicians became aware of the issue and started to influence the process. In the compromise it was agreed to drop the complete removal of the dike, to drop the two-hole solution, and to go with one larger dike breach in the east that would still meet the compensation requirements, but that would also appease the residents, at least a little bit (Peters and Sprötge 2015: 89). As the predominant direction of winds and currents are from the west, a breach in the east would prevent most storm surges to unimpededly enter the Groden. Also, a breach in the east would reduce the occurrence of flotsam in the polder area, which was an important argument for the residents and the local community, as the removal of flotsam is important for the integrity of the dike, and the clean-up demands public funds.

As Peters and Sprötge (2015) argued, an important point for the compromise was also that PGG was able to argue that the compensation for the cranes in the port could be compensated within the area of the Groden, and that it would not necessarily demand the complete removal of the dike to enhance the landscape (ibid: 87). Another point for convincing the residents and the local politicians was the commitment for funding a *Natur Erleben* project, which I will describe in the last section of this chapter. This project intended the construction of a boardwalk in the newly created intertidal area for tourists to experience the transformation of the area (ibid: 90)

The compensation measure Langwarder Groden

In 2012, the construction of the conservation measure had to begin, and the process started with the strengthening of the main dike. In the revised design planning that was published in 2013, the overall aim of the compensation measure was formulated as follows:

The development goal is to expose the polder area to the natural dynamic of the tidal forces and to create the prerequisites for the development of a salt-marsh complex. The changes in conditions should lead to a near-natural and largely uninfluenced development of biotopes (Planungsgruppe Grün 2013a: 8–9, translation JS)

The goal was to create, within the confined space of about 140ha in the Groden area, an area of near-natural dynamic. It was further explained that this would be achieved not by a complete removal of the dike, but by a partial breach, a reconnection of the tidal creek system to the polder, a lowering and a landscaping of the surface area, as well as an excavation of the canal that distributes the tidal water within the polder area. The clay material gained from the lowering of the area was used as dike building material in the strengthening of the main dike (ibid: 9). Moreover, it was explained that this compensation measure would contribute to a raise in the value level of the legally protected assets plants, animals, soil, water, and landscape. It was argued that the partial removal of the foredike would be aligned with the general principle of the Wadden Sea National Park, and that it would reduce the influence of a foreign element of the landscape (*landschaftsfremdes Element*) in the National Park (ibid). Why this was important, and how the environmental assets were valued, will be explained in 7.2.

The overall cost of around €8.5 million included several different aspects, such as landscaping the polder, structural design, and the enforcement of the main dike (ibid: 15). The project was financed by the project developer, and as the project developer was owned by the two federal states Lower Saxony and Bremen, it was mainly public money that was spend on the port, but also on the polder opening (Interview with Michael Willers). Due to the breach of the foredike, a lot of material was available,

about 594.000m² (Planungsgruppe Grün 2013a: 10). This material was then used to refill parts of the polder, which had been dug out to gain material for strengthening the main dike. All in all, for this conservation measure 739.000m³ (Peters and Sprötge 2015: 92) of material was moved, which was also one of the reasons that the project was criticized, and the media dismissively entitled the project as “Conservation with diggers” (Radio Bremen 2013, translation JS). Especially the farmers were critical about the way the conservation agencies and the National Park authority had pushed through their ideas about a coastal nature.

The following schematic shows the planning state in late 2012, and how the project was realized eventually. Visible is the main dike that confines the area to the south, as well as the smaller foredike that is in the north. South of the main dike is the village of Langwarden. The final breach of the foredike happened in September 2014. The foredike was breached on about one quarter of its entire length in the east. The deepened and widened drainage canal is visible that runs almost entirely to the west, as well as a number of sublittoral areas that are represented in deep blue. It is worth noting that the areas in cyan on the western part are regularly inundated after the dike breach, except for some small islands that were landscaped. The color scheme ranging from cyan over light-green to green indicates the different heights, which corresponds with the predicted development of vegetation and structure. The contour lines (indicating 20cm differences) and different colors show the confinements of the pioneer zone, the lower salt-marsh, the middle and upper salt-marsh as well as some grassland remaining in the east. These representations are the target biotopes that are expected to develop after the area is landscaped, and the tidal water can enter the area. Also noteworthy is that the main dike is strengthened, here indicated in red, representing the constructed berm.

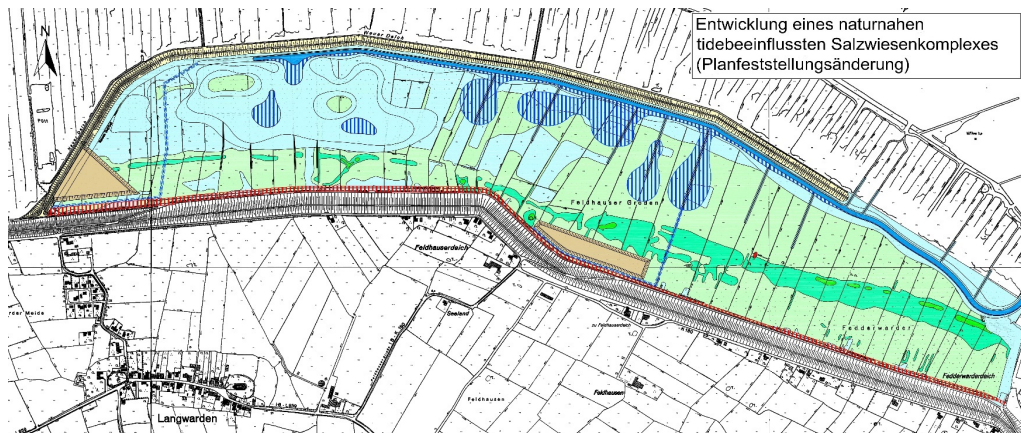


Figure 6: Revision concept dike breach, December 2012 (Planungsgruppe Grün 2012)

Once the dike was breached, the area was soon transformed into an intertidal space, where the inner part of the foredike was crumbling, and the edges of the former grassland areas were being eroded. Sediment was moved around in the Groden and new salt-marsh vegetation started to grow. In a recent newspaper article that reported about a visit of the current Minister for the Environment in Lower Saxony, the success of the Langwarder Groden restoration project was formulated. The consultant of PGG was quoted that more than 100ha of the area had been transformed into a salt-marsh and Wadden landscape, and that many coastal birds could be found in the area, such as oyster fisherman and redshanks. The area had developed into an important breeding ground (Glückselig 2018). The chairperson of the NPV was quoted that the project was a success: "We have nothing under control. It is all done by nature" (ibid).

The interests of the project developer: "Money is a synonym for power"

An interesting assessment about the specific interests of the project developer, who was the main driver behind the JadeWeserPort, was given in an interview with a staff member of the NLWKN. The NLWKN, as one of their employees in an interview explained to me, is a higher authority of the Federal state Lower Saxony. The agency is subordinated to the Department of the Environment. They advise the Department, but they are also subject to directives from the Department. Their stance in the conflict about the Langwarder Groden was to cooperate in such a way that the compensation measure was going to be implemented. Their main interest was that the legal requirements that stemmed from the planning approval from 2007 would be

implemented in a timely fashion. And additionally, the NLWKN was also responsible for the implementation of the compensation requirements that arose from the two dike strengthening measures in Cäciliengroden and Augustgroden, which were long overdue and which had to be implemented as soon as possible (Interview with Rolf Hellers).

Most importantly, as my interview partner mentioned, the polder openings in Germany would not happen without the legal requirements of a compensation, which also means that these conservation schemes would not happen without large infrastructure projects. This paradox is described by my interview partner with the phrase: "Money is a synonym for power" (ibid). He explained that the most important driver for the managed retreat scheme in Langwarden was the political will to build the JadeWeserPort. Only the *mélange* of interests that were at play with the JadeWeserPort allowed for the polder opening. He reminded that there are strong interests against the polder opening, namely the general principle of coastal protection and the policy of hold-the-line, which is also advocated by his agency. But he also mentioned the farmers, the dike associations, and many local politicians who would never be in favor of the polder opening. Moreover, he mentioned the need for financial means to fund the measure (ibid). He argued that there has to be an actor that is in need for a compensation measure and who has the financial ability and the political pressure to make such as project realistic. Otherwise, there would be no actor that would coordinate managed retreat in Germany. And this is a crucial point for understanding managed retreat in Germany. The Langwarder Groden managed retreat scheme is the result of a combination of legal requirements, political pressure for satisfying the compensation requirements, funds that are available from a large infrastructure project, but also increasing pressure from conservation agencies to recreate intertidal habitats. However, as he explained:

There is nobody who coordinates it [managed retreat], or who steers the finger puppets. Someone must direct it. And that actor has to have a certain level of suffering. (...) So, I think it is a question of power, and power is mostly expressed through money. And the one that wants something has gotten the money somewhere politically and has access to

it, and then can say what is going to happen. The foredike has to go, we will strengthen the dike, the risk stays the same, and we develop the area in an environmental way (ibid, translation JS)

My interview partner said the main interest of the project authority was to “avoid damage” (ibid) to the construction project. This included anything that would delay or jeopardize the project. The cost of the implementation was a rather flexible factor, especially in the early planning phase. The most important goal was to build the port. It is thus a common practice to first plan in enough financial buffer to be able to realize the necessary compensation schemes.

Even though cost may not be the most important factor in the planning phase, there is a common criticism in the literature about the amount of money that is invested by project developers in compensation schemes. Wilhelm Breuer argued that the financial funds for compensation measures are in most cases below 5% of the overall costs for planning and implementation of the development project, which he suggested would be too low (Breuer 2016: 375). For the JadeWeserPort, a rough calculation can approve Breuer’s argument, as the overall cost for the port was more than €900 million (Schmidt et al. n.d.: 22), and the cost for the conservation measure Langwarder Groden was about €8.5 million (Planungsgruppe Grün 2013a: 15). Even though the cost of the two other smaller compensation schemes would have to be added, the ratio would still be small, and the amount spent on compensation requirements would amount to about one per cent of the total cost of the port construction. This is to say that the funds for compensation requirement costs are very low in comparison to the main development project.

My interviewee from the NLWKN said that the project developer was mainly interested in realizing the project. Therefore, the developer needed suggestions for possible projects where compensation was possible. In the project planning phase, the developer puts away a sum of money for compensatory obligations and is then interested in a timely and reliable handling of the compensation business. “My perception is that the project developer doesn’t have an interest [in the compensation scheme], they only focus on the project. They are looking for time, money, and reliability” (Interview with Rolf Hellers). Therefore, he argued, it is a task for

conservation agencies to create offers in the form of compensation pools that can be accessed and called upon by any project developer. For him, there is a huge potential in thinking through this way of offering environmental projects that can provide the sought-after compensation needs. This could also play an important role for the implementation of managed retreat in the near future, as managed retreat projects could pool so-called eco-points in an eco-account, which are then offset when a compensation requirement occurs (Küpfer 2012).

The NLWKN in general is opposed to managed retreat. As a coastal protection engineer, my interview partner argued, you do not want to surrender what you have once gained, and freely give up the safety level that has been achieved (ibid).

The main point taken from this argument is that any managed retreat project needs someone to finance it. There is no overarching player that organizes managed retreat in Germany. In this sense, it also differs from managed realignment in the UK, where in many cases the payment is realized through government funding. The Langwarder Groden was funded by public money that was invested in the port project, and the Langeooger summer polder retreat scheme was funded by Statoil, who had compensation requirements after the construction of a gas pipeline through the Wadden Sea National Park (Interview with Frank Willms, Andreas Fischer). This is to say that the realization of managed retreat projects is largely driven by public or private investments, which mainly have an interest in profit. Managed retreat in Germany is only realized in the case of investments in an infrastructure project, which then creates compensation requirements that are legally binding. How the legal requirements come into existence, and how the valuation of environmental assets functions will be explained in the next part.

7.2 Compensating and balancing environmental values

The larger aim of compensating for environmental loss is to preserve some form of natural stock, biodiversity, and landscape aesthetics. The idea is that it is possible to assess the value of one landscape unit, ecosystem, or biotope, which is going to be altered or destroyed in a building process, and to compensate the loss of these assets

with the restoration and upgrading of the environmental value somewhere else. The notion of balancing environmental values is a highly bureaucratized process in Germany, depending on specific ecological knowledge productions, and it is at the heart of most managed retreat implementation processes in Germany. To understand the basics of the procedure, I refer to Plyusnin et al., who have explained:

The party implementing a project must compensate or offset any unavoidable negative impacts by conservationist and/or landscape care measures (...). An impact can be considered compensated if and when the negatively affected functions of the balance of nature have been restored in-kind, and the quality of the landscape has been appropriately restored or newly established (...). For compensation, land areas must be used which in fact require upgrading, and which can be upgraded (Plyusnin et al. 2014: 17)

An impact is then adequately compensated, when the negatively affected functions of the balance of nature are reestablished in the area affected, or in another area that is considered to be in need for improvement. I will look more closely at the methodology of assessing, valuing, and balancing environmental assets in order to make them quantifiable and comparable, which is a basic requirement for any compensation measure according to German conservation law. I will analyze this process, first by describing the legal framework of the Impact Mitigation Regulation (IMR) and then the assessment process of balancing the different value levels in the affected area and in the compensation area. This is commonly assessed in the planning process of a development project and worked out in the legally binding *Landschaftspflegerischer Begleitplan*, which was prepared by the environmental consultancy *IBL Umweltplanung*. In the end, I will provide a reading of critique of this procedure of environmental compensation and the notion of balancing environmental values.

Impact mitigation regulation

In Germany, the Federal Nature Conservation Act (BNatSchG), which was established in 1976, provides the main framework for nature conservation and

resource management. An important part of the Act is the IMR (*Eingriffsregelung*), which has also been in effect since 1976 (Bruns 2007: 1). The IMR specifies the mitigation and compensation requirements of environmental impacts that result from development projects, such as port and pipeline constructions, highway and other infrastructure projects, but also dike strengthening schemes. Wende et al. describe the main objective of this regulation as the “avoidance of significant disturbance or negative effects, and the compensation for impacts on natural assets in reference to habitats, soil, water, climate, air quality and the aesthetic quality of the landscape” (Wende et al. 2005: 101). The IMR prescribes that any interference with the environment by a development project must be avoided or reduced to its minimum. If not possible, e.g. when the political decision has been made to construct a port that inevitably comes with the destruction of a range of different environmental assets, the perpetrator is responsible to provide a restoration, replacement, or as an ultima ratio a compensation payment (Plyusnin et al. 2014: 16). The assessment and legal determination of the kind of compensation requirement is defined in a “strict procedure, resembling a ‘cascade,’ with separate integrated decision steps” (Wende et al. 2005: 102). Wende et al. explain:

First, it must be determined whether a planned project is to be regarded as having a significant impact, as defined under this regulation. This step thus involves a kind of ‘screening.’ If significant impairment of nature and the landscape cannot be excluded, the facts indicating the extent to which these impairments might be avoided or minimized must be clarified. (...) For unavoidable negative effects, corresponding restoration compensation measures must first be implemented (...). Restoration compensation involves a direct spatial and functional connection to the lost components of the natural balance system. Lost functions and values must be restored with compensation of equal ecological nature. (ibid)

The term “restoration compensation” describes the compensation “in-kind/on-site” (Plyusnin et al. 2014: 28), which would involve a spatial and functional compensation of the environmental assets that were lost in the same area with an immediate

functional connection. As an example, if trees were destroyed in a building project and would be compensated with the planting of trees in the immediate vicinity, it would be a restoration compensation. If the spatial circumstances do not allow an in-kind and on-site compensation, a "replacement compensation" (*Ersatzmaßnahme*) is required. In this case, the compensation is "out-of-kind/off-site" (ibid). As Wende et al. explain: "When restoration measures are not satisfactory, replacement compensation measures must be implemented." In this case, the "spatial and functional connection to the impact is interpreted in a less binding manner", and "negative effects on the natural system may also be compensated by revaluation of completely different functions at another location" (Wende et al. 2005: 102). In the case that a replacement compensation is necessary, in the planning procedure it must be decided whether the general societal interests outweigh the concerns of environmental degradation, and if that is the case, the project developer is required to provide the financial funds to implement the replacement compensations (ibid). For the JadeWeserPort, there were several different compensation requirements determined (Langwarder Groden, Warnsath, Ovelgönne), and they were spatially and with respect to ecological functionality remote from the site of the port construction. This is to say that the Langwarder Groden compensation measure, as well as the other two measures, were an *out-of-kind* and *off-site replacement compensation*.

During the planning process a range of different environmental and ecological assessments had to be made, mostly by private consultancies, not only to quantify the loss of environmental values at the port construction site, but also a pre-post comparison of the compensation site. The concept prescribes that the environmental loss at the encroachment site, which is measured in value levels from 1 to 5, is compensated with an environmental gain, in value levels again, at the compensation site. This kind of replacement compensation is a challenge, as the project developer cannot replace trees with trees, as I used the example earlier, but it must replace the equivalent of trees (counted in numbers) with a different ecological asset, such as a meadow or a swamp (quantified in hectare) for example. In the following, I will analyze this technocratic procedure of balancing different ecological assets, which are different

in kind, but which are also differently quantifiable, as it is relevant for the determination of the procedures chosen to renature the Langwarder Groden.

It should be mentioned again that the political pressure to successfully implement the deep-water port in Wilhelmshaven was the main driving force for the polder opening in Langwarden. In the planning phase, the pressure was on the project developer to find an adequate compensation site, and to develop a restoration program that would offset the environmental degradation incurred by the port construction. The compensation plan would be worked out by a private consultancy, and eventually be reviewed and checked by the planning approval authority. The conservation agencies would have a right of legal action. The main interest of the project developer was to avoid time lag, costs, or a stoppage of the project due to planning errors. As almost all managed retreat schemes in Germany were implemented as part of compensation requirements, it is of interest to understand the procedure of the assessment of balancing environmental assets in detail.

Landschaftspflegerischer Begleitplan

The project developer, in this case the *JadeWeserPort Realisierungsgesellschaft*, had to present possible compensation measures already in the planning phase. The balancing of negative impacts on the one hand, and compensation requirements on the other hand is detailed in the *Landschaftspflegerischer Begleitplan* (LBP). This document was worked out by a private consultancy during the planning procedure, and it was published in 2004. It was then reviewed by the planning permission agency, and with the planning approval in 2007, it became a legally binding document. The conflict that arose after 2007 was already resumed in the section above. The compromise reached in 2012 required substantial changes to the implementation plan, and it triggered the review of the LBP, which was reworked by the consultancy Planungsgruppe Grün (PGG), and published in 2013 (Planungsgruppe Grün 2013a). For my work, I was able to examine the reviewed chapter of the LBP that deals with the Langwarder Groden. The LBP details the expected loss of environmental assets, and it provides a plan for the compensation measure that would offset the incurred loss.

In the beginning, the document broadly lists the legally protected assets that were altered or destroyed during the construction of the port and that had to be compensated in the Langwarder Groden. There were four different categories: animals, plants, water, and landscape. The category *animals* contained macrobenthos and fish in the supralittoral, eulittoral, and sublittoral area. The category *plants* was detailed as coastal mudflats, anthropogenically sedimented areas with dune vegetation, and a degraded sand beach (Geniusstrand). The category *water* contained the surface water of the sub-, eu- and supralittoral area⁴. And finally, the category *landscape* contained the landscape ensemble (*Landschaftseinheit*) of the North Sea and Jade Bay, the Genius Beach, Voslapper Groden, Rüstersieler Groden and Maade Bay (Planungsgruppe Grün 2013b: 3). There is more detail to these four categories, but it is enough to point out that the compensation requirements were associated with these four really different aspects of the environment. As I have shown above, the port construction involved the overbuild of mudflats, dune areas, the coastal water body, the coastal seafloor and all the flora and fauna it contained, but it also interfered with the category landscape, which was mainly due to the large infill area and the cranes that were considered to have a negative effect on the aesthetics of the landscape.

One important underlying methodology for the assessment and balancing of environmental assets is the so-called biotope value method (*Biotopwertverfahren*). This method is common in environmental compensation processes, and it was also applied in the Langwarder Groden. As Bruns explains, this methodology is related to concepts in Geography, where landscapes are subdivided into spatial units according to phenomenological aspects such as vegetation, occurrence of animals, structural elements etc. In planning, the notion of a biotope as a spatial unit is being used for the localization, measurement, and compensation of environmental change (Bruns

⁴ The littoral zone is the overall term for the landscape that is close to the shore. It is generally distinguished in three parts, the sublittoral that is constantly covered in water, the eulittoral that is the intertidal zone, and the supralittoral that is the area immediately above the eulittoral zone and that is at times influenced by sea spray or storm surges.

2007: 143). Biotopes are conceptualized as "quasi-homogenous spatial units of the landscape" (ibid: 144).

The biotope model uses for the representation and assessment of ecosystems [*Naturhaushalt*] the notion of biotope as a spatially definable unit of an ecosystem. The demarcation of biotopes is primarily achieved with vegetational and structural aspects (ibid, translation JS).

The association of a spatial unit with one particular biotope type is achieved with a generalization of the characteristic attributes of the occurring plants, animals etc. Commonly, the method involves a mapping of vegetation, animals and other aspects. It follows a mapping guide that presents many different biotope types and prescribes a standardized assessment methodology. There are hundreds of different biotope types, and they are ordered in larger categories such as woods, brush, grassland, fenlands, sea and coast, inland waters and others. For the Langwarder Groden, the mapping guide of Drachenfels (2013) was used. The goal of this procedure is a standardized detection of biotope types and value levels, an easy applicability, a comparability of different landscapes, and a reduction of complexity. In that sense, this procedure resembles projects of state simplification, as they were described in chapter six, even though the biotope value method is far more often used than the hazard lines in New Zealand, it is more standardized, and it also seems to be less controversial in the public debate. The conflict with the Förderverein was far less focused on the valuation methodology, and on scientific questions in general, than it was the case in New Zealand. The main difference was that the scientific methodology in Germany was not decisive in the sense that it would determine whether the project would be implemented or not, whereas in New Zealand the scientific methodology would very well influence whether a particular property was affected by the hazard line or not.

The biotope value method was used as a balancing model for assessing the loss of value incurred on the encroachment site, as well as the gain of value on the compensation site. This was achieved with a comparison of the value levels before the impact, as well as the expected level after the impact. The difference of value on the encroachment site had to be compensated with an equivalent raise in the value level

on the compensation site. In each case, the size of the area in hectare was an important reference value. A compensation would be achieved when the assumed loss in value equaled the assumed gain in value.

The biotope types in the Langwarder Groden were assessed in 2003, and as a result there was predominantly one biotope type. Except for one small area in the east, which was assessed with “other mesophilic grassland”, the predominant biotope type was “intensive grassland in the marsh” (Planungsgruppe Grün 2013a: 7, translation JS). In the LBP it was argued that the grassland was species-poor and that the predominate plant was grass (*Alopecurus pratensis*). Other indicator plants for humidity, and species of the mesophilic grassland, were missing. This assessment would result in a low score of the biotope value (value level 2, out of 5).

In one of my interviews, I spoke to a consultant who was at the time involved in the assessment of the Langwarder Groden. He explained that it took several days to map the entire Groden, which is about 140ha in size. Next to the assessment on the ground, which included a classification of the vegetation and species, they would also use aerial photographs to distinguish different patches of vegetation and to speed up the classification of the area (Interview with Sven Pickert). He described the biotope value method by giving an example: If the status quo is assessed with value level 5, for an area of 100ha in size, and the encroachment might entail a drop in value from value level 5 to value level 1 for this particular area, then a compensation measure would need to enhance an area of 100ha from value level 1 to level 5 in order to completely offset the development project. But if the area, where the compensation measure is implemented already had a value level of 3, the size of the area would have to increase (double) in order to achieve a balance (ibid). This concept of integrating value levels and area size is commonly called an “area-value equivalence” (*Flächen-Wertigkeits-Äquivalenz*) (Bruns 2007: 221, translation JS).

Even though the methodology seems complex, and it does contain a great margin of interpretation and subjectivity, the basic idea is rather simple, and reminds of a general accounting concept. The important part is that the concept assumes that the level of measurement of the value level immediately corresponds with the level of measurement of the size of the area in ha. An increase in value by only one level can

be offset by a doubling of the area size. In that way, environmental values are transformed into abstract numbers and can be measured, graded, exchanged, and traded. This conceptualization of environmental values is the basis for environmental compensations and the impact mitigation regulation. Despite the complexity of the calculation, assessment, and methodology, this approach allows administrative agencies a relatively quick and straight forward assessment of the compensation requirements, and whether all necessary compensation obligations were fulfilled with the conservation measure.

In an interview with a member of the commission of the planning approval authority, who compiled the planning approval report in 2007, and who was responsible for the evaluation and approval of the compensation measures, I naively asked whether he had ever been to the Langwarder Groden. I was interested on what basis he was able to determine whether the destruction of environmental values by the port were adequately compensated in the Langwarder Groden. With his response I understood the extent of formalism that is inherent in the compensation procedure, and possibly in conservation law in Germany in general. He argued that he had never visited the site, but that a visit would not be important. Rather, his work would build on expert reports. In these expert reports, he would be interested in the balance sheets that showed the detrimental effects of the development project and the added values created by the compensation measure (Interview with Friedrich Koller). He argued that his authority would examine the balancing, as well as the argumentation for the compensation measures by the experts. The focus would be on the credibility of the argument, but also the credibility and reputation of the experts themselves. "And when we do not have any doubts about the experts competences, then we adopt it" (ibid). If the balance sheet showed an equal result, his authority would accept the application. As a comparison, my interviewee explained, I could think of it like repaying a debts in a different currency. "If you have debts in Euro, you can repay the dept also in Swiss Franc, Dollar or Ruble. Just the total amount has to be right" (ibid).

According to this approach, the detailed balancing took place for the Langwarder Groden. As an appendix to the LBP, there was a table that included a balance sheet of the losses and gains of the environmental assets involved. It was a complex table with

many details. The table used five value levels, ranging from 1 (very low), 2 (low), 3 (medium), 4 (high) to 5 (very high). The balancing took place for the four relevant values animals, plants, water, and landscape, and each asset was looked at separately in its own table. Exemplary, I will discuss the section of the table about the asset animal in the sublittoral area. The table was separated into two parts, on the left it included the current state of the area affected by the construction as well as the expected state after the development project. It indicated that an area of 310.8ha of sublittoral habitat would be affected, and that this area would be reduced from value level 3 to value level 1. As an explanation: for this area the seafloor and water column are destroyed by the construction of the sheet piling box. The right side of the table indicated that an avoidance would not be possible, and neither a restoration compensation. This only left a replacement compensation, which was accomplished with the measure in the Langwarder Groden, as well as in Warnsrath and Ovelgönne. For the Langwarder Groden, the table showed that an area of 41ha of intensive grassland was transformed into a “near-nature salt-marsh complex”, which went along with a projected rise in the value level from 2 to 5. This factor was then added to other factors, and the result was a balance of value levels. Next to the sublittoral, this was also done for the supralittoral as well as the eulittoral animals, and moreover for the assets plants, water, and landscape. On the left hand, the table indicated the size of the area in ha and the decrease of the value level, and on the right hand it indicated the kind of the compensation measure, its size and the augmentation of the value level (Planungsgruppe Grün 2013a: n.p.). This kind of technocratic valuation and balancing of environmental assets is of interest for state authorities, planning offices, and the project developer, as it allows for the relatively easy and uncontroversial assessment and compensation of environmental degradation. However, it does little to mediate between conflicting parties, nor is it transparent in the way how the value levels are assessed. In the following I will discuss some of the common criticisms of this approach.

Critique of the biotope value method

There is a range of criticism towards the way environmental processes are conceptualized within the frameworks of planning and Nature Conservation laws. With specific reference to the biotope value method, Bruns maintains that the association of biotope types and landscapes is a "subjective and multicriteria decision. The decision can diverge due to a difference in perception as well as weighing of criteria" (Bruns 2007: 144–145, translation JS). She explains that it cannot be assumed that the biotopes represent the "landscape reality", but rather that they are a simplification of reality. I would suggest that they are not just simplifications, but also a simplistic product of the knowledge practices of the expert, and the way the expert represents this knowledge. Plus, it implies many normative assumptions that are implicit in the mapping guide, the methodology, as well as the idea of the environment as a separate sphere and as a stock (Cowell 1997). Similarly, Theobald contended that the valuation is at least a four-level relation: "*Someone values something* with respect to a particular *goal* under the application of specific *criteria*" (Theobald 1998: 12, translation JS, emphasis in original). This shows the complexity and messiness of the valuation procedure. It is value-laden, and it involves many judgements that are often not reflected and transparent.

Bruns concludes that the biotope value methodology is incomplex, that it reduces the work load for the consultant, and is easily transferable to many different cases of application (Bruns 2007: 146). In that sense, it is important to ask who profits from a relatively easy, fast, and transferable assessment practice. My argument is that state agencies as well as consultancies have an interest in effective, scalable, and easy to apply methodologies. Whereas state agencies are mostly interested in comparable and consistent, as well as credible results, consultancies are interested in efficiency with respect to work load and time. For them, environmental assessments are a business model. Over the past two decades, many environmental consultancies have opened for business, as the amount of work with environmental assessments has massively increased. There has been a growing market for environmental consultancies, as many infrastructure projects demand an environmental review, which is commonly outsourced to a consultancy. As the building boom is continuing, and

the environmental law is more strict, environmental consultancies are a busy business. Overall, however, stands the principle of economic growth and extraction of environmental resources. The Nature Conservation Law in Germany is not constructed to reliably prevent detrimental effects on the environment. When the political will develops for the implementation of an infrastructure project, it will likely be implemented.

The criticism of simplification is also present in the disapproval of the way scales of measurements are handled in the biotope value method. It is being criticized that an ordinal scale (e.g. school grades) is being transformed into a ratio scale (e.g. length). Whereas an ordinal scale talks about the *more or less* of values (4 is more than 2), a ratio scale has a neutral point and talks about the degree of difference and the proportion of values (4 is twice as much as 2. For school grades this is not the case. Even though inverted, a 2 is not twice as good as a 4). The criticism with respect to the biotope value method contends that the method assumes a ratio scale for the purpose of measurement and comparability, even though the ranking of biotope values follows an ordinal scale. It is simply determined that an intensive grassland with a value level 2 is factor 2.5 worth less than an intertidal salt-marsh with a value level 5. And it is determined that the overbuilt and completely destroyed sandy beach (Geniusstrand) is diminished in value by factor 3 (level 3 to 1) (Planungsgruppe Grün 2013a: 28). The value levels are established by normative positing. The categorization of an area may be methodologically complex and follow scientific knowledge, but the ranking of biotope values is a normative positing. However, the techno-scientific methods suggest an objective measurement and balancing, and they mute any discussions about questions of landscape aesthetics, place attachment, or sustainable development.

Another point of critique is that the biotope value method does not provide a more nuanced estimation of the impacts, as it does not grasp the cumulative effects of the construction measure, the long-term effects on the site, as well as the effects on adjacent ecosystems. The method can only give a schematic and vague idea of a small range of indicators for just one moment in time before and after the encroachment (Bruns 2007: 205). The range, duration, and complex connectivity of the encroachment

on the entire ecosystem is not pictured with this method, which is also why Breuer maintained that due to the mentioned deficits, “there are considerable residue damages in the environment and the landscape that, due to the large number of encroachments, amount to a serious problem” (Breuer 2016: 375–376, translation JS).

The practice of environmental balancing assumes that ecosystems are a stock or a budget. In case something is taken out, it can be inserted at a different area and the stock of values is refilled. This is highly problematic, as it equates something like a bank account or a warehouse with something as complex as different ecosystems. It negates that each human intervention into the environment is an alteration of the existing ecosystem. As Cowell argued:

beneath the reassuring rhetoric of ‘maintaining’ environmental capital, the process of trading-off existing environments for some compensatory replacement inevitably transforms the environment, affecting what (or who) is sustained. This is not simply because of the physical changes incurred but because of the plurality of values located in the environment, some of which cannot be adequately represented in new creations or restorations. (Cowell 1997: 296)

In that sense it is critical to acknowledge that the Langwarder Groden project is a deep intervention into the existing environment, and even though some actors as well as the legal framework consider it an improvement and a legal requirement, it is an intervention with effects on the environment and the local population.

This leads me to the argument that environmental valuation, and especially the balancing of value levels, should be considered mainly as a technology of governing complex environments for a particular purpose. The purpose of conservation and environmental restoration is strongly embedded in German Conservation Law, but even more important is the principle of economic growth and urban development. Related to this is the criticism by Wilhelm Breuer that environmental concerns have only rarely led to an abandoning of a development project. Whereas §15, section 5 of the Federal Conservation Act (BNatSchG) prescribes that a development project may not be approved if the environmental impacts cannot be compensated (Plyusnin et al.

2014: 17–18), Breuer has shown that it is not the case that a project was not realized due to the potential detrimental effects could not be offset (Breuer 2016: 375). This has been a concern during my research, and I asked several interviewees whether the increased conflicts over land-use would make it more difficult or even impossible to implement an infrastructure project due to lack of space for a potential compensation scheme. An interviewee from the NLWKN said that he has not come across this situation, but that it would also cast a bad light on environmentalists and conservation agencies (Interview with Rolf Hellers). Economic development is clearly a priority over environmental protection and conservation, and environmental compensation is oftentimes a skewed compromise.

7.3 Which coastal nature is to be protected?

There has been a considerable conflict about different ideas of which coastal nature should be protected, or which kind of coastal nature should be (re)produced. The actors involved had fundamentally opposing ideas about what kind of coastal environment they wanted, how they would achieve it, and how much human intervention was needed. In the following I will analyze the conflicts about these different ideas.

My interviewee of the consultancy PGG was involved in talking to the different actors during the phase of finding a compromise. As he saw himself as a service provider, without particular interests by himself, he adopted the role of a mediator between the conservation agencies, the NPV, the project developer as well as the local action group. He had ambiguous feelings towards the project. On the one hand, he advocated it, as it restored a coastal landscape to a near-natural status, on the other hand he was torn about the extent of the project. With respect to the amount of material being moved, and cost, he said: "I have never invested so much effort for an conservation scheme" (Interview with Michael Willers). He said that he would generally understand the difference between the planners who had to plan and construct the JadeWeserPort on the Federal State level, and who were interested in a secure, and

quick handling of the compensation requirements. But he also understood the farmers. For him, it was difficult to deal with the inequality of decision making power (ibid).

In order to grasp the incomprehension of the local farmers about the extent of the conservation measure it is helpful to quote one farmer at greater length. During this section of our interview we were sitting in his car, driving through the Groden, and visiting the construction site. Large dump trucks were transporting soil, clay and other material around the site. Excavators were deepening the tidal canal and landscaping the area. Small islands were constructed, and the large areas were lowered in order to be flooded by the tide. My interview partner, who was one leaseholder among the farmers in the Groden, who lived right behind the main dike, and who worked on the farm in the third generation, sarcastically said that "this is nature conservation with diggers". He explained the impressive efforts of the measure. A gravel road in the polder had to be constructed to allow the dumpers to move the dirt along the site. Sitting in my interviewee's car in the polder area, and watching the dumpers driving along, he said:

The trucks over there are constructing a gravel road. Almost three kilometer long. Because inside of the dike there is a canal, and you have to get water into the Groden, you have to dig this canal, 18, 20 meters wide. So that during a tide enough water can enter the Groden. And to widen the canal they have to build the gravel road, with 12 to 15 thousand tons of gravel. The gravel comes from Duisburg [a city in North Rhine-Westphalia with an important inland port, more than 300km away]. It comes with ships. 1200 tons per ship, it goes ashore in Nordenham, and the companies bring it here. When there are many trucks, there has been a ship that was just unloaded in Nordenham. When there are less trucks, they don't have a ship available, and then the trucks go all the way to Leer in East Frisia [about 100km away] to pick up the gravel there. (Interview with Fred König, translation JS)

Later, I learned that most of the gravel comes from Norway, is transshipped in Duisburg and then shipped with barges to Nordenham, then put on trucks and transported the last 20km on the road to Langwarden. My interviewee told me that it was planned to remove the gravel, which was placed on fleece blankets, once the construction process was finished. The dumpers are so heavy that they would sink into the ground if this gravel road was not built. The efforts and expenditures for this conservation measure were remarkable, and most of the residents were critical. Another aspect I was told was that the construction company had to implement a bird control technique during the breeding time in spring, and that it was a requirement for them to drive around the Groden in circles, in intervals of 3 hours. One employee of the construction company was mostly occupied with driving around in circles. My interview partner said that this was checked from the consultants. However, in his mind bird control was not working as the birds would still use the area of the Groden for breeding (ibid).

In general, the farmers had quite a different understanding of the coastal nature they were part of and that they wanted to preserve. For the Förderverein Langwarder Groden, the meadows were an example of a cultural landscape that would also serve as a coastal protection measure. My interview partner said that in the Groden there was the best nature one could think of. The farmers already had a number of restrictions for using the land. They were only allowed to cut the grass at certain times, not use fertilizer and slurry, and the stocking density was with two cows per hectare relatively low. In the past, the land was used for agriculture, so for him this extensive usage was already a concession and a positive development towards a usage in unison with nature (ibid).

By contrast, the conservation agencies, the NPV, but also PGG assessed the Groden as intensive grassland with rather low environmental value. In their thinking a coastal landscape would have to be considerably different from an inland grassland, and it would have to exhibit different vegetation and animals than what was in the Groden. According to the environmental assessment that was made during the planning phase, the soil had largely lost its salinity, and the expected coastal birds could only rarely be

found in the area. Rather, the area was characterized as “economic grassland” (Interview with Michael Willers).

The debate about intensive or extensive grassland is not bound to the usage, as many farmers argued, but to the status of the land, and what kind of vegetation and animals could be found. Interestingly, the debate about the assessment of the type of grassland, and whether it was extensive or intensive grassland, had importance for the legal procedure of compensation. Even though I have not participated in the environmental assessment of the area, and I do not challenge the classification of the land in “intensive grassland”, I do want to point out that it was in the interest of the planners and the project developer that the area was of low value. This is because it would allow the compensation measure to upgrade the Groden from a lower value level to value level five, and that the compensation requirements of the port construction could be realized within the area of the Groden. If the Groden had a higher value level to begin with, an additional area might have been necessary to meet the compensation requirements.

My interview partner of PGG, as well as a high-ranking member of the municipal administration of Butjadingen, remarked that the most active people in the local action group were the farmers that were affected by the compensation measure, as they would have to give up their land that they were leasing from the domain agency. My interview partners explained that the farmers would receive an EU payment for the agricultural area, and that each farmer was dependent on this payment. Once the farm area was diminished, the payment would be reduced, which would also have explained their interest in maintaining the Groden (Interview with Michael Willers; Interview with Werner Korn). These remarks were certainly valid, and they also explained why the farmers who had direct interest in the area of the Groden were most involved in the protest campaigns. However, I do not share the belief that they had advanced the concerns about flood risks only to incite panic, as it was sometimes argued. I do think that they were seriously concerned about losing a beloved and well-known cultural landscape to something new that they could not control, and that was imposed by experts from outside.

Challenging the natural dynamic: a need for an initial ignition

Contrary to the arguments invoked above, that a withdrawal of human influences from an area would increase the natural dynamic and biodiversity, some authors and even state authorities have reconsidered this assumption. In a scientific article, Leiner and Menke (1998) argued that an abandonment of salt-marshes would lead to a loss of biodiversity and depletion of the variety of the landscape. Areas where agricultural usage has ceased were mostly dominated by monoculture of wildrye, and the biodiversity was reduced. Therefore, the NPV should rethink their approach of a natural dynamic that focuses on the reduction of human intervention in the coastal forelands and in the salt-marshes, and rather organize a diverse use concept that would include extensive grazing, fallows, extensive sheep farming, extensive cow farming and other alternating farming practices (Leiner and Menke 1998). This would not only do justice to the natural landscape of the National Park, but it would also acknowledge that the North Sea coast is a cultural landscape, and as the authors argue, it would raise the acceptance of the National Park within the population.

The argument of an abandonment of the strict policy of no-human intervention in the National Park has repeatedly occurred. And the NPV has increasingly implemented management plans that foresee a variety of extensive agricultural use cases in the foreland in order to raise the biodiversity and recreate a diverse coastal landscape. My interview partner from PGG explained that when the Wadden Sea National Park was founded in the 1980s, the main principle was to remove any human intervention from the protected areas, and to hand over the area to natural processes. The expectation was that the natural dynamic would create a near-natural landscape that could also be found in areas that had experienced little human intervention before. However, as he argued, over time the NPV and the conservation agencies realized that they would not get the expected outcome, but that a wildrye monoculture would develop that would not develop any further and that would not resemble the desired natural dynamic (Interview with Michael Willers). As a consequence, ideas developed that included stronger management of the areas, also to create a higher biodiversity. The idea was "to give an initial ignition, to stir up the materials, so that the dynamic of the natural space starts to work on its own again" (ibid). A key idea is that in some

circumstances it may be necessary to initiate a process with a dike breach, in order to allow for a more natural dynamic. The ideal for a natural coastline is to allow as little human intervention as possible. However, in this case it was necessary to initiate a man-made intervention. Today, the Wadden Sea National Park authority is increasingly accepting to allow for a moderate human intervention in order to initiate new natural dynamics. In that sense, natural dynamic is always spatially and temporally confined and may need an initial ignition.

“First-class and second-class birds” - Nature conservation as value politics

In an interview with a consultant, who was involved in the initial environmental planning for the JadeWeserPort, he argues that conservation is always “value politics”. He acknowledges that conservation has a historical and contingent element: “At times it is the breeding bird, at times it is the European Hamster. There was a time when ground beetles were investigated because they were deemed important. And then a lot of dry grassland was constructed to create the habitat for the beetle. But then it was not that interesting anymore and something else came up” (Interview with Sven Pickert).

The farmers criticized the normative ideas brought forward by the conservation agencies and the planners. One farmer argued: “We have a fantastic nature here”, and continued:

We used to have a real birdlife. In winter, there were goose that sat on the cut grass. Many other birds came in winter in the Groden, because they have protection from storm surges. Sometimes, they would stay over winter. These birds, when there are salt-marshes developing here, all the birds will disappear. The birds that were here are not so important. So, for the people [conservationists and planners] there are apparently first-class and second-class animals. The birds that are in the Groden now are second-class animals, and they want to have different birds here. (Interview with Fred König)

What my interviewee describes with first-class and second-class birds is a deeply embedded concept in environmental planning, and bureaucratically termed valuable

species (*wertgebende Art*). In environmental law, valuable species are important for the identification and determination of bird reserves in the EU. The idea is that a valuable species endows a particular area, through its occurrence, an outstanding value. Some coastal birds are thus valuable species, as they render coastal areas special and valuable. Conservation agencies and the NPV are legally obliged to foster the life of valuable species, whereas other species are rather considered disturbing. When asked about this notion about a bird hierarchy, one planner explained that the NPV is committed to promote particular birds to live in the National Park, and to provide them with the needed habitat. And they are more interested in coastal birds than in inland birds (Interview with Michael Willers).

The last section in this chapter deals with the project Natur Erleben (Experience Nature), which was agreed upon when the compromise was reached. The project involves the construction of a boardwalk in the newly created intertidal polder area, a range of different information signs, as well as a bird watching cabin.

“Natur Erleben”

A high-ranking member of the municipal administration of Butjadingen was generally in favor of the port construction in Wilhelmshaven, but he was highly critical of the polder opening in Langwarden. The town hall, where we meet for the interview, is just some kilometers away from the Polder. He also uses a phrase that has been used by others when describing the project: “It is nature conservation with diggers.” He continues: “That does not make sense to me. Where salt-marshes develop, that is ok and fine with me. But why do we have to mess around with nature?” (Interview with Werner Korn). He laments that the entire process has been hard for his administration and that he had many conversations with residents. Half-jokingly and half serious he describes what he does on a daily basis as a local politician: “I drink liters of coffee, drive thousands of kilometers around, talk until I am blue in the face, and in the end nothing comes out of it” (laughs) (ibid). He makes it clear that it is difficult to convince the people who live behind the dike about the polder opening. He says that everybody knows about how expensive the construction of dikes is, and that it seemed absurd to dig a hole into the dike. People would not understand why the administration would

spend money on a project like this and deliberately diminish the flood security for the community (ibid). Butjadingen is a peninsular and has with about 37km the longest dike of all municipalities in Germany. "And therefore, coastal protection is of course something essential. And when someone then touches our dikes..." (ibid).

For him, the Natur Erleben project is a consolation for the disadvantages and risks that would come with the polder opening. Even though he likes the project, he makes clear that it does not change his opinion about breaching the dike. But he sees an opportunity for the community with the Natur Erleben project. He explains that tourism is one of the most important sources of income for the residents. And as a tourist town on the North Sea coast it is important to be able to point out a unique selling point. He says: "In principle we all [all coastal towns] can offer the same. We try to offer a bathing place, you can go for a walk around the mudflats, you can eat fish, and so you don't really know whether you are in Neuharlingersiel, in Fedderwardersiel, or in Cuxhaven on holidays. The difference is not so big." Therefore, he argues, it is important to have an attraction that the other coastal tourist places do not have. And the Natur Erleben project is an opportunity to set Butjadingen apart from other places. He argues that it is something special to have immediate access to the Wadden Sea National park and to the World Heritage Site. He believes that this will give Butjadingen an edge in the competition to other coastal communities and he plans on promoting the Natur Erleben project accordingly (ibid).

Just shortly after the Natur Erleben project was realized, the main website of the community (www.Butjadingen.de) featured the Natur Erleben project prominently and advertised that tourists would now be able to experience the World Heritage Site and the natural dynamic of the sea. The website, which also allows to directly book holiday apartments and houses, is captioned with "In the middle of great Nature" (*Mittendrin in großer Natur*). The website says that the Langwarder Groden is the best place for birdwatching. It describes the site, the 4km long boardwalk, and the observation huts for birdwatching. It also mentions that there are several information panels that explain the nature and the landscape. "With the measure Natur Erleben, an attractive and unique opportunity of experiencing Nature was created: Through a boardwalk you can enter the site and witness the evolution of a new salt-marsh, the corresponding

animals and plants and the constant change of ebb and high tide.” The website uses catchy language to advertise the “fascinating insights in the wildlife and vegetation of the Wadden Sea”, and it says that anyone would be able to witness the “elementary forces and the dynamic of the tides at close range” (Nordsee-Halbinsel Butjadingen 2018, translation JS).

It might have come as a surprise that in the end, after a long planning process for a deep-water port and a year-long dispute in the community, a tourist attraction would get this much appraisal. The Natur Erleben project functioned as an appeaser for the local community. I was not able to speak to the residents after the project was realized, but I assume, and hope, that they benefit from the project. Over time, there has been a reframing of the process, from a destruction of nature due to the port construction, and the conservation with diggers arguments to finally the image film on the community website www.Butjadingen.de, which praises the nature that can be experienced, the natural dynamic and the elementary forces. The way the Natur Erleben project is portrayed silences the struggles by the local farmers, the destruction through the port construction, and the amount of soil that was moved during the polder opening. The result is a major new deep-water port, and a transformed coastal space into a new tourist attraction and hotspot for bird watchers.

7.4 Chapter summary

In Germany, managed retreat is closely related to compensation requirements stemming from large infrastructure projects. The Langwarder Groden scheme was an extensive conservation project that had considerable effects on the existing ecosystem. Most managed retreat schemes would not have been implemented if not for a legally binding compensation requirement, and if not the funds were available from the project developer, as well as the political pressure was high for implementing the project. As the dominant approach to coastal management is hold-the-line, which is also valid for the still existing summerpolders and foredikes on the German North Sea coast, managed retreat is only implemented within a legally binding and administrative planning process.

The way managed retreat is implemented is guided by the principle of conservation, the guidelines of the Wadden Sea National Park, and the notion of a natural dynamic that has as little human influence as possible. However, as I have discussed in the last section, this notion is being questioned. An initial ignition is deemed necessary to push-start environmental processes that are desired and that are deemed natural. The natural dynamic that is then started is confined to a particular and well designated space, it is strictly monitored, but it does not challenge the overall aim of providing a secure defense strategy on the coast. All concerns about an increased flood risk due to the breach of the foredike can be dismissed. The main dike has been strengthened, and even a local farmer has called the new main dike a "Jahrhundertdeich" (Interview with Fred König), due to its height and strength. This is to say that managed retreat takes place only outside the main dike, which is still considered the hard border of the settled land, and which is not questioned with any of the managed retreat schemes.

Moreover, the Natur Erleben project is gratefully taken up by the local administration, and readily commodified. The administration and the tourist industry profit from the commodification of the intertidal area, and directly link it to hope for economic growth within the community. The Natur Erleben project may well be a valuable project, and it probably is the best outcome that the community Butjadingen could have wanted.

8. Conclusion

In this dissertation, I investigated managed retreat as a recent transformation in the government of coastal environments. Managed retreat is about the rearrangement of buildings, people's activities, and the (re)production of landscapes. It is highly normative and politically contentious. It involves a reassessment of questions of how the coast should be used, how a desirable coastal landscape should look like, and with which regulatory tools these goals may be achieved. The implementation of managed retreat is controversial, as it affects people in their use of property and agricultural land.

Since the 1980s, coastal scientists, conservationists, council officers, and planners have increasingly problematized the way urbanization and capital accumulation lead to an armoring of the coast, which in turn resulted in a degradation of coastal environments and increasing hazard risks. Other concerns have been tied to climate change and the uncertainties of sea level rise. The problematizations have constituted the *coasts in crisis discourse* and provided the strategic framework in which managed retreat as a government program has developed. The problematizations have structured and ordered the way managed retreat was developed.

Since the 1990s, managed retreat has emerged as a politically relevant concept, and the first schemes were implemented in the UK, in Germany, and other countries. Unlike some authors, who suggested that managed retreat was about surrendering land to the sea, and withdrawing human usage from coastal areas (Dronkers et al. 1990; McGrath 2013; Barkham 2014), I argued that it is rather a deliberate and strategic transformation of coastal spaces guided by particular views on the functioning of coastal processes. Even though the notion of surrendering land to the sea is used by some actors in the contentious debates on managed retreat, I have shown that the implementation of managed retreat schemes is thoroughly controlled and security for existing structures play an important role.

Interestingly, the literature on managed retreat does not put the concept into a larger historical context, and does not relate it to relocations in the past, such as the one on Wangerooze, or other relocations that have occurred throughout recent history (McGlashan 2003). Rather, it is argued that managed retreat is a new strategy

to combat coastal hazard risks and climate change related problems on the coast (French 2006; Esteves 2014a). Even though the literature falls short in working out the differences and continuities of managed retreat in relation to relocations in the past, and thus cannot adequately point out the distinctiveness of managed retreat, their assessment is nevertheless accurate, as managed retreat is strongly science driven, uses prognostic tools, government technologies, and planning approaches that are considerably different from relocations in the past.

Even though the importance of managed retreat has increased as a planning strategy, I showed in my analysis that the spatial allocation of managed retreat areas is highly controversial, and densely populated areas are still protected with hard engineering. Managed retreat has not replaced the widespread practices of hold-the-line in any way, but it has rather diversified the options in coastal management. This is evident in the case of the Langwarder Groden, where the main dike was strengthened before the foredike was breached. It also shows in New Zealand, where debates about managed retreat are rather focusing on suburban areas, whereas highly urbanized areas in coastal cities are continuously fortified with hard engineering structures. This shows that the protection of property and the economic wellbeing of the community at large are still the most important interests of politics.

Managed retreat is closely related to an increased influence of state authorities in the coastal realm. In the theoretical chapter, I discussed several, at times conflicting, approaches to understanding the state and political power. Many accounts in state theory, as Gordon critically maintains, deduce the activities of government “from essential properties and propensities of the state, in particular its supposed propensity to grow and to swallow up or colonize everything outside itself” (Gordon 1991: 4). The Langwarder Groden case study may suggest that this is true. State authorities lobbied and paid for the construction of the port, which had tremendous environmental effects, as well as the implementation of a managed retreat scheme, which in the end turned into a commodified natural landscape that may promote further economic growth. For this kind of reading of the events, a historical materialist theory of the state, or the notion of the environment making state developed by Christian Parenti, would be an adequate theoretical framework. However, with a discussion of

Governmentality Studies, I showed that a stronger focus should be placed on governmental practices, political rationalities, and the analysis of governmental technologies. This is because, as Gordon continues, “the state has no such inherent propensities; more generally, the state has no essence. The nature of the institution of the state is (...) a function of changes in practices of government, rather than the converse” (ibid). Therefore, I have analyzed the changes in political rationalities in coastal management and have comprehensively researched the governmental technologies that are being developed, discussed and contested, which are at the heart of managed retreat. In this research approach, the state appeared rather in its *symbolic unity* as an *imagined collective actor*.

Key for the transformation of government in coastal areas is specialized technoscientific knowledge that is embedded in administrative procedures of state actions. I discussed hazard lines and hazard maps as technocratic artifacts and important technologies in rendering built-up coastal areas legible and subject to government intervention. Hazard maps are an attempt to understand and bring order to the slow and creeping process of coastal erosion. They are tools to not only know what may happen in the future (50 and 100 years), but more importantly the lines can easily prescribe a course of action, through building provisions, restrictions, and trigger points for the forced relocation of structures. Hazard maps are also used as a tool for showing affected property owners the potential extend of coastal erosion, and in how far they are affected. Related to the hazard risk approach is the notion of raising awareness among property owners and *creating risk-aware citizens*. I discussed this in the theory chapter as a common political tool within the neoliberal rationality. Property owners are educated by state authorities. As Rose and Miller suggested, “power is not so much a matter of imposing constraints upon citizens as of ‘making up’ citizens capable of bearing a kind of regulated freedom” (Rose and Miller 1992: 174). Neoliberal forms of government may create new constraints but also new freedoms for subjects either through responsabilization or through the creation of new risks. Once a risk is created in the sense that a particular socio-environmental situation is legible, calculable, and formulated by state authorities, people can and have to make

the deliberate decision to take or avoid the risk; e.g. to buy or sell a house that may be evacuated within the next ten years.

The aim of planning authorities is not only to safe and protect the housing market from assets at risk and negative impacts on the market, but also to create citizens aware of coastal hazards, so they are responsive to the hazards and consider moving away. In New Zealand, risk has emerged as the new object of government in coastal management. State agencies are interested in a reduction of the overall risk, and less in the fate of individual property owner. As Councils are in a difficult situation, ideas about alternative actors and their influence on the housing market are developed. Market-based instruments and risk-related valuation of properties that would *nudge* house owners to selling their property and eventually moving away from the hazard area are in discussion.

In Germany, the notion of environmental compensation and balancing values was at the heart of the discussion. Managed retreat is deeply embedded in legally binding administrative processes, and the public dispute was less focused on the scientific methods, but rather on the loss of land and the fear of the sea. I discussed the details of the valuation method and showed that particularly state agencies and consultancies are interested in an easy to use, scalable and robust method for administering and exchanging environmental values. I argued that the IMR would not prevent environmental degradation, particularly when the political will was strong to implement the development project.

In the introduction, I argued that managed retreat was different from relocations in the past, as there was more scientific research that goes into the decision-making process, and the political process was strongly guided by scientific expert knowledge. Unlike relocations in the past, where for example the decision to relocate the village of Wangerooge was reached after a few guided walks by the administrative delegation, today the political process is strongly driven by contentious debates about scientific methodology, and questions of representation of expert knowledge. Local action groups are likely to form and engage in the debate with their own scientific expertise, often sourced from expert reports that they commissioned. My argument is that the discussion focusing on scientific methodology overshadows the fact that there

are competing interests fought out at the coast, and that once questions of access to land and property are concerned, interests will likely clash. The public discussion about scientific methods often denies *the contestedness and the political quality* of the issue and suggests that a proper scientific assessment process would alleviate the conflict.

Debates about scientific methodology often get lost in nitty-gritty technical debates, where at the end it is argued that there is still uncertainty, and more research is necessary, as the example on the Kāpiti Coast showed. Scientific expert knowledge, objectivity, and the notion of truth played an important role in the debate. However, with the words of the Geographer David Demeritt, I would like to suggest that it would be helpful to turn away from these concepts and rely on the “rhetoric of social trust and solidarity in trying to construct a political response to climate change. Trust in the social institutions of science makes for a very different and much less authoritative rhetoric than the objective scientific truth so often invoked as the self-evident justification for political action” (Demeritt 2001: 329). The author continues that:

the trouble with the rhetoric of objectivity is that it suggests that science somehow stands above and outside the fray as a uniquely privileged vehicle to Truth. This understanding of scientific truth leaves us with an inflexible, take-it-or-leave-it approach to scientific knowledge: either true, objective, and therefore undeniable, or false, subjective, and thus unworthy of any credence. It contributes to the starkly dichotomous public reactions to technical expertise: on the one hand, unqualified faith in and craven deference to science, and on the other, outright rejection of and alienation from scientific knowledge and institutions. (ibid)

This notion of a take-it-or-leave-it approach to science was evident in the case study in New Zealand as well as in Germany. In both cases, the opponents of the managed retreat projects quickly turned against the science, and soon the debate was focused on the nitty-gritty of scientific details of the methodology. My impression of the debates was that most actors expected the struggle to be solved within the domain of scientific facts. It was argued that once the facts were right, a solution would be found. Politicians and scientists alike would be charged with the difficult task to think

outside the box, and create an atmosphere of equal knowledges, participation, and an open process of searching for a way to deal with changes in the coastal environments. This will be a continuous task for the coming generations, as the necessity for an orderly managed retreat from coastal areas is growing.

References

- Abel, N., Gorddard, R., Harman, B., Leitch, A. M., Langridge, J., Ryan, A. and Heyenga, S. (2011) Sea level rise, coastal development and planned retreat: analytical framework, governance principles and an Australian case study. *Environmental Science & Policy*, 14(3), 279–288.
- ABPmer (2015) The cost of undertaking managed realignment schemes in the UK. Briefing Note. Southampton. Retrieved 18.05.2015, from <http://www.omreg.net/resources/>.
- ABPmer (2018) OMREG database. Retrieved 06.01.2018, from www.omreg.net.
- Abrams, P. (1988) Notes on the Difficulty of Studying the State. *Journal of Historical Sociology*, 1(1), 58–89.
- Adam, P. (2002) Saltmarshes in a time of change. *Environmental Conservation*, 29(1), 39–61.
- Ahlhorn, F. and Bormann, H. (2015) Entwicklungsmöglichkeiten des Hochwasserschutzes im Küstenraum – Risiko oder Sicherheit? *Wasser und Abfall*, 17(6), 26–30.
- Ahlhorn, F. and Kunz, H. (2002a) Literaturstudie zur Entwicklung und Bedeutung von Sommerdeichen. Norderney: Niedersächsisches Landesamt für Ökologie - Forschungsstelle Küste.
- Ahlhorn, F. and Kunz, H. (2002b) The future of historically developed summerdikes and polders. A saltmarsh use conflict, in: *Proceedings of Littoral 2002. The changing coast. EUROCOAST / EUCC*. Porto, Portugal, 365–374.
- Ahlhorn, F. and Meyerdirks, J. (2010) Speichern statt pumpen - Abschlussbericht. Nationalpark- und Biosphärenreservatsverwaltung Niedersächsisches Wattenmeer. Wilhelmshaven.
- Airoidi, L., Abbiati, M., Beck, M. W., Hawkins, S. J., Jonsson, P. R., Martin, D., Moschella, P. S., Sundelöf, A., Thompson, R. C. and Åberg, P. (2005) An ecological perspective

on the deployment and design of low-crested and other hard coastal defence structures. *Coastal Engineering*, 52(10-11), 1073–1087.

Alexander, K. S., Ryan, A. and Measham, T. G. (2012) Managed retreat of coastal communities: understanding responses to projected sea level rise. *Journal of Environmental Planning and Management*, 55(4), 409–433.

Allan, S. and Fowler, R. (2014) Independent Review of the Kapiti Coast Proposed District Plan. Allan Planning and Research Ltd. Retrieved 22.05.2017, from https://www.kapiticoast.govt.nz/contentassets/0c65798ed06a43f5b7d826dfcec06e18/independent_review_of_the_kapiti_coast_pdp.pdf.

Allemeyer, M. L. (2006) "Kein Land ohne Deich ...!": Lebenswelten einer Küstengesellschaft in der Frühen Neuzeit. Göttingen: Vandenhoeck & Ruprecht.

Allin, J. (2014) Comments on the coastal panel's report "Coastal Erosion Hazard Assessment for the Kāpiti Coast: Review of the Science and Assessments Undertaken for the Proposed Kāpiti Coast District Plan 2012".

Arnold, S. (2013) Further Submission on KCDC Draft District Plan 2012.

Arnold, S. (2014) Coastal Erosion Hazard Assessment for the Kāpiti Coast: Comment on draft Panel Review Report.

Atkinson, P. W., Crooks, S., Drewitt, A., Grant, A., Rehfish, M. M., Sharpe, J. and Tyas, C. J. (2004) Managed realignment in the UK – the first 5 years of colonization by birds. *Ibis*, 146(1), 101–110.

Auckland Regional Council (2000) Coastal hazard strategy: Coastal erosion management manual. Technical Publication No. 130. Retrieved 22.02.2018, from <http://www.aucklandcity.govt.nz/council/documents/technicalpublications/TP130%20Coastal%20hazard%20strategy%20-%20coastal%20erosion%20management%20manual%202000.pdf>.

Bäckstrand, K. (2004) Scientisation vs. Civic Expertise in Environmental Governance: Eco-feminist, Eco-modern and Post-modern Responses. *Environmental Politics*, 13(4), 695–714.

- Barkham, P. (2014) Should coastal Britain surrender to the tides? *The Guardian*, 07.02.2014. Retrieved 22.06.2015, from <http://www.theguardian.com/environment/2014/feb/07/should-coastal-britain-surrender-to-tide>.
- Barkowski, J. and Freund, H. (2006) Die Renaturierung des Langeooger Sommerpolders - Eine zweite Chance für die Salzwiese? *Oldenburger Jahrbuch*, 106, 257–278.
- Behre, K.-E. (1999) Die Veränderungen der niedersächsischen Küstenlinien in den letzten 3000 Jahren und ihre Ursachen. *Probleme der Küstenforschung im südlichen Nordseegebiet*, 26, 9–33.
- Behre, K.-E. (2008) Landschaftsgeschichte Norddeutschlands: Umwelt und Siedlung von der Steinzeit bis zur Gegenwart. Neumünster: Wachholtz.
- Belina, B. (2013) Staat und Raum im Anschluss an Marx: Positionen in Radical Geography und Materialistischer Staatstheorie, in: B. Belina (Ed.) *Staat und Raum*, 161–185. Stuttgart: Steiner.
- Berry, S. and Vella, J. (2010) Planning Controls and Property Rights – Striking the Balance. Resource Management Law Association. Retrieved 07.07.2016, from http://www.rmla.org.nz/wp-content/uploads/2016/09/rmla_roadshow___planning_controls_and_property_rights_paper_as_at_281010.pdf.
- Blackett, P. and Hume, T. M. (2011) Governance issues with respect to coastal erosion management in New Zealand: GNS Science Report 2011/34. Institute of Geological and Nuclear Sciences Limited.
- Blundell, K. (2012a) Kāpiti erosion risk may devalue 1800 homes. *The Dominion Post*, 27.08.2012. Retrieved 25.02.2014, from <http://www.stuff.co.nz/dominion-post/news/kapiti/7555304/Kapiti-erosion-risk-may-devalue-1800-homes>.
- Blundell, K. (2012b) 1800 beachfront homes at risk. *The Dominion Post*, 28.08.2012. Retrieved 25.02.2014, from <http://www.stuff.co.nz/national/7558732/1800-Kapiti-beachfront-homes-at-risk>.

- BNatSchG §24 Nationalparke, Nationale Naturmonumente. Retrieved 25.01.2018, from <https://dejure.org/gesetze/BNatSchG/24.html>.
- Bowen, G. A. (2009) Document Analysis as a Qualitative Research Method. *Qualitative Research Journal*, 9(2), 27–40.
- Brady, M. (2014) Ethnographies of Neoliberal Governmentalities: from the neoliberal apparatus to neoliberalism and governmental assemblages. *Foucault Studies*, 18, 11–33.
- Brandt, K. (1992) Besiedlungsgeschichte der Nord- und Ostseeküste bis zum Beginn des Deichbaues, in: J. Kramer and H. Rohde (Eds.) *Historischer Küstenschutz: Deichbau, Inselnchutz, und Binnenentwässerung an Nord- und Ostsee*, 17–37. Stuttgart: Konrad Wittwer.
- Braun, B. (2014) A new urban dispositif? Governing life in an age of climate change. *Environment and Planning D*, 32(1), 49–64.
- Breuer, W. (2016) Eingriffsregelung, in: W. Riedel, H. Lange, E. Jedicke and M. Reinke (Eds.) *Landschaftsplanung*, 357–380. Berlin, Heidelberg: Springer Spektrum.
- Bridge, G. (2014) Resource geographies II: The resource-state nexus. *Progress in Human Geography*, 38(1), 118–130.
- Britton, R., Dahm, J., Rouse, H., Hume, T. M., Bell, R. and Blackett, P. (2011) Coastal Adaptation to Climate Change: Pathways to Change.
- Brock, K. A., Reece, J. S. and Ehrhart, L. M. (2009) The Effects of Artificial Beach Nourishment on Marine Turtles: Differences between Loggerhead and Green Turtles. *Restoration Ecology*, 17(2), 297–307.
- Bröckling, U., Krasmann, S. and Lemke, T. (2011) Governmentality: Current Issues and Future Challenges. New York: Routledge.
- Brooke, J. S. (1992) Coastal Defence: The Retreat Option. *Journal of the Institute of Water and Environmental Management*, 6(2), 151–157.

- Bruns, E. (2007) Bewertungs- und Bilanzierungsmethoden in der Eingriffsregelung: Analyse und Systematisierung von Verfahren und Vorgehensweisen des Bundes und der Länder. Dissertation.
- Bruun, P. (1972) The History and Philosophy of Coastal Protection. Proceedings, 13th Coastal Engineering Conference, Vancouver, 1972.
- Bruzzzone, S. (2013) Climate Change and Reorganizing Land Use: Flood Control Areas as a Network Effect. *International Journal of Urban and Regional Research*, 37(6), 2001–2013.
- Bultmann, R. (2011) „Sommerdeich nicht anfassen“: Förderverein setzt auf Verhandlungen und Überzeugungsarbeit. *NordWestZeitung Online*, 02.03.2011. Retrieved 11.07.2013, from http://www.nwzonline.de/wesermarsch/kultur/sommerdeich-nicht-anfassen_a_1,0,635195397.html.
- Burchell, G., Gordon, C. and Miller, P. (1991) The Foucault Effect: Studies in Governmentality. Chicago: University of Chicago Press.
- Burd, F. (1995) Managed retreat: A practical guide. Peterborough: English Nature.
- Carley, J., Komar, P. D., Kench, P. and Davies, R. B. (2014) FINAL Coastal Erosion Hazard Assessment for the Kāpiti Coast: Review of the Science and Assessments Undertaken for the Proposed Kāpiti Coast District Plan 2012.
- CBRE (2012) The Kapiti key to Wellington's growth. Retrieved 10.04.2014, from <http://www.cbre.co.nz/aboutus/mediacentre/mediaarchives/Pages/032512c.aspx>.
- Clément, V., Rey-Valette, H. and Rulleau, B. (2015) Perceptions on equity and responsibility in coastal zone policies. *Ecological Economics*, 119, 284–291.
- Coastal Ratepayers United (2014) Submission on the Science Panel's draft report.
- Collins, D. (2009) Contesting Property Development in Coastal New Zealand: A Case Study of Ocean Beach, Hawke's Bay. *International Journal of Urban and Regional Research*, 33(1), 147–164.

- Collins, D. and Kearns, R. (2008) Uninterrupted views: Real-estate advertising and changing perspectives on coastal property in New Zealand. *Environment and Planning A*, 40(12), 2914–2932.
- Collins, S. (2003) Our eroding nation: Battle for the dunes. *New Zealand Herald*, 01.01.2003. Retrieved 28.07.2014, from http://www.nzherald.co.nz/nz/news/article.cfm?c_id=1&objectid=3049392.
- ComCoast (2007) ComCoast flood risk management schemes: Work Package 3. Rijkswaterstaat. Delft.
- Common Wadden Sea Secretariat (2010) Coastal Protection and Sea Level Rise. CPSL Third Report. The role of spatial planning and sediment in coastal risk management. Trilateral Working Group on Coastal Protection and Sea Level Rise. Wilhelmshaven.
- Cooper, J. A. G. and McKenna, J. (2008) Working with natural processes: the challenge for coastal protection strategies. *The Geographical Journal*, 174(4), 315–331.
- Cooper, J. A. G. and McKenna, J. (2009) Boom and Bust: The Influence of Macroscale Economics on the World's Coasts. *Journal of Coastal Research*, 25(3), 533–538.
- Cooper, J. A. G. and Pilkey, O. H. (2012) Pitfalls of shoreline stabilization: Selected case studies. Dordrecht: Springer.
- Corderoy, J. (2017) Property 2017: Gold Coast set to boom, but still no end in sight for Sydney. Retrieved 17.06.2018, from <https://www.news.com.au/finance/real-estate/buying/property-2107-gold-coast-set-to-boom-but-still-no-end-in-sight-for-sydney/news-story/0d10fe1f6ec94ddc1e1698eee52dc368>.
- Corrigan, P. R. and Sayer, D. (1985) The great arch: English state formation as cultural revolution. Oxford, New York: Blackwell.
- Cowell, R. (1997) Stretching the Limits: Environmental Compensation, Habitat Creation and Sustainable Development. *Transactions of the Institute of British Geographers*, 22(3), 292–306.

- Cutting, T. (2017) Strong value increases seen across Kāpiti Coast District over the past three years. Retrieved 30.11.2017, from <http://www.kapitino.co.nz/news/post/strong-value-increases-seen-across-kapiti-coast-district-over-the-past-three-years>.
- Dahm, C. (2002) Beach User Values and Perceptions of Coastal Erosion. Technical report. Environment Waikato. Hamilton, New Zealand.
- Daily, G. C., Söderqvist, T., Aniyar, S., Arrow, K., Dasgupta, P., Ehrlich, P. R., Folke, C., Jansson, A., Jansson, B.-O., Kautsky, N., Levin, S., Lubchenco, J., Mäler, K.-G., Simpson, D., Starrett, D., Tilman, D. and Walker, B. (2000) The Value of Nature and the Nature of Value. *Science*, 289(5478), 395–396.
- Daniel, H. (2001) Replenishment versus retreat: the cost of maintaining Delaware's beaches. *Ocean & Coastal Management*, 44, 87–104.
- Davies, C. (2015) Wallasea Island project takes significant step forward as sea walls breached. *The Guardian*, 13.07.2015. Retrieved 09.01.2018, from <https://www.theguardian.com/environment/2015/jul/13/wallasea-island-project-takes-significant-step-forward-as-sea-walls-breached>.
- de Lange, W. (n.d.) Kapiti Coast coastal hazard assessment. Retrieved 15.05.2013, from www.kapiticoast.govt.nz/Documents/Downloads/District-Plan-Review/coastal-hazards/reports/independent-panel/Kapiti-Coast-coastal-hazard-assessment.pdf.
- Dean, C. (1999) *Against the tide: The battle for America's beaches*. New York: Columbia University Press.
- Dean, M. (2010) *Governmentality: Power and rule in modern society*. London: Sage.
- Dean, M. (2015) Neoliberalism, Governmentality, Ethnography: A Response to Michelle Brady. *Foucault Studies*, 20, 356–366.
- Defeo, O., McLachlan, A., Schoeman, D. S., Schlacher, T. A., Dugan, J., Jones, A., Lastra, M. and Scapini, F. (2009) Threats to sandy beach ecosystems: A review. *Estuarine, Coastal and Shelf Science*, 81(1), 1–12.

- Defra (2001) Managed Realignment: Land Purchase, Compensation and Payment for Alternative Beneficial Land Use. Retrieved 12.06.2018, from <http://webarchive.nationalarchives.gov.uk/20080609152434/http://www.defra.gov.uk/envirom/fcd/policy/mrcomp/mrcomp.htm>.
- Defra (2002) Managed Realignment Review - Project Report. London.
- Defra (2004) Making space for water: Developing a new Government strategy for flood and coastal erosion risk management in England. A consultation exercise. Retrieved 28.06.2018, from www.look-up.org.uk/2013/wp-content/uploads/2014/02/Making-space-for-water.pdf.
- Demeritt, D. (2001) The Construction of Global Warming and the Politics of Science. *Annals of the Association of American Geographers*, 91(2), 307–337.
- Demirović, A. (2007) Nicos Poulantzas: Aktualität und Probleme materialistischer Staatstheorie. Münster: Westfälisches Dampfboot.
- Demirović, A. (2010) Materialistische Staatstheorie und die Transnationalisierung des kapitalistischen Staates, in: A. Demirović, S. Adolphs and S. Karakayali (Eds.) *Das Staatsverständnis von Nicos Poulantzas: Der Staat als gesellschaftliches Verhältnis*, 53–80. Baden-Baden: Nomos.
- Demirović, A., Adolphs, S. and Karakayali, S. (2010) Einleitung, in: A. Demirović, S. Adolphs and S. Karakayali (Eds.) *Das Staatsverständnis von Nicos Poulantzas: Der Staat als gesellschaftliches Verhältnis*, 9–17. Baden-Baden: Nomos.
- Department of Conservation (1994) New Zealand Coastal Policy Statement 1994. Wellington. Retrieved 31.12.2013, from <http://doc.org.nz/publications/conservation/marine-and-coastal/new-zealand-coastal-policy-statement/archive/new-zealand-coastal-policy-statement-1994/>.
- Department of Conservation (2010) New Zealand Coastal Policy Statement 2010. Wellington. Retrieved 14.03.2013, from <http://doc.govt.nz/documents/conservation/marine-and-coastal/coastal-management/nz-coastal-policy-statement-2010.pdf>.

Department of Conservation (2017) NZCPS 2010 guidance note: Coastal hazards.

Retrieved 12.09.2018, from

<https://www.doc.govt.nz/globalassets/documents/conservation/marine-and-coastal/coastal-management/guidance/policy-24-to-27.pdf>.

Department of the Environment, UK (1992) Planning policy guidance: Coastal Planning. HMSO Publications. London.

Donnelley, L. S. (1959) Coastal erosion. Paekakariki to Waikanae. *New Zealand Engineering*, 14(2), 48–52.

Doody, J. P. (2004) 'Coastal squeeze' – an historical perspective. *Journal of Coastal Conservation*, 10(1), 129–138.

Doody, J. P. (2013) Coastal squeeze and managed realignment in southeast England, does it tell us anything about the future? *Ocean & Coastal Management*, 79, 34–41.

Drachenfels, O. v. (2013) Kartierschlüssel für Biotoptypen in Niedersachsen, Stand März 2011. NLWKN. Hannover.

Dronkers, J., Gilbert, J. T. E., Butler, L. W., Carey, J. J., Campbell, J., James, E., McKenzie, C., Misdorp, R., Quin, N., Ries, K. L., Schroder, P. C., Spradley, J. R., Titus, J. G. and Vallianos, L. (1990) Strategies for Adaption to Sea Level Rise. Report of the IPCC Coastal Zone Management Subgroup: Intergovernmental Panel on Climate Change. Geneva. Retrieved 06.07.2015, from <http://papers.risingsea.net/IPCC-1990-Strategies-for-Adaption-to-Sea-Level-Rise.html>.

Environment Agency (n.d.) Statutory Law. Retrieved 21.01.2019, from <http://www.environmentlaw.org.uk/rte.asp?id=184>.

Environment Waikato (2002) Coastal hazards and development setback recommendations. Summary Report. Retrieved 06.01.2018, from <https://www.waikatoregion.govt.nz/assets/PageFiles/2090/hsrSection1.pdf>.

Esteves, L. S. (2014a) Managed realignment: A viable long-term coastal management strategy? Dordrecht: Springer.

- Esteves, L. S. (2014b) The need for adaptation in coastal protection: Shifting from hard engineering to managed realignment, in: L. S. Esteves (Ed.) *Managed realignment: A viable long-term coastal management strategy?*, 1–18. Dordrecht: Springer.
- Esteves, L. S. (2014c) What is managed realignment?, in: L. S. Esteves (Ed.) *Managed realignment: A viable long-term coastal management strategy?*, 19–31. Dordrecht: Springer.
- Eurosion (2004) Living with coastal erosion in Europe: Sediment and Space for Sustainability. Part 1. Retrieved 16.01.2018, from <http://www.eurosion.org/reports-online/part1.pdf>.
- Ewald, F. (1991) Insurance and risk, in: G. Burchell, C. Gordon and P. Miller (Eds.) *The Foucault Effect: Studies in Governmentality*, 197–210. Chicago: University of Chicago Press.
- Fankhauser, S. (1995) Protection versus retreat: the economic costs of sea-level rise. *Environment and Planning A*, 27, 299–319.
- Finkl, C. W. and Walker, H. J. (2005) Beach nourishment, in: M. L. Schwartz (Ed.) *Encyclopedia of coastal science*, 147–161. Dordrecht: Springer.
- Flitner, M., Heins, V. and Herbeck, J. (2018) Critical Beaches. Coastal Erosion and Geosociality in South-Eastern Ghana, in: E. Nadalutti and O. Kallscheuer (Eds.) *Region-Making and Cross-Border Cooperation: New Evidence from Four Continents*, 47–63. London: Routledge.
- Ford, L. (1977) Alternative means of combatting beach erosion. Reprinted from "Beach Conservation Newsletter No. 29", Beach Protection Authority of Queensland, Brisbane, Australia, in: J. G. Gibb (1978) *The problem of coastal erosion along the 'Golden Coast' western Wellington, New Zealand*. Ministry of Works and Development. Wellington.
- Förderverein Langwarder Groden (n.d.) Satzungs - Entwurf: Erhalt unserer Heimat zwischen den Deichen. Retrieved 06.06.2013, from <http://langwarder-groden.de/app/download/5779479547/Satzung+FLG.pdf>.

- Förderverein Langwarder Groden (2010) Die Varianten zur Umsetzung von Kompensationsmaßnahmen im Langwarder Groden. Vergleichende Darstellung und Bewertung. Retrieved 06.06.2013, from [http://langwarder-groden.de/app/download/5779479610/Vergleich+Varianten+Langwarder+Groden+Endversion+\(1\).pdf](http://langwarder-groden.de/app/download/5779479610/Vergleich+Varianten+Langwarder+Groden+Endversion+(1).pdf).
- Foucault, M. (1980) Truth and power, in: C. Gordon (Ed.) *Power/Knowledge: Selected Interviews and Other Writings 1972-1977*, 109–133. New York: Pantheon.
- Foucault, M. (1982) The subject and power. *Critical Inquiry*, 8(4), 777–795.
- Foucault, M. (1995) Discipline and punish: The birth of the prison. New York: Vintage Books.
- Foucault, M. (2007) Security, Territory, Population: Lectures at the Collège de France 1977 - 1978. New York: Palgrave Macmillan.
- Foucault, M. (2008) The birth of biopolitics: Lectures at the Collège de France, 1978-79. New York: Palgrave Macmillan.
- Freeman, C. and Cheyne, C. (2008) Coasts for Sale: Gentrification in New Zealand. *Planning Theory & Practice*, 9(1), 33–56.
- Freeman, R. and Maybin, J. (2011) Documents, practices and policy. *Evidence & Policy*, 7(2), 155–170.
- French, P. W. (1997) Coastal and estuarine management. London, New York: Routledge.
- French, P. W. (1999) Managed retreat: a natural analogue from the Medway estuary, UK. *Ocean & Coastal Management*, 42(1), 49–62.
- French, P. W. (2001) Coastal defences: Processes, problems and solutions. London: Routledge.
- French, P. W. (2006) Managed realignment - The developing story of a comparatively new approach to soft engineering. *Estuarine, Coastal and Shelf Science*, 67, 409–423.

- Gesing, F. (2016) Working with nature in Aotearoa New Zealand: An ethnography of coastal protection. Bielefeld: Transcript.
- Gesing, F. (2017) Whose Beach, Which Nature? Coproducing Coastal Naturecultures and Erosion Control in Aotearoa New Zealand, in: E. Dürr and Pascht A. (Eds.) *Environmental Transformations and Cultural Responses: Ontologies, Discourses, and Practices in Oceania*, 125–156. New York: Palgrave Macmillan.
- Gibb, J. G. (1978) The problem of coastal erosion along the 'Golden Coast' western Wellington, New Zealand. Ministry of Works and Development. Wellington.
- Gibbs, M. T., Thébaud, O. and Lorenz, D. (2013) A risk model to describe the behaviours of actors in the houses falling into the sea problem. *Ocean & Coastal Management*, 80, 73–79.
- Giddens, A. (1985) The nation-state and violence. Cambridge: Polity Press.
- Global Property Guide (2018) New Zealand's house price boom is over. Retrieved 06.01.2018, from <https://www.globalpropertyguide.com/Pacific/New-Zealand/Price-History>.
- Glückselig, D. (2018) „Das ist hier keine Kuschellandschaft“. *NordWestZeitung Online*, 12.07.2018. Retrieved 01.09.2018, from https://www.nwzonline.de/wesermarsch/wirtschaft/langwarden-langwarder-groden-in-butjadingen-das-ist-hier-keine-kuschellandschaft_a_50,1,4238398957.html.
- Goeldner-Gianella, L. (2007) Perceptions and Attitudes Toward De-polderisation in Europe: A Comparison of Five Opinion Surveys in France and the UK. *Journal of Coastal Research*, 235, 1218–1230.
- Gordon, A. (2015) Coastal Hazard Lines – Last Century's Thinking. Australasian Coasts & Ports Conference. Auckland, 15-18 September 2015.
- Gordon, C. (1991) Governmental rationality: an introduction, in: G. Burchell, C. Gordon and P. Miller (Eds.) *The Foucault Effect: Studies in Governmentality*, 1–51. Chicago: University of Chicago Press.

- Grant, A. (n.d.) The Tollesbury and Orplands Managed Retreat Sites. Centre for Ecology, Evolution and Conservation, University of East Anglia. Retrieved 14.11.2013, from <http://www.uea.ac.uk/~e130/Tollesbury.htm>.
- Griggs, G. B. (2017) *Coasts in crisis: A global challenge*. Oakland, California: University of California Press.
- Gurunathan, K. (2012a) Councillors knew too late. *Kapiti News*, 12.09.2012.
- Gurunathan, K. (2012b) The nature of the machine. *Kapiti News*, 10.10.2012.
- Gurunathan, K. (2014a) Little confidence for public that lessons learnt. *Kapiti News*, 08.01.2014, from <http://issuu.com/the.star/docs/214008kn>.
- Gurunathan, K. (2014b) 'Bloody mess' has cost Kapiti ratepayers \$2m. *Kapiti News*, 26.03.2014.
- Hall, S. (1980) Nicos Poulantzas: State, Power, Socialism. *New Left Review*, 119, 60–69.
- Hanks, D. (2016) Miami-Dade property values surge nearly 9 percent in 2016. *Miami Herald*, 31.05.2016. Retrieved 17.06.2018, from <https://www.miamiherald.com/news/local/community/miami-dade/article80989917.html>.
- Hanley, M. E., Hoggart, S.P.G., Simmonds, D. J., Bichot, A., Colangelo, M. A., Bozzeda, F., Heurtefeux, H., Ondiviela, B., Ostrowski, R., Recio, M., Trude, R., Zawadzka-Kahlau, E. and Thompson, R. C. (2014) Shifting sands? Coastal protection by sand banks, beaches and dunes. *Coastal Engineering*, 87, 136–146.
- Harris, C. (2016) Couple heartbroken after storms leave \$155,000 Wairarapa bach worth \$2500. *The Dominion Post*, 07.04.2016. Retrieved 08.04.2016, from <http://www.stuff.co.nz/dominion-post/business/residential-property/78670742/Couple-heartbroken-after-storms-leave-155-000-Wairarapa-bach-worth-2500>.
- Harvey, D. (1996) *Justice, Nature and the Geography of Difference*. Cambridge, MA: Blackwell.
- Harvey, D. (2006) *The Limits to Capital*. New York: Verso.

- Haughton, G. and White, I. (2017) Risky spaces: Creating, contesting and communicating lines on environmental hazard maps. *Transactions of the Institute of British Geographers*, 43(3), 435–448.
- Hawkes Bay Regional Council (2014) Hawke's Bay Regional Coastal Environment Plan. Retrieved 16.01.2015, from [http://www.hbrc.govt.nz/HBRC-Documents/HBRC%20Document%20Library/Current%20RCEP%20\(excl%20Schedules%20and%20Maps\).pdf](http://www.hbrc.govt.nz/HBRC-Documents/HBRC%20Document%20Library/Current%20RCEP%20(excl%20Schedules%20and%20Maps).pdf).
- Hayward, B. (2008) 'Nowhere Far From the Sea': Political Challenges of Coastal Adaptation To Climate Change in New Zealand. *Political Science*, 60(1), 47–59.
- Healy, T. R. (2005) New Zealand, Coastal Geomorphology and Oceanography, in: M. L. Schwartz (Ed.) *Encyclopedia of coastal science*, 712–714. Dordrecht: Springer.
- Healy, T. R. and Soomere, T. (2008) Managed retreat - Is it really an option for mitigation of chronic erosion and storm surge flooding?, in: L. Wallendorf (Ed.) *Solutions to coastal disasters congress 2008*, 456–462. Reston, Va.: American Soc. of Civil Engineers.
- High Court of New Zealand (2013) Interim Judgement of Williams J.
- Hinrichsen, D. (2016) *Our common seas: Coasts in crisis*. London, New York: Routledge.
- Hofstede, J. (2007) Küstenschutz im Küstenrisikomanagement. *Hansa International Maritime Journal*, 144(6), 103–105.
- House of Commons, Environment Committee, UK (1992) Coastal zone protection and planning: Minutes of evidence and appendices. Second Report, Volume II. HMSO Publications. London.
- Howard, J. D., Kaufman, W. and Pilkey, O. H. (1985) National strategy for beach preservation. Position paper, Second Skidaway Institute of Oceanography Conference on America's Eroding Shoreline, June 1985, Savannah, Georgia. Retrieved 19.07.2016, from www.wcu.edu/WebFiles/PDFs/psds_SKIDAWAY2_1985.pdf.

- Huxley, M. (2008) Planning, Space and Government, in: K. R. Cox, M. Low and J. Robinson (Eds.) *The SAGE handbook of Political Geography*, 123–140. Los Angeles: Sage.
- Institute of Estuarine and Coastal Studies (1992) Northey Island set-back scheme. Report 2. August 1991 to January 1992. University of Hull. Retrieved 06.01.2018, from <http://publications.naturalengland.org.uk/file/6451246240104448>.
- Institute of Estuarine and Coastal Studies (1996) Northey Island managed retreat. Report 6. Results to February 1996. English Nature. Retrieved 06.01.2018, from <http://publications.naturalengland.org.uk/file/5484949733900288>.
- Jacobson, M. (2004) Review of the New Zealand Coastal Policy Statement 1994 - Coastal hazards. Wellington.
- JadeWeserPort (n.d.) Historie - JadeWeserPort. Retrieved 26.01.2018, from <http://www.jadeweserport.de/hafen-betrieb/historie/>.
- Jessop, B. (1985) Nicos Poulantzas: Marxist Theory and political strategy. London: Macmillan.
- Jessop, B. (1990) State theory: Putting the capitalist state in its place. Cambridge: Polity Press.
- Jessop, B. (2007a) From micro-powers to governmentality: Foucault's work on statehood, state formation, statecraft and state power. *Political Geography*, 26(1), 34–40.
- Jessop, B. (2007b) State power: A strategic-relational approach. Cambridge: Polity Press.
- Jessop, B. (2017) Nicos Poulantzas on political economy, political ecology, and democratic socialism. *Journal of Political Ecology*, 24(1), p. 186.
- Jürgens, H.-J. (2015) Wangerooger Chronik. 1850-1900. Wangerooge: Jürgens (author's edition).

- KCDC (2006) Kāpiti Coast: Choosing futures. Coastal Strategy. Retrieved 02.04.2014, from <http://www.kapiticoast.govt.nz/Documents/Downloads/Strategies/Coastal-Strategy.pdf>.
- KCDC (2010) Kapiti Coast District Plan Review: Discussion document. Natural Hazards & Managed retreat.
- KCDC (2012a) New coastal hazard information to be included in LIMs. Letter sent to property owners on the Kāpiti Coast. 25.08.2012. Paraparaumu.
- KCDC (2012b) Coastal hazards on the Kapiti Coast. [Power-Point slides]. Kāpiti Coast, Open Days, September 2012. Retrieved 25.02.2018, from https://www.kapiticoast.govt.nz/contentassets/a933446e8c094de8a946d20b9f36a1de/coastal_hazards_presentation_for_open_days.pdf.
- KCDC (2012c) Asset Management Plan. Part A. Retrieved 14.03.2013, from <http://www.kapiticoast.govt.nz/Documents/Downloads/asset-management-plans/2012/Part-A-Asset-Management-Plan.pdf>.
- KCDC (2013) Notice of motion: Information of coastal erosion hazards and the District Plan review. Council report on a public meeting, 18 April 2013. Retrieved 22.01.2016, from http://www.kapiticoast.govt.nz/contentassets/ec7d77f283474717a47870112cfc8117/18-april/1013-kcdc-or-coastal_erosion_hazard_information-and-district_plan_rview-sp-13-866.pdf.
- KCDC (2014) Proposed Kāpiti Coast District Plan. Chapter 4 Coastal Environment. Strikethrough version. Retrieved 05.02.2018, from <https://www.kapiticoast.govt.nz/Your-Council/Planning/District-Plan-Review/Proposed-District-Plan/Volume-1/>.
- KCDC (2017) Independent Review on Proposed District Plan. Retrieved 05.02.2018, from <https://www.kapiticoast.govt.nz/Your-Council/Planning/District-Plan-Review/Way-forward-for-Proposed-District-Plan/>.
- Keenan, S. (2010) Subversive Property: Reshaping Malleable Spaces of Belonging. *Social & Legal Studies*, 19(4), 423–439.

- Kirkpatrick, S. (2012) The Economic Value of Natural and Built Coastal Assets: Part 2: Built Coastal Assets. *ACCARNSI Discussion Paper*.
- Kramer, J. (1958) Die Strandaufspulung Norderney 1951-1952 und ein Plan zu ihrer Fortführung. *Die Küste*, 7, 107–139.
- Krieger, K. (2013) The limits and variety of risk-based governance: The case of flood management in Germany and England. *Regulation & Governance*, 7(2), 236–257.
- Kunz, H. (1996) Groynes on the East Frisian islands: History and experiences. *Proceedings of the twenty-fifth International Coastal Engineering Conference*, 2128–2141.
- Küpfer, C. (2012) Strengthening ecology in the landscape – the eco-account is an important instrument to stabilize ecological functions. ECLAS Conference proceedings. The Power of landscape. Warsaw, 19-22 September 2012.
- Lange, H. and Garrelts, H. (2007) Risk Management at the Science–Policy Interface: Two Contrasting Cases in the Field of Flood Protection in Germany. *Journal of Environmental Policy & Planning*, 9(3-4), 263–279.
- Lawrence, J., Bell, R., Blackett, P., Stephens, S. and Allan, S. (2018) National guidance for adapting to coastal hazards and sea-level rise: Anticipating change, when and how to change pathway. *Environmental Science & Policy*, 82, 100–107.
- Lawrence, J., Sullivan, F., Lash, A., Ide, G., Cameron, C. and McGlinchey, L. (2013) Adapting to changing climate risk by local government in New Zealand: Institutional practice barriers and enablers. *Local Environment*, 20(3).
- Leary, F. (2014) Inquiry on QV. Email Conversation.
- Leggett, D. J., Cooper, N. and Harvey, R. (2004) Coastal and estuarine managed realignment: Design issues. London: CIRIA.
- Leiner, C. and Menke, C. (1998) Naturschutz und Landnutzung in Salzmarschen - Vorländer Ost-Frieslands zwischen natürlicher Dynamik und kulturlandschaftlichen Prozessen. *Naturschutz und Landschaftsplanung*, 30(8/9).

- Lemke, T. (2001) 'The birth of bio-politics': Michel Foucault's lecture at the Collège de France on neo-liberal governmentality. *Economy and Society*, 30(2), 190–207.
- Lemke, T. (2002) Foucault, Governmentality, and Critique. *Rethinking Marxism*, 14(3), 49–64.
- Lemke, T. (2007) An indigestible meal? Foucault, governmentality and state theory. *Distinktion: Scandinavian Journal of Social Theory*, 8(2), 43–64.
- Lemke, T. (2015) New Materialisms: Foucault and the 'Government of Things'. *Theory, Culture & Society*, 32(4), 3–25.
- Lemke, T. (2016) Foucault, governmentality, and critique. London, New York: Routledge.
- Loftus, A. (2018) Political ecology II. *Progress in Human Geography*, E-publication, 1–11.
- Lübbing, H. (1951) Das Alt-Wangerooger Seebad unter der Hofrätin Westing und die Katastrophe von 1855, in: W. Hartung (Ed.) *Wangerooge: Wie es wurde, war und ist*, 120–136. Oldenburg: Edo Dieckmann.
- Lucius, R. v. (2012) Jade-Weser-Port: Im tiefen Wasser. *Frankfurter Allgemeine Zeitung*, 20.09.2012. Retrieved 01.02.2018, from <https://www.faz.net/aktuell/politik/inland/jade-weser-port-im-tiefen-wasser-11897365.html>.
- Lüders, K. (1951) Der Seebau auf der Insel Wangeroog, in: W. Hartung (Ed.) *Wangerooge: Wie es wurde, war und ist*, 30–38. Oldenburg: Edo Dieckmann.
- Lumsden, J. (2003) Strategies for managing coastal erosion hazards on the Kapiti Coast: A report for Kapiti Coast District Council.
- Mann, M. (1984) The autonomous power of the state: Its origins, mechanisms and results. *Archives européennes de sociologie*, 25(2), 185–213.
- Markau, H.-J. (2003) Risikobetrachtung von Naturgefahren. Dissertation. Kiel.
- Martin, S. (2006) Bilanz über 20 Jahre Nationalpark Niedersächsisches Wattenmeer. WWF. Frankfurt am Main.

- Maxwell, J. (2014) Coastal rules axed from plan. *Kapiti Observer*, 31.07.2014. Retrieved 18.09.2014, from <http://www.stuff.co.nz/dominion-post/news/local-papers/kapiti-observer/10330736/Coastal-rules-axed-from-plan>.
- McGlashan, D. J. (2003) Managed relocation: an assessment of its feasibility as a coastal management option. *The Geographical Journal*, 169(1), 6–20.
- McGrath, M. (2013) Sea surrender plan to ease flood fears on south coast. *BBC News*, 04.11.2013. Retrieved 27.04.2016, from <http://www.bbc.com/news/science-environment-24770379>.
- McNeill, R., Nelson, D. J. and Wilson, D. (2014) Water's edge. The crisis of rising sea levels. A Reuters Series. Retrieved 05.01.2015, from <http://www.reuters.com/investigates/special-report/waters-edge-the-crisis-of-rising-sea-levels/#article-1-insidious-invasion>.
- Meiners, U. (2010) Landunter im Langwarder Groden? Landvolk Niedersachsen Webseite. Retrieved 10.08.2013, from <http://landvolk.net/Agrarpolitik/Land-und-Forst/2010/11/1046/Kompensation.php#/-1/>.
- Michael Otto Stiftung (2010) Ein Zukunftsbild für eine klimasichere Wattenmeerregion. Hamburg.
- Miller, P. and Rose, N. (1990) Governing economic life. *Economy and Society*, 19(1), 1–31.
- Miller, P. and Rose, N. (2008) Governing the present: Administering economic, social and personal life. Cambridge: Polity Press.
- Minister of the Environment Denmark, Germany, Netherlands (1991) Ministerial declaration of the sixth trilateral governmental conference on the protection of the Wadden Sea. Esbjerg.
- Ministerium für Energiewende, Landwirtschaft, Umwelt und ländliche Räume des Landes Schleswig-Holstein (2013) Generalplan Küstenschutz des Landes Schleswig-Holstein. Fortschreibung 2012. Retrieved 14.08.2015, from <https://www.schleswig-holstein.de/DE/Fachinhalte/K/kuestenschutz/generalplanKuestenschutz.html>.

- Ministry for the Environment (2008) Coastal Hazards and Climate Change. A Guidance Manual for Local Government in New Zealand. Retrieved 22.01.2016, from <https://www.mfe.govt.nz/publications/climate/coastal-hazards-climate-change-guidance-manual/>.
- Ministry for the Environment (2009) Preparing for coastal change: A guide for local government in New Zealand.
- Ministry for the Environment (2017a) Coastal Hazards and Climate Change: Guidance for local government.
- Ministry for the Environment (2017b) Preparing for coastal change: A summary of coastal hazards and climate change guidance for local government.
- Mitchell, T. (1991) The Limits of the State: Beyond Statist Approaches and Their Critics. *The American Political Science Review*, 85(1), 77–96.
- Mohaupt, D. (2015) Klimawandel - Das Wattenmeer droht zu ertrinken. *Deutschlandfunk*, 11.12.2015. Retrieved 02.01.2018, from https://www.deutschlandfunk.de/klimawandel-das-wattenmeer-droht-zu-ertrinken.697.de.html?dram:article_id=339532.
- Moller, B. (2013) Consideration for the KCDC Coastal Expert Panel: Methods used by CSL specifically the Precautionary Approach. Email correspondence with KCDC expert panel. Retrieved 05.11.2014, from <https://www.kapiticoast.govt.nz/contentassets/a933446e8c094de8a946d20b9f36a1de/consideration-for-the-kcdc-coastal-expert-panel-methods-used-by-csl-specifically-the-precautionary-approach-b.pdf>.
- Mossman, H. L., Davy, A. J., Grant, A. and Elphick, C. (2012) Does managed coastal realignment create saltmarshes with 'equivalent biological characteristics' to natural reference sites? *Journal of Applied Ecology*, 49(6), 1446–1456.
- Neal, W. J., Bush, D. M. and Pilkey, O. H. (2005) Managed retreat, in: M. L. Schwartz (Ed.) *Encyclopedia of coastal science*, 602–606. Dordrecht: Springer.

- Nimmo, R. (2008) Governing Nonhumans: Knowledge, Sanitation and Discipline in the Late 19th and Early 20th-Century British Milk Trade. *Distinktion: Scandinavian Journal of Social Theory*, 9(1), 77–97.
- Nimmo, R. (2011) Actor-Network Theory and Methodology: Social Research in a More-Than-Human World. *Methodological Innovations Online*, 6(3), 108–119.
- NLWKN (2007) Generalplan Küstenschutz Niedersachsen/Bremen - Festland. Norden. Retrieved 24.01.2016, from http://www.nlwkn.niedersachsen.de/download/22925/Generalplan_Kuestenschutz.pdf.
- NLWKN (2010) Generalplan Küstenschutz Niedersachsen: Ostfriesische Inseln. Retrieved 22.01.2017, from http://www.nlwkn.niedersachsen.de/download/59866/Generalplan_Kuestenschutz_Inseln.pdf.
- NLWKN (2017) Küstenschutz und Deichbau in Niedersachsen: Antworten auf häufig gestellte Fragen. Retrieved 24.10.2017, from https://www.nlwkn.niedersachsen.de/hochwasser_kuestenschutz/kuestenschutz/antworten_auf_haeufig_gestellte_fragen/kuestenschutz-und-deichbau-in-niedersachsen-45182.html.
- Nordsee-Halbinsel Butjadingen (2018) Natur Erleben Langwarder Groden. Retrieved 13.01.2018, from <https://www.butjadingen.de/reisefuehrer/unesco-weltnaturerbe-wattenmeer/natur-erleben-langwarder-groden/>.
- Padamsey, S. (2013) An invitation to sue Council? Reader's letter to the editor. *Kapiti Coast News*, March 2013. Retrieved 11.02.2015, from <http://www.kcnews.co.nz/story.php?storyID=6522>.
- Painter, J. (2000) State and governance, in: E. S. Sheppard and T. J. Barnes (Eds.) *A companion to economic geography*, 359–376. Oxford: Blackwell.
- Painter, J. (2006) Prosaic geographies of stateness. *Political Geography*, 25(7), 752–774.
- Parenti, C. (2015) The Environment Making State: Territory, Nature, and Value. *Antipode*, 47(4), 829–848.

- Parliamentary Commissioner for the Environment (2014) Changing climate and rising seas: Understanding the science. Parliamentary Commissioner for the Environment.
- Parliamentary Commissioner for the Environment (2015) Preparing New Zealand for rising seas: Certainty and Uncertainty.
- Peart, R. (2008) Time to get serious about our coastline. *New Zealand Herald*, 29.01.2008. Retrieved 13.02.2014, from http://www.nzherald.co.nz/nz/news/article.cfm?c_id=1&objectid=10489217.
- Peart, R. (2009) Castles in the sand: What's happening to the New Zealand coast? Nelson: Craig Potton Pub.
- Peart, R. (2014) The good, the bad and the ugly. *New Zealand Herald*, 04.01.2014. Retrieved 14.02.2014, from http://www.nzherald.co.nz/environment/news/article.cfm?c_id=39&objectid=11181049.
- Peters, K. H. and Sprötge, M. (2015) Der Langwardergröden und sein Vordeich. *Nachrichten des Marschenrates*, 52, 79–96.
- Pethick, J. (1993) Shoreline Adjustments and Coastal Management: Physical and Biological Processes under Accelerated Sea-Level Rise. *The Geographical Journal*, 159(2), 162–168.
- Pethick, J. (2002) Estuarine and Tidal Wetland Restoration in the United Kingdom: Policy Versus Practice. *Restoration Ecology*, 10(3), 431–437.
- Pilkey, O. H. (1988) Seawalls Versus Beaches. *Journal of Coastal Research*, 4, 41–64.
- Pilkey, O. H. (2005) Foreword, in: M. L. Schwartz (Ed.) *Encyclopedia of coastal science*, n.p. Dordrecht: Springer.
- Pilkey, O. H. and Cooper, J. A. G. (2014a) Are natural beaches facing extinction? *Journal of Coastal Research*, 70, 431–436.
- Pilkey, O. H. and Cooper, J. A. G. (2014b) The last beach. Durham: Duke Univ. Press.

- Planungsgruppe Grün (n.d.) Langwarder Groden - Ausgleichsmaßnahmen/Deichverstärkung. Retrieved 02.08.2016, from <https://www.pgg.de/umweltplanung/wasserwirtschaft2/langwarder-groden.html>.
- Planungsgruppe Grün (2012) Karte Landschaftspflegerischer Begleitplan Maßnahme 'Langwarder Groden'.
- Planungsgruppe Grün (2013a) Planänderung zum Planfeststellungsbeschluss der WSD - Nordwest vom 15.03.2007: -P-143.3/72 – Jade Weser Port Hier: Langwarder Groden. Austauschkapitel zum Landschaftspflegerischen Begleitplan. Ovelgönne-Frieschenmoor.
- Planungsgruppe Grün (2013b) Planänderung zum Planfeststellungsbeschluss der WSD – Nordwest vom 15.03.2007. Erläuterungsbericht Landschaftspflegerischer Begleitplan (LBP). Ovelgönne-Frieschenmoor.
- Plyusnin, V., Müller, B., May, A. and Albrecht, J. (2014) Assessment, Compensation and Biodiversity Offsets of Environmental Impacts: The German-Russian Compendium. Sochava Institute of Geography. Irkutsk, Dresden, Moscow, Bonn.
- Pompe, J. J. and Rinehart, J. R. (1995) Beach Quality and the Enhancement of Recreational Property Values. *Journal of Leisure Research*, 27(2), 143–154.
- Pontee, N. (2013) Defining coastal squeeze: A discussion. *Ocean & Coastal Management*, 84, 204–207.
- Poulantzas, N. (2014) State, power, socialism. London, New York: Verso.
- Rachor, E. (2003) Salzwiesenentwicklung an der Wurster Küste. *Bremer Beiträge für Naturkunde und Naturschutz*, 6, 51–60.
- Radio Bremen (2013) Umweltschutz mit Baggern. Retrieved 25.11.2014, from <http://www.radiobremen.de/politik/dossiers/jade-weser-port/langwarder-groden108.html>.
- Radio Bremen (2014) Wo liegt Neu-Wangerooog? Nordwestradio - Radio Bremen. Retrieved 20.05.2015, from

<http://www.radiobremen.de/nordwestradio/serien/schauplatz-nordwest/neuwangerooge100.html>.

Ramsay, D., Gibberd, B., Dahm, J. and Bell, R. (2012) Defining coastal hazard zones for setback lines: a guide to good practice. National Institute of Water and Atmospheric Research (NIWA). Hamilton, New Zealand.

Reise, K. (2015) Kurswechsel Küste: Was tun, wenn die Nordsee steigt? Kiel: Wachholtz.

Reise, K. (2017) Facing the Third Dimension in Coastal Flatlands: Global Sea Level Rise and the Need for Coastal Transformations. *Gaia*, 26(2), 89–93.

Reisinger, A., Judy Lawrence, Hart, G. and Chapman, R. (2015) From coping to resilience: The role of managed retreat in highly developed coastal regions of New Zealand, in: B. C. Glavovic, M. Kelly, R. Kay and A. Travers (Eds.) *Climate change and the coast: Building resilient communities*, 285–310. Boca Raton: Taylor & Francis.

Ricketts, P. J. (1986) National policy and management responses to the hazard of coastal erosion in Britain and the United States. *Applied Geography*, 6(3), 197–221.

Rilkoff, M. (2014) Homes at mercy of the ocean. *Taranaki Daily News*, 22.07.2014. Retrieved 25.07.2014, from <http://www.stuff.co.nz/taranaki-daily-news/news/10292917/Homes-at-mercy-of-the-ocean>.

Robbins, P. (2008) The State in Political Ecology: A Postcard to Political Geography from the Field, in: K. R. Cox, M. Low and J. Robinson (Eds.) *The SAGE handbook of Political Geography*, 205–218. Los Angeles: Sage.

Robertson, M. M. (2012) Measurement and alienation: making a world of ecosystem services. *Transactions of the Institute of British Geographers*, 37(3), 386–401.

Robertson, M. M. and Wainwright, J. D. (2013) The Value of Nature to the State. *Annals of the Association of American Geographers*, 103(4), 890–905.

Rose, N. and Miller, P. (1992) Political Power beyond the State: Problematics of Government. *British Journal of Sociology*, 43(2), 173–205.

- Rouse, H. L., Bell, R. G., Lundquist, C. J., Blackett, P. E., Hicks, D. M. and King, D.-N. (2017) Coastal adaptation to climate change in Aotearoa-New Zealand. *New Zealand Journal of Marine and Freshwater Research*, 51(2), 183–222.
- Rupp-Armstrong, S. and Nicholls, R. J. (2007) Coastal and Estuarine Retreat: A Comparison of the Application of Managed Realignment in England and Germany. *Journal of Coastal Research*, 23(6), 1418–1430.
- Ruthe, C. (2012) RE LIM's - Hazard lines. Correspondance with Mayor, Councillors, staff management. Retrieved 25.02.2014, from <https://issuu.com/davidluly/docs/121120035317-c04ed17669f04294a29390f8b70ef742>.
- Ruthe, C. (2014) Submission on the Science Panel's Draft report: Coastal Erosion Hazard Assessment for the Kapiti Coast: Review of the Science and Assessments Undertaken for the Proposed Kapiti Coast District Plan 2012.
- Rutherford, S. (2007) Green governmentality: Insights and opportunities in the study of nature's rule. *Progress in Human Geography*, 31(3), 291–307.
- Saar, M. (2011) Relocating the Modern State: Governmentality and the History of Political Ideas, in: U. Bröckling, S. Krasmann and T. Lemke (Eds.) *Governmentality: Current Issues and Future Challenges*, 34-55. New York: Routledge.
- Saldana, J. (2009) *The Coding Manual for Qualitative Researchers*. London: Sage.
- Scheve, J. (2017) Der Sicherheitsdiskurs im deutschen Küstenschutz - Hemmnis für eine notwendige Transformation in Zeiten des Klimawandels. artec-paper Nr 215. artec Forschungszentrum Nachhaltigkeit. Bremen.
- Schmidt, E., Ollero, J. and Kluth, A. (n.d.) Container- und LNG-Terminals: JadeWeserPort - Übersicht über die Baumaßnahme. Retrieved 26.01.2018, from <https://vzb.baw.de/publikationen/pianc/0/2010-03.pdf>.
- Schwalfenberg, S. (2013) Area-oriented coastal protection: A theoretical and stakeholder based analysis of possible synergies and obstacles on the German North-Sea coast. Master Thesis. Oldenburg, Groningen.

- Science Media Centre (2017) Climate change and insurance - Expert Reaction.
Retrieved 18.09.2017, from
<https://www.sciencemediacentre.co.nz/2017/04/28/climate-change-and-insurance-expert-reaction/>.
- Scott, C. R. (2007) Wallasea wetland creation scheme - Lesson learned. Southampton.
Retrieved 21.05.2015, from
http://www.abpmer.net/wallasea/media/reports/scott_wallasea_lessons_learned_260107.pdf.
- Scott, J. C. (1998) Seeing like a state: how certain schemes to improve the human condition have failed. New Haven: Yale University Press.
- Shand, R. D. (n.d.) Maps of erosion hazard prediction lines. Retrieved 21.08.2017, from
<http://coastalsystems.co.nz/downloads/Predicted%20Hazard%20Erosion%20Shorelines%20-%20Kapiti%20Coast.pdf>.
- Shand, R. D. (2008) Kāpiti Coast Erosion Hazard Assessment. Part 1: Open Coast. Wanganui.
- Shand, R. D. (2015) Kapiti Erosion Hazard Assessments | Coastal Systems Ltd. Website.
Retrieved 20.08.2015, from <http://coastalsystems.co.nz/kapiti-erosion-assessments/>.
- Shand, T., Reinen-Hamill, R. and Kench, P. (2015) Methods for Probabilistic Coastal Erosion Hazard Assessment. Australasian Coasts & Ports Conference. Auckland, 15-18 September 2015.
- Sherwell, P. (2016) \$40bn to save Jakarta: the story of the Great Garuda. *The Guardian*, 22.11.2016. Retrieved 12.01.2017, from
<https://www.theguardian.com/cities/2016/nov/22/jakarta-great-garuda-seawall-sinking>.
- Siders, A. (2013) Managed coastal retreat: A legal Handbook on shifting development away from vulnerable areas. New York.
- Smith, N. (2008) Uneven development: Nature, capital, and the production of space. Athens: University of Georgia Press.

- Soucie, G. (1973) Where beaches have been going: into the ocean. *Smithsonian*, 4(3), 55–61.
- Speybroeck, J., Bonte, D., Courtens, W., Gheschiere, T., Grootaert, P., Maelfait, J.-P., Mathys, M., Provoost, S., Sabbe, K., Stienen, E. W.M., van Lancker, V., Vincx, M. and Degraer, S. (2006) Beach nourishment: an ecologically sound coastal defence alternative? A review. *Aquatic Conservation: Marine and Freshwater Ecosystems*, 16(4), 419–435.
- Staletovich, J. (2015) New study finds Florida leads the nation is property at risk from climate change. *Miami Herald*, 27.07.2015. Retrieved 22.01.2018, from <http://www.miamiherald.com/news/local/environment/article29029159.html>.
- Stancheva, M., Rangel-Buitrago, N. and Anfuso, G. (2011) Expanding Level of Coastal Armouring: Case Studies from Different Countries. *Journal of Coastal Research*, 64, 1815–1819.
- Stanley, A. (2013) Natures of risk: Capital, rule, and production of difference. *Geoforum*, 45, 5–16.
- Statistics New Zealand (2013) 2013 Census QuickStats: Kapiti Coast District. Retrieved 14.05.2015, from http://www.stats.govt.nz/Census/2013-census/profile-and-summary-reports/quickstats-about-a-place.aspx?request_value=14325&parent_id=14322&tabname=#14325.
- Sterr, H. (2008) Assessment of Vulnerability and Adaptation to Sea-Level Rise for the Coastal Zone of Germany. *Journal of Coastal Research*, 24(2), 380–393.
- Sterr, H., Markau, H.-J., Daschkeit, A., Reese, S. and Kaiser, G. (2008) Risikomanagement im Küstenschutz in Norddeutschland, in: C. Felgentreff and T. Glade (Eds.) *Naturreisiken und Sozialkatastrophen*, 337–352. Berlin: Spektrum.
- Stone, J. (2015) Japan to build 250-mile-long, four storey-high wall to stop tsunamis. *Independent*, 24.03.2015. Retrieved 23.02.2018, from <https://www.independent.co.uk/news/world/asia/japan-to-build-250-mile-long-four-storey-high-wall-to-stop-tsunamis-10131013.html>.

- Storey, B., Noy, I., Townsend, W., Kerr, S. and Salmon, R. (2017) Insurance, housing and climate adaptation: current knowledge and future research. Motu Economic and Public Policy Research. Retrieved 18.09.2017, from <https://motu.nz/assets/Documents/our-work/environment-and-agriculture/climate-change-impacts/Insurance-Housing-and-Climate-Adaptation.pdf>.
- Stronkhorst, J. and Mulder, J. (2014) Considerations on managed realignment in The Netherlands, in: L. S. Esteves (Ed.) *Managed realignment: A viable long-term coastal management strategy?*, 61–68. Dordrecht: Springer.
- Theobald, W. (1998) Umweltbewertung als inter- und transdisziplinärer Diskurs, in: W. Theobald (Ed.) *Integrative Umweltbewertung: Theorie und Beispiele aus der Praxis*, 7–18. Berlin: Springer.
- Titus, J. G. (1990) Greenhouse effect, sea level rise and land use. *Land Use Policy*, 7(2), 138–153.
- Tol, R. S. J., Klein, R. J. T. and Nicholls, R. J. (2008) Towards Successful Adaptation to Sea-Level Rise along Europe's Coasts. *Journal of Coastal Research*, 242, 432–442.
- Tonkin & Taylor Ltd (2017) Coastal Erosion Hazard Zone Assessment for Selected Northland Sites. 2017 Update. Report prepared for Northland Regional Council. Retrieved 04.02.2018, from <https://www.nrc.govt.nz/media/9545/tonkintaylorcoastalerosionhazardzonesreport2017updatewebversion.pdf>.
- Tortell, P. (2012) Submission on the proposed Kapiti Coast District Plan 2012.
- Townend, I. and Pethick, J. (2002) Estuarine flooding and managed retreat. *Philosophical Transactions of the Royal Society A: Mathematical, Physical and Engineering Sciences*, 360(1796), 1477–1495.
- Tunstall, S. M. and Penning-Rowsell, E. C. (1998) The English Beach: Experiences and Values. *The Geographical Journal*, 164(3), 319–332.

- Turbott, C. and Stewart, A. (2006) Managed Retreat from Coastal Hazards: Options for Implementation. Hamilton, New Zealand. Retrieved 01.02.2013, from <http://www.waikatoregion.govt.nz/PageFiles/5405/tr06-48.pdf>.
- University of Auckland (2018) Coasts in crisis. Press release. Retrieved 30.05.2018, from <https://www.auckland.ac.nz/en/about/news-events-and-notice/news/news-2018/05/coasts-in-crisis.html>.
- van Veen, J. (1962) Dredge, drain, reclaim: the art of a nation. The Hague: Nijhoff.
- Waikato Regional Council (2011) Waikato Regional Coastal Plan. Hamilton, New Zealand.
- Walker, R. A. (1973) Wetlands Preservation and Management on Chesapeake Bay: The Role of Science in Natural Resource Policy. *Coastal Zone Management Journal*, 1(1), 75–101.
- Walsh, C. (2017) Metageographies of coastal management: Negotiating spaces of nature and culture at the Wadden Sea. *Area*, 46, 1–8.
- Walters, W. (2012) Governmentality: Critical encounters. New York: Routledge.
- Wasser- und Schifffahrtsdirektion Nordwest (2007) Planfeststellungsbeschluss für den Ausbau der Bundeswasserstraße Jade im Bereich von km 7 bis km 15 durch die Errichtung eines Tiefwasserhafens für Containerschiffe (Jade Weser port). Retrieved 10.09.2013, from <http://www.wsd-nordwest.de/service/planfeststellung/index.html>.
- Watts, M. (2003) Development and Governmentality. *Singapore Journal of Tropical Geography*, 24(1), 6–34.
- Weir, M. (2013) Submission by Mike Weir to KCDC Science Panel 3 December 2013. Retrieved 22.01.2018, from <http://www.kapiticoast.govt.nz/contentassets/a933446e8c094de8a946d20b9f36a1de/submission-by-mike-weir-to-kcdc-science-panel-3dec2013.pdf>.
- Weisser, F. (2014) Practices, politics, performativities: Documents in the international negotiations on climate change. *Political Geography*, 40, 46–55.

- Wellington City Council (n.d.) Land Information Memorandum (LIM). Retrieved 09.09.2016, from <http://wellington.govt.nz/services/rates-and-property/property/reports/lim>.
- Wende, W., Herberg, A. and Herzberg, A. (2005) Mitigation banking and compensation pools: improving the effectiveness of impact mitigation regulation in project planning procedures. *Impact Assessment and Project Appraisal*, 23(2), 101–111.
- White, V. (2017) Fears beaches could vanish forever. *Hawke's Bay Today*, 16.01.2017. Retrieved 01.02.2017, from http://www.nzherald.co.nz/hawkes-bay-today/news/article.cfm?c_id=1503462&objectid=11782829.
- Whitehead, M. (2008) Cold Monsters and Ecological Leviathans: Reflections on the Relationships between States and the Environment. *Geography Compass*, 2(2), 414–432.
- Whitehead, M., Jones, R. and Jones, M. (2007) The Nature of the State: Excavating the Political Ecologies of the Modern State. Oxford: Oxford Univ. Press.
- Williams, S. J., Dodd, K. and Krafft Gohn, K. (1990) Coasts in crisis. U.S. Geological Survey Circular 1075. Washington D.C.: US Government Printing Office.
- Wissel, J. (2007) Die Transnationalisierung von Herrschaftsverhältnissen: Zur Aktualität von Nicos Poulantzas' Staatstheorie. Baden-Baden: Nomos.
- Witte, H.-H. (1970) Die Schutzarbeiten auf den Ostfriesischen Inseln. *Die Küste*, 19, 68–124.
- Wolters, M., Garbutt, A. and Bakker, J. P. (2005) Salt-marsh restoration: evaluating the success of de-embankments in north-west Europe. *Biological Conservation*, 123, 249–268.
- Yohe, G. W. (1991) The cost of not holding back the sea—economic vulnerability. *Ocean and Shoreline Management*, 15(3), 233–255.

Zimmermann, W. H. (2007) Die mobile Immobilie. Zum traditionellen Wandern von Holzbauten in Europa und Nord-Amerika im 1. und 2. Jahrtausend n. Chr., in: F. Kaspar and B. Adam (Eds.) *Bauten in Bewegung*, 64–92. Mainz: von Zabern.

Appendix

List of interviews

I anonymized the names of my interview partners. The description of the profession and work-place has a general wording to provide anonymity. Four unrecorded interviews were omitted from the list.

1. Frank Willms & Andreas Fischer, Wadden Sea National Park Authority, Wilhelmshaven, 30.05.2013
2. Karl Reinders, Wadden Sea National Park Authority, Wilhelmshaven, 05.07.2013
3. Fred König, Förderverein Langwarder Groden, Butjadingen, 05.07.2013
4. Kai Meier, Ecologist, University Bremen, Bremen, 26.08.2013
5. Rolf Hellers, NLWKN, Norden, 27.08.2013
6. Tillman Beek, 2nd Oldenburg Dike association, Butjadingen, 30.08.2013
7. Michael Willers, Planning consultant, Wesermarsch, 12.09.2013
8. Werner Korn, Municipal administration Butjadingen, Burhave, 22.10.2013
9. Kurt Schnelle, JadeWeserPort, Wilhelmshaven, 22.10.2013
10. Friedrich Koller, Planning approval authority, telephone interview, 23.10.2013
11. Heinz Anders, Alfred-Wegener-Institut, telephone interview, 23.10.2013
12. Beate Schiller, WWF, Hamburg, 25.10.2013
13. Emily Wilson, Scientist, Hamilton, 11.02.2014
14. Josh Lowry, NIWA, Hamilton, 13.02.2014
15. John Stone, University of Waikato, Hamilton, 18.02.2014
16. Elizabeth Ford, Lawyer, telephone interview, 20.02.2014
17. Ron Johnson, Thames Coromandel District Council, telephone interview, 26.02.2014
18. Wayne Hamilton, Kāpiti Coast District Council, Paraparaumu, 03.03.2014
19. Todd Arnold, Sally Finch, Kāpiti Coast residents, Paraparaumu, 03.03.2014
20. Mark Fisher, Kāpiti Coast resident, Paekakariki, 04.03.2014
21. Thomas Harris, Councilor Kāpiti Coast District Council, Paraparaumu, 04.03.2014

22. Margret Cooper, Olivia Marshall, Kāpiti Coast District Council, Paraparaumu, 05.03.2014
23. Randell Thomson, Councilor Kāpiti Coast District Council, Waikanae, 05.03.2014
24. Peter Anderson, Kāpiti Coast resident, Wellington, 06.03.2014
25. Andrew King, Kāpiti Coast resident, Paraparaumu, 07.03.2014
26. Walter Lee, Councilor Kāpiti Coast District Council, Paraparaumu, 07.03.2014
27. Linda Hathaway, Kāpiti Coast resident, Te Horo Beach, 10.03.2014
28. Fred Collins, Waikato Regional Council, Hamilton, 11.04.2014
29. Rebecca Smith, Planning consultant, Hamilton, 14.04.2014
30. Josh Brown, Planning consultant, Thames, 15.04.2014
31. Tim Waters, Councilor Hastings District Council, Clifton, 01.05.2014
32. Shawn Simmons, Hastings District Council, Napier, 01.05.2014
33. Lydia Dean, Walking on Water, Haumoana, 01.05.2014
34. Sam Rogers, Hawke's Bay Regional Council, Napier, 02.05.2014
35. Ron Miller, Hastings District Council, Hastings, 02.05.2014
36. Colin Green, Greater Wellington Regional Council, telephone interview, 08.05.2014
37. Pete White, NIWA, Hamilton, 09.05.2014
38. Michael Walter, ICBM, University Oldenburg, Wilhelmshaven, 02.02.2015
39. Sven Pickert, Planning consultant, Oldenburg, 26.03.2015
40. Roger McMaster, Local action group, Pagham Beach, 15.06.2015
41. Michael Summers, Arun District Council, Littlehampton, 15.06.2015
42. Timothy McLean, Environment Agency, Worthing, 16.06.2015
43. James Neal, Environment Agency, Worthing, 16.06.2015
44. David Cross, Pagham Parish Council, Pagham, 17.06.2015
45. Wayne Bure & Sarah Collin, Planning consultants, Southampton, 18.06.2015
46. Dirk Shanahan, Businessman, Selsey, 19.06.2015