NATURE AT WORK

The feasibility of Building with Nature projects in the context of EU Natura 2000 implementation

Vera Vikolainen

UNIVERSITY OF TWENTE.

NATURE AT WORK.

THE FEASIBILITY OF BUILDING WITH NATURE PROJECTS IN THE CONTEXT OF EU NATURA 2000 IMPLEMENTATION

DISSERTATION

to obtain
the degree of doctor at the University of Twente,
on the authority of the rector magnificus,
Prof.dr. H. Brinksma,
on account of the decision of the graduation committee,
to be publicly defended
on December 21st, 2012 at 12.45 hrs.

by

Vera Vikolainen
Born on July 31st, 1982
in Saint-Petersburg, Russia

This dissertation has been approved by:

Promotor: prof. dr. J.Th.A. Bressers

Assistant promotor: dr. K.R.D. Lulofs

Thesis committee members:

prof. dr. R.A. Wessel, UT, MB

prof. dr. J.Th.A. Bressers, UT, MB

dr. K.R.D. Lulofs, UT, MB

prof. mr. dr. M.A. Heldeweg, UT, MB

prof. dr. S.M.M. Kuks, UT, MB

prof. dr.ir. H.J. de Vriend, TU Delft

dr. M.W. van Buuren, Erasmus UR

dr.ir. D.C.M. Augustijn, UT, CTW

The work described in this thesis was performed at the Twente Centre for Studies in Technology and Sustainable Development, Institute for Innovation and Governance Studies, Faculty of Management and Governance, University of Twente, PO Box 217, 7500 AE Enschede, The Netherlands.

Colofon

ISBN 978-90-365-3493-2

Table of Contents

Acknowledgements

The work presented in this thesis was carried out as part of the innovation programme Building with Nature. The Building with Nature programme is funded from several sources including the Subsidieregeling Innovatieketen Water (SIW, Staatscourant nr. 953 and 17009), sponsored by the Dutch Ministry of Transport, Public Works and Water Management, and partner contributions from the participants in the Foundation EcoShape. The programme receives co-funding from the European Fund for Regional Development (EFRO) and the Municipality of Dordrecht.

I am grateful to all those who inspired me to pursue a PhD and those who motivated me to carry it through to the end. My parents, Larisa and Viktor, who made sure my brother and I obtained university degrees, and those schoolteachers and university lecturers who helped me develop the necessary skills. I would like to thank my Master thesis supervisors Nico Groenendijk and Ramses Wessel for suggesting a PhD as a possible career path and Frans Coenen, Kris Lulofs and Hans Bressers for directing this path towards water management. I cannot thank my PhD thesis supervisors Hans Bressers and Kris Lulofs enough for leading me through it. My PhD research would be impossible without the support of the EcoShape Foundation and its enthusiastic managers who introduced me to the world of dredging, hydrology, ecology, morphology and ambitions for a better world: Huib de Vriend, Stefan Aarninkhof, Wouter Dirks, Jan van de Meene, Erik van Slobbe, Tom Ysebaert and Anneke Hibma. More generally, I would like to thank all the participants within the Ecoshape-Building with Nature consortium that contributed to the open, inspiring and productive atmosphere in this splendid program. I would like to thank all the respondents and interviewees who agreed to participate in my research and gave me the opportunity to learn and collect data. Publishing journal articles was an enjoyable experience and so I would like to thank the journal editors for considering the results of my research worthy of publication and the anonymous reviewers for their helpful comments.

The five years of employment in the Department of CSTM at the University of Twente was a time of enormous professional and personal growth. I would like to thank all my fellow junior and senior researchers at CSTM. I would especially like to acknowledge the continuous and warm support of my office mates Hazel Kwaramba, Yan Yan Xue, Nthabiseng Mohlakoana, Menno Smit and Wouter Andringa. The gourmet in me is grateful to Joy Clancy and Giles Stacey for the wonderful dinners and Pimm's. A special thanks to Ritchie and his family for their support and care, to Ada Krooshoop and Barbera van Dalm for always being there to lend a helping hand and Ian Priestnall for bearing with my English. Last but not least, all my friends, family, sports mates and instructors deserve a huge hug for the love and joy that kept me sane and not too fixated on my research.

Chapter 1. Introduction

In this chapter, the scope of the thesis is introduced, and the research domain is specified in the sections on estuaries and coasts, Natura 2000 and water infrastructure. Following this, the problem definition and the main research variables are outlined. The chapter concludes by stating the central research questions and the corresponding sub-questions.

Research domain

Estuaries and Coasts

Estuaries and coastal zones are among the most densely populated areas in the world and host major economic activities. They provide a wide range of economic benefits to many sectors including fishing, industrial complexes and amenity services such as tourism and recreation. Estuaries are also often ideal locations for ports, harbours and shipyards as they provide the necessary shelter for ships as well as access further inland along major rivers. Human activities in coastal and estuarine areas include navigation, dredging, sand extraction, fisheries, aquaculture, industry (including oil and gas extraction, wind farm development), disposal of sewage and waste water, water extraction (such as for power stations and industry), safety (including sea defences and flood protection), recreation including bird watching and hunting, urbanisation, cover for cables, pipes and tunnels, military activities and research activities (European Commission, 2011).

Estuaries and coastal zones are however also amongst the most dynamic and complex ecosystems. They are made up of a wide range of different habitats, such as sand banks, mudflats and sand flats, salt marshes and at their coastal edge sand dunes, coastal lagoons, shallow inlets and bays, reefs, islets and small islands, sandy beaches and sea cliffs. These habitats are of prime importance for wildlife, especially migrating and breeding birds, and of major value in terms of their rich natural resources (such as, as nursery grounds for commercially important fish). In addition, they also offer a wide variety of services such as shoreline stabilization, nutrient regulation, carbon sequestration, detoxification of polluted waters and the supply of food and energy resources (Millennium Ecosystem Assessment, 2005).

The pressure of human activities on estuarine and coastal ecosystems is high. In estuaries in particular, large areas of intertidal habitat have been claimed for agricultural, urban and industrial developments and the remaining habitat is often degraded by strong anthropogenic pollution (Cox *et al.*, 2006). Run-off nutrients from agricultural and urban systems have increased several-fold in the developed river basins of the planet, causing major ecological changes in estuaries and coastal zones (Chapin *et al.*, 2000). Rising sea-levels induced by climate change is a particular concern for estuaries and coastal zones as they are vulnerable to increased risk of storms, intense rainfall and flash floods, all of which could lead to unprecedented damage to built-up areas and infrastructure. Combined with subsidence of the delta soils, sea-level rise could lead to a series of changes in the delta environment. It increases coastal erosion, threatening human settlements and enlarging the risk of coastal flooding (Deltares, 2009).

Natura 2000

Estuaries and coasts are protected under international, national and EU laws. Under the EU laws, the EU Water Framework Directive (2000/60/EC) establishes a framework for the protection of all surface waters (rivers, lakes, transitional and coastal) and groundwater and aims to achieve a good ecological status (or a good ecological potential for heavily modified water bodies) and a good chemical status by 2015. The EU Marine Strategy Framework Directive (2008/56/EC) establishes a framework for the protection and restoration of marine ecosystems. Estuarine habitats are protected through the EU Directive on the conservation of natural habitats and wild flora and fauna (Habitats Directive 92/43/EEC). Shorebirds are dependent on estuaries and coastal zones during long-distance migration from breeding to over-wintering grounds. Furthermore, numerous bird species breed in estuarine and coastal habitats. These are protected under the EU Directive on the conservation of birds (Birds Directive 79/409/EEC).

The Birds and Habitats Directives form the legal basis of the EU Natura 2000 network of protected areas and are the centrepiece of EU nature and biodiversity policy. No other EU environmental directives have caused as much European and national case law as these two directives over the past decade (for an overview see European Communities, 2006). Court cases include infringement procedures brought by the European Commission against member states, and national socioeconomic developments have been cancelled due to the Directives' impacts. For instance, Denmark, Finland, France, Germany, Greece, Ireland and the Netherlands were taken to the European Court of Justice (some of these member states more than once) for failing to correctly and fully transpose the Directives into national law (Beijen, 2010). In the Netherlands, Birds and Habitats Directives gained a reputation for 'locking up' economic developments due to the presence of protected species (Bastmeijer and Verschuuren 2003, 2004) – a belief that is still widespread in the current societal debate (Arnouts and Kistenkas, 2011).

Water infrastructure

The impact of the Birds and Habitats Directives was particularly strong in the field of water infrastructure. Many water infrastructure related projects were delayed or cancelled due to the Directives' impact on water management practices, especially as a result of the Habitat assessment procedure for plans and projects (Mink, 2007, van Hooydonk, 2006). Thus, van Hooydonk (2006) states that available case law on the application of the EU Birds and Habitats Directives shows that many, if not the most, legal disputes involve waterways and ports. He studied a total of 18 major projects in the UK, the Netherlands, Flanders, Germany and France that incurred severe delays and cancellations due to court cases. The most prominent examples are the Antwerp and Rotterdam port expansions, delayed for more than one year each, and Western Scheldt container terminal, planned in early 2000 and still in preparation.

The majority of cases studied by van Hooydonk (2006) are located in northwest Europe. High population densities and intense economic activities in this region result in heightened pressure on estuarine and coastal ecosystems. As such, the scale and characteristics of socioeconomic activities and environmental problems in this region are quite different from Spain, for example, where species such as the imperial eagle and the bear live in a habitat the size of the Netherlands (Neven *et al.*, 2005). Given the similarities in problem scale and solving strategies within northwest Europe, it makes sense to choose this region for further analysis. Estuaries and coasts in northwest Europe face

an ongoing need for maritime infrastructure developments such as port expansions, waterfront developments, remediation and flood control measures.

Most of these developments include dredging works. “Dredging is the maritime transportation of natural materials from one part of the water environment to another by specialised dredging vessels. It involves collecting and bringing up, fishing up or clearing away or out material and / or any object from the bed of a river, sea; transporting it to the relocation site and unloading the material or object” (European Dredging Association, 2012). The purpose of dredging can be maintenance of the depth or the deepening of navigation access or channels; it can also be land reclamation, coastal protection, seabed stabilisation for offshore energy installations or the removal of contaminated sediments. Dredging is recognised as potentially having major environmental impacts and is often considered as a ‘polluting’ activity because of side effects such as turbidity and increased sedimentation. The extraction or relocation dredging operations can disturb marine life. Further, the material dredged up is often regarded as waste. Nevertheless, dredging is absolutely necessary for the purposes mentioned above, and its side effects are often temporary and the dredged material can have beneficial uses. It can be used as fill material, construction material (such as for artificial islands) and for soil improvement in agricultural land if it is was extracted from fresh water (European Dredging Association, 2005).

The tension between the ports industry and dredging on the one hand, and the EU Birds and Habitats Directives on the other became so pressing that the European Commission established an expert “Working Group on Estuaries and Coastal Zones”. The aim of the working group was to enhance the exchange of information on existing experiences and best practices in relation to the management of port-related activities and Natura 2000, and to provide general guidance on the application of the nature directives in these areas. The working group was chaired by the Commission (The Nature and Biodiversity Unit of Directorate General Environment and the Maritime transport, ports policy and maritime security Unit of Directorate General for Energy and Transport) and composed of experts from different Member States, scientific experts, representatives of key stakeholder groups (including European Sea Port Organisation and the European Dredging Association), NGOs, as well as Commission services (Directorate General of the Environment, Directorate General of Transport and Energy, Directorate General of Maritime Affaires and Fisheries). The Working Group met six times from 2007 to 2009 to discuss a guidance document and significantly contributed to its elaboration. In 2011, the European Commission published guidelines and recommendations that illustrate the European Commission’s view on this topic and contain the outcomes of discussions held within the working group (European Commission, 2011).

Practical problem

The current state of affairs in estuaries and coastal zones can be described as a tension between human activities and the preservation of natural habitats. The fulfilment of socioeconomic goals, such as the improvement of industrial or recreational infrastructure and the prevention of coastal flooding, is often seen as a threat to the environment and natural habitats. Together, water infrastructure projects that include dredging works, the European Union (EU) Natura 2000 network of protected areas and the estuaries and coasts in northwest Europe form a specific domain where such tension is observed. The tension takes the form of judicial conflicts in national or European

courts, and also societal and political conflicts with resulting delays and cancellations of water infrastructure projects.

The desired state of affairs is a balance between the quality of life and the quality of the environment, implying the reconciliation of socioeconomic and ecological goals related to estuarine and coastal developments. As such, the practical problem of this research can be defined as: reconciling socioeconomic and ecological goals in water infrastructure projects that require dredging in Natura 2000 estuaries and coasts of northwest Europe. Due to language constraints on the researcher, the selected countries are limited to the Netherlands, Belgium, the UK and Germany.

A shift towards Building with Nature

The pressure on coastal zones and estuaries has encouraged a shift towards new approaches that consider socioeconomic circumstances alongside environmental protection. The new approaches originate from scientific discourses that have reframed the relationship between human societies and their natural environment, such as the discourses on socio-ecological systems and ecosystem services (Constanza *et al.* 1997, Holling 1998, cited in van Slobbe *et al*., forthcoming). The starting point is that people are "integral parts of ecosystems and that a dynamic interaction exists between them and other parts of ecosystems, with the changing human condition driving, both directly and indirectly, changes in ecosystems and thereby causing changes in human-well-being" (Millennium Ecosystem Assessment, 2005).

From a historical perspective, the search for innovative strategies started around 1980 when three innovative strategies were developed within water management that remain of relevance: integrated water management, integrated water resources management and adaptive water management (Lulofs and Bressers, 2010, cited below with permission of authors).

> "Integrated Water Management attempted to link and coordinate previously fragmented water management tasks, for instance the management of groundwater, surface water, storm water, wastewater and drinking water. Substantial efforts were made to coordinate between water managers in charge of the sewage system and those in charge of water treatment infrastructure to realize best conditions. The innovation was primarily an effort to make bureaucracy work more effectively and efficiently; and effort towards a more optimal achievement of pre-established water policy goals and the goals of different sub-sectors of water management. This is sometimes also referred to as internal integration.
>
> Integrated Water Resources Management emerged when water managers realized their dependencies on other sectors of society and opportunities emerging from those sectors. This approach can be described as external integration of water management. The external integration can cover linkages to and cooperation with fields such as agriculture, tourism, nature, economy, housing and transport. The essence of Integrated Water Resources Management is taking into consideration potential causes for water problems and potential solutions for water problems that are embedded in other policy sectors and their sub-sectors. The surface water quality, for instance, depends not only on the installed public water treatment technology but also on the behaviour of businesses and households that emit into the sewage system and the behaviour of actors that produce diffuse sources of

pollution, such as rinse off from agricultural land. The latter is determined by the nature and intensity of farming and the use of fertilizers, herbicides and pesticides.

Adaptive Water Management emerged gradually as it became clear for the water managers that in the complex world of Integrated Water Resources Management purely rational goal-oriented behaviour is difficult, if not impossible. Coordination and cooperation with other policy domains is for instance complicated by processes and dynamics which are out of phase, and different problem definitions of actors, which are hard to influence. Adaptive Water Management implies that water ambitions should be formulated and achieved in interaction with short-term and long-term opportunities that emerge from dynamics within the water sector and other sectors in society. This comes close to a perspective of water managers that struggle for satisfying outcomes in the context of imperfect information and actor-related dynamics. Water managers realized more and more that they are working in a policy and politics domain and need to take into account other actors' preferences, which are not necessarily revealed and could change over time. Adaptive Water Management placed emphasis on long-term potentially large improvements that come with broad temporal and geographical scale perspectives".

The idea of Adaptive Water Management stems from ecology. Huitema *et al.* (2006) argue that the core message of Adaptive Water Management is the fundamental realization of the unpredictability of ecosystems and their responses to human interference. Given the characteristics of ecosystems, long-standing paradigms of natural resource management such as that of the Maximum Sustainable Yield lead to unexpected outcomes in the long run, often in the shape of negative surprises. This is because human interference, especially if focused on one particular parameter (e.g. maintaining a navigable water level, a certain level of fish stocks), leads to a chain of reactions – sometimes over a long term - from the ecosystem that at some point will undermine the efforts that humans undertake. Such ideas on ecosystems were translated into proposals for new ways of managing ecosystems, which became known as Adaptive Water Management. Adaptive Water Management implies a shift in thinking about appropriate behaviour and norms for the resource manager:

> "The overall goal of adaptive management is not to maintain an optimal condition of the resource, but to develop an optimal management capacity. This is accomplished by maintaining ecological resilience that allows the system to react to inevitable stresses, and generating flexibility in institutions and stakeholders that allows managers to react when conditions change. The result is that, rather than managing for a single, optimal state, we manage within a range of acceptable outcomes while avoiding catastrophes and irreversible negative effects" (Johnson, 1999).

A shift towards adaptive water management and increased environmental consciousness has given rise to several 'movements' promoting new approaches to designing water infrastructure. Initiatives such as *Building with Nature*, *Working with Nature* and *Flanders Bays* are examples of such movements which seek innovative project designs that realize socioeconomic project goals in harmony with the environment.

Building with Nature seeks to develop new ways of thinking and acting in relation to sustainable coastal development. The initiative was launched in 2008 by the EcoShape Foundation as a public-

private innovation programme (EcoShape, 2012). Building with Nature is an approach whereby infrastructure is planned, designed and operated whilst creating new opportunities for nature while using natural forces whenever possible. Rather than presuming the worst – that a project will harm the natural environment – and acting defensively, Building with Nature explores positive, pro-active opportunities using the dynamics of the natural system as a starting point.

In parallel with *Building with Nature*, the *Working with Nature* concept was developed under the auspices of the World Association for Waterborne Transport Infrastructure (PIANC). PIANC published its first *Working with Nature* position paper in 2008 and revised it in 2011. PIANC sees *Working with Nature* as doing things in a different order: establishing project needs and objectives, understanding the environment, making meaningful use of stakeholder engagement and preparing initial project design to benefit navigation and nature (PIANC, 2011).

Another such initiative is *Flanders Bays 2100*, which was introduced in May 2009 by a group of dredging companies and international consultants. It was conceived as an answer to the complexities of the dramatically receding Belgian coastline, which has been reduced to a narrow strip and requires dykes for its protection. The goal is to return to a wide and soft coast, where sand in outstretched dunes, sandbanks and islands provide a natural and flexible protection zone. This return to the historical Belgian coastline is envisaged by 2020, with further broadening of the coast with room for nature, tourism and harbours by 2050. The added value of Flanders Bays is in combining safety, sustainability, nature, attractiveness and socioeconomic developments in a balanced way, with respect for the wide variety of purposes and needs of coastal communities and their hinterlands (International Association of Dredging Companies, 2010).

Building with Nature definition

The above-mentioned movements are similar in their attempts to reconcile tensions between socioeconomic and ecological goals in water infrastructure projects. The underlying assertion is that the proposed approaches will, in the long run, balance the needs of human society and its natural environment. This thesis will focus on the *Building with Nature* approach as advocated by the Dutch EcoShape Foundation. The gist of *Building with Nature* programme is given in Box 1 (taken directly from Aarninkhof *et al.*, 2010). This thesis reflects one of the governance PhD projects within the Building with Nature research programme.

The concept of *Building with Nature* was developed by the Czech hydraulic engineer J.N. Svašek in 1979 (quoted in International Association of Dredging Companies, 2010) and further explored and linked to the field of coastal management by Waterman (2008, 2010). Waterman defines *Building with Nature* as 'flexible integration of coast and water by making use of materials, forces and interactions present in nature, in the context of hydrological and morphological situation' (Waterman, 2010). Waterman's definition captures the interaction between nature and infrastructure, and more specifically the interaction between hydro-morphology (abiotic materials and forces present in nature) and coastal engineering.

Building with Nature is a five-year innovation and research programme (2008-2012) carried out by the EcoShape Foundation (www.ecoshape.nl). This 30 million Euro program is initiated by the Dutch dredging industry, while partners represent academia, research institutes, consultancies and public parties. The program aims to develop knowledge for the sustainable development of coasts, deltas and rivers by combining practical hands-on experience with state-of-the-art technical and scientific knowledge on the functioning of the ecosystem and its interaction with infrastructures. Key is that infrastructure solutions are sought that utilise and at the same time enhance the natural system, such that ecological and economic interests strengthen each other.

This approach is reflected in the five program objectives that were established for the program:

1. Develop ecosystem knowledge enabling Building with Nature
2. Develop scientifically sound design rules and norms
3. Develop expertise to apply the Building with Nature concept
4. Make the concept tangible using practical Building with Nature examples
5. Establish how to bring the Building with Nature concept forward in society and make it happen

The core of the program is centred around four real-world cases (Holland Coast, Southwest Delta and the Marker- and IJssel Lakes in The Netherlands, plus case Singapore in a tropical environment). Generic research on governance-related topics and nature sciences is carried out by a group of 20 PhD researchers. Throughout the program the interaction between disciplines is promoted, involving ecologists, engineers and policy makers. The work comes together in a work package called eco-dynamic design, which aims to draft a manual with guidelines for eco-dynamic design of marine infrastructure. Results will become publicly available throughout the course of the program, with completion of the design manual envisaged for December 2012.

Box 1. Building with Nature research programme

Under materials, Waterman refers to loose mobile sand and silt, and under the forces and interactions present in nature he lists tides and waves (specifically in the breaking zone), swell and river outflow (as a force and as a source of freshwater sediment), estuarine and ocean currents, gravity, wind, rain and solar radiation. The *Building with Nature* method also includes the interaction between vegetation and sand. Another factor it considers is the complex interaction between marine organisms and sand/silt/clay particles in beach and near shores. Building with Nature takes into account the present geomorphology and the historic development of coastal and delta areas, soil and subsoil characteristics, land subsidence plate tectonics, marine/river and terrestrial environment, flora and fauna, ecosystems, climate and climate change with all its implications such as sea-level rises, more frequent and intense storm surges and rainfall, as well as periods of drought.

The *Building with Nature* method proposed by Waterman mainly applies to land reclamation in coastal and delta areas. The most extensive applications of *Building with Nature* are found in the

Netherlands, but examples also exist elsewhere in Europe, Africa, the Middle East, the Americas and Australia. Among the examples in the Netherlands, Waterman notes the Delfland coast, the Port of Rotterdam and IJmuiden land reclamations. All three have a dune-beach outer perimeter as coastal defences, include one or more nature reserves and have economic functions (e.g. recreation, tourism, industry) in harmony with the nature reserves, realized by carefully considered zoning and overall spatial planning.

The EcoShape Foundation goes further than Waterman's definition by adding the societal dimension (governance), the biotic dimension of nature and connecting the three elements into a triangle which in its final form consists of the following three aspects (van Slobbe *et al*., forthcoming, see Figure 1.1):

1. *Engineering* representing the man-made infrastructure: all human interventions which aim at influencing the natural system (dams, dykes, harbours, shipping lanes, reclamations).

2. *Nature* encompassing the abiotic components, such as sedimentation and erosion, water and wind transport (also referred to as hydro-morphology); and biotic components, such as food webs, the influence of bioengineers (also referred to as the ecosystem).

3. *Governance* representing the institutional side, both formal (laws, regulations, standards, decision-making structures, stakeholder involvement) and informal (political power, networks, agreements, established practices).

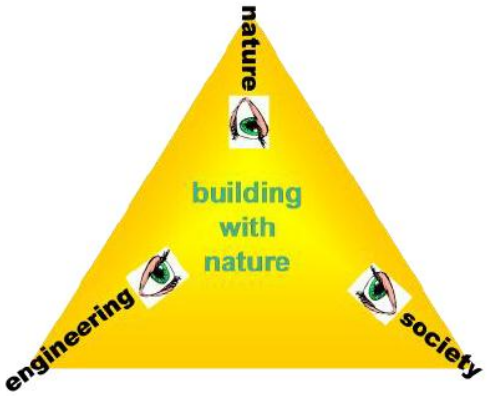


Figure 1.1. Building with Nature as represented by EcoShape Foundation (taken directly from van Slobbe et al., forthcoming).

The EcoShape Foundation applied the Building with Nature approach to large-scale sand nourishment and ecological landscaping in the Netherlands. The three guiding principles for the application of the approach are (Aarninkhof *et al*., 2010):

1. Make optimal use of natural processes;

2. Explore opportunities for nature development as an integral component of project design;

3. Reserve space to accommodate natural system dynamics.

The EcoShape Foundation refers to this approach as eco-dynamic design and explains its difference with traditional design with the help of examples below (text and photos taken from EcoShape, 2012; more examples available in the annex).

Port development

Le Havre is the tenth largest container port in Europe and under the project of "Port 2000" the Port Autonome du Havre was realizing a major port extension for container vessels. The project faced several challenges, one of them being the compensation for loss of nature or even the increase of nature values.

Traditional design of harbour expansion is mainly based on economic issues. The design and construction methods are shaped by the functional requirements and by cost savings.

The *eco-dynamic design* of Port 2000 Le Havre took into consideration the environmental issues alongside the economic and functional requirements. The construction was executed in phases to minimize the ecological effects on the estuary and compensation measures were taken to mitigate the environmental effects and positively influence the environment. As part of the environmental compensation measures an island dedicated to bird habitat was created.

Wetland restoration

Situated in the Special Protection Areas of the Crouch and Roach estuaries, 115 hectares of wetland are created on Wallasea Island. The wetlands are compensation for areas that were destroyed during the harbour development during the 1990's. The British government ordered a replacement and promoted the use of Management Realignment Strategies. In these strategies water (in this case the sea) is given more space by breaching the sea walls and allow flooding at some parts of the land.

A *traditional approach* for compensating measures as wetland restoration would mean minimal effort to just meet the requirements. Most likely the process would be dictated by the authorities. In terms of flood protection a traditional design would be that the existing dikes would further be raised to cope with progressing sea level rise. With even so potentially increasing river discharges high water levels in the estuary would further be raised, possibly inundating other areas of natural value.

An *eco-dynamic approach* to wetland restoration implies that both location and design are highly influenced by

environmental factors, but also include an integral approach. In case of Wallasea the location is carefully chosen to have the largest additional environmental value without destroying any of the existing environment. Moreover, the wetlands are not only aimed to compensate nature, but also to shape flood protection and recreational benefits.

Freshwater lake dikes

To dampen waves and recreate gradual land-water transitions brushwood mattresses were constructed in front of the dike. The innovative application of braided brushwood mattresses aims to create floating foundations for emergence of reed vegetation.

Traditionally, Dutch freshwater lake dikes have relatively steep slopes, which border directly with water. Shallow zones and the gradual slope from land to water are lacking. Consequently, species that inhabit these zones are decreasing. In addition, constant lake-water levels cause erosion of shores. To reduce wave impact on dikes rows of poles can be placed in front of the dike, or dikes can be designed to withstand wave impacts themselves.

In an *eco-dynamic design* of a freshwater lake dike, brushwood mattresses facilitate the development of floating reed marsh in the shallow zone in front of a dike. This marsh reduces wave impact on the dike, enhances sedimentation and creates a clear shallow water zone with (submerged) vegetation. Thereby, the initial substrate of the mattress could be suitable for establishment of filter feeders, such as zebra mussels and other species.

Coastal defence

Along the north coast of the Western Scheldt near the village of Ellewoutsdijk an innovative coastal defence measure is applied. Both parallel dikes near Ellewoutsdijk are not strong enough to safely withstand a super storm level such as would occur with a frequency of once every 4000 years. A solution to maintain safety standards for this location is to allow dike overflow during extreme high water conditions and built a secondary dike.

In a *traditional design*, a dike forms a strict border between land and sea. With the land behind the dikes subsiding and the expected sea level rise the height difference is increasing. The unwanted results are the seepage of salt water that can adversely influence land use behind the dikes (e.g. agriculture).

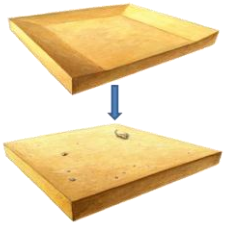
In an *eco-dynamic design*, two parallel dikes are present and a limited overflow of the primary dike is allowed. The secondary dike ensures safety. This creates a zonation of flood risk and a

broader line of coastal defence with a more gradual transition between land and sea. The primary dike does not have to be raised which can save considerable costs. The area between the dikes can be utilised for extensive land use forms, such as grazing and nature.

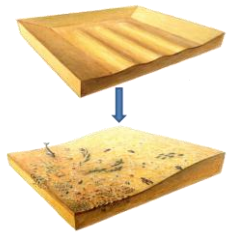
Sand extraction

Ecological landscaping is an innovative measure that creates morphological gradients, i.e. various sea bed forms, to make the sea bed more attractive for the development of new habitats. This pilot project has applied this philosophy in a large sea bed mining pit off the coast of Southern Holland. Two large scale bed forms were created in the mining pit and aimed to increase the biodiversity in the pit itself.

A *traditional* design of a sand mining pit is characterized by a flat sea bed and is meant for the extraction of sand and gravel. However, such design could lead to a growing impact on the sea bed ecology. After the mining is completed habitat recovery occurs slowly (if at all) and with reduced biodiversity. Ecological research on tidal ridges shows that there are differences in the benthic community composition of the trough, slope and crest of the ridge.



The *eco-dynamic* sand mining pit is designed using bed forms that have a similar scales as sand waves occurring naturally in the area. Due to this landscaping, the ecological development of habitats in the mining pit occurs more rapidly and with larger biodiversity.



Sand nourishment The increased demand for marine aggregates such as sand and gravel, could lead to a growing impact on the sea bed ecology. Present mining policy aims providing for rapid ecological recovery and restoration of the original habitat on a flat sea bed. This is a limiting approach, as 1 flat sea beds are not ecologically attractive and 2 restoration of the original sea bed is impossible as water depths have changed due to the creation of the mining pits. In recent years, it has become increasingly clear that by creating morphological gradients (i.e. bed forms), the sea bed becomes more attractive for the development of new ecological habitats. This pilot project has applied this philosophy in a large sea bed mining pit off the coast of Southern Holland. Two large scale bedforms were created in the mining pit and aimed to increase the biodiversity in the pit itself. This pilot aimed firstly at researching the neccessary design- and organizational procedures to create a landscaped pilot location in a large scale extraction site and secondly to research the resulting potential of the ecological development (increase in biodiversity) in the site via monitoring. The project searched for the best ways to design and create the landscapes so that when extraction is finished, ecology can optimally benefit from the resultant underwater landscape.

Large-scale sand nourishment is an innovative measure to create long term flood safety in combination with extra space for nature and recreation. "Sand Engine Delfland" is a pilot project related to

the EcoShape Foundation to assess the feasibility of this innovative measure.

A *traditional* design of sand nourishment has the primary objective of shoreline maintenance using a medium volume of sand (2-5 million m^3). The lifespan of the nourishment is in the order of 5 years. This means that every 5 years the nourishment has to be redone, resulting in a frequent disturbance of the ecosystem.

In the *eco-dynamic* execution of a nourishment, a surplus of sand (order 20 million m^3) is put into the natural system and is expected to be re-distributed alongshore and into the dunes, through the continuous natural action of waves, tides and wind. In this way a large-scale nourishment gradually induces dune formation along a larger stretch of coastline over a period of one or more decades, thus contributing to the preservation and increase of safety against flooding over a longer period.

The *Building with Nature* approach is taking root in Dutch water management. In 2008, the Dutch Delta Commission adopted the concept of beach and shore nourishment as the primary measure to guarantee long-term safety and development of the coast (Delta Commission, 2008). The Delta Commission was appointed by the Dutch Government to address the long-term threats of climate change on the Netherlands. In the light of accelerated sea-level rise, the Delta Commission recommended an increase in the annual coastline nourishments to 40-85 million m^3/year. Another 40 million m^3/year of nourishment would enable a seaward extension of the shoreline of about 1000m in the next 100 years. The Commission attributes large benefits for nature and society from such an extension, explicitly stating that this approach allows for the application of *Building with Nature* type concepts.

A similar *Working with Nature* approach was adopted by the European Commission. The guidelines for dealing with the Birds and Habitats Directives in estuaries and coastal zones explicitly recommend that “the design of plans or projects should always be based on mutually beneficial strategies with a view to achieving dual goals of both Natura 2000 conservation objectives and socio-economic objectives, according to the ‘working with nature’ concept” (European Commission, 2011, p.5).

In this thesis, we draw on the definitions given by the founding father (Waterman) and later advocates (EcoShape, 2012; Aarninkhof *et al.*, 2010) to define Building with Nature design. A design of a water infrastructure project can be called Building with Nature when:

1. It explores opportunities for nature development at the initial project design stage; and integrates socioeconomic and ecological goals.

2. It uses nature dynamics and materials occurring in nature in the context of hydrological and morphological situations to achieve the project’s goals.

3. It creates opportunities for development of new nature and improves the ecological values currently present in the project area.

Table 1.1. Integration of socioeconomic and ecological project goals (Component 1).

Method	**Description**	**Indicator**
Building with Nature (+)	Nature and ecology are given equal consideration alongside socioeconomic goals (recreation; flood defence; industry development) at the initial stage of project planning and design	- Nature's current status and values are given full consideration - Effects of intended project works on nature's status and values are assessed - Different options to achieve the area's socioeconomic goals are considered, an option where nature is equally important is chosen - Scientific data and argument is used in elaborating a project design and especially the function of nature within it
Traditional (0)	Project design is an engineering solution dominated by socioeconomic goals (recreation; flood defence; industry development) that treats nature as of secondary importance	- Effect of project works on nature not assessed, argued away (e.g. as temporary or minimal), or simply ignored - No options considered to assign nature a role alongside the socioeconomic goals of a project - Scientific data or argument (e.g. ecological effects assessment) is lacking or inconsistent

Table 1.2. *Use of* nature dynamics to achieve project's goals (Component 2).

Method	**Description**	**Indicator**
Building with Nature (+)	Project design 'co-produces' with abiotic and biotic elements of the ecosystem to achieve project goals	- Biotic elements are utilized (the dynamics and influence of plants and species): food webs, bioengineers and other living organisms, interaction marine organisms – sand/silt/coral - Abiotic elements are utilized (hydro-morphological dynamics): ebb and flood; wave and swell action; sea currents and other tidal currents; river outflow (as force and a supplier of freshwater and sediment); gravity; wind; rain; solar radiation; interaction dunes-vegetation (root system of the vegetation hold together sand and silt); interaction coastal zone-mangroves - No need to repeat physical intervention after the initial project works are completed, nature does the work, design is self-sustaining
Traditional (0)	Project design uses man-made materials and follows monotonous unnatural lines	- Solid structures are utilized: concrete, bricks, metal, etc. that need continuous reinforcement and enlargement (e.g. dykes)

Table 1.3. *Improvement* of current ecological situation (Component 3).

Method	Description	Indicator
Building with Nature (+)	Project design aims to improve the existing ecological situation and create added value	- Area's ecologic potential is recovered (reversing a downward trend or the degradation of current ecological values) - Ecological status of the area is improved (increasing valuable surface area, number of species, variety of species etc.) - The maintenance of ecological values is made easier, faster and/or more secure
Traditional (0)	Project design emphasizes 'no damage' to existing situation	- Current ecological situation is used as a reference point - No loss of ecological values is ensured, either with or without nature development measures

Building with Nature operationalization

To translate Building with Nature design into observable indicators, all the definitions and examples of Building with Nature and also traditional methods available in the literature (Waterman 2008, 2010; Aarninkhof *et al.*, 2010; EcoShape, 2012; van Slobbe *et al.*, forthcoming) were extracted. This material was then categorized in terms of the three main components of Building with Nature mentioned above. The descriptions of each component from various sources were then grouped together and formulated as indicators (Tables 1.1, 1.2 and 1.3).

Building with Nature measurement

Assessing a project design using the indicators in Tables 1.1, 1.2 and 1.3 provides an informed judgement based on secondary research data, such as project proposals, reports, assessments, summaries and technical designs, insider information provided by project managers and expert opinion of interviewees.

The measurement level of Building with Nature design is ordinal. Each component – *integration* (Table 1.1), *use of* (Table 1.2) and *improvement* (Table 1.3) - of nature observed in a project design is assigned a score that reflects the number of positive features. The presence of at least one indicator is necessary for a component to achieve a '+' score. The value spectrum of a component, as shown in Chapter 6, is only introduced when case study data allow a longitudinal measurement. If none of the design components are observed a project is assigned a '0' score. A zero score amounts to a traditional design. By assessing the three components, an evaluator is able to place a project design along the Building with Nature spectrum from '0' to '+++', with each score carrying equal weight. Since the Building with Nature concept is only starting to emerge, it is possible that only a few projects will have been implemented fully in accordance with the principles and thus achieve a '+++' score. Rather, projects will be found at every point along the spectrum: '0', '+', '++' and '+++'. A project that integrates nature goals and improves the ecological situation will score a '++'.

Knowledge problem

In this thesis, the *Building with Nature* triangle is defined as follows (Figure 1.2):

1. *Engineering* refers to the extent to which Building with Nature ideas in a project design, assessed along the three dimensions outlined above as 0, +, ++, +++.

2. *Nature* represents the estuaries and coasts of northwest Europe, a specific domain where water infrastructure projects requiring dredging works commonly take place.

3. *Governance* refers to a specific governance aspect of estuaries and coasts in the EU: the EU Birds and Habitats Directives that form the legal basis of the EU Natura 2000 network of protected areas.

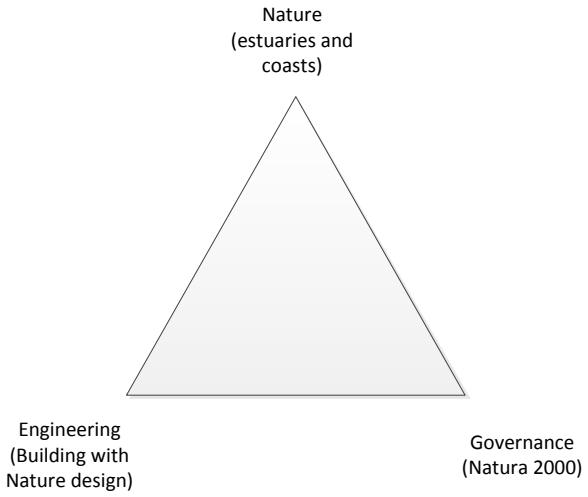


Figure 1.2. Building with Nature in this thesis

Within the Nature domain of estuaries and coasts in northwest Europe, this thesis explores the relationship between Governance and Engineering: the application of the Building with Nature design approach in Natura 2000 areas. The tension caused by traditional engineering design takes the form of judicial, societal and political conflicts related to the requirements of the Birds and Habitats Directives which shape the EU Natura 2000 biodiversity network, resulting in delays and cancellations of water infrastructure projects. A research issue is what effect the Building with Nature design has on the current situation (Figure 1.3).

The main assertion of this thesis is that the extent one follows the Building with Nature design is related to Natura 2000 governance: the more Building with Nature ideas that are incorporated in the design of a project, the better it will fulfil the Birds and Habitats Directives' requirements (hereafter: Natura 2000 requirements). This assertion is based on the long-term goal of the Building with Nature approach, which is to balance the needs of human society and its natural environment (Figure 1.4).

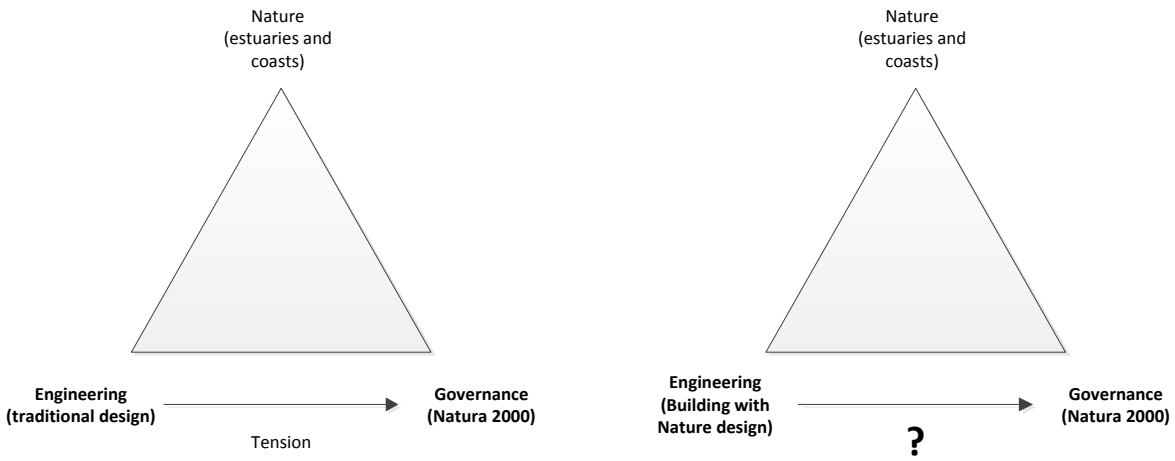


Figure 1.3. Conceptual model of the knowledge problem.

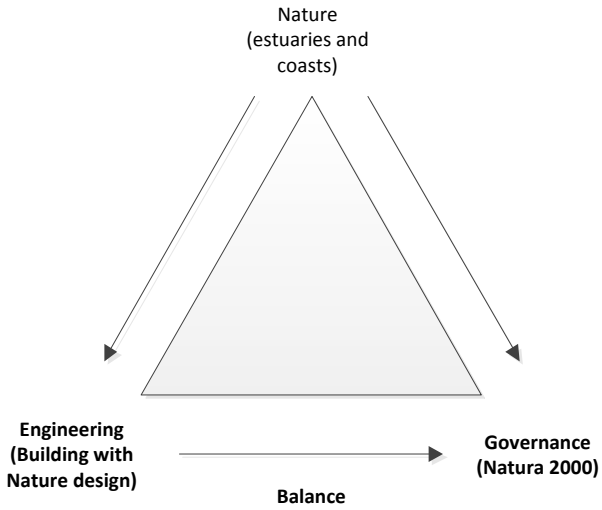


Figure 1.4. Impact model

In the terminology attached to variables, Engineering (the extent the Building with Nature design is applied) is the independent variable and Governance (the implementation of Natura 2000 requirements) is the dependent variable in this thesis. The independent variable, Building with Nature design, has already been defined and operationalized above.

The dependent variable of the analysis is defined as the implementation of Natura 2000 requirements in a water infrastructure project. From a project-level perspective, the implementation of Natura 2000 requirements is successful when the goals of the project implementer are fulfilled, such as water infrastructure being realized (constructed). A project implementer can be a public, private or public-private authority confronted with the requirements of Natura 2000 in an area where they intend to develop water infrastructure. The Natura 2000 requirements studied in this thesis are Article 6 Habitats Directive assessment for plans and projects, including a court ruling related to this assessment, and Natura 2000 compensation requirements imposed on local implementation processes. The dependent variable and the corresponding implementation

outcomes will be further specified in the theoretical chapter of the thesis (Chapter 3). The main research variables are depicted in Figure 1.5.

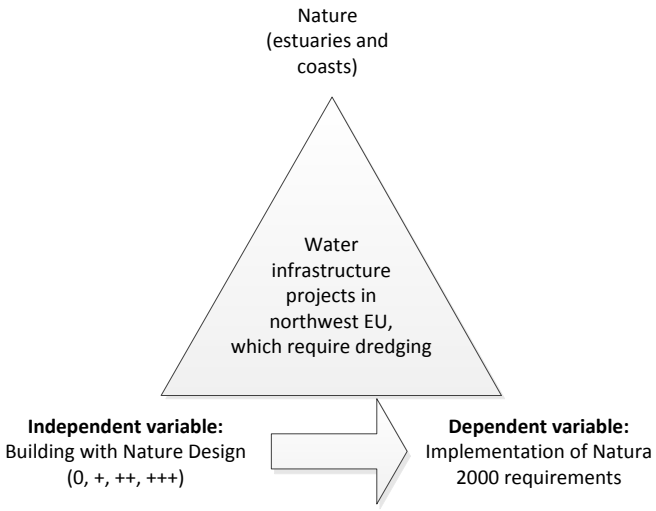


Figure 1.5. Main research variables

Research Goal

The practical goal of the research is to gain insight into how the Building with Nature design could be applied in Natura 2000 areas and whether its application could be helpful in reconciling the conflict between the socioeconomic goals of water infrastructure and the environmental protection goals of Natura 2000. Such an explanation is intended to contribute to the EcoShape Building with Nature design and development manual. The manual, or Building with Nature Guideline, is specifically targeted at:

- project owners or proponents, ecologists, engineers, consultants, water infrastructure contractors with a stake or responsibility in project design and development processes;
- authorities, policymakers, politicians, administrators, standards institutes, NGOs and financers that can potentially influence the design criteria and thus the challenges posed to the first group.

The manual is intended to provide its target reader groups with guidance on how to introduce the Building with Nature principles into water infrastructure development processes. It will be published online upon completion (EcoShape, 2012). The present thesis contributes to the manual by providing guidance to the targeted reader groups on how to handle regulatory governance aspects of Building with Nature design projects using Natura 2000 as an example (see Appendix). The societal value of the research results, in their guidance form, is in advising practitioners on the application of Natura 2000 requirements in water infrastructure projects in estuaries and coastal zones.

Research questions and thesis structure

The central research question of this thesis is:

How is the extent of Building with Nature design related to the implementation of Natura 2000 requirements in water infrastructure projects in northwest Europe's estuaries and coasts?

To minimize the likelihood that the asserted relationship between the main variables of interest is biased, this thesis will apply method triangulation. Here, the relationship between the extent of Building with Nature design and the implementation of Natura 2000 requirements will be analysed by combining three different case-study designs (sub-questions Q3 through Q5). Triangulation, or the combination of methodologies in the study of the same phenomenon, is argued to reduce bias and improve the validity of social research. If a proposition can survive being confronted with a series of complementary methods for testing its validity, the uncertainty in its interpretation is greatly reduced and researchers have more confidence in the findings (Denzin, 1970, Blaikie, 1991, Meffert and Gschwend, 2012).

To answer the central research question, the following sub-questions have been formulated:

Q1: Which Natura 2000 governance factors, at the level of the EU member states, define the context for implementing water infrastructure projects in estuaries and coastal zones?

Q2: How does Contextual Interaction Theory (CIT) order and structure Natura 2000 governance factors and Building with Nature design in implementation processes and what does this imply for research methodology?

Q3: How is the extent of Building with Nature related to the implementation of Natura 2000 requirements? (answered using a multiple case-study design)

Q4: How is the extent of Building with Nature related to the implementation of Natura 2000 requirements? (answered using a quasi-experimental case-study design)

Q5: How is the extent of Building with Nature related to the implementation of Natura 2000 requirements? (answered using in a longitudinal case-study design)

The definition and operationalization of Building with Nature design provided in this chapter will be used throughout the thesis.

The thesis consists of seven chapters. Following this introduction, Chapter 2 will discuss the implementation of EU Natura 2000 requirements at the level of the EU member states. In the EU's multilevel governance context, project level implementation of Natura 2000 requirements takes place within the context of member state level implementation. In Chapter 2, the variables which constitute the Natura 2000 policy field within the EU member states will be identified based on a review of recent literature. The focus of this chapter is on northwest Europe although several EU-27 member states beyond this region are included if they were included in the literature reviewed. Although the implementation of Natura 2000 varies across member states, the core differences can be described in terms of the factors outlined in this chapter.

Chapter 3 will present the frameworks and perspectives available in the literature to explain either project-level or multilevel implementation processes. Building on this discussion, the chapter will explain the choice of the theoretical framework used in this thesis – Contextual Interaction Theory (CIT) – and state its main assumptions. CIT is used in this thesis as a framework, or a conceptual lens, to guide the exploration of the linkages between the extent of Building with Nature design and the outcome of implementing Natura 2000 requirements at a project level. CIT will be used to categorize and order the factors outlined in Chapter 2 (hence the order of the Chapters in this thesis) but not for the purposes of theory testing or development. The second part of Chapter 3 will outline the methodology used to answer the central research question, elaborate the three research designs applied and the procedures used for case selection, data gathering and analysis.

Chapter 4 will present a sub-set of 14 water infrastructure projects in Natura 2000 estuaries and coasts in the Netherlands, Flanders, the UK and Germany. Each project will be discussed in terms of the Building with Nature components in its design and the outcome of applying the Article 6 Habitats Directive procedure. The comparative analysis of several cases within their own context (hydro-morphological, ecological and socioeconomic) amounts to a multiple case-study design.

In Chapter 5, two Dutch cases selected from the sample discussed in Chapter 4 will be analysed in more detail: Waterfront Harderwijk and coastal development in Zeewolde. The hypothesis posed in this chapter is that the integration of nature and socioeconomic goals (the first component of Building with Nature design) can increase the likelihood of a coastal zone development project being approved should its fulfilment of Natura 2000 requirements be challenged in court. The hypothesis is tested in a quasi-experimental design setting employing the modus operandi method of analysis.

In Chapter 6, the implementation of a flood control project in the Scheldt estuary in Flanders is analysed. This single case, of a flood control project, is analysed at four different points in time such that the time intervals can reveal changes in the extent of Building with Nature design and the outcome of local implementation processes. The case study data are presented in the form of a theory-guided reconstruction of project chronology in a longitudinal design setting.

Chapter 7 will discuss the research findings and place them in perspective. Alongside the findings, guidance for practitioners will be proposed along with considerations of representativeness and suggestions for further research being outlined. Finally, the conclusions regarding the research questions will be presented.

Four chapters of this thesis were originally written as independent publications for various journals (Chapter 4, 5 and 6) or as a chapter for an edited volume (Chapter 2). To avoid overlaps, the included sections describing the theoretical framework, problem definition and the Building with Nature concept were removed from these chapters and placed in separate chapters (or sections of chapters) in the thesis.

Chapter 2. Natura 2000 as a context for project implementation[1]

The research question posed in this chapter is: which Natura 2000 governance factors, at the level of member states, define the context for implementing water infrastructure projects in estuaries and coastal zones? To answer the question, this chapter will discuss the fulfilment of Natura 2000 requirements by member states based on a review of the available literature. The member states discussed are part of the northwest European region[2], but some of the other EU-27[3] member states were also included if they addressed in the literature referenced in this chapter. The chapter opens by introducing the requirements of the Birds and Habitats Directives, which shape the governance of Natura 2000 areas. It proceeds with the national implementation arrangements made by member states to satisfy these requirements. It concludes by answering the research question.

Requirements of Birds and Habitats Directives

Nature conservation policy in the EU is based on the Birds Directive (79/409/EEC) and the Habitats Directive (92/43/EEC). A directive constitutes one of the formal legal instruments for developing EU policy and is binding as to the result to be achieved. For example, under the Birds and Habitats Directives, achieving a 'favourable conservation status of species and habitats' is binding upon each member state to which these Directives are addressed. The aim of a directive is to bring together and coordinate the laws of the member states in the policy field addressed by the directive. A directive sets a deadline for the harmonization of national laws in a way that will secure the achievement of a Directive's goal. Below the main goals as set out in these two Directives are briefly introduced.

The Birds Directive's aim is the 'conservation of all species of naturally occurring birds in the wild state in the European territory of the member states' (Article 1). Articles 3 and 4 of the Directive contain provisions for *habitat protection*: establishment of Special Protection Areas (SPAs) for endangered species from Annex 1 Birds Directive as well as the preservation, maintenance and re-establishment measures for protected areas. Articles 5 through 9 contain provisions for *species protection*: prohibition to kill or capture birds, destroy or damage their nests and eggs, disturb birds, sell birds or parts of birds. Species mentioned in Annex II may be hunted under special national legislation. Derogation from species protection is only allowed under limiting requirements.

The aim of the Habitats Directive as stated in its Article 1 is to 'contribute towards ensuring biodiversity through the conservation of natural habitats of wild flora and fauna in the European territory of the member states'. Articles 3 to 11 and Annexes I to III contain provisions for *habitat*

[1] A later version of this chapter will be published as: Vikolainen V., Lulofs K. and J.T.A. Bressers (2013) 'The transfer of Building with Nature approach in the context of EU Natura 2000', in: C. de Boer, J. Vinke-de Kruijf, G. Özerol and J.T.A. Bressers (Eds.) *Water Governance, Policy and Knowledge Transfer. International Studies on Contextual Water Management,* Earthscan – Routledge

[2] France, Belgium, the Netherlands, Germany, and the United Kingdom

[3] Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, United Kingdom

protection. According to Article 4 paragraph 1, within three years of the notification of the Directive, each member state shall propose a list of sites indicating habitat types contained in Annex I and species in Annex II. According to Article 4 paragraphs 2-3 within six years of the notification of the Directive, the European Commission in agreement with each member state will establish a list of Sites of Community Importance drawn from the member states' lists of proposed sites. According to Article 4, paragraph 4, within no more than six years of the establishment of the list of sites, the member states shall designate those sites as Special Areas of Conservation (SACs).

Article 3 paragraph 1 of the Habitats Directive provides for the creation of a coherent EU biodiversity network, Natura 2000, which includes the SACs established under the Birds Directive and the SPAs established under the Habitats Directive.

Article 6 of the Habitats Directive contains the most far-reaching provisions by far. Paragraph 1 requires member states to establish the necessary conservation measures in their SACs, involving if necessary a management plan. Paragraph 2 obliges member states to take appropriate steps to avoid natural habitats and the habitats of species deteriorating as well as the disturbance of species in SACs. Paragraphs 3 and 4 introduce the so-called 'habitat assessment'. Paragraph 3 requires an appropriate assessment of any plan or project not directly connected with, or necessary to, the management of a Natura 2000 site but likely to have a significant effect thereon. Competent authorities shall only agree to a project in the absence of a negative effect. Where there is a negative assessment of the implications for the site, in the absence of alternative solutions, a plan or project must nevertheless be carried out for reasons of the overriding public interest. This includes ones of a social or economic nature. If such situations occur, the member state shall take all compensatory measures necessary to ensure that the overall coherence of Natura 2000 sites is protected. The member state shall inform the Commission of the compensatory measures adopted. Habitat assessment also applies to SPAs designated under the Birds Directive, thereby replacing Article 4 paragraph 4 of the Birds Directive. Furthermore, provisions of Article 6 of the Habitats Directive (including appropriate assessment) apply to Sites of Community Importance as soon as they are established by the European Commission according to Article 4 paragraph 4. This can be before the national designation of sites has taken place (Beijen, 2010).

Articles 12 to 16 and Annexes IV to VI of the Habitats Directive contain provisions for *species protection*. Strict protection applies to animal species listed in the Annexes and prohibits their capture, hunting, disturbance, deliberate destruction or the taking of eggs, deterioration or destruction of breeding sites or resting places. Derogation from prohibition is allowed for imperative reasons of overriding public interest, and hunting may be allowed subject to restrictions. Some species and areas in the Annexes are indicated as priority species and habitats. These address endangered species that require special protection measures.

Implementation of the Directives

As the foregoing outline of the Directives' requirements shows, the member states have been required to take the following steps in order to achieve the goals set by the Directives: 1) Transpose the Directives into national law (within two years of its notification), 2) Select and designate protected sites (SPAs and SACs), 3) Take conservation measures, and 4) Assess any plans and projects that are likely to have significant effect on the site. In 2010, all member states had a legal framework

in place for the implementation of the Directives, and the designation of SPAs and SACs as Natura 2000 sites, while more than 80% of member states had selected and designated about 80-100% of their sites. Most of the member states plan to complete formal SAC designation in 2013-2014 (van Apeldoorn *et al.*, 2010). The formal implementation stage is thus well underway and its progress has been analysed in the literature.

Transposition of the Birds and Habitats Directives into national legislation

The way in which national legislation transposing the Directives is passed partly depends on the constitutional structure of a country: in France and the Netherlands, legislation was passed by the central authorities; in Belgium, it was passed at the regional level; in Great Britain one set of legislation applies to England and Wales, while Scotland and Northern Ireland have their own legislation. In the Netherlands, species and habitats protection were transposed in separate laws: site protection in the Amended Nature Conservation Act 1998 (entered into force in 2005) and species protection in the Flora and Fauna Act (2002). In the Belgian region of Flanders, habitat protection was transposed into the Amended Nature Conservation Decree 2002 (entered into force in 2004) and species protection is still under development. In the United Kingdom, the Birds Directive is transposed in the Wildlife and Countryside Act of 1981, the Wildlife Order (Northern Ireland) of 1985 and the Nature Conservation and Amenity Lands Order (Northern Ireland) of 1985. The Habitats Directive, including species protection, is transposed into the UK Habitats Regulations of 1994. Austria, Germany, England, Flanders and the Netherlands have transposed the Directives' provisions into nature conservation legislation. In France and Sweden, the transposition has taken place under environmental law: in France through an Environmental Code (statutory provisions) and Rural Code (regulatory provisions), and in Sweden an Environmental Code. The legislation in countries with a federal structure such as Germany and Austria varies widely in terms of details in the individual federal states.

In many member states, the Directives were not transposed by the deadline set. It may be that the member states did not prioritise and allocate adequate resources to the implementation of the Directives. At the same time, many environmental NGOs were able to offer the resources and expertise required by the Directive and put pressure on member states' governments and administrations by making complaints of non-compliance to the Commission (Paavola, 2004). Such complaints are one of the ways the Commission is able to stay informed about the process and fulfil its function as a watchdog of the EU treaties. In accordance with Article 226 of the EC Treaty, the Commission can enforce sanctions against member states for non-compliance with the Directives by referring the cases to the European Court of Justice. The European Court of Justice has issued more than 60 rulings concerning the Birds Directive and 45 rulings concerning the Habitats Directive (Beijen, 2010). Most of these were infringement procedures initiated by the European Commission for incorrect, incomplete or late transposition into national legislation, including in the Netherlands, Belgium, France and Italy.

Where the Habitats Directive was not correctly, or timely, transposed, the cases that were pending before national courts were checked directly against the Directive's provisions (Backes *et al.*, 2006). Furthermore, those areas which were included on the list of Sites of Community Importance but not yet designated nationally (this could take up to six years), were in reality already protected under Article 4 paragraph 5 of the Habitats Directive. Article 6 of the Habitats Directive applies to these

areas immediately, irrespective of whether this provision has been correctly transposed into national law. The immediate application of the Habitats Directive, as enforced by national courts, led to many problems in practice. The situation in the Netherlands is a good example in this regard.

In the Netherlands, the Birds and Habitats Directives were only fully transposed into national legislation in 2005. The Dutch government failed to inform relevant actors about the consequences of the two Directives. This caused a legally uncertain situation and led to many problems (Beunen, 2006). The actors involved in the decision-making processes, such as project developers and street-level officers, simply did not know about the Directives or did not know how to apply them. This lack of attention, knowledge and awareness led to decisions that rarely met the requirements of the Directives in the sense that appropriate assessments of project effects were rarely undertaken (Beunen, 2006; Beunen *et al.*, 2009). As a result, many plans and projects were challenged in court by environmental NGOs because of the presence of protected species and, as a consequence, protected species became a symbol of the Directives' restrictive effect on spatial development in the Netherlands (van der Zouwen and van Tatenhove, 2002). After the first cases were decided in court, the roles and influences of courts, judges and lawyers increased, as did the dominance of the legal perspective in the Directives' implementation in the Netherlands. Many of the articles about the consequences for Dutch planning practices were written by lawyers (e.g. Bastmeijer en Verschuuren, 2003, 2004; Verschuuren, 2003, 2004). The initial negative experiences with the Directives have created an image that economic developments in the Netherlands are 'locked up' because of having to apply the Directives. To some extent, this image is still influential in current political and professional debates (Arnouts and Kistenkas, 2011).

Selection and designation of Natura 2000 sites

The Birds Directive gives member states limited freedom in selecting areas. It allows only the use of ornithological criteria in designating SPAs, and only allows reasons of public safety (e.g. flood risk) to derogate from these criteria. Site protection under the Birds Directive (Article 4 paragraph 4) was extremely strict and did not allow any exceptions. This regime was later replaced by the more-flexible habitat assessment (Article 6 paragraphs 2-4 of the Habitats Directive) that allows derogations for reasons of overriding public interest. Species protection is extremely strict and applies to all birds found in the wild (not only to endangered species) and derogations are limited. Similarly, only ecological criteria could be used to designate SACs under the Habitats Directive. The strict designation requirements of both Directives explain the reluctance of member states to designate SPAs and SACs (Beijen, 2010).

Furthermore, scientific information to assist in site designation was not always available and no detailed designation guidelines were provided by the Directives. As a consequence, several member states have designated too few areas, areas that were too small, or later tried to change the designation. This in turn led to a considerable number of rulings by the European Court of Justice over the failure of member states to submit lists of designated sites by the deadlines (Paavola, 2004). Recent statistics show that the member states have designated between 3% and 26% of their total national area as SPAs, and between 7% and 31% of their total national area as SCIs (Natura 2000 barometer 2010).

A comparison of designated sites in Flanders, the Netherlands, England and the German federal states of Lower Saxony, North-Rhine Westphalia showed that the Netherlands has designated relatively large areas: half of its sites are 100 ha or larger (Bouwma *et al.*, 2008). Flanders, the Netherlands, Lower Saxony and North-Rhine Westphalia designated similar percentages of their total surface area (between 8% and 14%). England had the least percentage at 6% although the figure for the whole of the UK is 8.9%. The Netherlands has relatively many SPAs under the Birds Directive due to the importance of its territory for migrating birds. Belgium has the highest density of SPAs under the Birds Directive (234) based on country surface in the EU-27 (Backes *et al*., 2011).

The final responsibility for area designation rests in all member states at the ministerial level although, in federal states, formal designation can take place through regional or provincial legislation (as in Belgium). The member states differ in the ways they designate sites. Van Apeldoorn *et al.* (2010) discern two groups:

1. Those that favour *general* designation with only a few site characteristics (name, location, borders and area; also species and habitats). Site objectives are worked out in detail in management plans. France and the UK are examples of this way of working;

2. Those that have developed a *detailed* designation specifying site objectives and descriptions. This form of designation can be found in various countries including the Netherlands.

A general designation document may lead to uncertainty concerning the site objectives and hence more time-consuming preparation of the management plan. A more detailed designation document, on the other hand, may reduce the preparation time needed for the management plan, but require more site-specific information and thus take more time to prepare.

The responsible ministries can delegate some Natura 2000 implementation tasks to regional bodies, national committees, working groups or independent administrative bodies. A comparative study by Neven *et al.* (2005) found that functional decentralisation, as typically found in Anglo-Saxon and Nordic cultures, leads to a more effective implementation process for Natura 2000. In the UK, Natural England is a depoliticized intermediary organization between central and decentralized levels of government in the specific area of nature conservation. The advantage of this kind of intermediary organization is that it can facilitate and mediate between policymakers and the policy area, and in so doing create support among the stakeholders who will implement the policy. The disadvantage is that it leads to fewer opportunities for the administration to combine priorities in an integrated way and diminishes political control. In France, mediation and negotiation takes a form of 'client' or 'relation' management, carried out at the local level by a prefect. In the Netherlands, decentralization is territorial and has been expressed through delegating certain tasks and authorities for nature conservation (e.g. preparation of management plans) to the provinces. The management of many Natura 2000 sites is carried out by large environmental NGOs.

Both Directives leave the issue of public consultation and the participation of stakeholders (such as experts, NGOs, lay public members and sector organizations) in site selection and designation for the member states to decide. There are large differences in the ways the member states have dealt with this issue and, within the EU-27, van Apeldoorn *et al.* (2010) categorize three types of participation:

- Informal consultation: the public administration body produces information. The public has to find it and explore possibilities to express their opinions. Sometimes, consultation meetings have been organized, the results of which *may be* taken into account by the administrative authority;

- Formal consultation and approval: the public administration produces information. Stakeholders have legal rights to express their views and these have to be considered by the administrative authority;

- Shared responsibilities (full participation): stakeholders are organized and invited to express their opinions and are highly committed to, and involved in, decision-making.

In the first phase of site selection and designation, half of the EU-27 member states introduced informal participation. No member state organized full participation including shared responsibilities during the designation process. Even though NGOs were heavily involved by helping and advising the responsible ministry in many countries, this always took place informally. In the later phase of designation, most member states seem to have opted for a more flexible strategy with at least some commitment. For instance, the responsible authorities in Finland and France changed their ways of managing the process from one with little or no public participation to a more open way of working (Apeldoorn *et al.*, 2010).

Neven *et al.* (2005) report in more detail on the role of stakeholders in Natura 2000 implementation. The implementation in the UK and France is characterised by goal-oriented communication with sector organizations combined with bottom-up governance practices. Here, government provides a coaching style of leadership, facilitating contributions from public and private parties and 'learning by doing' strategies. Similar bottom-up practices are found in Spain and Sweden. In the Netherlands, the attitude taken by the government is active and distinctly prescriptive. The Ministry of Agriculture, Nature and Food Quality's (now the Ministry of Economic Affairs, Agriculture and Innovation) memorandum for Natura 2000 published in 2005 indicates the most important steps in the implementation process and shows 'what must be done', and where there is scope for further consideration. In contrast to France and the UK, where freedom is given for bottom-up consultations with stakeholders, the Ministry of Agriculture, Nature and Food Quality has chosen for a more indirect form of participation. In the Netherlands, information from the rounds of talks has been elaborated upon and processed by specialists and site managers into the 'Natura 2000 Objectives Document' (Natura 2000 Doelendocument), which is used as a framework for implementation. Nevertheless, the relationship between government and nature and environmental organizations is all too frequently characterised by a traditional top-down attitude and relationship (government rather than governance) with too little acknowledgement that the two sides need each other's resources and knowledge. Studies in the Netherlands have however often stressed the importance of openness and flexibility in steering nature conservation policy (Natuurplanbureau, 1997; RMNO, 2003; RLG, 2003 cited in Neven *et al.*, 2005, p.112).

Similarly, Bouwma *et al.* (2008) discern two types of participation with regard to stakeholder involvement in the designation process in the areas neighbouring the Netherlands: selective and professional participation. England, Lower Saxony and North-Rhine Westphalia held consultations at a local level with managers and owners of the sites (selective participation). By establishing working

groups, England, Lower Saxony and North-Rhine Westphalia undertook extensive site-based consultation processes and an official procedure was established at the local level to enable complaints to be lodged prior to the required list being sent to the EC. The Netherlands and Flanders involved only professional organizations (professional participation). Their contribution involved giving advice that was then taken into consideration in the policy process. The Netherlands and Flanders carried out consultations at national and regional levels without establishing an extensive site-based consultation process. The main targets were the authorities responsible for the areas (including NGOs) and national organizations representing affected stakeholders.

A consequence of selective participation in the designation process was that it gave more opportunities to find the best solutions for all, and thus generated stakeholder support and increased the legitimacy of later decisions. It also decreased the size of designated areas. Professional participation, on the other hand, deferred potential conflicts until the phase in which management plans would be discussed with site owners. Overall, a lack of participation by stakeholder groups in the process of designation was the most common source of problems at this stage of implementation (Paavola, 2004).

Management of Natura 2000 sites

The next step after formal designation is the establishment of the necessary conservation measures at the site level to achieve the favourable conservation status (in both SPAs and SACs). Both conservation measures and a favourable conservation status first need to be defined, and a management plan is an instrument suggested by the Habitats Directive for this purpose. Only a few member states or regions, including Flanders and the Netherlands, have formulated objectives at the national or regional level for them to be further developed in more detail at the site level. However, in many countries, both objectives and plans are in their infancy (Kruk *et al.*, 2010).

The first assessment of conservation status covered the period 2001-2006 and was based on the best available data. In the majority of member states, less than 40% of species and habitats were reported as having a favourable conservation status (CBS, 2006).

Although the EU legislation only suggests management plans as an instrument for Natura 2000 sites to reach a favourable conservation status, these are obligatory under national law or site designation documents in about half of the EU-27 member states. In the remaining states, they are nevertheless usually developed as guidance for most of the sites. The majority of obligatory management plans are also legally binding (van Apeldoorn *et al.*, 2010; Kruk *et al.*, 2010). The Netherlands is the only country among its neighbouring areas (England, Lower Saxony, North-Rhine Westphalia and Flanders) in which the formulation of management plans is obligatory under national law (Bouwma *et al.*, 2008). An important condition for management plans to be fully implemented is that they are well-accepted by those stakeholders involved in the site management, especially where the management plans are not legally binding. In many cases, early and active stakeholder involvement in the designation process has contributed to the acceptance of the plans and their positive attitude towards Natura 2000. Case study results have shown that in a situation where the management of a site depends on many different stakeholders, a planning process that emphasizes interaction and cooperation (the UK case) seems to offer better possibilities than a more formal and hierarchical planning process (the Dutch case) (Beunen and de Vries, 2011). In Flanders, it was originally intended

to make management plans compulsory for all Natura 2000 sites but after drawing up six pilot schemes, Flanders decided to make the formulation of management plans an optional strategy. According to the Flemish environmental sector, the consensus- based approach has led to goals being set disappointingly low. The Flemish government agency stated that it was too time-consuming to conduct these processes at every site and that it should only be used as a tool where suitable. However, Flemish farmers unions were positive about the value of a consensual approach to management plans (Bouwma *et al.*, 2008).

In most EU-27 member states, a management plan cannot force landowners and land users to take the necessary management measures unless they have voluntarily agreed by signing a contract. The instrument of contract-based management is increasingly seen as the basis for site management in many EU countries as is illustrated by the agri-environmental contracts which are used in all member states. Other instruments include letters of intent, licensing, integration of nature conservation into other programmes (e.g. rural and regional development), lists of allowed and forbidden activities, buying of land from private owners and management execution (Kruk *et al.*, 2010). However, some issues remain concerning financial compensation for land-use restrictions resulting from Natura 2000 activities and the extent to which interested individuals can participate in voluntary contract-based management. Another issue of concern is the general unwillingness of private landowners to join management schemes. However, in Flanders, the increased possibility to join voluntary management schemes was viewed positively by landowners and land users who had previously felt hostile towards imposed restrictions (Bouwma *et al.*, 2008).

Assessment of plans and projects under Article 6 of the Habitats Directive

Assessing plans and projects according to Article 6 paragraphs 3 and 4 of the Habitats Directive, the so-called 'habitat assessment', is the main instrument of Natura 2000 policy. It obliges the authorities to check if a plan or project is likely to have significant effects on a Natura 2000 site and, if that is the case, to carry out an appropriate assessment of these effects (Article 6 paragraph 3). In the event of a negative assessment, the authorities are obliged to check for possible alternatives; and if there are none, state the imperative reasons for an overriding public interest and take compensation measures (Article 6 paragraph 4). Initially, this formulation sparked considerable criticism due to such undefined terms as 'significant effect', 'appropriate assessment', 'overriding public interest'. These were later clarified through case law and guidance documents (European Commission, 2000, 2002, 2007a, b).

The application and interpretation of Article 6 by the courts in England, Flanders, Austria, Germany, Sweden, France and the Netherlands was investigated by Backes *et al.* (2006). On the whole, they concluded that Article 6 had been reasonably well transposed in most countries, although this had taken a considerable time and had caused friction. In the Netherlands, the courts have compelled the direct application of Article 6, which has caused many problems in practice. In France, conversely, it seemed that projects that should have been tested against Article 6 had long profited from a tardy transposition because the highest court had rejected the rulings of lower courts that tested proposals against Article 6. No direct checks against Article 6 were found in England, which possibly had to do with the fact that England had adopted the necessary implementation legislation as early as 1994.

An example of differences in the transposition of Article 6 Habitats Directive in the Netherlands and Flanders is provided by van Hoorick (2004) and Freriks (2004). Article 6 of the Habitats Directive was transposed into Article 36ter paragraphs 3 to 7 of the Nature Conservation Decree in Flanders in 2002. An appropriate assessment is applicable for possibly adverse activities requiring a permit, plans or programmes. The notions of an 'activity requiring a permit' as well as 'plan or programme' are defined in the opening part of the Nature Conservation Decree. Not all countries provide a statutory definition of a 'plan' in their national law (Flanders and Germany are the only ones among those studied by Backes *et al.*, 2006). A characteristically Flemish transposition feature is the use of 'activity requiring a permit, plan or programme' rather than 'plan or project' as used in the Habitats Directive. The consequence is that certain activities fall outside the scope of an appropriate assessment because they do not require a permit under the national permit system. It is seen as a shortcoming in the Flemish region that there is no separate permit requirement for such activities (van Hoorick, 2004). The requirements for compensating measures (Article 36ter paragraph 5-2 of the Nature Conservation Decree) follow the interpretation Guide provided by the European Commission quite closely, and are perhaps stricter than the original text of Article 6 paragraph 4 of the Habitats Directive. A compensation measure is required that actively develops an equal habitat or an equivalent surface area of the natural environment.

Article 6 of the Habitats Directive was transposed into Articles 19d to 19k of the Nature Protection Act in the Netherlands in 2005. The Dutch Nature Protection Act links to the definitions in the Directive (plans and projects) and adds another category of 'other activities'. These categories are broader than the ones found in the Flemish legislation. In the Netherlands, the 'habitat assessment' decision is issued by the provincial authorities. The Flemish legislation stipulates that in one specific situation, that of overriding public interest, it is always the Flemish government that decides on the existence of overriding public interest, including for reasons of a social or economic nature (Article 36ter paragraph 5). The consequences for a project when the Flemish government does not accept the arguments for an overriding public interest are therefore not clear (Freriks, 2004).

Further, Backes *et al.* (2006) found a relationship between the role that courts either do, or do not, play, and the meaning of Article 6 in practice. This is explicitly linked to restrictions in access to the courts and the different ways that justice is administered within the EU. In both Austria and Germany there are very few opportunities open to citizens for public participation and legal protection to contest the national legislation that effects Article 6 paragraph 3 and 4 Habitats Directive. The highest court considers that there is no need of legal protection for citizens since the EU nature conservation Directives concern the protection of a general interest as opposed to individual interests. This is not regarded by the European Commission as an infringement of EU law since citizen involvement is not mandated in Article 6 paragraph 3 of the Habitats Directive. Public participation is mandatory if there is also an Environmental Impact Assessment procedure, but this derives from the Environmental Impact Assessment Directive and not from the Habitats Directive. In England, it is decided for each specific case whether opportunities for public participation will be offered and often legal protection is available against sector decisions. There is less haste in England to present differences of opinion on the application of legal frameworks to the courts, and solutions are first sought through consultations. In Sweden, the way the public is consulted depends upon the statute (e.g. physical planning law, etc.) on which the decision was taken and is usually limited to the 'affected public' and environmental NGOs. In Flanders, environmental NGOs have access to the

Belgian Council of State to contest decisions. In the Netherlands, access to the appeals procedure against a permit issued under the Nature Protection Act is open to interested parties and stakeholders including nature and environmental NGOs. In the Netherlands, unlike in Germany and Austria, there is no relativity review: an interested party can present all their arguments against a decision even if they have no specific interest in these arguments. There are therefore many more opportunities to participate in legal actions in the Netherlands than in the other countries studied.

Another finding by Backes *et al.* (2006) is related to the role of information and guidance as a facilitating measure provided by the government to enable the proper application of Article 6. In the other countries studied, the authorities responsible for transposing and implementing Article 6 of the Habitats Directive published guides or explanatory memoranda on the interpretation of Article 6 earlier than in the Netherlands. The need for information 'assistance' is particularly high in France, Germany and England where there are no separate permits for nature conservation, and decisions on the application of Article 6 paragraph 3 and 4 are taken within the framework of other permit systems that are more directed at the approval of plans and projects. The issuing authority in these countries is frequently not primarily expert in the field of nature conservation and is very often advised by an expert governmental agency, such as Natural England in England. The study notes that an expert, centrally organized authority like Natural England can prove particularly beneficial in terms of the quality of application of Article 6 of the Habitats Directive.

Discussion and conclusions

The research question asked in this chapter was: which Natura 2000 governance factors, at the level of the member states, define the context for implementing water infrastructure projects in estuaries and coastal zones? The literature suggests that, for a project implementer confronted with the Natura 2000 requirements, the following aspects of national (member-state level) implementation could define the context for water infrastructure projects:

1. The size and borders of Natura 2000 sites designated in or around the intended project location;
2. National, federal or regional legislation applicable to the Natura 2000 site in question; and whether it is still possible for the Birds and Habitats Directives to have a direct effect;
3. The transposition of Article 6 of the Habitats Directive into national law (whether habitat assessment take place within existing sector permits, or there is a separate nature conservation permit);
4. The responsible national agency or regional authority formally charged with Natura 2000 implementation in the member state concerned;
5. Stakeholders (if any) affected by the designation of a Natura 2000 site and their involvement in negotiations ;
6. Management plans and/or contracts drawn up or in preparation for the site;
7. The conservation status and the conservation objectives of the site;

8. Court access by the public to contest the application of Article 6 of the Habitats Directive and its conditions;

9. National information and guidance on Article 6 of the Habitats Directive in the member states concerned.

From a multilevel governance perspective, the implementation of EU Natura 2000 requirements at the project level will take place within the context of member-state-level implementation (Figure 2.1). Although implementation at this level varies across member states, it can be specified using the nine variables outlined above. However, the literature discussed in this chapter does not make clear to what extent each of the nine factors is influential in the implementation of water infrastructure projects, in particular in Building with Nature design projects, in Natura 2000 areas.

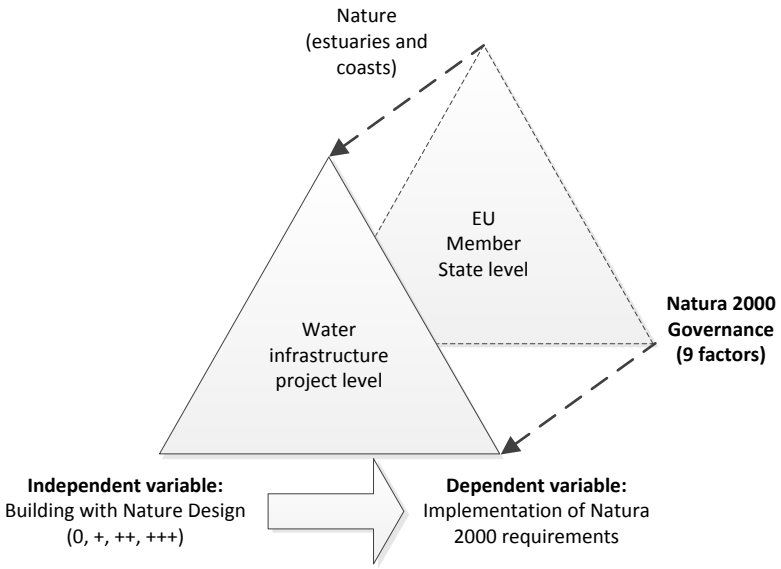


Figure 2.1. Project-level and member-state-level implementation of Natura 2000 requirements

Thus, to answer the central research question, a theoretical framework is needed that is able to categorize the Natura 2000 governance factors and at the same time provide insights into how these factors might influence project-level processes. Such a framework will be discussed in the next chapter.

Chapter 3. Theoretical and methodological considerations

The research question considered in this chapter is: how does Contextual Interaction Theory (CIT) order and structure Natura 2000 governance factors and Building with Nature design in implementation processes and what does this imply for research methodology? Based on a review of available theoretical approaches, this chapter will justify the theoretical framework (CIT) used and explain how it is applied in this research. The methodology section will then define the type of inquiry carried out in this research, outline the case selection process and discuss the research design, data gathering and data analysis procedures.

Theoretical framework

Chapter 2 concluded that, in order to answer the central research question, a theoretical framework was required that would account for project-level processes alongside Natura 2000 governance factors at the member-state level. Below, the frameworks and perspectives which are available in the discipline of policy studies are discussed.

Available theoretical approaches

Several theoretical perspectives are available in the policy implementation literature that addresses the governance-level and project-level factors that influence implementation. The study of policy implementation has seen rapid strides (for a review see O'Toole, 1986, 2000) since one of the first systematic accounts was completed by Pressman and Wildavsky (1973). Policy implementation covers the developments between the establishment of an apparent intention on the part of government to do something, and the ultimate impact in the world of action (O'Toole 2000, p. 266). Initially, two theatrical strands, known as 'top-down' and 'bottom-up', dominated the debate. Top-down theories view policy as set at the top, by democratically elected politicians, and then evaluate the subsequent implementation process with particular attention to the attainment of the policy's goals (e.g. Pressman and Wildavsky, 1973; Mazmanian and Sabatier, 1983). Top-down discussions would typically concentrate on factors that influence implementation, reasons for an implementation deficit, and conditions for effective implementation. Factors seen as decisive for policy outcomes include policy design, available resources, organization, hierarchy and control (Schucht, 2001).

In contrast, bottom-up approaches focus on the analysis of processes that occur during implementation and factors that influence this (e.g. Hjern 1982, Hjern and Hull 1982). This perspective is 'bottom up' in the sense that it starts with the implementing agents and examines their behaviour and motivations, and the personal and structural factors which encourage and/or force them to act in the ways that they do (Jordan, 1995). Commonly, this approach starts with a policy problem and then investigates the complex interactions between public and private actors and organizations on various levels, their potentially divergent systems of interests, beliefs and perceptions (Knill and Liefferink, 2007). Implementation in the bottom-up view is seen as an interactive process, with the original policy design being adapted as a result of activities on the ground and actors' adaptive strategies. The strict distinction between policy formulation and implementation is therefore rejected.

In a multilevel context, such as the EU, where there is an extra 'level' of government above those upon whom action depends – the member states – poor implementation remains a fact of life (Jordan, 1995, 1999). Top-down studies in an EU setting usually look for explanations of implementation 'deficits' or 'gaps' on the EU and national levels. Such explanations are related to formulating European policies, transposing them into national law and nominating national competent authorities. The bargaining process within the Council of Ministers, and the need to achieve consensus, often leads to inefficient 'fudges' to cover differences in views or interpretations and produces sub-optimal policy designs (Dimitrakopoulos and Richardson, 2001). The issues unresolved at the policy formulation stage are then left to the later implementation stages. Scholars studying the transposition of EU Directives analyse national transposition acts, instruments and techniques that influence timely, precise and legally correct transposition (e.g. Steunenberg and Voermans, 2006) alongside the institutional compatibility or 'fit' between national structures and practices and the supranational requirements (Knill, 1998, Smith, 2000, Lulofs, 2001). The probability of transposition is also argued to depend on the national ministry in charge, the EU decision-making procedure used (directives enacted by the Commission, the Council, or the Council together with Parliament) and the mere prospect of a transposition deadline (Mastenbroek, 2003). From this perspective, the manner of legal and practical implementation of European policies, rather than the evaluation of policy impacts, serves as an indicator in assessing implementation effectiveness (Knill and Liefferink, 2007). The results of implementation are measured once legal and practical implementation is complete, and the analysis does not continue beyond this stage.

According to Jordan (1995), bottom-up studies in an EU context focus their analysis on the interactions and locally inspired innovations that occur within, or arise from, the domestic sphere. A bottom-up perspective pays closer attention to national dynamics suggesting that there may only be tenuous links between what happens on the ground within member states and what is decided or adopted in Brussels. For 'bottom- uppers', it makes more sense to begin with the complexity of interactions at the national and local levels, examining the extent to which these are, or are not, inspired by Community legislation, rather than assuming that these are the automatic result of what is decided in Brussels. Such an approach has been used to map the interactions within member states in relation to specific problem areas including integrated pollution control (Jordan, 1993), water quality (Ward *et al*., 1995), recreation (Apeldoorn, 2011) and spatial planning (Backes *et al*., 2007, Zonneveld *et al*., 2008). From a bottom-up perspective, the success criterion is the achievement of local goals and, consequently, bottom-up accounts usually describe how national, regional or local actors make policies 'work' in a specific policy field or in a sector of economic activity, but such accounts are rarely theoretically underpinned.

In addition to the implementation literature, taking a legislative perspective on the implementation of the EU Birds and Habitats Directives (and EU law in general) could provide insights into how legislation-related factors influence the process. The existence of EU law is crucial for policy implementation and, given the strong regulatory emphasis of its policies, the EU is often thought of as a 'regulatory state' (Majone, 1996). Environment is one policy area where policy responsibility is shared between the EU and its member states. Here a mixture of legal regulation and inter-state cooperation is used, with the 'EU Directive' being the preferred legal instrument (Nugent 2003, pp.325-328). Directives tend to be more general in style than regulations. They are less concerned with detailed and uniform application of policy and more with laying down policy principles that

member states must seek to achieve, but can select an appropriate means under their respective national constitutional and legal systems (Nugent 2003, p. 239). The legislative provisions of EU Directives are also the result of negotiations between the member states, the Commission and the Parliament. Compromises are often more about the wording of a legal text, than about the underlying idea. In this context, one can speak of 'constructive ambiguity' where choosing words that can be interpreted in various ways contributes to the political consensus on a piece of legislation (Senden, 2006). Partly as a consequence, the texts of EU legislation have been repeatedly criticised for being out of line with the principles of good drafting for their vague definitions, extremely long preambles and titles, confusing statements, clashing or complicated provisions, frequent amendments to legislation without proper codification, consolidation and revision and the absence of transitional arrangements leading to a legal vacuum (Xanthaki, 2001, Krämer, 2007, Puissochet and Timmermans in Senden, 2006). The inherent contradiction between flexibility and uniformity in Community legislation is that it has to offer sufficient space to guarantee compatibility with the various national legal orders present in the EU and at the same time ensure that the major policy principles are adhered to. For example, in the practical implementation of the EU Birds and Habitats Directives, their provisions were interpreted as being too strict if they were to be followed in land-use development, making any plan or project impossible, but at the same time as being too vague due to the ambiguous terms such as 'significant effect' that they contain (Beunen, 2006).

The legal perspective on the implementation of Birds and Habitats Directives has dominated the national discussion in the Netherlands. Many of the articles about the consequences for Dutch planning practices were written by lawyers (e.g. Bastmeijer en Verschuuren, 2003, 2004; Verschuuren, 2003, 2004). The dominance of legal interpretation and the focus on legislative bottlenecks is partly due to the incomplete transposition of the Birds and Habitats Directives into Dutch national law prior to 2005. However, the consequences of such interpretations, as highlighted by Beunen (2006), are that decision-making became an increasingly legalistic discourse and a self-reinforcing development. After some initial cases were decided in court, the role and influence of courts, judges and lawyers increased. As a consequence, greater emphasis was put on judicial and formal aspects of decision-making, as opposed to substantial aspects. This led to parties more often using formal aspects of law and legislation as weapons in the political decision-making battle. Disagreements about decisions were more easily brought to court, which again increased the influence of the judicial discourse on decision-making.

In recent years, the focus of national discussions on the Birds and Habitats Directives in the Netherlands has shifted towards the room available for 'legislative stretch'. A state-of-the-art analysis of Natura 2000 implementation in the Netherlands by the Ministry of Economic Affairs, Agriculture and Innovation (Ministerie van Economische Zaken, Landbouw en Innovatie, 2011) and its review by prominent legal scholars (van Wijmen *et al*., 2011) concluded that the gains from legislative stretch were limited and flexibility should be sought in the active realization of Natura 2000 goals. The flexibility in the Natura 2000 regime can be realized by viewing the conservation objectives seriously and through 'smart implementation'. Such an implementation is characterized by an intention to achieve the goals of a directive in the most efficient and successful way. Overall, a more pro-active attitude towards Natura 2000 objectives is desirable (van Wijmen *et al*., 2011).

Contextual Interaction Theory

Where do the theoretical perspectives outlined above leave us? The top-down policy implementation perspective is not concerned with the processes that follow from the formal implementation stage which, in the EU context, comprise the transposition into national legislation and the nomination of national authorities. Conversely, the bottom-up perspective covers national, local and project level interactions, but only does so in a narrative and descriptive way. A legal analysis of the Birds and Habitats Directives has been helpful in resolving problems related to incorrect transposition and led to the conclusion that the flexibility of the Natura 2000 regime can be realized by a more pro-active attitude towards Natura 2000 objectives. Natura 2000 conservation objectives are site-specific, and so the strategies for 'smart implementation' are ultimately context-dependent. This highlights the context-dependency of implementation rules and their 'localization' by those individuals who apply them. That is, legal rules have local meaning and local applications (Gregg, 1999).

In terms of implementation research, sufficient evidence has been accumulated to partially validate both top-down and bottom-up arguments, and virtually all analysts have moved beyond the top-down/bottom-up dispute and synthesized 'third generation' perspectives have been offered by scholars such as Goggin *et al*. (1990) and Stoker (1991). The heuristic use of such approaches offers a systematic way of sorting through the complexity while providing a reasonable framework with which to consider the context and dynamics of their particular setting (O'Toole, 2004). For the research question posed in this thesis, such a framework enables one to sort through a multitude of variables such as the nine factors outlined in the previous chapter, and possibly many others, while taking account of the local context and local actors, i.e. the water managers intending to apply Building with Nature project designs in a specific geomorphological context. In other words, it links governance factors with project-level factors while including the implementing actors.

The 'third generation' perspective adopted in this thesis is the Contextual Interaction Theory (CIT) of policy implementation. This theory has developed over time with its initial roots contained within the implementation analysis of the dissertation of one of its advocates (Bressers 1983). It has been further elaborated in "instrumentation theory" to enable a comparison of instruments while acknowledging that their efficacy is fully dependent on contextual factors (Bressers and Klok, 1988, Klok, 1991, Bressers and Ringeling, 1995). Subsequently, network analysis has been added (Bressers, O'Toole and Richardson, 1995, Bressers, 1998, Bressers and O'Toole, 1998, 2005, Ligteringen, 1999) along with learning and dealing with uncertainty (Bressers and Rosenbaum, 2000, Arentsen, Bressers and O'Toole, 2000), multiple scale issues (Bressers and Rosenbaum, 2003) and other aspects of the governance regime as part of the context (Bressers and Kuks, 2003, 2004, Bressers, 2009). The original core of the theory has thus been reconceptualised, rephrased and renamed (Bressers, 2004) and recently the role of boundary judgments (Bressers and Lulofs, 2010) has been included. Not all of the above theoretical ideas will be employed in this thesis, and there now follows an elaboration of those parts of the theory necessary to answer the research question, based largely on the recent works of Bressers (2004, 2009), Bressers and Lulofs (2010) and de Boer and Bressers (2011) and cited with their permission.

CIT conceptualizes policy implementation as a social interaction process in which persons, groups and organizations convert inputs, i.e. the arguments to act and interact, into outputs. Such outputs

are often inputs for further processes involving human beings behind the organizations they represent who are responsible for processing causes into effects (Figure 3.1).

The concept of "process" is used here in the sense of a conversion process, such as in the early political science model by David Easton (1966). A conversion process is not a change in a phenomenon over time but something that forms the relationship between phenomena. Several inputs to such a process are "processed" into something new and different. Since, in social reality, this conversion is not produced by production lines but rather by activities and interactions of actors (people representing themselves and/or organisations), they are labelled as "interaction processes".

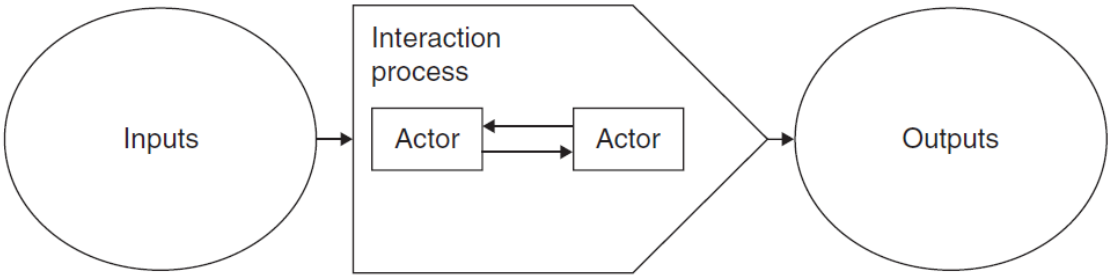


Figure 3.1. An interaction process as the conversion of inputs into outputs (source: Bressers, 2004)

Interactions are visualised as two-actor processes. This representation is to some extent symbolic since, in reality, there are generally a greater number of actors actively engaged. Nevertheless, in many cases related to water management processes where multiple issues are at stake there will be two sides, or groups, per issue, and this makes it possible to incorporate multiple actors into the theoretical analysis (Owens, 2008).

Apart from the fact that multiple actors can be involved in a process, even if they can often be grouped into coalitions for a particular issue, there is another source of complexity. There are an infinite number of factors that might conceivably influence the course and outputs of an interaction process. Just fifteen factors, each with only two values, would create more than 30,000 different combinations of circumstances. However, since interaction processes are human activities, all influences, including those created by policy instruments, flow through the key characteristics of the actors involved. Thus, at least initially, it is possible to establish an inner core of factors that is far more parsimonious as shown in Figure 3.2.

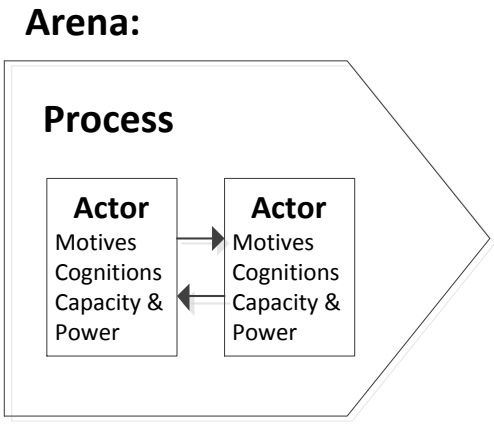


Figure 3.2. Process model showing the actor characteristics used in Contextual Interaction Theory (source: Bressers, 2009)

The main assumptions of CIT are quite straightforward (Bressers, 2004, 2009). Firstly, policy processes are actor-interaction processes, the course and outcomes of which are determined by the present combination of key actor-characteristics. Three characteristics of the actors – their motivation, their cognitions (information held to be true) and their capacity and power – drive the social-interaction processes.

Motivation has its origins in an actor's individual goals and values, in the degree of external pressure and in a self-assessment of one's effectiveness.

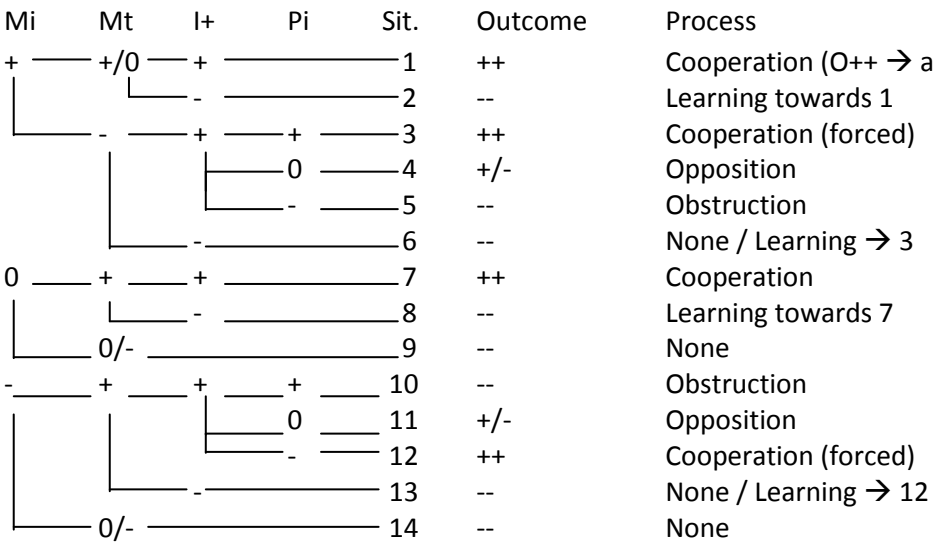
Cognitions refer to observations and information gathered about reality, but crucially includes interpretations of that reality that are influenced by filter frames and interactions with other actors.

Capacity and Power can be attributed to actors by others (formal powers such as legal or institutional rights) and/or rooted in resources such as money, skills, time and consensus.

These three core characteristics influence each other, and one cannot exclude any without losing considerable insight. Further, they are not just a selected subset from several other equally important ones; rather they represent different perspectives on social interaction processes that have proved to be exceptionally useful in explaining the dynamics of such processes. There are also long traditions of thinking in line with one or more of these perspectives (see de Boer and Bressers, 2011).

CIT includes a probabilistic predictive element detailing what kind of interactive atmosphere, with what kind of results, can be expected from different combinations of actor characteristics (Bressers, 2004). All hypotheses are specified in flowcharts indicating a predicted type of interaction and implementation results for each combination of characteristics of the two actors (or groups of actors) involved. As such, a differentiation is made between the likelihood that a certain policy is implemented and the adequacy of such implementation. The reason being that the three key actor characteristics might very well differ when one, for instance, considers the motivation and resources required to implement a policy in some form (such as by providing licences), compared with an implementation that retains the full incentive strength of the policy (through strict conditions and

enforcement for example). Figure 3.3 shows a flowchart representing the likelihood of implementation.



Mi = Motivation implementers regarding this application

Mt = Motivation target group regarding this application

I+ = Information for application of positive partner(s) (highest level)

Pi = Balance of power viewed from position of implementer

Figure 3.3. The likelihood of a policy instrument being applied using Contextual Interaction Theory (source: Bressers, 2004).

Based on the configuration of the actor characteristics of the actors (the motivation of implementers (Mi), the motivation of the target group (Mt), information for application of positive partner(s) (I+) and the balance of power viewed from the of implementer's position (Pi)) CIT delivers a total of 14 hypotheses about the outcome of an interaction covering various forms of cooperation (active, passive or forced), opposition and (joint) learning.

While the characteristics of the actors shape the process, they are in turn also influenced by the course of and their experiences in the process and they can therefore gradually change during the process. All other factors, including policy instruments and external contextual circumstances, will influence the core characteristics but only because, and insofar as, they change relevant characteristics of the actors involved. Three layers of factors (specific, structural and wider context factors) that influence these characteristics are shown in Figure 3.4.

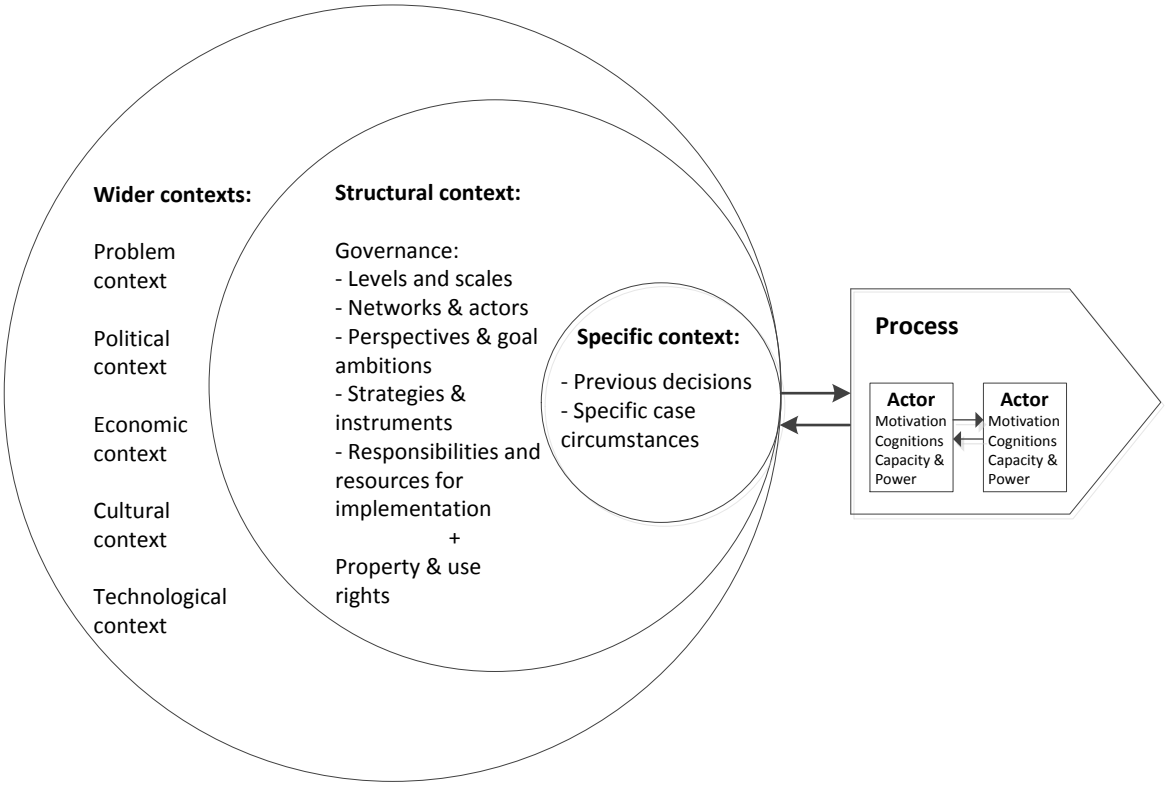


Figure 3.4. Layers of contextual factors that influence actor characteristics (source: Bressers, 2009).

Part of that context is *case specific*. This involves factors like the characteristics of the geographical place where the project is realized, but also many other kinds of circumstances. A notable category is that of the case history consisting of previous decision-making and framing.

A further layer of context is the *structural context*, covering both the elements of governance and the relevant property and use rights (Bressers and Kuks, 2004). An important part of the structural context is formed by the "five multiplicity aspects of governance" (Bressers and Kuks, 2003) outlined below. Governance is used here as a neutral, albeit expanded, understanding of the scope of (often national level) policy (de Boer and Bressers, 2011):

1. Multiple levels of governance. Which levels of governance dominate the policy discussion? What is the accepted role of government at various scales? Which other organizations are influential in the governance activities on these levels? Who decides or influences such issues? How is the interaction between various levels of governance organized?

2. Multiple actors in the policy network. How open is the policy arena? Open to whom and where, precisely? What role do experts play? How do the various governmental and other organizations relate to each other?

3. A multiplicity of problem definitions and other policy beliefs. What are the dominant maps of reality? To what degree do the actors accept uncertainty? Is the policy problem regarded as something individuals must deal with, or is it a problem for society in a collective sense? Where coordination is required with other fields of policy, what are the links accepted by the actors?

4. Multiple instruments in the policy strategy. Which instruments belong to the relevant strategy or strategies? What are the target groups of the instruments, and what is the timing of their application? What are the characteristics of these instruments?

5. Multiple responsibilities and resources for implementation. Which organizations (including government ones) are responsible for implementing the arrangements? What is the repertoire of standard reactions to challenges known to these organizations? What authorities and other resources are made available to these organizations by the policy? With what restrictions?

Around the structural context, there is another yet more encompassing *wider context* circle covering the political system, socio-cultural, economic, technological development and problem contexts. Some cultural settings can, for instance, make hierarchical approaches less feasible, or make a certain degree of social control obsolete.

Further assumptions concerning the layers of context and their relevance are:

a. That the first layer of context covers specific case characteristics, such as of the geographical place and the history of the process, such as decisions made before the delineated research period, that often specify the setting of the institutional arena for the case process. This context is also partly dynamic over time with changes resulting from experiences in the process itself and by targeted actions by those involved.

b. The characteristics of the actors are partly influenced by factors from a wider and more general external context that is labelled the structural context in CIT. It consists of elements of public governance and private property and use rights. The structural context will be far less influenced by individual implementation cases than the specific context. This is the essence of the difference between the specific and the structural contexts: that the latter holds in principle for all similar cases and not just for a specific case. Nevertheless, it too will gradually change in processes on a scale larger than the case, but with similar dimensions of motivational, cognitive and resource developments in response to external influences and internal frictions.

c. Around this context, there is yet another, more encompassing, circle covering the political system, socio-cultural, economic, technological development and problem contexts.

d. Each wider context not only influences the narrower ones within it, they can also directly influence the characteristics of the actor.

The application of CIT in this research

CIT is a multifaceted theory that can be applied in many different ways. For the research question posed in this thesis, its value is in including both the relevant layers of factors in the analysis: multilevel governance factors stemming from Natura 2000 and project-level processes and physical characteristics. Although its predictive component does not specify a direct causal link between these two layers, which makes it difficult to apply CIT in the strict sense of the word ‘theory’, it can serve as a framework, or a conceptual lens, for visualizing and understanding how a causal link could potentially operate. It allows the researcher to categorize the Natura 2000 governance factors

according to the contextual layers of CIT and thus discern the governance context and link together the concepts of main research question. Nine factors were outlined in the previous chapter:

1. The size and borders of Natura 2000 sites designated in or around the intended project location;
2. National, federal or regional legislation applicable to the Natura 2000 site in question; and whether it is still possible for the Birds and Habitats Directives to have a direct effect;
3. The transposition of Article 6 of the Habitats Directive into national law (whether habitat assessment take place within existing sector permits, or there is a separate nature conservation permit);
4. The responsible national agency or regional authority formally charged with Natura 2000 implementation in the member state concerned;
5. Stakeholders (if any) affected by the designation of a Natura 2000 site and their involvement in negotiations ;
6. Management plans and/or contracts drawn up or in preparation for the site;
7. The conservation status and the conservation objectives of the site;
8. Court access by the public to contest the application of Article 6 of the Habitats Directive and its conditions;
9. National information and guidance on Article 6 of the Habitats Directive in the member states concerned.

Thus, site-specific factors, such as their size and borders, management plans and the conservation status and objectives of the site (factors 1, 6 and 7) constitute the specific context layer (the specific case circumstances). The remaining factors constitute the structural context layer, or governance context: the national, federal or regional legislation (factor 2) characterizes the multilevel aspect of the governance context (levels & scales); the transposition of Article 6 of the Habitats Directive, the access to court and the national information and guidance (factors 3, 8, 9) make up the national strategies and legal instruments for implementation (strategies & instruments); the authorities formally charged with implementation (factor 4) are those with responsibility for implementation (responsibilities and resources for implementation); and finally, the stakeholders affected by the site designation (factor 5) are the policy actors either included or excluded from the implementation (networks and actors). The CIT framework also suggests that these factors influence the implementation process through the motivations, cognitions and power of the actors participating in a project, and so the latter are also included in the analysis (Figure 3.5).

Structural context and specific context factors (also referred to as contextual factors) are treated as *independent variables* in this analysis. As Figure 3.5 suggests, there are many such factors and their definitions are rather broad. However, CIT argues that only those that alter the actors' characteristics actually influence implementation. On this basis, the relevant contextual factors will be defined in more detail for each in-depth case study of this thesis, as will be the application of CIT.

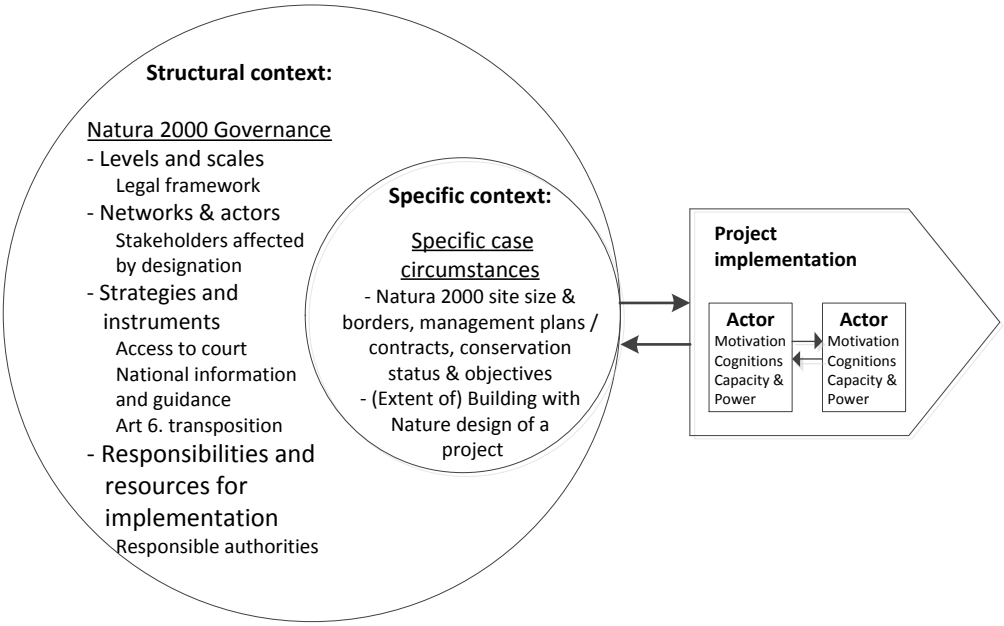


Figure 3.5. CIT as applied in this research

In Chapter 5 (quasi-experimental case design), CIT will be used mostly to simplify the vast contextual field and locate the possible independent variables. This is particularly useful because, as Figure 3.5 suggests, Building with Nature design is not the only independent variable that could influence and explain the outcome. The predictive part of the theory is not used in the analysis in Chapter 5, and actor interactions are not elaborated on.

In Chapter 6 (longitudinal case design) the predictive part of CIT (reflected in the flowchart in Figure 3.3) will be used to distinguish and qualitatively characterise the four phases of project implementation. The focus of the analysis will be on actor interactions, emphasizing that supra-national policy instruments such as Natura 2000, adopted by national governments, feed into ongoing social interactions and are just one of the elements that shape what takes place.

The dependent variable of the analysis is defined as the implementation of Natura 2000 requirements in a water infrastructure project. From a project-level perspective, the implementation of Natura 2000 requirements is deemed successful if the goals of the project implementer are fulfilled, such as the desired water infrastructure is realized (i.e. constructed). Here, a project implementer can be a public, private or public-private authority confronted with the requirements of Natura 2000 in an area where they intend to develop water infrastructure. The outcome of project implementation is indicative of how well a project fulfils the requirements, or how well Natura 2000 is implemented on the project level. The following Natura 2000 requirements and the corresponding outcomes of project implementation will be focused on in the empirical chapters (Table 3.1).

Table 3.1. Specification of dependent variables in each empirical chapter

Natura 2000 requirements for water infrastructure projects	Project implementation outcome
Assessment based on Habitats Directive Article 6 of a project's possible effects on a Natura 2000 site	Project design raised no objections or was successfully defended in court Project design raised objections and requires reconsideration due to a court ruling before it can be physically implemented (Chapter 4)
	Court approval / reversal of a project design in response to the argument that a project has a significant negative effect (Chapter 5)
Natura 2000 compensation requirements imposed on local implementation processes	Cooperation (active, passive or forced), opposition or (joint) learning (Chapter 6)

Overall, CIT is used to explore and understand the individual cases, and it is not the aim of this research to test or develop the theory further. CIT is used as a framework that steers the researcher's observations and is used to interpret and discuss the research results.

Methodology

The research design used to answer the central research question of this thesis can be categorized as a factor-centric small-N design (Gschwend and Schimmelfennig, 2007). Factor-centric design is primarily concerned with the explanatory power of a particular causal variable, which in this research is Building with Nature design, while other independent variables (Natura 2000 governance factors) serve as control variables to ensure that alternative causal factors are taken into consideration. The reason for choosing a small-N design is that, at least within the European context, too few water infrastructure projects have applied Building with Nature design principles to allow a larger sample. Small-N research is nevertheless suitable for generating hypotheses about relatively new approaches, such as Building with Nature design, which can then be later tested using large-N designs.

The research reported in this thesis is based on case studies of an explorative and qualitative character. The goal of the research is to explore the link between a presumed cause (Building with Nature design) and an effect (outcome of implementing Natura 2000 requirements at the project level) in a way that enables one to understand the process. This is a qualitative definition of causality, also referred to as causal mechanism (Mohr, 1999). A case-study approach is suitable for this type of inquiry as it allows the researcher to study the process in more detail than for example a survey.

Quantitative techniques would also require more cases and a more detailed operationalization and quantification of Building with Nature design, and this is not currently possible because Building with Nature is only starting to emerge.

To minimize the danger that the presumed relationship between the cause and effect is a result of bias, the thesis will apply method triangulation: the relationship between the extent of Building with Nature design and the outcome of implementing Natura 2000 ideas at the project level will be analysed using three different case study designs (Chapter 4 through Chapter 6). Triangulation, or the combination of methodologies in the study of the same phenomenon, is argued to reduce bias and improve the validity of social research. Triangulation as a term was first coined by Webb *et al.* (1966, cited in Meffert and Gschwend, 2012) who advocated the use of multiple measurement processes, or measurement triangulation. Later, the concept of triangulation was extended by Denzin (1970) to include data triangulation (use of multiple data sources), investigator triangulation (use of multiple researchers) and method triangulation (use of multiple methods). The argument advanced by the advocates of triangulation is that by combining methods in the same study, researchers can partially overcome the deficiencies that flow from any one method and enhance confidence in the research findings. Denzin also argued for within-method triangulation – using various strategies within one method. Within-method triangulation allows researchers to capitalize on the strengths of one particular methodology to triangulate proposition tests (as in experimental method triangulation, see Meffert and Gschwend, 2012). By applying method triangulation, this thesis does not have to compromise the strengths of qualitative case studies by using quantitative methodologies to increase confidence in the conclusions. Even the critics of triangulation (e.g. Blaikie, 1991) admit that it is legitimate, and may be useful, to use triangulation within a particular methodological perspective. The methodological limitations of individual case designs and data analysis methods will be discussed in each empirical chapter as they arise.

Case selection

Three pilot projects developed by EcoShape Foundation – Holland Coast, South-West Delta and Marker- and IJssel lakes in the Netherlands (see Chapter 1, box 1) – have applied Building with Nature design principles from the onset. However, the implementation of these projects is still ongoing and their analysis will not be able to provide an answer to the central research question. Apart from these EcoShape pilot projects, only a few initiatives have been explicitly termed Eco-dynamic or Building with Nature. Nevertheless, there are sufficient examples where at least one of the Building with Nature design components have been applied by project initiators, even if this was not their expressed intention. This can be explained by the reality that Building with Nature design emerged in response to the pressing problems in estuaries and coasts experienced not only by the EcoShape Foundation, but also by a much broader range of water managers and stakeholder organisations. So it makes little sense to exclude projects that are implicitly designed according to Building with Nature principles, though not explicitly termed as such, from the analysis.

The selection of cases for this thesis research was guided by non-probability (i.e. non-random) sampling, in which cases are selected deliberately by the researcher (Collier, 1995). Deliberate selection, based on the knowledge of a population and the purpose of the study, is also referred to as purposive or judgemental sampling (Babbie, 2004). Purposive sampling can be used to yield a small subset of a larger population in which many members are easily identifiable but enumeration

of them all would be nearly impossible. Such a subset is sufficient for comparative purposes. In Chapter 4, fourteen cases, within which the extent of Building with Nature design ranges from '0' to '+++', will be studied as a subset of a larger population of water infrastructure projects that involve dredging operations in northwest European estuaries and coasts. This subset was selected using the diverse case method (Seawright and Gerring, 2008) which requires the full range of values characterising the dependent and independent variables (X,Y) or their relationship (X-Y) to be included. As such, the fourteen cases were selected such that they covered the full range of variation in the extent of Building with Nature design (X) and the implementation of Natura 2000 requirements in a project (Y). In terms of cases with a high level of Building with Nature design, the sample is almost the complete population as the number of such projects is extremely limited.

Following this, three cases were selected from this subset for a more in-depth analysis: Waterfront Harderwijk and coastal zone Zeewolde (analysed in Chapter 5) and a flood control area in Kruibeke, Bazel and Rupelmonde (analysed in Chapter 6). These cases were strategically selected based on expectations of them having a rich information content as suggested by the less-detailed assessment in Chapter 4. In more detail, the opposite court rulings in the Harderwijk and Zeewolde cases seemed to be related to the differing values of the independent variable and thus made a relevant study; and the Kruibeke, Bazel and Rupelmonde case appeared to demonstrate changes in the independent variable over a period of some thirty years. An information-oriented selection process is useful in maximizing the utility of information from small samples and single cases (Flyvbjerg, 2006).

Research design

The unit of analysis in this research is a water infrastructure project involving dredging works located either in an estuary or a coast in northwest Europe that is faced with having to meet Natura 2000 requirements (hereafter the terms 'case' and 'project' are used interchangeably). Each of the three empirical chapter of this thesis employs a different case study design.

Chapter 4, where the full subset of cases is discussed, uses a holistic multiple case design (Yin, 2003, p.40). Fourteen explorative case studies (i.e. water infrastructure projects) are analysed within their own context (hydro-morphological, ecological and socioeconomic). The rationale for a multiple case design is the same as that for multiple experiments and derives from the understanding of literal or theoretical replication (Yin, 2003, p.52). Additional cases are chosen for a study because they are expected to yield similar data, or different but predictable findings, within a specified range of variables to facilitate a credible comparison of two or more cases.

Chapter 5 analyses two cases from the above subset in more detail, and these are similar in all respects apart from the values of the variables of interest. Such a configuration makes this suitable for a quasi-experimental case design (Gerring, 2007, p. 154). The analysis unpacks the causal mechanism between one specific contextual factor (the first component of Building with Nature design) and one stage of implementation (the court decision) for both the Waterfront Harderwijk and the coastal zone Zeewolde projects.

Chapter 6 is a longitudinal case design of a flood defence project in Kruibeke, Bazel and Rupelmonde (Flanders) in which four implementation stages are used as embedded units of analysis (Yin, 2003, p.42). The rationale for this longitudinal single case study is that studying the same project at two or

more points in time can reveal changes in presumed variables of interest over selected time intervals.

Data gathering

The main sources of the research data are qualitative semi-structured interviews and documents.

The analysis of the subset of cases in Chapter 4 of this thesis is based on data collected between 2008 and 2010. This included interviews with informants from public and private organizations, project documentation supplied by the interviewees and historical cases available in the literature. One informant representing the organization active in the field was interviewed in each case.

For the in-depth case studies, the following data-gathering logic was applied. To begin with, general information was collected from the dedicated project websites. A general inquiry stating the goals and purpose of the research was then sent to the project secretariat or directly to a project manager. An initial list of government institutions, private and non-profit stakeholders and their corresponding roles in the implementation processes was drawn up with the help of the identified project secretariat/project manager. Then, one respondent from each government institution and stakeholder organization was interviewed using qualitative semi-structured interviews. To ensure that all the actors were covered, including a project's opponents, each respondent was asked to name all the participating actors, and their roles were later crosschecked with document sources. To ensure that all relevant documents were obtained, all respondents were asked to supply the documentation that they considered relevant to the project and/or had mentioned during the interview. This snowballing effect ensured that the set of documents and respondents was complete. Research ethics were addressed by informing the participants what their participation in the research would entail. Confidentiality and anonymity related to the information supplied was guaranteed.

Data for the Zeewolde and Harderwijk cases were collected in August and September 2009, and for the Kruibeke, Bazel and Rupelmonde case in February and March 2011. More details of specific document sources and sampling techniques for the semi-structured interviews are provided in the individual empirical chapters.

Data analysis

Cases used in a multiple-case-study design (Chapter 4) are exploratory, and the assessment applies a systematic evaluation of key variables as a data analysis technique. The quasi-experimental comparison of Harderwijk and Zeewolde (Chapter 5) is more explanatory in nature and involves the modus operandi method, also known as the 'detective paradigm' (Scriven, 1976). The Kruibeke, Bazel and Rupelmonde case analysis (Chapter 6) is a theory-guided reconstruction of chronological events, which is a special form of a time-series analysis (Yin, 2003, p.125). Each data analysis method and its application in the case study is explained at greater length in the relevant empirical chapter.

Summary

The research question posed in this chapter is: how does Contextual Interaction Theory (CIT) order and structure Natura 2000 governance factors and Building with Nature design in implementation processes and what does this imply for research methodology? CIT refers to these factors as structural and project-specific contextual factors and maintains that they influence the

implementation process through the characteristics of the actors involved in the interaction process. CIT will be used in this thesis to locate the main research variables in the vast context of Natura 2000 governance and to distinguish and characterise the various phases of project implementation. It will be used in combination with qualitative case studies in applying the three research designs and three different methods of data analysis.

Chapter 4. Building with Nature and Natura 2000: a multiple-case study design[4]

The central research question - how is the extent of Building with Nature related to the implementation of Natura 2000 requirements - is answered in this chapter using a multiple-case study design. The chapter focuses on the assessment of plans and projects, based on Article 6 of the Habitats Directive, as a specific Natura 2000 requirement for water infrastructure projects. The question is divided into two sub-questions that will be answered for each case:

- To what extent do the designs of selected cases comply with the definition of Building with Nature?
- What is the outcome of applying Article 6 of the Habitats Directive in the selected cases?

The chapter presents a subset of recent water infrastructure projects in the Netherlands, Belgium, the UK and Germany. Each case is discussed it terms of its design and application of Article 6 of the Habitats Directive. The chapter concludes by answering the research question and selecting two cases for further in-depth research.

Data and methodology

In this chapter, 14 explorative case studies (of water infrastructure projects) are analysed in their own hydro-morphological, ecological and socioeconomic context. This type of design is termed a holistic multiple-case design (Yin, 2003). The cases are based on data collected between 2008 and 2010 in the form of interviews with informants from public and private organizations, project documentation supplied by the interviewees and historical cases available in the literature (van Hooydonk, 2006; Mink, 2007). One informant representing the organization active in the field was interviewed from each project.

The goal in case selection was to generate a subset of projects covering the full range of Building with Nature incorporation in their design from a larger population of water infrastructure projects in northwest European estuaries and coasts. Many such projects are identifiable but enumeration of them all would be nearly impossible. The subset had to be sufficient for credible comparison of each case with all the others in the set (pairwise comparison). The cases were selected using the diverse case method (Seawright and Gerring, 2008). This method requires the inclusion of the full range of values characterising the dependent and independent variables or their relationship. Subsequently, the 14 cases were selected so as to cover the full range of variation in the extent of Building with Nature design and the outcome of applying Article 6 of the Habitats Directive. In terms of cases with a high Building with Nature design content, the selection amounts to almost the entire population as such projects are limited. The measurement of the extent of Building with Nature design followed

[4] An earlier version of this chapter was published as: Vikolainen V., Bressers J.T.A. and Lulofs K. (2011) 'Management aspects of Building with Nature projects in the context of EU Bird and Habitat Directives', *Environmental Engineering and Management Journal*, Vol. 10, Nr. 11, pp. 1675-1686

the procedures outlined in Chapter 1: each component – *integration*, *use of* and *improvement to* of nature was assigned a '+' if it was present in a project design; or a '0' if it was absent. The assessment of the components amounts to an informed judgement based on the research data and insider information provided by interviewees. The outcome of the implementation was measured in terms of an assessment of a project design's effects according to the requirements of the Article 6 procedure. The outcome was deemed *successful* if a project design raised no objections or was successfully defended in court, whereas an *unsuccessful* project was one that raised objections leading to its design having to be reconsidered due to a court ruling for it to be implemented. The outcomes were assigned a ☺ or a ☹ respectively. Case descriptions were compiled to provide sufficient information for a systematic account of the core research variables for each case.

Due to the researcher's language limitations, the selection of countries was limited to the Netherlands, Belgium (Flanders), the UK and Germany. Dutch projects (6 in total) dominate the selection compared to projects from other countries (2 Flemish, 3 German, 2 UK and 1 cross-border Flemish/Dutch) due to reasons of accessibility and financial constraints. To minimize country bias, variation in the range of the independent variable was introduced across cases from one country. A distinct advantage of diverse case selection, as pointed out by Seawright and Gerring (2008), is that it enhances the representativeness of the sample of cases chosen by the researcher. On the other hand, the inclusion of the full range of variation may distort the actual distribution of cases across the spectrum. However, the distribution of cases across the spectrum is not a primary concern in this research since we are more concerned with the relationship between the main variables of interest.

Case studies

1. Delfland coast

The Delfland coast is a 14 km long chain of dunes between Rotterdam and The Hague in the province of South Holland. It is seen as one of the weak spots on the Dutch coast, and one that needs reinforcement to fulfil flood defence requirements. In particular, the narrow sand dyke and the small dunes at Solleveld require additional sand to guarantee long-term flood security. The sustainable reinforcement of Delfland coast is thus necessary.

source: www.zuid-holland.nl

In addition to this, there is a lack of recreation and nature possibilities along the Delfland coast, with the dunes between de Banken and Solleveld being particularly narrow. The nature areas in the area are only partially accessible for recreation best. There is a major shortage of recreational facilities and nature in the southern part of the province.

To improve flood security, dunes can either be heightened or extended seawards. Moreover, 'hard' structures such as dykes can be used in certain locations. An Environmental Impact Assessment (EIA) of the Delfland coast looked at the following alternatives: existing situation (reference), dune heightening, seawards extension and seawards extra extension. A comparison of these alternatives

(DHV, 2007) found that seawards extension would satisfy all the requirements in terms of long-term flood security and spatial quality while being both realistic and affordable.

The dunes are part of the Natura 2000 biodiversity network, and the effects on nature of all the above alternatives were investigated in the EIA. The alternative of heightening the dunes it was concluded would lead to significant effects on the existing nature as large areas of existing dunes would be covered with sand. Mitigation during execution of the works was found to be impossible. Significant effects were to be expected on the population of sand lizards, a Natura 2000 priority species. Compensation and recovery of the sand lizard population would take considerable time, making it impossible to satisfy the compensation requirements of Article 6 of the Habitats Directive.

Seawards extension, on the other hand, would have minimal effects on nature as the sand would be located adjacent to the existing dune. The existing white dunes would be further from the coast, and grow over and develop into grey dunes within 20 years. In the meanwhile, newly created dunes (the sand placed seawards) would develop a comparable surface area to the present white dunes within 5-10 years. In this way, the steady loss of the white dunes is compensated by the progressive development of the new dunes. The total surface area of dunes increases and the balance of effects on nature is positive. In addition, the constructed dunes will be quickly covered with sand, looking more natural as a result. Given this nature component, this alternative was more acceptable than an alternative focussed on only the flood defence goal.

The Delfland coast project thus integrated flood defence, nature and recreation goals. It made use of natural dune development to facilitate dune compensation at any moment in time. As a result, it will increase the total dune area and thereby improve the area's ecological status. Thus, it fulfils all Building with Nature criteria. The project's EIA included appropriate assessment under Article 6.3 of the Habitats Directive and was approved. All the project works have since been successfully completed.

Case 1. Delfland coast:

Building with Nature design	*Integration*	*Use of*	*Improvement*
	+	+	+
Habitats Directive Article 6.3 Assessment	☺		

2. Western Scheldt container terminal

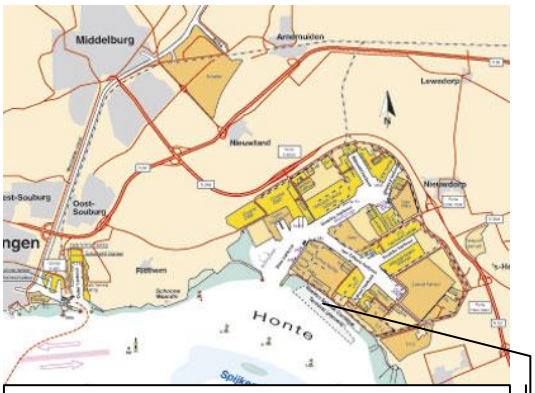
The historical description of this case follows closely that by van Hooydonk (2006). The competent port authority of Zeeland Seaports developed a plan to construct a Western Scheldt Container Terminal (WCT) next to Flushing East port. This 'world class' terminal would have a quay measuring 2,650 metres in length and 500 metres in width. The construction works would require 41 hectares of existing land and 141 hectares of newly reclaimed land. The terminal would have a capacity of 1.5 million containers a year.

In October 2002, the provincial authorities of Zeeland agreed an amendment to the regional land-use plan, paving the way for the construction of the WCT. The amendment changed the classification of the area from an ecological development area to that of a seaport area. By way of compensation, another area was designated for ecological development.

The area destined for the WCT in the amended regional land-use plan included a piece of a nature reserve that was part of the Western Scheldt protected area (SPA) under the Birds Directive and was on the list of areas proposed by the Netherlands as protected areas (SAC) under the Habitats Directive. An environmental assessment found that the plan would have negative consequences for the natural assets in the area concerned. Some claimed that the nature reserve would completely disappear due to the construction of the WCT.

A case was brought before the Dutch Council of State (the Supreme Administrative Court of the Netherlands) by the municipality of Goes, environmental interest groups, a residents' association and thirteen private individuals.

The Council ruled that the provincial authorities had not sufficiently investigated alternatives to the project as required by Article 6.4 of the Habitats Directive. They had not considered an alternative construction location outside the region, other activities providing employment inside the region, other locations for the construction of the container terminal or other activities through which to expand and strengthen the position of the port of Flushing East. Given this insufficient consideration of alternatives and the lack of "an imperative reason" of overriding public interest, the duty not to gravely endanger achievement of the prescribed outcomes of the Habitats Directive (under which the area was identified) was found to be breached. Additionally, the Council of State ruled that neither the consequences of the proposal for the hinterland and its inhabitants, mainly in terms of nuisance due to increasing carriage of goods by rail, nor the necessary mitigation measures had been sufficiently investigated when the land-use plan was amended, and this amounted to a breach of Dutch administrative law.



Western Scheldt Container Terminal (artist's impression)

Source: www.havenkaarten.com
www.zeelandseaports.com

On 16 July 2003, the Council of State annulled the decision to amend the land-use plan. Before the annulment was issued, the contract had already been granted to a building constructor, and the 50-60 employees who were already working on the design had to be sent back home. The Province of Zeeland was ordered to carry out all the necessary research to revise the WCT plan, including a new EIA with a comprehensive compensation plan and a social cost-benefit analysis. Solutions were also sought for the inhabitants of surrounding municipalities. The construction of the new terminal was expected to start in 2012.

As of 2002, the only objective of the WCT project was to construct a new terminal. Neither nature goals nor nature dynamics were taken into account. As such, the project cannot be classified as Building with Nature. Rather, the authorities tried to change the area designation from SPA and SAC to port development through amending the regional plan. This incorrect application of Article 6 of the Habitats Directive was later suspended by the Council of State.

Case 2. Western Scheldt Container Terminal (before 2002):

Building with Nature design	*Integration*	*Use of*	*Improvement*
	0	0	0
Habitats Directive Article 6.3 Assessment	☹		

3. Second Maasvlakte Rotterdam

"Second Maasvlakte" is part of the "Project Mainport Rotterdam" approved by the Dutch government in 1997. It includes the reclamation of 2,000 hectares of land for the construction of a port and industrial area in the North Sea linked to the existing Maasvlakte. The port is situated next to three areas that are classified under Birds and Habitats Directives and that form part of a national network of ecological structures. In addition, the area off the current coastline has developed into a valuable marine habitat. Based on a detailed EIA study, the impacts were identified and a package of mitigation measures developed (Mink, 2007). The assessment was carried out for the Voordelta, Voorne dunes, Kwade Hoek and Kop van Goeree protected areas. Further, it was concluded that the environmental impact on adjacent sites could not be excluded and so compensation measures were also outlined. Following the requirements of Article 6.4, the authorities notified the European Commission of the compensatory measures adopted. The Commission formulated positive advice on the proposals in 2003.

The impact assessment was not entirely conclusive on the effects of this reclamation on the Wadden Sea. It stated that 'the nature and magnitude of the effect are not known. Expert judgement indicates that further, supplementary studies would do little to reduce this uncertainty'. The opinion given was that 'if monitoring programmes should reveal significant negative effects, mitigating and compensatory measures would then be taken' (Hommes, 2006). Nevertheless, the Dutch authorities issued a construction permit.

In 2004, this permit was challenged before the Council of State by the Dutch Fisheries Board. The Board claimed that the effects of extending Mainport Rotterdam on fish larvae and mud transport to the Wadden Sea had not been sufficiently investigated. The Court ruled that these objections were valid and that the appropriate assessment procedure had to be carried out to investigate the impact of the extension on the integrity of the Wadden Sea area. The Court stated that investigations did not indicate that further research could not give more insight into the impact of Second Maasvlakte on the protected values of the Wadden Sea.

Source: www.maasvlakte2.com

The Court insisted that an appropriate assessment procedure and related investigations should be performed of the effects on the Wadden Sea. The Court based its conclusions on the text of the Directive since this had not yet been fully transposed into the national planning procedures.

The project incurred a year's delay as a result of Court case. New evidence that the food balance in the Wadden Sea would not be significantly disturbed by the project allowed the construction permit to be reinstated. Construction started in 2008, and is scheduled to finish by 2030. The main goal of the Second Maasvlakte was to extend the port but, unlike the Western Scheldt Container Terminal project, the Second Maasvlakte project's authorities acknowledged the status of the nature in the project area, and assessed the impact of project works without trying to downplay them. The procedure under Article 6.4 Habitats Directive was followed correctly: an EIA was drawn up, mitigation and compensation measures were proposed and the Commission notified. While there was no evidence of a negative impact in terms of the effects of the Wadden Sea, there was also no 'scientific' certainty. The project's emphasis on effects assessment was so strong that, ruling out negative impact and ensuring no loss of current ecological values became a priority, while neither use of nature dynamics nor improvement of nature were considered.

The outcome of an application of Article 6 of the Habitats Directive (the delay due to a court case) had nothing to do with the project's design. The reason for the court appeal was of a totally different nature. Research has shown that there were three reasons for the Fisheries Board appeal (Hommes *et al*., 2009). Firstly, because it had not been allowed to participate in the negotiations with the minister when the project was starting (in the 1990s), the Board was not satisfied with the decision-making process. Secondly, the Board was concerned about income losses due to the loss of fishing grounds in the area where the extension to Mainport Rotterdam (3000 hectares) was envisaged and especially where the marine protected area (31,250 hectares) was planned. Finally, as it had not been actively involved in the decision-making process, no compensation had been arranged for the fishing industry prior to its objection in 2005.

Case 3. Second Maasvlakte Rotterdam:

Building with Nature design	*Integration*	*Use of*	*Improvement*
	+	0	0
Habitats Directive Article 6.4 Assessment	☹		

4. Oyster reefs Eastern Scheldt

Following the construction of a storm surge barrier in the Eastern Scheldt, in the Netherlands, the inflow of water and sand to the estuary fell. The remaining sandbars were gradually being washed over during storms, with sand disappearing into the channels which were actually too deep. As a result of these processes, the Eastern Scheldt was facing what was termed a 'sand hunger'. If this was not addressed, less than half of the sandbars would remain by 2100. These sandbars and the mudflats of the Eastern Scheldt are an important feeding area for birds and a designated Natura 2000 area. The disappearance of inter-tidal habitats such as these mudflats and sandbars would significantly reduce the Natura 2000 area in size and the conservation of these inter-tidal areas thus became a long-term goal for the Eastern Scheldt.

Oyster reefs, also known as ecosystem engineers, are one of the measures that can be taken against 'sand hunger'. Ecosystem engineers is a term applied to organisms that can reinforce their environment and prevent erosion. The function of an oyster riff is to dampen waves and prevent sand from disappearing into the channels. The concept is that oysters will attach themselves to a substrate of dead shells placed on the edges of sandbars. Reefs were placed at three locations near Val and Viane in the Eastern Scheldt in October 2010. A separate appropriate assessment was drawn up for each location, and a permit was issued for construction and monitoring up to 2012. If the results of the monitoring were positive, oyster reefs could be applied on a larger scale. It takes approximately five years for a substrate to be completely covered with living oysters.

Source: Google Maps; EcoShape (2009)

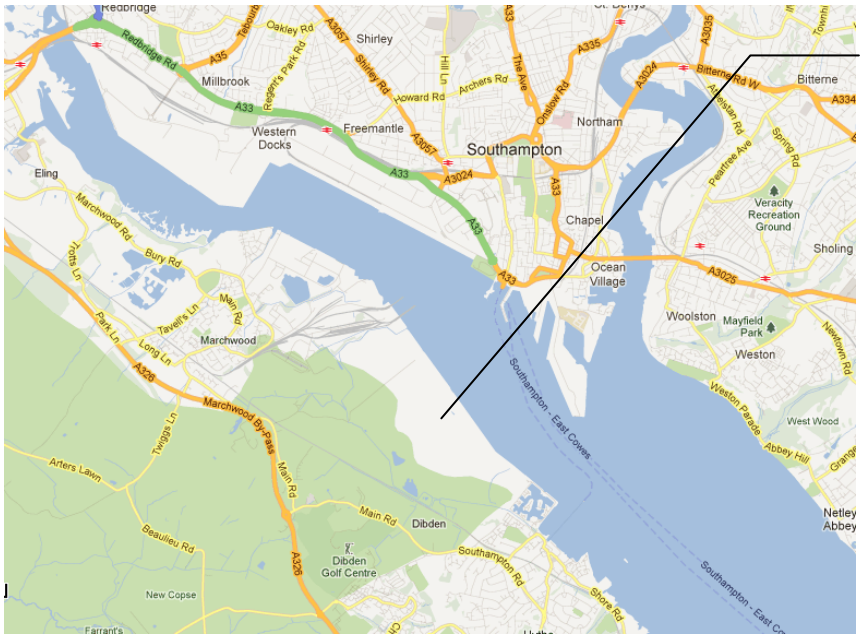
The draft design for the oyster reefs was discussed with the regional environmental NGOs, who were positive about the riff's benefits in preventing erosion. However, local mussel farmers were concerned about any future large-scale application of oyster reefs, as they feared food competition between mussels and oysters. The project management maintains that the effects on mussels can be calculated, while mussel farmers fear for their incomes. Even if oyster reefs were to be applied on a larger scale, they would still need to be augmented with sand nourishment to prevent sand hunger. The oyster reefs would ensure that the sand remained longer on the bar and that less nourishment would be necessary. The use of oyster reefs would thus contribute to intertidal area restoration and save costs in repeated sand nourishment. It utilizes the effect of ecosystem engineers to stabilize the mudflats and restore the area's ecological potential. As such, the oyster reefs project fulfils all of the Building with Nature criteria. An appropriate assessment procedure was carried as required by Article 6.3 of the Habitats Directive and the permit was granted.

Case 4. Oyster reefs Eastern Scheldt:

Building with Nature design	*Integration*	*Use of*	*Improvement*
	+	+	+
Habitats Directive Article 6.3 Assessment	☺		

5. Southampton Dibden Bay

In 2000, Associated British Ports (ABP) proposed an extension to the port of Southampton with a deep-water container quay. The terminal would for the most part occupy land that had been reclaimed using dredged material. The environmental impact of the project on the surrounding areas would amount to a significant loss of intertidal habitat in the nearby SPA (Solent) and SAC (New Forest) sites. ABP argued that the effects of building the port would be mitigated by creating a creek around the port.



Dibden Bay reclaim

Source: Google maps; http://marinaprojects.com/

During the public inquiry, conservation bodies refused to accept the proposed mitigation plan. They argued that there would be adverse effects and all the consequent steps of Article 6.4 of the Habitats Directive needed to be followed (alternatives, imperative reasons of overriding public interest, compensation). Since ABP could not guarantee that there would be no adverse effect, they instead argued that mitigation measures could be turned into compensation measures.

In response, the conservation bodies demanded an "imperative reasons of overriding public interest" (IROPI) statement, which had not been prepared. The public enquiry escalated into an adversarial contest in which compromises were no longer feasible. It was clear that ABP could not win on mitigation grounds, but they argued that they could no longer stop the process. The outcome of the public enquiry, during which thousands of objections were filed, was a refusal to grant the permit by the British Authority based on recommendations from the Inquiry Inspector.

The arguments considered that (Mink, 2007):

- Although there is a need for additional container capacity, this need could also be fulfilled by other expansion programmes foreseen on the British east coast.
- The project confuses mitigation and compensation; in other words, the project needs large-scale compensation, but many of these measures were presented as mitigation. The Inspector considers that the 'appropriate assessment' is flawed.
- Although there were economic considerations, the Inspector did not believe that the Imperative Reasons of Overriding Public Interest test could be met.

Although the case did not go before the European Court of Justice, the European law weighed heavily in the conclusions of the Inspector. Dibden Bay was the first port-related project in the UK to be cancelled for environmental reasons. It really hammered home the distinction between mitigation and compensation. The costs incurred due to the public inquiry and related expenses amounted to £44 million.

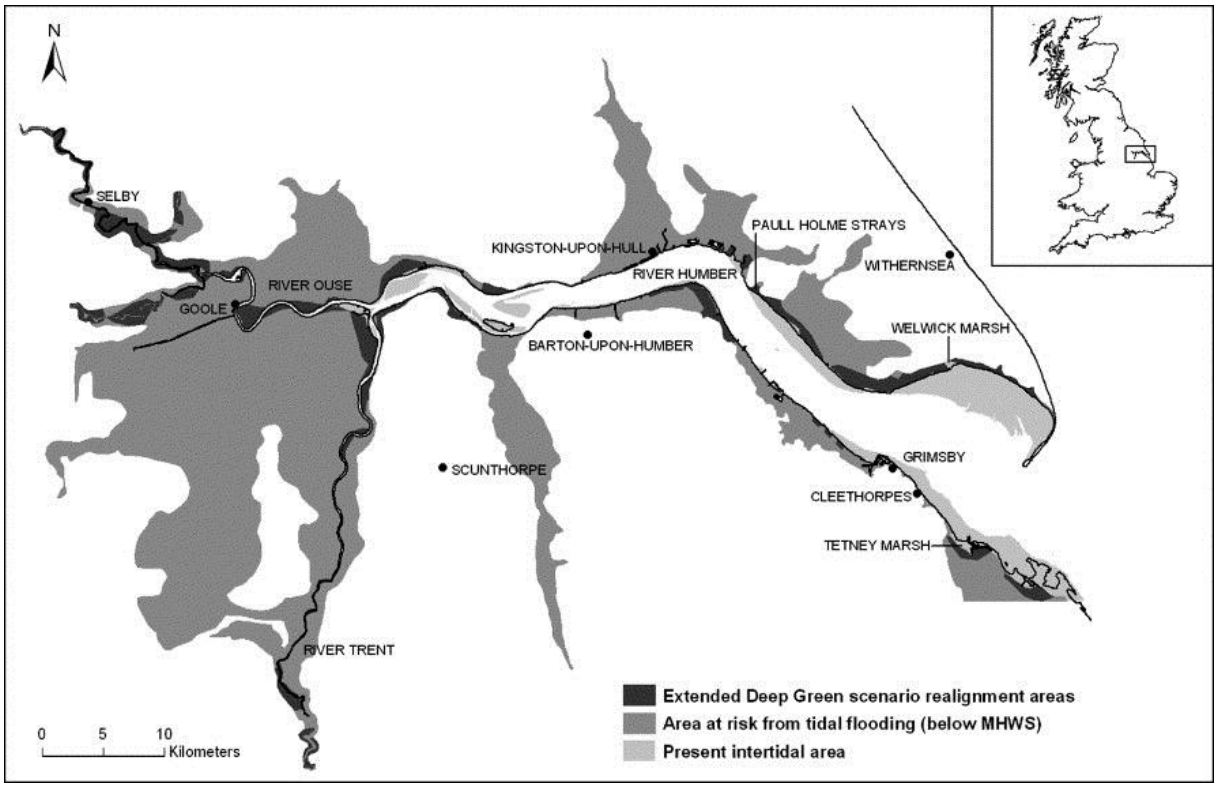
The proposal to develop a creek around the port area in Dibden Bay followed mitigation logic and the authorities involved clearly tried to downplay the negative effects of the construction. As part of this, nature goals were not integrated into the proposal at all, l*et al*one nature dynamics or attempts to improve the ecology of the area. Hence, the Dibden Bay project cannot be classified as Building with Nature. Incorrect application of Article 6 of the Habitats Directive led to a refusal to grant a permit during the project inquiry and the project was cancelled as a result.

Case 5. Southampton Dibden Bay:

Building with Nature design	*Integration*	*Use of*	*Improvement*
	0	0	0
Habitats Directive Article 6.3 Assessment	☹		

6. Humber estuary: Hull and Immingham

The ports of Hull and Immingham are located in the Humber estuary on the northeast coast of England. Both port developments were designed in the same way and are discussed together. The proposal to construct a new Quay 2005 facility in Hull coincided with the intention of the authorities to extend the boundaries of the Humber Estuary SPA and Ramsar site. The initial response of the Associated British Ports (ABP) was to object to the proposed designation and proceed with the proposed developments as soon as possible. However, after the painful evaluation procedure for the Dibden Bay proposal, an important change in philosophy emerged within ABP. Instead of raising concerns about site designation, the company moved to a position of support and was keen to have the designations in place as soon as possible. Furthermore, ABP changed its policy towards assessing impacts and necessary compensation measures. Instead of following the 'industrial norm' that sought to play down the impact on wildlife, ABP recognized the benefits of securing agreement on compensation measures from the outset.



Source: Andrews *et al*. (2006)

Morris and Barham (2007) report on the subsequent impact of this approach on the developments at Immingham Outer harbour and Hull Quay 2005. Both projects were assessed in terms of Article 6.4: Imperative Reasons of Overriding Public Interest. The Secretary of State in each case justified approval by referring to the growing shipping traffic, to the importance of ports to the regional and national economy, to the absence of viable alternatives and to the lack of sufficient capacity. Regional employment opportunities were also a factor. In both developments, a legal agreement was drawn up and ABP committed itself to developing compensatory habitat, and both statutory and non-statutory conservation organizations withdrew their objections to both developments. This resulted in a considerably reduced public inquiry for Hull Quay 2005 and no public inquiry for

Immingham Outer Harbour developments. A key element in producing compensatory measures for the Hull and Immingham proposals was found in the information provided by the Environment Agency's Estuary Shoreline Management Plan.

Mudflats were to be used for habitat creation and realignments formed part of the Humber flood risk strategy. Two compensation sites for Hull and Immingham were secured (Morris and Barham, 2007). One at Welwick in the outer estuary, where realignments were not expected to have significant impacts on the hydrodynamic regime but were ideally located for habitat creation. The other was at Chowderness where realignment was proposed as a viable option to secure overall flood management options in the middle and upper estuary. Thus, although not directly a component of the flood defence strategy, ABP's realignment sites made an important contribution to the overall progress of the strategy.

Although the Hull and Immingham projects had negative impacts on the integrity of the Natura 2000 network and had to be compensated for, the authorities integrated the compensation measures with the existing flood defence strategy. Based on scientific data provided by the Environmental Agency, two realignment sites were conveniently located to create compensatory habitat. The maintenance of ecologically valuable mudflats was thereby secured. Managed realignment permits dyke overflow at storm surge heights, which stimulates natural processes although nature dynamics are utilized only infrequently. The correct procedure under Article 6.4 of the Habitats Directive was followed and eventually there were no objections.

Case 6. Humber estuary Hull, Immingham:

Building with Nature design	*Integration*	*Use of*	*Improvement*
	+	0	+
Habitats Directive Article 6.4 Assessment	☺		

7. Hamburg Airbus facility

Airbus was searching for a location for the production of its new large Airbus 380 in the late 1990s. The extension of the existing Airbus site in Hamburg would require reclaiming 171 ha of the Mühlenberger Loch, a large tidal flat of 675 ha in the River Elbe.

Due to its major importance for wildlife, particularly migratory birds and fish, the area was designated for inclusion in the RAMSAR List in 1992, was designated as a Special Protection Area (SPA) under the EU Birds Directive, and proposed as a Site of Community Importance (SCI) according to the Habitats Directive in 1997. Constructing the Airbus site would have significant effects on the SPA as well as on the SCI: a loss of freshwater mudflats, of breeding and sanctuary areas for birds and some shallow waters. The impacts of all the project's components were analysed and assessed in conjunction with expert reports prepared as part of the Environmental Impact Assessment (EIA) and the compensation plan. It was shown that there was no alternative solution to extending the existing industrial site. Furthermore, the proposed extension was of major importance for maintaining the competitiveness of the European aerospace industry and it would create a number of highly qualified

jobs. The Commission gave a favourable opinion in April 2000, saying that the negative implications for the Natura 2000 site were justified, but that the Commission was not in a position to fully assess whether the compensatory measures and their timing would ensure the overall coherence of the Natura 2000 network. In response, Germany committed itself to propose further sites in order to comply with its obligations under Article 4 of the Habitats Directive. This largely positive response from the Commission was provided after much lobbying on the German side, including correspondence between the then German Chancellor, Gerhard Schröder, and the President of the European Commission, Romano Prodi. The project had the full backing of both Hamburg and German authorities.

Source: Vidaurre *et al.* (2008), p.8

One month after the European Commission's response, Hamburg's Chamber of Commerce authorised the expansion of the Airbus facility in conjunction with the following compensation measures (Mink, 2007):

- Restoring Haseldorfer Marsch, a 220 ha tidal arm of a former tributary of the Elbe;
- Developing an area of 100 ha currently not very valuable for birds into a new wetland area;
- Creating 100 ha of new freshwater mudflats by removing the top layer from a part of the nearby island of Hahnöversand.

The authorisation process was split into Airbus site expansion on the one hand, and compensation measures on the other. This separation speeded up the authorisation process and the start of building; it also implied that objections concerning the compensation measures would not affect work on site expansion (so decoupling the two parts of the process).

The usual procedure (without decoupling) could have required the compensation measures to be completed before or during the construction. This change to the usual procedure is likely to have been the result of pressure applied by the Airbus consortium and by the city-state of Hamburg (Vidaurre *et al*., 2008).

Work on site expansion and on compensation measures began in early 2001. In February 2002, a court in the neighbouring Bundesland Schleswig-Holstein declared a freeze on the activities in the Haseldorfer Marsch area, and this was reconfirmed in 2006. Meanwhile, an evaluation of the Hahnöfersand compensatory measure, carried out by Hamburg's Council of Nature Protection, determined that the measure had not been appropriate, or at least not successful. Despite this, the Hahnöfersand compensatory measure was declared complete in December 2005.

In 2005, the nature conservation organisation BUND (one of the largest German environmental NGOs and the German section of Friends of the Earth) launched a complaint against Germany to the European Commission's DG Environment, based on the lack of compensatory measures for the Airbus site expansion. In December 2006, an infringement procedure against Germany was opened that analysed the maintenance of the coherence of the Natura 2000 network, as required by Article 6.4 of the Habitats Directive, a process which could result in very significant fines. Construction of the Airbus facility was finished in July 2007.

The impact assessment of the extension to the Airbus facility covered all the steps prescribed in Article 6 Habitats Directive, and both the facility and its agreed compensation measures were completed on the ground. Commission approval was obtained after some political pressure and doubts were then raised by environmental NGOs as to whether the compensation was appropriate. Furthermore, administrative decoupling of parts of the project and proposing further sites under Article 4 Habitats Directive were allowed by the Commission. This encourages the conclusion that Article 6 was applied in a rather 'procedural' manner in order to extend the Airbus facility as soon as possible, with nature treated as a matter of secondary importance. As such, this project cannot be described as following the Building with Nature philosophy.

Case 7. Hamburg Airbus:

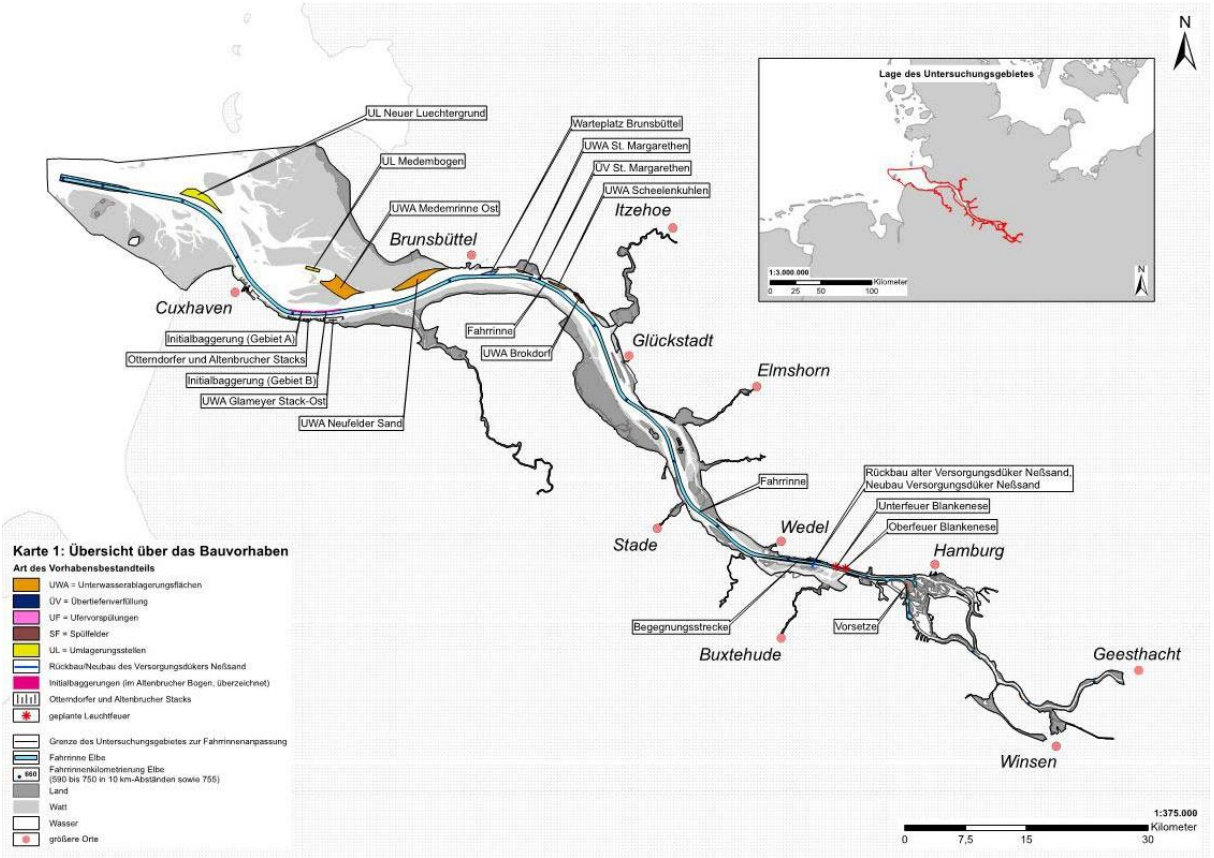
Building with Nature design	*Integration*	*Use of*	*Improvement*
	0	0	0
Habitats Directive Article 6.4 Assessment	☺		

8. Hamburg Tidal Elbe and Fairway deepening

In 2003-2004, the extent of dredging in the Elbe was increased from 2 million m^3 to 8 million m^3 per year. The Hamburg Port Authority was considering how to deal with the increased dredging volume. After some research, the 'Tidal Elbe' concept was proposed (Hamburg Port Authority and WSD-Nord, 2006). The concept was general guidance for Elbe estuary development, but not binding. The parallel 'river engineering and sediment management concept' on the other hand was binding, but without a

fixed implementation period. This concept is currently being implemented in two projects: ‘sediment trap’ and ‘fairway deepening’.

‘Sediment trap’ is a pilot project to trap sediment coming from the mouth of Elbe River and to maintain its cleanliness by avoiding mixing with polluted sediment from Hamburg harbour. The sediment trap project is located in a former dredging area located in the Elbe River within Hamburg’s city borders and was finished in 2008. The project was carried out under a maintenance dredging permit and a habitat assessment was not required. However, an unofficial assessment by the Federal Institute of Hydraulics showed no negative effect. There is also an ongoing monitoring programme.



Source: Hamburg Port Authority

The ‘fairway deepening’ project was designed taking ‘Tidal Elbe’ into account and partly implements its ideas. The previous dredging strategy had been complicated by the Elbe estuary being administratively divided, with the border between Lower Saxony and Schlezwig Holstein running up the estuary. Part of the River Elbe, within the city borders, comes under the Hamburg Port authority. The mouth of the Elbe, between the dykes outside Hamburg’s city borders, comes under the authority of the Federal Waterways. As a consequence, Hamburg could not dispose of the sediment in the mouth of the estuary where it would be carried out to sea. Instead, dredgers would take the sediment to the utmost corner within the city borders, and currents would carry it back into the harbour. Deepening the new fairway includes disposing of sediment over a wider area such that it is not carried back. Further, dredging in the mouth of the river (creating a new underwater profile) minimizes the effects of the tide. There has been a lot of protest against the deepening based on environmental and safety considerations. The Environmental Impact Assessment had to be redrafted

three times. First, the initiators claimed there would be no negative effects, but protests forced more research. This research identified negative effects and it was decided to use the Spadenlander Busch project as compensation. This is a mudflat development that will be used to reduce incoming tidal energy. Spadenlander Busch used to be a separate project but changed its label to act as compensation for the fairway deepening. As a result, the Spadenlander Busch work has been delayed and the Commission was notified of the compensation plan, which it approved in spring 2012. The Fairway deepening has faced fierce opposition from environmental groups who won the court injunction to halt dredging and construction work in summer 2012. The court ruling is still pending, with no firm date for a decision yet set.

The new fairway deepening strategy is an improvement over the previous one but the initial denial of negative effects and the consequent reformulation of existing projects (Spadenlander Busch) for compensation purposes is not in accordance with Building with Nature design principles. Therefore, the deepening cannot be classified as such. The outcome of the Article 6 process is not yet known.

Case 8. Hamburg Tidal Elbe and Fairway deepening:

Building with Nature design	*Integration*	*Use of*	*Improvement*
	0	0	0
Habitats Directive Article 6.4 Assessment	?		

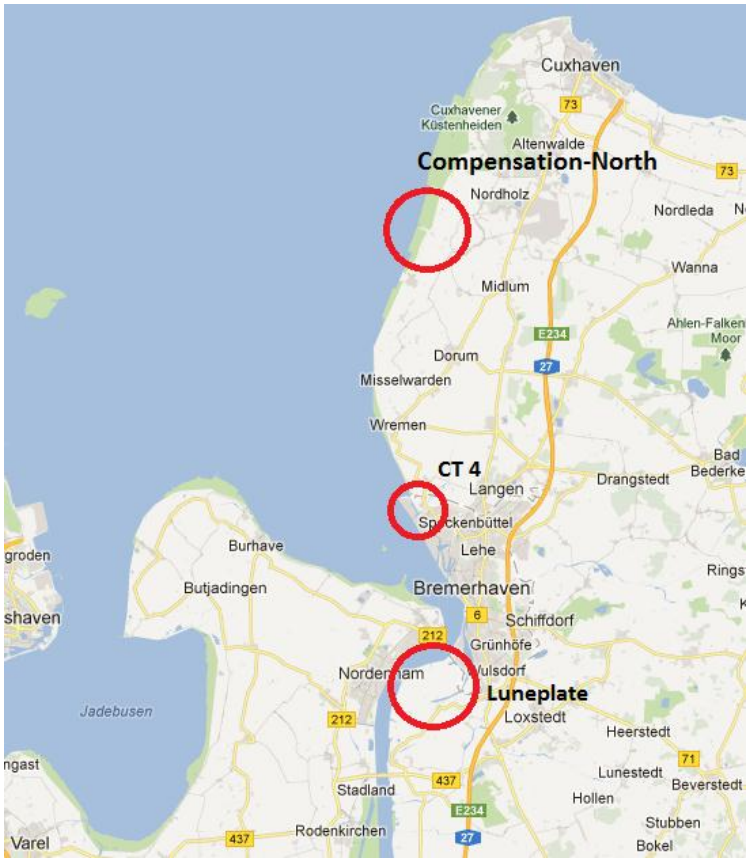
9. Bremerhaven Container port CT4

Four major container terminal (CT) extensions have taken place in Bremerhaven: CT 1, 2, 3 and the most recent CT 4. Involving 90 ha of land reclamation, CT 4 is the largest and most expensive port extension in the history of Bremen. The four extensions together form a five-kilometre quay, of which CT 4 makes up 1.7 km and is suitable for large container ships.

Plans for CT 4 started in 2000. However, the legal situation was unclear with the authorities being unsure as to whether the estuary would be notified as a Natura 2000 site. In the planning process, the authorities took the 'worst case scenario' as a starting point: the whole estuary would be notified. Given the huge increase in turnover, the container terminal extension became a political mission and the authorities had to deal with the uncertainties by treating the project as if it was in a notified area (taking account of all the assessment steps under Article 6 of the Habitats Directive). The whole estuary was indeed notified in 2005.

Possible locations within Bremen were too small to serve as compensation sites, so it was clear that a solution had to be found together with the neighbouring state of Lower Saxony. Lower Saxony was interested in the port extension because many future CT 4 workers would live in Lower Saxony. During the roundtable talks between Lower Saxony and Bremen several compensation areas were considered but eventually only two compensation sites could be identified, both more than 10 km from CT4.

As part of 'Compensation-North', an estuary ecosystem similar to the one impacted on by CT 4 extension was created within the Lower Saxony Wadden Sea Park. The summer dyke was breached to create salt marshes on former meadow and farmland. The dyke was opened by digging out gullies and the soil from the gullies was used to reinforce the main dyke. The area was purchased from the farmers by Bremen Ports, a private authority in charge of port maintenance and development. The coastal defence interests were satisfied and the compensation work improved the ecological status of a Natura 2000 site. After about two to three years of development, the site was finished and has been operational since 2007.



Source: Google maps

As part of 'Compensation-South', the Luneplate sandbank in the River Weser was developed into a nature site. Luneplate was originally an island in the River Weser, which was reinforced by a dyke and connected to the mainland in 1920. Luneplate had been part of Lower Saxony, but was transferred to Bremen in 2010. The agreement between Lower Saxony and Bremen was signed in 2004 as a way of securing compensation and industrial area development. The Natura 2000 compensation package included a thirteen-metre storm surge barrier to allow tidal flow on the Luneplate. However, the agreement between Lower Saxony and Bremen did not allow dyke realignment, which at first sight was disappointing from a nature perspective, but later studies showed that dyke realignment would make little difference as river dynamics are not very significant. A grassland area along the Luneplate is an SPA, and the estuary outside the dyke is also a Natura 2000 site. The Luneplate work was finished by the end of 2010 and notified to the Commission as a Natura 2000 site. Following the planning process, Bremen authorities notified the Commission of the proposed activities in a Natura 2000 site and received a positive response. The requirements had been well met, and initially critical NGOs had no reason to object once they saw the proposed compensation measures.

There were only two minor court trials: objections by private farmers and noise complaints near the construction site in the North. The farmers lost their case, and the noise issue was resolved by providing isolating windows. Clearly, the CT 4 extension in Bremen had negative impacts on the integrity of the Natura 2000 network and required compensating measures. Similar to what the authorities did in Hull and Immingham, the authorities in Bremen integrated the compensation with flood defence measures and improved the ecology of an existing Natura 2000 site. The project design

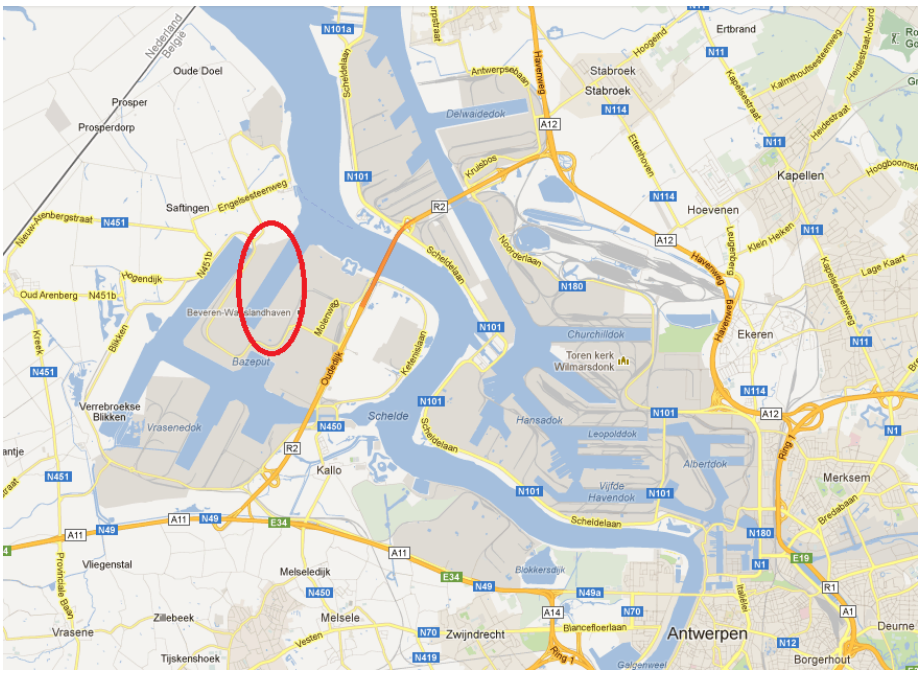
was less dynamic than it could have been if dyke realignment was allowed. The correct procedure, under Article 6.4 of the Habitats Directive was followed, and initially critical NGOs had no reason to maintain their objections.

Case 9. Bremerhaven Container port CT 4:

Building with Nature design	*Integration*	*Use of*	*Improvement*
	+	0	+
Habitats Directive Article 6.4 Assessment	☺		

10. Antwerp Deurganck dock

Container traffic in the port of Antwerp expanded by 80% between 1980 and 1990, and a further 80% growth was expected by 2005. As the right bank of the River Scheldt had already reached maximum capacity, a location for a new dock was sought on the left bank. The Maritime Access Department of the Flemish Ministry of Public Works and Mobility took the lead in this project, which was deemed to be of 'overriding national interest' to ensure the competitive position of the Port of Antwerp. The department commissioned an EIA to investigate various alternative locations based on strategic, planning, technical, nautical, social, ecological and legal parameters.



Source: Google maps

The EIA listed the Birds Directive under legal parameters, and states that 'planned operations have a negative effect on the ecological values in the area' (Milieu en Veiligheid, 1996). However, the EIA did not propose any mitigation or compensation measures as specified under Article 6.4 of the Habitats Directive. Further, the Commission was not notified. A decision by the Flemish government on 20 January 1998 confirmed the construction of the dock according to the preferred alternative.

This decision also established a working group to prepare the Strategic Plan for port development (Scheldt Left bank) that included representatives from adjoining municipalities and environmental institutes. The strategic plan drawn up by the working group stated that 'there is a string of (large) nature areas being created and maintained by the environmental institutes in consultation with various actors. The total port area, with the exception of the outer 100 metre buffer zone, will be excluded from designation under Birds and Habitats Directives. The compensation for this (inclusive of Deurganckdok) will be provided by nature development projects under construction' (Werkgroep Strategisch Plan Linkerscheldeoever, 1999).

Successive decisions by the Flemish government implemented the strategic plan: approval of the strategic port development plan (25.5.99); regional zoning plan amendment (01.06.99); and an amended designation decision under the Birds Directive to existing designated nature development areas as compensation for partial loss of ecological value as a result of Deurganck dock construction (23.06.98). The construction of the dock started in 1999.

In 2000 and 2001, the inhabitants of the adjacent village of Doel and nature protection societies made use of all the legislative instruments at their disposal on the national and European levels, including Birds and Habitats Directives, to suspend construction of the dock. Both amendments to the regional plan and construction permits were suspended by the Flemish Council of State in 2000 and 2001.

To overcome the adversity, Antwerp Port Authority commissioned a new EIA and sought solutions for the inhabitants of Doel. Nature protection societies were involved in the preparation of the new EIA and the new compensation plan. The revised EIA took account of 600 ha of SPA under the Birds Directive and a Habitat SAC along the coast. It stressed that the compensation work was to be implemented before, or at least simultaneously, with the construction of the dock (Milieu en Veiligheid, 2001). The revised EIA was ready by September 2001 and approved in October 2001. On 14 December 2001, the Flemish Parliament approved a Validation Decree enabling work on the Deurganck dock to resume. Works resumed on 13 April 2002.

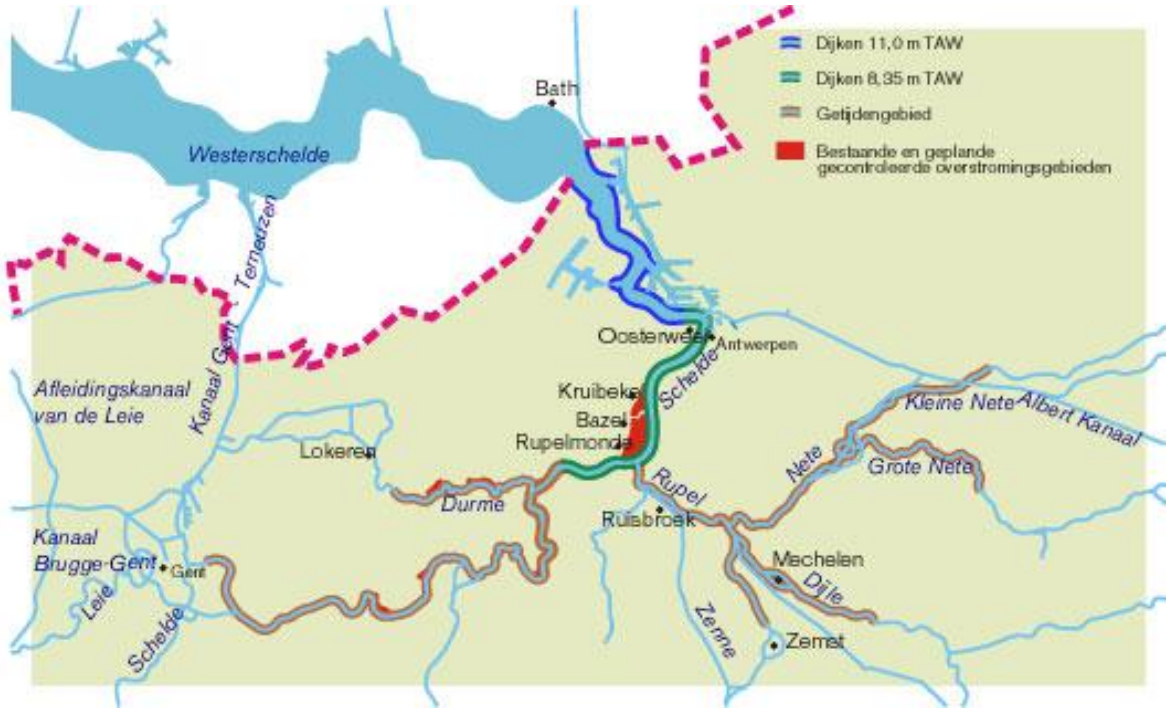
Until 2000, the only objective of the Deurganck dock project was to construct a new dock. Neither nature goals nor nature dynamics were taken into account in the first EIA. As such, the project cannot be classified as a Building with Nature one. Rather, the authorities tried to change the SPA and SAC designations to one of port development by amending the regional zoning plan. This incorrect application of Article 6.4 of the Habitats Directive led to work being suspended by the Flemish Council of State.

Case 10. Antwerp Deurganck dock (pre-2000):

Building with Nature design	*Integration*	*Use of*	*Improvement*
	0	0	0
Habitats Directive Article 6.4 Assessment	☹		

11. Kruibeke, Bazel and Rupelmonde flood control area

The validation decree of the Flemish Parliament (14/12/2001) and the Resolution of the Flemish Government (20/02/2002) ensured the construction and exploitation of Deurganck dock provided the requirements of the Bird sand Habitats Directives were met. The decree linked each construction permit for infrastructure dock works with a permit for nature compensation projects around the left bank of the River Scheldt in the Antwerp area. The flood control area in Kruibeke, Bazel and Rupelmonde area (hereafter referred to as Kruibeke) is one such compensation project.



Source: http://www.nwtonline.nl

The following compensation goals were assigned for Kruibeke: 300 ha of mudflats and marshes, 150 ha of meadow as an area for birds and 40 ha of forest compensation (Soresma, 2001). At the time these compensation goals were set, attempts to implement a flood control area in Kruibeke had been ongoing for at least 35 years. During this time, various project designs were proposed, never implemented, and then reformulated. With compensation requirements in place and a construction permit guaranteed by the validation decree, implementation was finally nearing. The final project design implemented in Kruibeke integrated the goals of flood defence, nature development, compensation for a project of overriding public interest (Deurganck dock) and local stakeholder interests. The operation of flood control area relies on tidal dynamics, while its design contributes to the overall ecological situation in the estuary. As such, this project displays many Building with Nature features. The appropriate assessment procedure under Article 6.3 of the Habitats Directive was carried out and a statement for the European Commission on the role of the Kruibeke project in Natura 2000 plans was drawn up. The construction works were expected to be completed by 2012.

Case 11. Flood control area Kruibeke, Bazel, Rupelmonde:

Building with Nature design	*Integration*	*Use of*	*Improvement*
	+	+	+
Habitats Directive Article 6.4 Assessment	☺		

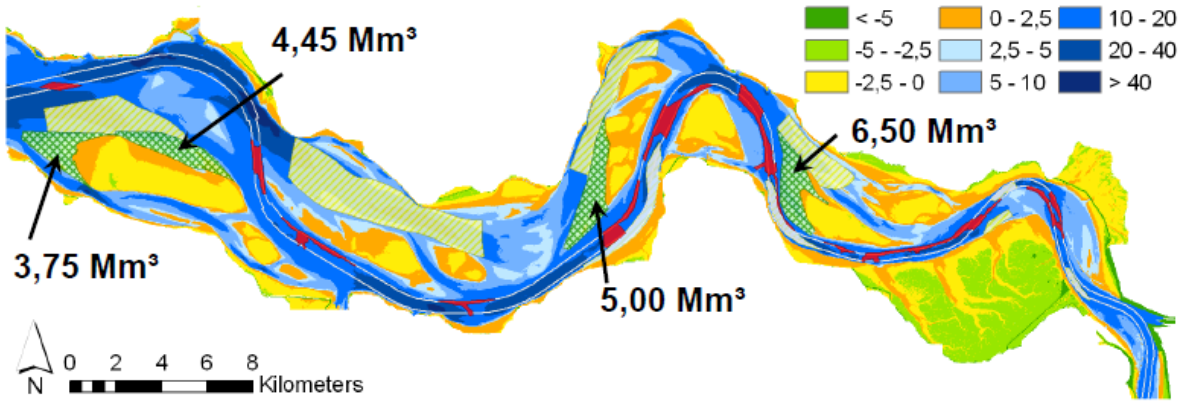
12. Flexible disposal strategy - Western Scheldt

Until 2009, dredging in Western Scheldt took place in ten locations with dredged material disposed of in secondary channels. The risk in this method is that secondary channels, currently used by smaller vessels, might disappear as the amounts of dredged material increase. Western Scheldt is classified as a high and low dynamic estuary (1130-type) within the Natura 2000 network. The long-term goal was to maintain a multiple channel system and, to achieve this, a new disposal strategy was needed.

A strategic Environmental Impact Assessment (EIA) of deepening the Western Scheldt and a full EIA were prepared by the Flemish-Dutch Scheldt Commission (VNSC) and published in 2003-2004 and 2006 respectively. The EIA considered several disposal strategies, including disposal in the secondary channels and disposal on the edges of sandbars. The report showed that disposal in secondary channels had a small negative effect (loss of inter-tidal low-dynamic habitat) although this was difficult to calculate using existing models. Disposal on the edges of sandbars balanced this uncertainty by creating extra areas such that a positive effect resulted even in the worst-case scenario. According to the EIA, disposal on the edges was thus the most environmentally friendly alternative by creating a low dynamic habitat and contributing to maintaining the multiple channel system, and hence Natura 2000 conservation objectives. The EIA also included an appropriate assessment according to Article 6 of the Habitats Directive.

The permit for the project was issued in February 2010 and the deepening is in progress with disposal on the edges of sandbars. Half a million cubic metres of dredged material were disposed of in 2004, 1.5 million m^3 in 2006 and 8-9 million m^3 in 2010. The channel deepening uses a combination of disposal strategies: on the edges, in the main channels and in the secondary channels. This is called a flexible disposal strategy: apart from ecologically valuable sites, the whole estuary is seen as a disposal area, and disposal locations are determined based on the morphology of the estuary (Plancke and Ides, 2006). Compared with the previous deepening work, the disposal areas have become larger.

This flexible disposal strategy contributes to maintaining the ecological situation in the estuary by creating a low dynamic habitat. The estuary's ecological status is explicitly taken into consideration and the most environmentally friendly alternative is included. However, this environmentally friendly strategy is used in combination with a traditional disposal method (in secondary and main channels), which makes the design a lot less dynamic. Further, this flexible disposal strategy could not on its own overcome the negative effects of Western Scheldt deepening, and so compensation measures according to Article 6.4 were needed.



Dredged material disposal locations on the edges of sandbars and expected quantities over a period of five years. Source: http://www.watlab.be

Case 12. Flexible disposal strategy Western Scheldt:

Building with Nature design	*Integration*	*Use of*	*Improvement*
	+	0	+
Habitats Directive Article 6.4 Assessment	☺		

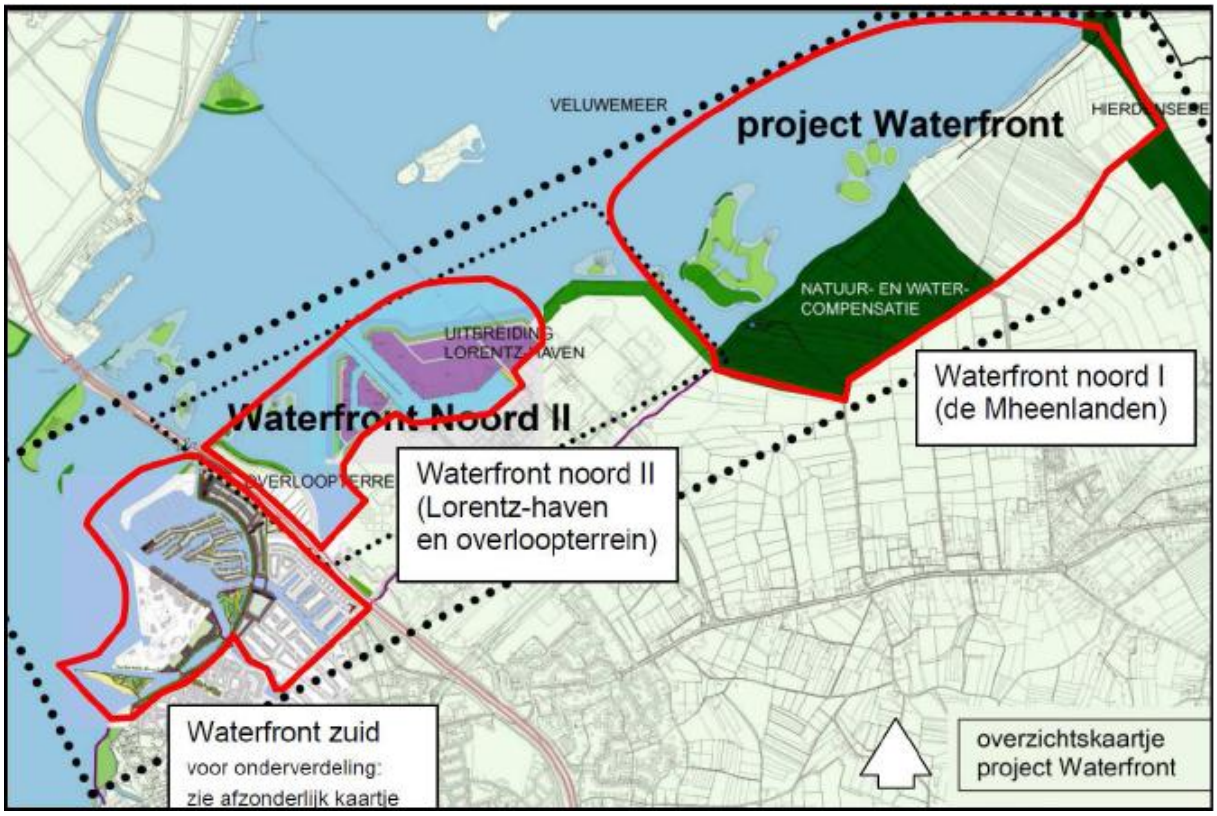
13. Waterfront Harderwijk

The original city centre of Harderwijk was located along the coast of the Veluwe's border lakes. Growing industry and tourism activities in the city have gradually pushed the centre inland and this has eventually led to environmental degradation as well as parking and traffic problems close to the water. To address these problems, the municipality of Harderwijk intended to give the old industrial area (Haven) a new function and move its existing economic activities to a relatively new industrial area nearby (Lorentz-Haven). To minimize the negative effects of the Lorentz-Haven expansion, a new nature area has to be developed on the adjacent Mheenlanden pastureland. The result of all the necessary action steps is that approximately five kilometres of coastline will be redeveloped. This redevelopment was split into several stages (Tauw, 2009): first, the negative effects on water and the ecology will be compensated for in Mheenlanden; then space will be given to businesses from the old industrial area (Haven) so that they can relocate to Lorentz-Haven; and finally the area known as Waterfront-South (which includes Haven) will be redeveloped as a housing and leisure location.

Mheenlanden is vacant pastureland that will be assigned new functions: water storage, nature and agriculture. This has been laid down in an agreement between the local environmental NGO and the municipality of Harderwijk. Mheenlanden will be transformed into wet grassland so that it can develop into a valuable bird area. Through small islands and mud flats, Mheenlanden will be connected with the other side of the Veluwe's border lakes (Hardenbroek) and become part of the

"Natte As" project of forming a national network of ecological structures. This design was negotiated in cooperation with the Province of Flevoland. The islands will serve as stepping stones for birds and animals between the old and the new nature areas.

The development of a new industrial area (Lorenz-Haven), and in particular the new parking lot, was planned in the waters of the Veluwe's border lakes and would require land reclamation. Despite the Veluwe and Wolderwijd Lakes being designated as a Natura 2000 site, the municipality of Harderwijk concluded during the preparation of plans that no assessment procedure was necessary as the Mheenlanden development would 'neutralize' the loss of ecological values (Gemeente Harderwijk, 2006).



Source: Tauw (2009), p.16

Bird Protection NGOs lodged an appeal against the zoning plan in July 2007, saying that the appropriate assessment procedure requirements had not been satisfied. In October 2008, the Dutch Council of the State ruled that these objections were valid. It further ruled that the absence of significant effects on nature has not been sufficiently underpinned, and the municipality's decision not to follow the requirements of an Article 6 assessment was not convincing. As a consequence of this ruling the municipality had to 'repair' the zoning plan and complete an appropriate assessment, which took another 1.5 years and cost approximately €0.5 million.

The waterfront development had been initiated for economic reasons and considerable emphasis was put on minimizing and neutralizing its effects on nature. Although the authorities attempted to improve the ecological situation by proposing nature development measures, doubts were raised as

to whether these improvements were based on a design that fully acknowledged the effect on nature and has given nature equal priority with socioeconomic goals.

Case 13: Waterfront Harderwijk

Building with Nature design	*Integration*	*Use of*	*Improvement*
	0	0	+
Habitats Directive Article 6.3 Assessment	☹		

14. Coastal zone Zeewolde

The coastal zone of the Polderwijk residential area is northeast of the centre of Zeewolde. The current recreation facilities of the coastal area are limited and the goal of a coastal zone development project was to improve recreation facilities for swimming, sunbathing, costal walking and water sports. The project area is approximately 150 hectare and consists mainly of open water of the Wolderwijd, one of the Veluwe's border lakes. The coastal zone development envisages three beaches and an island with a lagoon (StAB, 2008, pp. 6-7):

- Pluuthaven beach – a coastal line along the dyke, in the south of the project area, with park-type facilities including grass fields, trees, playgrounds, benches, etc.
- Stille Strand beach – a grass 'beach' on the side of the dyke with a green area as background, approximately 200 metre long and 50 metre wide. Short-term camping in tents (such as for water-sport competition participants) would be permitted. Facilities to include several barbeque spots.
- Lanterstrand beach – a sandy beach to the north of the Stille Strand, 350 metre long and 50 metre wide as a family beach.

Source: www.iivr.nl

- Spiekerzand – an island in the open water of the Wolderwijd with water recreation facilities including a haven for small boats and catamarans, rowing boat rental, water bikes and canoes, a surfing and sailing school and cafes. The island will be connected to the shore with a bridge or a dam, and car access will only be permitted for those servicing the facilities.
- South of the island of Spiekerzand - a chain of small islands separated by creeks forming a lagoon. These islands will serve as a nature development measure to increase the habitat of protected species of fish and migrating birds. Further, the islands will be accessible for

recreation (a walking route, picnic facilities). In the winter, the area will be closed to visitors and no building will be permitted. One of the main purposes of the chain of islands is to create a lagoon for the newly created beaches. This will create peaceful swimming and boating conditions and serve as a spawning ground for fish and as a shallow water sanctuary area for birds (its nature function).

The original project design did not satisfy the preliminary assessment made, according to Article 6 of the Habitats Directive and the Dutch Flora and Fauna Act, by the Province of Flevoland. To be allowed to proceed with the project, the municipality decided to make the recreational facilities less extensive and improve the added value for nature. The nature function is realised by the Spiekerzand development. A further elaboration of the effects on ecological values led the municipality to conclude that there were no significant negative effects as a result of project works and that an appropriate assessment was thus not required. The renewed zoning plan for the coastal zone development was finalized by the Council of Zeewolde on 28 June 2007.

The local Bird protection NGO lodged an appeal against the project arguing that (StAB 2008, p. 2):

- The developments have a negative effect on protected ecological values (species and habitats);
- Significant effects are not excluded given that there are other developments in the area (a cumulative effect);
- An appropriate assessment should have been completed.

At the end of April 2009, the Dutch Council of State declared the NGO's appeal to be invalid, enabling the coastal zone development to go ahead, albeit with a delay of about one year.

As in the Waterfront Harderwijk case, the Zeewolde coastal zone development was driven by socioeconomic goals (recreation) but here the authorities adapted their design until nature was given sufficient priority and an improved ecology ensured. This enabled the authorities to make a strong case based on the absence of any significant effect in the project area in their court defence.

Case 14: Coastal zone Zeewolde

Building with Nature design	*Integration*	*Use of*	*Improvement*
	+	0	+
Habitats Directive Article 6.3 Assessment	☺		

Discussion and conclusions

The central research question - how is the extent of Building with Nature related to the implementation of Natura 2000 requirements - is answered in this chapter using a multiple-case study design. The specific Natura 2000 requirement for water infrastructure projects analysed in this

chapter was the Habitats Directive's Article 6 assessment of plans and projects likely to have significant negative effects on the values of a Natura 2000 site. The question was divided into two sub-questions and addressed for each case:

- To what extent do current practices in the water infrastructure field comply with the definition of Building with Nature?
- What is the outcome of applying Article 6 of the Habitats Directive in current project design practices?

A total of fourteen projects were discussed, and Table 4.1 summarizes the findings of the case studies. Three projects were assessed with a '+' on all three Building with Nature components: Delfland coast, the Eastern Scheldt oyster reefs and the Kruibeke, Bazel and Rupelmonde flood control area. These projects were able to rule out significant negative effects at the appropriate assessment stage (Article 6.3) and were successfully implemented.

Table 4.1. Findings from the multiple-case study design

Article 6 / **BwN**	☺	**?**	☹
+++	1, 4, 11		
++	6, 9, 12, 14		
+			3, 13
0	7	8	2, 5, 10

Note: BwN = Building with Nature; Article 6 = outcome of habitat assessment; the numbers are the project numbers in order of their appearance in the chapter,

The following four projects scored a '++', indicating that two Building with Nature components were identified: Humber estuary, Bremerhaven CT4, Western Scheldt disposal strategy and Zeewolde coastal zone. Again, these four were successfully implemented: the Zeewolde coastal zone proponents were able to rule out any significant negative effect, and the remaining three projects applied Building with Nature design to their compensation measures under Article 6.4 of the Habitats Directive.

Two projects scored a single '+': the Second Maasvlakte Rotterdam and Waterfront Harderwijk. Both projects resulted in objections in court and had to reassess the ecological effects of their designs through an assessment in line with Article 6 of the Habitats Directive.

Five projects failed to display any features of Building with Nature ideas: the Western Scheldt container terminal, Southampton Dibden Bay, Hamburg Airbus, Elbe channel deepening and Deurganck dock. These all followed a traditional design approach, and so scored a '0'.

Out of these five projects, three were cancelled or delayed in court, and had to reassess their impacts and propose new nature compensation plans (Western Scheldt container terminal, Southampton Dibden Bay and Deurganck dock). The Hamburg Airbus project was implemented following political pressure, and the outcome of the Elbe channel-deepening proposal is unknown at the time of writing. Both these Hamburg-based projects raised serious objections due to their environmental impacts.

Overall, nine of the fourteen projects scored at least a '+', meaning that at least one Building with Nature design component was identified. Two of these nine were unsuccessful in terms of following the Article 6 procedure (Projects 3 and 13) and these were the only two with a single '+' score. The majority of the projects with successful outcomes scored highly on the extent of their conformity with Building with Nature ('++' or '+++'). As such, it is plausible to argue that the extent of Building with Nature ideas in a project design is positively correlated to the outcome of implementing Natura 2000 requirements (specifically, Article 6 Habitats Directive assessment) for water infrastructure projects. From the cases discussed in this chapter, the following are chosen for further analysis in the following chapters.

A comparison of the Waterfront Harderwijk and the coastal zone Zeewolde projects will be made because they are similar in so many respects (location, type of project, the same local environmental NGO lodging an appeal, and on the same grounds), yet the Council of State rulings were diametrically opposed. As such, the cases are appropriate for a quasi-experimental comparison and this makes it possible to test the hypothesis that the extent of Building with Nature conformity in the project design explains the opposite court rulings.

The long decision-making history of the Kruibeke, Bazel and Rupelmonde flood control area and its link to the Harbour of Antwerp compensation scheme makes it suitable for a longitudinal study to explore the effect of Natura 2000 designation on local implementation processes and the evolution of Building with Nature in project design. Studying this case at different points in time can potentially reveal changes in variables of interest at different times, which is especially interesting given the flood control area's final design scores highly on its Building with Nature value (+++).

Chapter 5. Building with Nature and Natura 2000: a quasi-experimental case study design[5]

The central research question - how is the extent of Building with Nature related to the implementation of Natura 2000 requirements – is addressed in this chapter through a quasi-experimental case study design. One specific Natura 2000 requirement for water infrastructure projects studied in this chapter is the Habitats Directive's Article 6 assessment for plans and projects. The outcome of implementation is defined according to the ruling by the Dutch Court of Appeal. In two of the projects studied in the previous chapter, Waterfront Harderwijk and coastal zone Zeewolde, the authorities proposed designs that were to an extent in line with Building with Nature and had further argued that the projects had no significant negative effect. Despite similar levels of biodiversity loss, their close proximity and equivalent operative legislative frameworks, the Administrative Jurisdiction Division of the Dutch Court of Appeal ruled differently in the two cases: the Harderwijk decision was reversed (in 2008) while Zeewolde was approved to continue in 2009 (Case 200706044/1 and 200706194/1; Case 200800948/1). Integrating nature and socioeconomic goals is the first component of Building with Nature design (see Chapter 1), which we refer in this chapter as 'integrated nature design'. The opposing court rulings might suggest that the Zeewolde authorities had managed to prove that their project design integrated nature and socioeconomic project goals while the Harderwijk authorities had failed to do so. In this study, 'integrated nature design' is defined as a design that achieves the socioeconomic goals of the project while taking into account the particular site-specific characteristics of a Natura 2000 site, rather than merely carrying out an assessment of the environmental consequences of a predefined project design. The hypothesis posed in this chapter is that the application of integrated nature design in Natura 2000 areas increases the likelihood of a project gaining approval by the Dutch Council of State. To test this hypothesis, a quasi-experimental case design is applied to compare the Harderwijk and Zeewolde cases.

The chapter is structured as follows. We first present the theory and the methodology used in the analysis and then introduce the case study. Following this, we test the above hypothesis against rival explanatory variables. We end by summarizing the case study findings and drawing conclusions in the final section.

Application of CIT to the case study

The hypothesis we have posed links three elements:

- The EU Birds and Habitats Directives (Natura 2000).
- Specific type of project design.
- Project approval in court.

[5] An earlier version of this chapter has been published online as: Vikolainen V., Bressers J.T.A. and Lulofs K. (2012) 'Implementing EU Natura 2000 at the project level: lessons from the Veluwe Border lakes in the Netherlands', *Public Administration,* DOI: 10.1111/j.1467-9299.2011.01971.x (paper version forthcoming)

Apart from linking different contexts, CIT helps to simplify the vast contextual field and locate the possible independent variables (Xi). This is particularly useful since we are not sure whether integrated nature design is the only independent variable that accounts for the outcome. Two layers of independent variables are specified in our analysis (Figure 5.1):

- Structural context: the requirements of EU directives under study, as well as national administrative and legal arrangements used to transpose them.
- Specific context: project-specific circumstances like geographical, ecological, and hydrological case characteristics, as well as previous project plans or ideas.

In this chapter, the dependent variable (Y) is the outcome of project implementation, defined in terms of the decision of the Administrative Jurisdiction Division of the Council of State (the highest Dutch administrative court, hereafter referred to as the Court). The outcome is viewed as successful if the project is approved (as with Zeewolde) and unsuccessful when a project is rejected (Harderwijk). One should also note that, at the time of writing, neither of the projects has actually been physically completed.

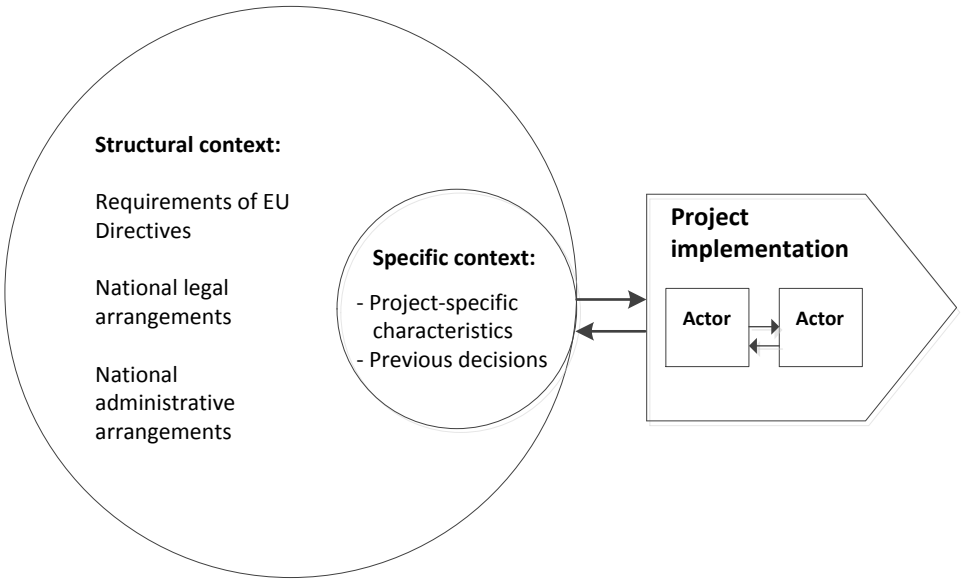


Figure 5.1. Contextual interaction theory applied to the case study

In line with the theoretical assumptions, our analysis identifies contextual factors that could potentially explain why the implementing actors defended their project in Court in the way they did. The implementing actors in our study are the public organizations involved in the project: the municipality of Harderwijk, the municipality of Zeewolde, the Province of Gelderland, the Province of Flevoland and a Bird protection NGO (Vogelbeschermingswacht Noord-Veluwe).

Data and methodology

Data collection

A series of semi-structured interviews were held with key informants from the organizations mentioned above, as well as with officials from the Ministry responsible for implementation of Natura 2000 in the Netherlands. Data collection was done in August and September 2009, gathering

relevant project documentation, including reports, minutes, correspondence, decisions, technical designs, as well as other related material. Court decisions were retrieved from the official web site of the Administrative Jurisdiction Division of the Council of State (www.raadvanstate.nl).

Methodology

This paper presents a qualitative causal explanatory study. We are interested in the causal link between one specific contextual factor (integrated nature design) and one stage of implementation (Court decision) of coastal development projects in Harderwijk and Zeewolde. Causality is defined in terms of processes through which it operates, or causal mechanisms (Little 1991 cited in King *et al.* 1994). To unpack the causal mechanism we have compared two municipalities that are similar in all relevant respects: the degree of biodiversity lost as a result of coastal development needs, location within the Natura 2000 network (Veluwerandmeren area) and the presence of an active environmental NGO (Vogelbeschermingswacht Noord-Veluwe). One of the municipalities (Zeewolde) administered a project with a more integrated nature design, while the other proceeded with a less integrated design. An appeal against both projects was lodged by the same environmental NGO. The Court's decision has been compared for both cases. This type of comparison is known as quasi-experimental (Gerring 2007, p. 154), or factor-centric small-N design (Gschwend and Schimmelfennig, 2007, p. 14).

The essential properties of the research design are illustrated below (Table 1). '?' indicates that the value of the dependent variable (Y, Court decision) is the major objective of the analysis. X_1 marks the key independent variable (integrated nature design): its initial value is denoted as '–' and its change of status as '+' (intervention). X_2 represents rival independent variables, or other contextual factors. Part of X_2 is held constant (biodiversity loss, location, NGO, appeal). The outcome of the X_1/Y interaction is observed at time t_1: after the Court decision was issued.

Table 5.1 Quasi-experimental research design

	t_1		
Treatment case: Zeewolde	Y	?	Project approved
(intervention = more integrated nature design)	X_1	+	More integrated nature design
	X_2	-	Rival explanations (partly const.)
Control case: Harderwijk	Y	?	Project reversed
(no intervention)	X_1	-	Less integrated nature design
	X_2	-	Rival explanations (partly const.)

Methodological limitations

The proposed methodology has several drawbacks. To begin with, there are limitations associated with causal inferences that rely on a small number of cases (Lieberson, 1991). We assume the existence of one primary cause (integrated nature design), but the chances are that more than one independent variable is associated with the difference in outcome. Therefore we need to be aware

of rival independent variables (X_2) and identify them. At the same time, the number of cases (n=2) is probably much smaller than the number of independent variables we can potentially locate, yet we do not know the probabilities of judicial success for each independent variable. Furthermore, the relationship between the independent variables and the dependent variable is distorted when cases are deliberately selected to differ in terms of the dependent variable, rather than sampling from all of the cases. For the same reason, the influence of constants (which is only part of X_2) is not really taken into account: their measurements are the same for both cases.

Another important limitation of the proposed methodology is that causal inference can never be known for certain. This is known as the fundamental problem of causal inference (Holland 1986 cited in King *et al.* 1994). In any one real project we can only observe an approval or reversal in Court, never both. Nor can we observe a decision before and after the intervention. Therefore, we try to estimate how a causal mechanism operates, as opposed to knowing it for certain. When we construct a quasi-experiment the assumption is that two units (projects in this case) are 'homogeneous': the same value of the explanatory variables causes the same expected value of the dependent variable. However, the two projects might differ in some unknown way that would bias our causal inference, as any two social phenomena will differ in some way. This assumption of causality is ultimately untestable (King *et al.,* 1994).

One way of thinking about the small-N methodology is to visualize a very small sample taken from a larger population (Liberson, 1991, p. 315). The question then becomes, what is the likelihood that the application of the same method will reproduce the patterns observed for the larger universe?

Method of data analysis

Given the limitations outlined above, we need additional analysis to address rival causal variables (X_2) that could possibly interfere with our main explanatory variable. Hence, we use the modus operandi method, also known as the 'detective paradigm' (Scriven, 1976). The method's goal is to account for all rival causal variables by identifying their characteristic causal chains (or certain distinctive features of this chain). These causal chains are an associated configuration of events, processes, or properties, usually in time sequence, connecting the cause with the effect, known as the modus operandi (MO) of a particular cause. The general nature of an MO inquiry is that of pattern recognition, with the following sequence of tasks.

First, all possible explanations of the Court decision are drawn. Scriven argues that it is not hard to list, and it is easier still to recognize, most and nearly all of the likely causes of a given, substantial, and highly specified social phenomena (Scriven, 1976, p. 107). One should simply include any possible cause, in any pragmatic sense of 'possible'. For our analysis, the initial focus for locating possible causal explanations is provided by our theoretical framework (CIT, Figure 5.1). CIT serves as a 'map' of the contextual field that helps us to 'see' where potential explanations could possibly be located. We then narrow down the contextual field based on the available literature. Thereafter, a series of semi-structured interviews is held with key actors involved in the project. Respondents are asked for their opinion as to what factors explain the outcome in order to minimize the risk that important causal explanations are left out. Second, explanations provided by the interviews are checked against the collected project documentation and the motivation given in the Court decisions. The final list of causal explanations is then drawn up. Third, each causal explanation is assigned a characteristic causal chain, which outlines its distinct pattern of properties ('if – then'

description, or MO). In the end, the explanatory power of each causal explanation is estimated based on the presence of its distinct pattern of properties based on data gathered from both cases.

The goal of the analysis is thus to discover how many complete patterns of properties (MOs) are present. If only one MO is complete, the causal explanation with which that MO is associated is the cause. If more than one complete MO is present, the associated factors are co-causes. Therefore Scriven does not rule out the possibility of several (interrelated) causes. In that case, it is still possible to distinguish one rival explanation from another according to the most distinctive features of their respective causal chains, even though the causal chains had crossed each other at some point.

Following the logic suggested by CIT, the presence of an MO for specific context factors is checked first. Thereafter, structural context factors are checked for the presence of a complete MO. The ones that display no MO are ruled out and the remaining ones are appraised for their explanatory power.

Case study background

The Veluwe border lakes (Figure 5.2) were designated as a protected area under the Birds and Habitats Directives in 2000 and 2003. The amended conservation objectives were published in 2007.

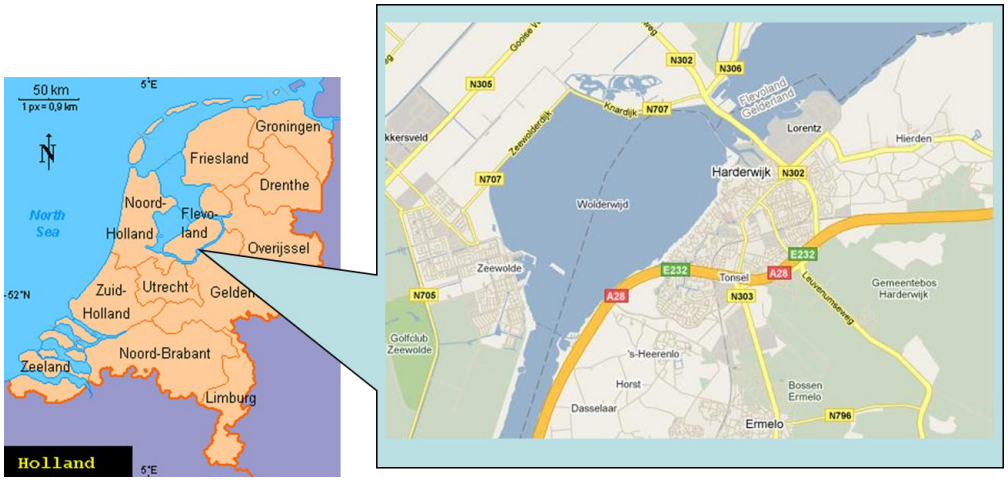


Figure 5.2. Veluwe border lakes in the Netherlands (source: Google maps)

The Waterfront Harderwijk project (Figure 5.3) encompasses a redevelopment of almost 5 kilometres of coastal zone along the Veluwe lake coast. Its main aims are the relocation of old industrial area, improvement of recreation and housing facilities, and strengthening the natural and water functions. The municipality of Harderwijk (Gemeente Harderwijk, 2006) argues that the loss of 8.5 hectares of habitat and forage areas can be neutralized by the creation of a green zone and nature-friendly areas, which would be suitable as new habitat for birds, fish and mussels, while the transformation of a nearby pastureland into marshes would make the area attractive for water- and grassland birds, creating a water retention area.

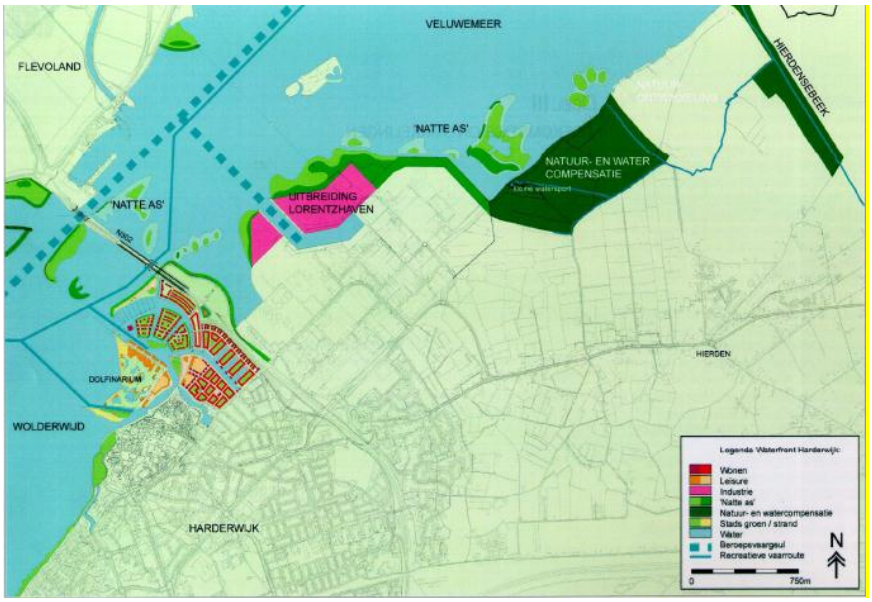


Figure 5.3. Waterfront Harderwijk (Source: Gemeente Harderwijk 2006, p.61)

The Zeewolde project (Figure 5.4) envisages a park zone, two beaches, an island with recreational facilities connected to the shore by a bridge or a dam, and a row of islands that would create a lagoon area (open area between the island and the shore). The municipality of Zeewolde (Gemeente Zeewolde, 2007) maintained that a permanent loss of 10 hectares of sanctuary and forage area for birds does not threaten the favourable conservation status, since the coastal lagoon, parts of which have shallow water, will support the recovery or even improve the habitat of the protected species.

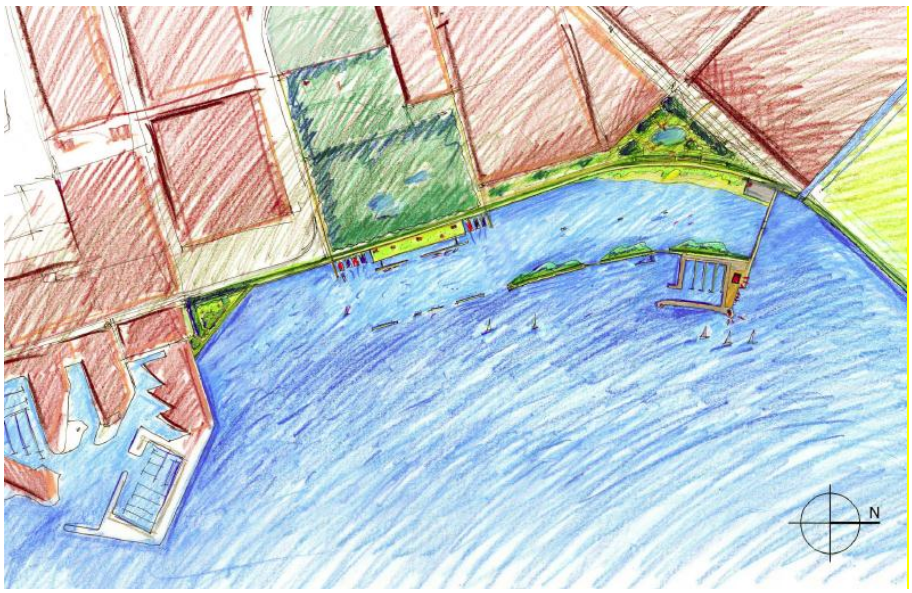


Figure 5.4. Coastal zone Zeewolde (source: Royal Haskoning 2005, p. 42)

Analysis

Using the methodology described above, seven causal explanations have been identified. This section explains each of them separately, following the theoretical assumptions of the analysis.

Integrated nature design

The main independent variable of interest is integrated nature design, defined as a design that achieves the economic goals of the project given the particular site-specific characteristics of the Natura 2000 site, rather than assessing environmental consequences of a predefined project design. For the two projects we analyse here, this translates into a discussion of whether nature design elements should be considered as a mitigation of adverse ecological effects or as part of the original project design. In the case of Harderwijk the Court ruled that 'Mitigation measures should not be taken into account to exclude the significant effects [on the Natura 2000 area] and can only be taken into consideration in the subsequent appropriate assessment procedure' (case 200706044/1 and 200706194/1, par. 2.11.3). In the case of Zeewolde the Court 'saw no reason to doubt the accuracy of data in Table 4.5 of the expert assessment report [importance of the project area for protected species]' (case 200800948/1, par. 2.8.1.) and stated that 'The Bird protection NGO has failed to show that the above mentioned effects [rest and forage area for birds, underwater vegetation] will not take place' (idem. par. 2.8.2). The complete MO of this factor would therefore consist of a stronger integrated design in Zeewolde, which is distinct from the Harderwijk case.

The analysis of project documentation shows that the first nature development plans in Harderwijk date back prior to the Natura 2000 implementation. The negotiations between the municipality and nature conservancy groups commenced simultaneously with the first project plan: in 1998. Three agreements were signed as a result, with a fourth one underway. Furthermore, the municipality was motivated to combine different functions (water retention area, nature mitigation measures) and to take account of the interests of various actors (nature conservancy groups, recreation and industry). The resulting zoning plan contains an extensive assessment of ecological effects but does not provide an entirely consistent nature development plan. The exact functions of the nature-friendly banks remained unclear until the Court hearing, when a written defence contradicted the argument advanced forward by one of the defending parties.

The Zeewolde coastal development plan originated from the regional development programme for the whole Veluwe border lakes area. Coastal development as a separate project was only negotiated with local residents and nature conservancy groups after they had produced their response. From the outset, the municipality was motivated to create a plan that would pass the legal assessment: it maintained the same nature design from the initial project document to the final zoning plan. Considerable elaboration and fine-tuning of the design to the requirements of the Birds Directive can be traced in the ecological assessment reports. Even though several documents refer to the intended nature design as a 'mitigation measure', the municipality and the province argued in its written defence and during the Court hearing that their plan was nature-inclusive. They asserted that they had chosen nature over recreation as a starting point for their plans as early as the project's inception.

In its legal appeal against Zeewolde, the bird protection NGO did not present any extensive ecological arguments against the intended nature design. It simply mentioned that the proposed island added no value to the current ecological situation. The main argument against both projects was the same, being based on Leybucht case (C-57/89): any decrease of a Natura 2000 area is allowed only in exceptional cases. However, the Court saw insufficient scientific evidence to doubt the positive contributions to nature of the Zeewolde plans, and left the issue of Natura 2000 area loss aside.

This points to a conclusion that the Zeewolde authorities were able to make a convincing argument in Court in favour of a nature-inclusive plan, which is very much in line with our definition of integrated nature design. This prevented 'mitigation' from being brought into the legal discussion (as happened in Harderwijk). The foregoing confirms the presence of this factor's MO.

Project administration

Correctly following administrative procedures is an absolute prerequisite for pursuing a successful case in an administrative court. Administrative procedures like those for the zoning plan are directly handled by project administration. The administrative follow-up, in turn, depends on the actors involved in the project, preparation time and amendments to the project's design. The more complex administrations, which take a longer time and involve more actors, generally run a greater risk of engaging in an incorrect administrative follow-up.

From the very start of the Waterfront redevelopment project, multiple interests were at stake: industry, recreation, nature and housing. The municipality therefore chose to engage in an open decision making process, involving multiple actors. The entire Waterfront project was divided into several zoning plans (Waterfront-North, Waterfront-South, and Waterfront-West), but they proceeded as one coherent spatial development plan. It took eight years from the drafting of initial plans in 1998 to finalize Waterfront-North. During this time the municipality did its best to absorb the emerging legislation and case law, as well as the interests of the various parties. The design of the project also underwent changes, when the decision was made to relocate the industrial are from the West to the North. The fact that the Waterfront area was under the authority of two Provinces (Flevoland and Gelderland) did not make things easier. By 2006 the municipality was already under quite a lot of pressure to enact the zoning plan, while the implications of the Natura 2000 framework were still crystallizing. Shortly after the enactment of the zoning plan (Dec. 2006) the Ministry of Agriculture, Nature and Fisheries published the renewed conservation objectives for the Natura 2000 Veluwe border lakes (first half of 2007). To safeguard their position, the municipality initiated a new assessment of the plan in light of the latest ministerial decree. The fact that the effects were assessed post-enactment is an administrative error to which the Court pointed: 'The new assessment provides the most recent data. […] It is not clear why this new data and information, or at least the relevant part of it, was not reported prior to enacting the zoning plan. […] The Court holds that the information as it was available at the time of enactment was insufficient' (case 200706044/1 and 200706194/1, par. 2.11.1).

In the case of Zeewolde, the coastal zone was initially part of the residential development plan. However, on the advice of the Province of Flevoland, the municipality separated the residential area and coastal development at an early stage. Coastal zone development proceeded after the residential area zoning plan had been settled. The overall design of the coastal zone plan did not undergo any major changes, and it took two years to proceed from the initial plans to the zoning plan's enactment. No significant legislative developments occurred during this time. Furthermore, the municipality was not involved in negotiations with nature conservancy groups until they had produced their response to the (proposed) zoning plans.

There is a noticeable difference in the way each administration handled its project. Zeewolde's step-by-step approach allowed for the rapid realization of the coastal zone project, while the overarching administration of the Waterfront was one step behind the events, with an improperly timed

assessment report due to increasing pressure. Furthermore, early de-coupling of residential (economic) interests in the Zeewolde case shifted attention towards the more prominent role of nature in coastal development and a more tailor-made design. In contrast to this, the Harderwijk administration chose a closer coupling of the zoning plans, which were eventually dominated by industry and residential development needs, in the absence of a consistent nature development plan. It is therefore plausible that project administration acted in parallel to integrated nature design, or may have even triggered it. In any case, this factor's MO was present.

Presentation of scientific data

Both Court decisions refer to the Cockle fisheries case (C-127/02), which holds that the plan can be approved without an appropriate assessment procedure if, based on the objective data, significant effects on the area in question have been excluded; or, likewise, if an appropriate assessment provides certainty that the project or other activities have no damaging effects on the natural characteristics of the area. This refers to a case where no reasonable scientific doubt remains as to the absence of damaging effects. Neither Harderwijk nor Zeewolde authorities conducted an appropriate assessment procedure: zoning plans were enacted on the premise that significant effects are excluded. The MO of this factor is that good quality scientific data enabled the actors to exclude significant effects and to argue in Court that no appropriate assessment was necessary.

In the case of Harderwijk, a total of four scientific reports were published; the last of them revised existing data in light of the new ministerial information. Prior to this report the effects were uncertain, and the conclusions of different ecologists were sometimes contradictory. The municipality and the province argued that the goal of the revised report was to update the information to gain better insight into the situation; while the Court saw it as 'essential circumstances, [which are] partly the result of different policy insights and, contrary to what was argued during the hearing, are not limited to the update of information only' (case nr. 200706044/1, 200706194/1, par. 2.11.1). Furthermore, the Court highlighted the confusion concerning the appropriate assessment procedure. 'The Province of Flevoland asserts in the challenged decision [zoning plan approval] that the conclusion as to the absence of significant effects on the area is correct […] and that appropriate assessment is not necessary. [The Province's] Court defence reads that the zoning plan procedure incorporated an appropriate assessment procedure and that all reports together represent an appropriate assessment' (idem. par. 2.4.). The revision report itself states that it can be seen as an 'appropriate assessment'.

Finally, the Court pointed out that the conclusions of the two reports were formulated differently: '[based on the reports available at the time] significant effects of the zoning plan could be excluded. The revised report states that significant effects are not to be expected. Moreover, the revised report as well as the approval decision by the Province of Flevoland argue that the revised report itself can be seen an appropriate assessment. […] Insofar as the revised report can be seen as appropriate assessment, its conclusion that significant effects are not to be expected does not provide the degree of certainty that an appropriate assessment should provide' (idem, par. 2.11.2). Document analysis shows that 'significant effects are not to be expected' is the conclusion drawn for the 'Veluwe Natura 2000 area'. The concluding chapter states that Waterfront-North has no effect on most conservation objectives for Veluwerandmeren. It is therefore not clear why the formulation that 'significant effects

are not to be expected' was taken as an overall conclusion of the report by the Court, and why the effects needed to be mentioned at all if the species are not found in the area.

The municipality of Zeewolde had approximately six years' experience with the application of Natura 2000 regulations preceding the Coastal zone project. The municipality's experience in residential area development (originally jointly with coastal development, but separately later) has been analysed in the literature (Backes *et al.,* 2007). Two scientific reports were published, and the Province provided some data on bird counting. When the publication of the first research report did not provide the level of certainty needed, the authorities decided to halt the project and wait for the second report. Even though the second report focused on a larger area, and indicated the effects of the Coastal zone project as 'slightly negative', the municipality considered that a sufficient degree of certainty about the effects had been achieved. The Province and the municipality referred to the report as a screening and have not called it an 'appropriate assessment'.

The bird protection NGO referred to the Leybucht case (C-57/89) in both of the appeals, arguing that where the loss of Natura 2000 area is implied, significant effects cannot be excluded and therefore an appropriate assessment should have been conducted place.

What follows from this analysis is that it is not so much the (objective) scientific certainty provided by the data but the actors' interpretation of when exactly the required level of certainty is reached. Admittedly, scientific information in ecology always comes with uncertainty. This, in the absence of objective criteria provided in the legal framework, is what makes the actors' perception of the quality of the scientific data the decisive factor. The interpretation of scientific data can be further strengthened by the following factors: consistent use of terminology (appropriate assessment or not), actors' prior experience and the exact wording of reports, conclusions and the interpretation thereof by the Court. Integrated nature design could, albeit indirectly, have contributed to the actors' confidence in their own design and the required level of scientific underpinning (Zeewolde), while in Harderwijk the actors tried to investigate the effects to the extent of the available knowledge. The MO of this factor was present and could have operated as a consequence of integrated nature design.

Geographical borders of Natura 2000 area

One of the possible rival explanations is that the borders of the Natura 2000 area have influenced the judicial decision. The Zeewolde project area lies entirely within a Birds Directive area, while parts of Waterfront are within both Bird and Habitat areas. Furthermore, the Natura 2000 border along the coast of Harderwijk allegedly takes part of the intended project activities into account, exempting it from legal requirements. This factor would explain the outcome if the absence of the Habitats directive in the case of Zeewolde made the legal assessment less strict, and the advantage of partial exclusion from Natura 2000 area was helpful to Harderwijk.

Even though the Zeewolde project is located outside the Habitats Directive area, the legislation in force required the authorities to apply the Habitats Directive assessment framework. Furthermore, document analysis shows that the ecological assessment did not exclude the adjacent habitat area. With regard to Harderwijk, the authorities did indeed try to change the borders of the Natura 2000 area, but the Court reversed their attempt. Moreover, a project location outside of the Natura 2000

area would not guarantee an easier procedure, since its external effects on an adjacent Natura 2000 area would still have to be assessed.

The exact location of both projects in relation to the Natura 2000 area could therefore have had no influence on the Court's decision. With no MO present this explanation is ruled out.

Court procedures

The judicial review used by the Court is a factor that could explain the outcome of the Harderwijk case in particular. The MO of this factor consists of a procedural decision based on (formal) legal considerations with no interpretation of project contents and underlying scientific data.

The allegedly 'procedural' issue in the Waterfront case was the submission of the revised research report after the zoning plan had been enacted. Here the Court judged that not all scientific data was available at the moment of approval by the municipal council, while the municipality maintained that it was merely an 'update' of scientific data. In its judgment the Court relied on the Nature Protection Act in combination with the General Administrative Law Act. The role of the General Administrative Law Act is significant in respect of the Court's function as a guardian of procedural 'decency' and the principle of proper administration: 'When preparing an order an administrative authority shall gather the necessary information concerning the relevant facts and the interests to be weighed' (art. 3:2). The Court's judgment was therefore in line with its function and was sufficiently content related from a lawyer's perspective. One of the ways to prevent 'procedural' instances is to anticipate the kind of legal requirements that are applicable in case of an appeal as early as the preparation phase of the project. This will ensure that the research and administrative approval are correct and judge-proof. For our analysis it means that legislative procedures do not explain a decision as a stand-alone factor, as they are applicable by default to all projects. This allows us to rule out this explanation.

Access to court

Project delays or cancellation as a result of Court appeals are directly linked with the accessibility of administrative courts to interested parties (legal entities). To establish this factor's MO, one would expect to find an active environmental NGO in the Veluwe border lakes area which had ready access to the Court.

International comparative research does confirm that – thanks to certain features of the Dutch legal system – frequent appeal procedures are more common in the Netherlands than in other EU countries. In addition to this, Dutch administrative courts issue a decision on average within one year after an appeal has been lodged, which is relatively quick in comparison to other EU countries (VROM Raad, 2008).

However, it is important to note that in both cases it was the same NGO acting in the same geographical region and the same appeal criteria were complied with. This factor has thus no explanatory power for the success of one case and the failure of another. Perhaps if two different NGOs were present (one less active than the other), or if the cases were located in two different EU countries with distinct legislative traditions, the role of this factor would be more prominent.

Implementation of Birds and Habitats Directives in Dutch legal order

In the course of investigation, the following features of Dutch implementation of EU directives emerged that could potentially have influenced the Court decision.

First, Dutch implementation of the Habitats Directive in the amended Nature Protection Act left important concepts like 'significant effects' and 'appropriate assessment' unspecified. Secondly, Dutch legislation uses a stricter assessment framework than that of the Habitats Directive, which allows economic, social and cultural requirements and regional and local characteristics considerations to be taken into account (92/43/EEC, art. 2 par. 3). Finally, the process for designating Natura 2000 areas in the Netherlands is rather complex. Consequently, conservation objectives for the Veluwe border lakes area have undergone a number of changes, with the last update published in 2007. In the case of Harderwijk, these became available after the enactment of the zoning plan, later on leading to the publication of a research report.

Ultimately, the same legislative concepts and the same assessment framework were applied in both projects, because the majority of research reports were drawn up after the amendment of the Nature Protection Act (three of four reports in the case of Harderwijk and all reports for Zeewolde). As explained previously, the evolving legislative framework became a disadvantage for Harderwijk predominantly as the result of the lengthy project preparation (eight years as opposed to two years in the case of Zeewolde). All in all, our conclusion is that these factors highlight several potential pitfalls in the application of Habitats and Birds Directives, but they do not constitute significant barriers to project implementation. Furthermore, they are not helpful in explaining judicial outcome, given that in the case of Zeewolde all of the same pitfalls were overcome.

The foregoing analysis ruled out four rival explanations with no MO: geographical borders of the Natura 2000 area; access to court; court procedures and the implementation of Birds and Habitats Directives in Dutch legislation. The influence of these factors was constant and the same in both cases. In theoretical terms, all of these factors are structural (Figure 5.5).

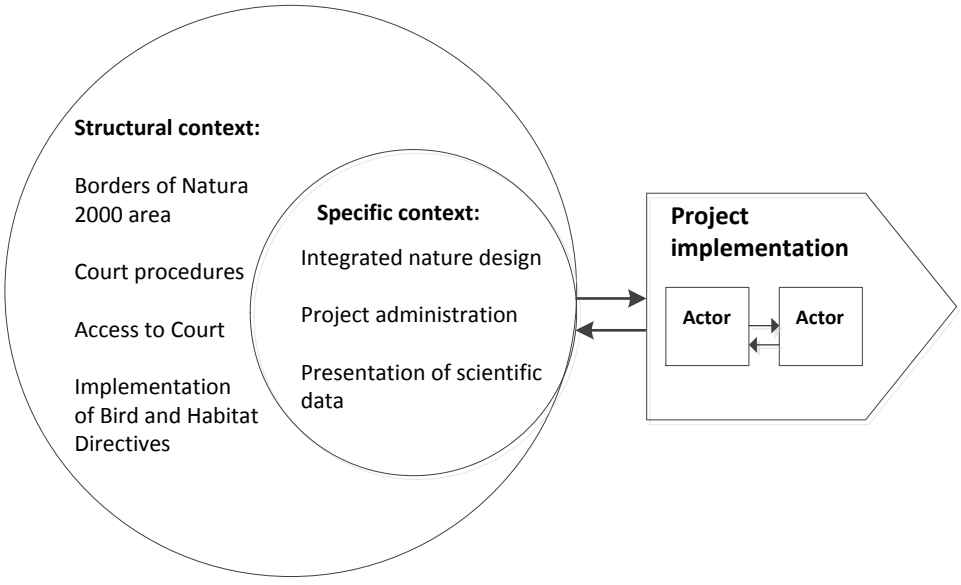


Figure 5.5. Contextual Interaction Theory: Zeewolde and Harderwijk case explanatory factors

Discussion and conclusions

In this chapter, we have posed the hypothesis that the application of integrated nature design in Natura 2000 areas will increase the likelihood of a project gaining approval by the Dutch Council of

State. We defined the first implementation stage, 'integrated nature design', as producing a design that meets the socioeconomic goals of the project while taking into account the particular site-specific characteristics of a Natura 2000 site, rather than as assessing the environmental consequences of a predefined project design (the first component of Building with Nature, see Chapter 1). Following this, we analysed seven rival explanations of project outcomes in Zeewolde and Harderwijk. For the main causal factor of interest – integrated nature design – a complete MO was established. Two other rival explanations displayed a complete MO: project administration and the presentation of scientific findings.

The last two factors acted alongside integrated nature design: project administration contributed to rapid and decisive realization of the proposed design in Zeewolde, and slowed it down in Harderwijk. Scientific findings were based on the proposed design and reflected the way actors accounted for its ecological effects, which was more consistent in the case of Zeewolde that Harderwijk. This leads us to believe that neither of the two factors alone had sufficient impact to have caused the outcome and their impact complements the explanatory power of the main causal factor. This allows us to link all three factors in the following causal chain (Figure 5.6).

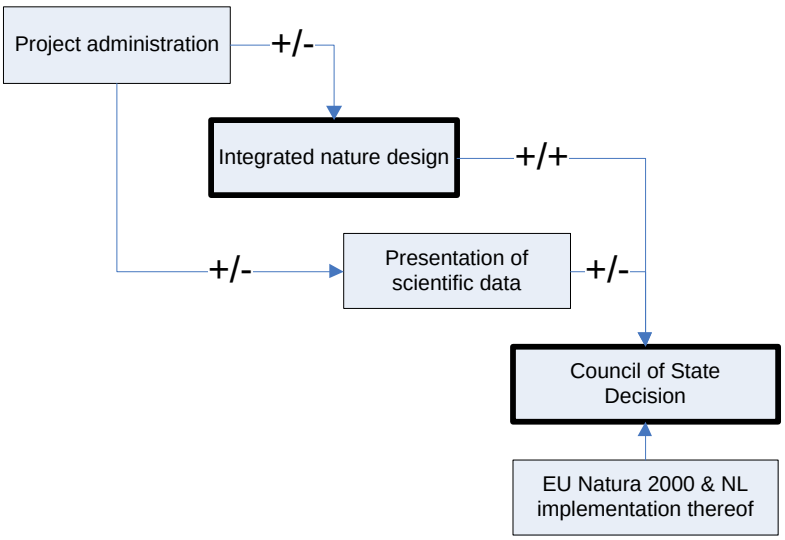


Figure 5.6. Causal factors and their influence on Court decision

Integrated nature design strengthens (+/+) the chances of the project being approved in Court. Presentation of the scientific data could either strengthen or weaken (+/–) the case in Court, depending on the actors' confidence in their own design and the way they handle the scientific data. Similarly, project administration could either increase or decrease the extent of integration of nature into the design (+/–). The implementation of Natura 2000 legislation sets a number of important conditions that must be taken in account but does not explain the variance in Court decisions.

This estimation of causal effect supports our hypothesis that integrated nature design in Natura 2000 areas can increase the chances of project's approval by the Dutch Council of State. However, since we were not able to rule out other variables and exclude interaction effect between them, this hypothesis needs refinement. The foregoing analysis of Harderwijk and Zeewolde cases suggests the following refinement: a coastal development project in a given Natura 2000 areas has a greater chance of success if its design integrates nature provided the administration and scientific findings

are favourable. The conclusion does not necessarily contradict a widespread view in the Netherlands that the EU Birds and Habitats Directives are of poor quality, their requirements are too strict and it is difficult for authorities to comply with them. Rather, we take a more positive stance and argue that, once the legislation is implemented, room can and should be sought within the existing framework, to realize both economic and ecological goals.

More practical recommendations with regards to the application of integrated nature design approach are:

(1) Project design is more successful if it is fine-tuned to Natura 2000 conservation objectives, in particular when it implies any loss of Natura 2000 areas;

(2) The loss of Natura 2000 area is possible without an appropriate assessment procedure on condition that scientific data excludes significant effects;

(3) Administrative decoupling could minimize the preparation time and prevent unintended administrative errors, especially with respect to the evolving legislative framework and case law;

(4) With respect to scientific certainty of ecological effects, it is advisable not to dwell on the question of 'significance', but to draw on previous experience and to use a consistent vocabulary, both in scientific reports and in a written court defence;

(5) It is useful to anticipate as early as possible, preferably in the project's preparatory phase, the type of legal requirements that would come into play in case of a legal appeal; and take the latest legislative developments into consideration.

The lessons from the Harderwijk and Zeewolde cases support the recommendations of the European Commission that 'projects should be "designed" using the "working with nature" concept. This means that the relevant Natura 2000 conservation objectives should be considered together with the technical project objectives from an early stage in project design and development' (European Commission 2011, p.27).

Chapter 6. Building with Nature and Natura 2000: a longitudinal case study design[6]

The central research question of this thesis - how is the extent of Building with Nature related to the implementation of Natura 2000 requirements – is addressed in this chapter through a longitudinal case design. To answer the research question, this chapter presents a longitudinal analysis of the way the Scheldt estuary flood defence project has been implemented. The Flemish flood defence strategy for the River Scheldt (the Sigma plan) was drawn up long before Natura 2000 was established but both the Sigma plan and Natura 2000 became relevant to the decision-making process regarding a flood-control project in the neighbouring towns of Kruibeke, Bazel and Rupelmonde. This project's long decision-making history enables one to measure three Building with Nature components – 'integration', 'use' and 'improvement' of nature – at different implementation stages and illustrate the evolution of flood-control area design. It also makes it possible to account for the effect of Natura 2000 requirements on local planning and implementation processes.

The chapter is structured as follows: we introduce the case study and present the theory and the methods used in the analysis. Thereafter we analyse each implementation stage of the project in terms of its design and implementation. We summarize the case study findings and draw conclusions in the last section.

Case study background

After the Flemish floods of 1976, King Boudewijn announced a flood risk scheme called the 'Sigma plan' in 1977. The aim of this plan was to protect the areas along the Zeescheldt (part of the river Scheldt under the tidal influence of the North Sea) and its tributaries. The plan consisted of three elements: dyke reinforcement, thirteen flood control areas, and a storm surge barrier. We centre our analysis on one of the thirteen flood control areas in the Sigma plan. A flood control area is an area enclosed by a higher outer dyke and a lower inner dyke along the river. If, during a storm surge, the water level rises above the inner dyke, a large amount of water can be stored temporarily in these reservoirs (for the space of a single tide), resulting in a dampening of the tidal wave and thus protecting valuable areas nearby from flooding. Depending on their position in the estuary and the weather, the inundation areas will be flooded only about once or twice a year (Cox *et al.*, 2006).

The envisaged flood control area (referred hereafter as 'the flood control area' or 'the project') was located on the east bank of the river Scheldt in the polders of Kruibeke, Bazel and Rupelmonde in the province of East Flanders, just 30 kilometres from Antwerp (Figure 6.1). The polders were historically used for agriculture, recreation and nature. With a total area of 750 hectares this is the largest flood control area among the thirteen areas proposed in the Sigma plan. Once the flood control area in

[6] An earlier version of this chapter has been published on-line as: Vikolainen V., Bressers J.T.A. and Lulofs K. (2012) 'The role of Natura 2000 and project design in implementing flood defence projects in the Scheldt estuary', *Journal of Environmental Planning and Management*, DOI:10.1080/09640568.2012.724014 (paper version forthcoming)

Kruibeke is fully operational, the risk of flooding in the Zeescheldt basin will decrease from once in 70 years to an average of once in 400 years.

Figure 6.1. Kruibeke, Bazel and Rupelmonde in East Flanders, Belgium (source: Ministerie van de Vlaamse Gemeenschap[7])

The eastern part of the flood control area (the polders of Kruibeke and Bazel) will be inundated daily at a controlled tidal height, which will lead to the creation of mudflats and salt marshes (Figure 6.2a, 6.2b). The western part of the flood control area (the polders of Bazel and Rupelmonde) will be inundated only during storm surges once or twice a year, thus allowing the wetland to develop (Figure 6.2c). Eventually, the flood control area will combine the functions of nature, water management, a construction-free agricultural zone and community and general facilities. The work on the project is scheduled for completion by the end of 2012.


a b c

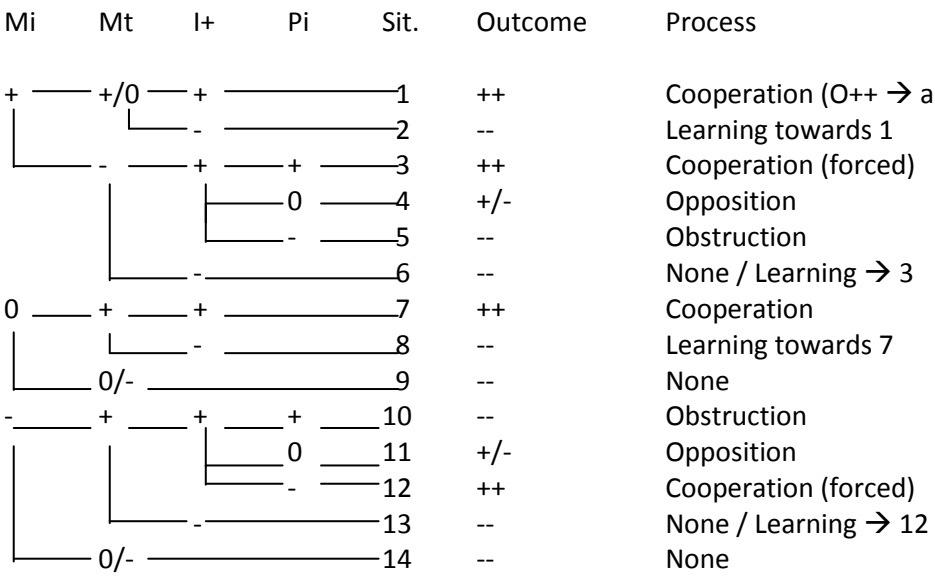
Figure 6.2. Kruibeke, Bazel and Rupelmonde flood control area (artist's impression) (source: Ministerie van de Vlaamse Gemeenschap, 1999)

Application of CIT to the case study

The application of CIT to this case study allows us to include all three layers of contextual factors of interest: Natura 2000 (structural context), 'Building with Nature' design components (specific context), and local actor interactions (project implementation). Although CIT does not specify direct causal links between the two outer levels of contextual factors, it does provide a series of hypotheses for the types of interactions and the likelihood that an instrument will be applied. CIT distinguishes various types of interaction, depending on the configuration of the actors' characteristics: motivation

[7] http://www.natuurenbos.be/nl-BE/Over-ons/Projecten/Scheldeproject/Kruibeke-Bazel-Rupelmonde.aspx

of implementers (Mi), motivation of a target group (Mt), information for application of positive partner(s) (I+), and the balance of power viewed from the position of the implementer (Pi). Each situation from 1 to 14 contains a hypothesis about the outcome of interaction: cooperation (active, passive or forced), opposition, and (joint) learning (Figure 6.3, taken directly from Bressers, 2004).



Mi = Motivation implementers viz. application
Mt = Motivation target group viz. application
I+ = Information for application of positive partner(s) (highest level)
Pi = Balance of power viewed from position implementer

Figure 6.3. The likelihood of application of a policy instrument under Contextual Interaction Theory

In our analysis, the implementer is the Zeescheldt Division of the Waterway and Sea Channel Department of the Flemish Ministry of Mobility and Public works (hereafter: Zeescheldt Division). The target group is the municipality of Kruibeke, which covers the neighbouring towns of Kruibeke, Bazel and Rupelmonde. The policy instrument is the flood control area in Kruibeke, Bazel and Rupelmonde, as proposed by the Flemish flood control scheme, the Sigma plan.

In line with the theoretical assumptions, an array of contextual factors (independent variables, X) at both national and European level feed into on-going interaction process between the Zeescheldt Division and the municipality of Kruibeke. We specify two layers of contextual factors (Figure 6.4):

The structural context includes the requirements of the EU Birds and Habitats Directives, defined in terms of compensation measures in Kruibeke for the construction of the Deurganck dock. The national policy requirements refer to Flemish national (water-) policies in so far as they were exerted an influence on the policy instrument that is the subject of our analysis.

The specific context includes project-specific plans, decisions and designs with regard to the flood control area in Kruibeke.

The dependent variable (Y) is the outcome of project implementation, defined as a certain configuration of actor characteristics: motivation, cognitions and power.

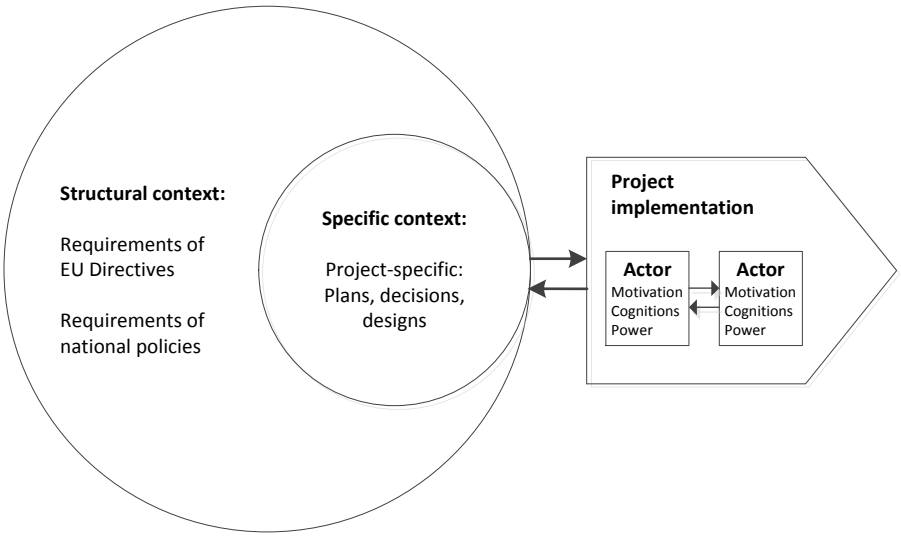


Figure 6.4. Contextual Interaction Theory applied to the case study

We use these series of interaction outcomes to distinguish and qualitatively characterize the four phases of the project implementation. In this way, CIT helps us to explore and understand the case. It is not our aim here to test or develop the theory.

Data and methodology

Following the theoretical assumptions, the analysis presented in this paper is carried out at the project level; it looks at the actors' interactions. A list was drawn up of government institutions and stakeholders, which participated in the Deurganck dock and Kruibeke projects and their corresponding roles in the implementation processes:

- The Municipality of Kruibeke: flood control area opponents;
- The Municipality of Kruibeke: flood control area proponents;
- Flemish Nature protection society (Natuurpunt Vlaanderen): an NGO that lodged a court appeal against the construction of Deurganck dock; proponent of Kruibeke flood control area in combination with nature development;
- Antwerp port authority: Deurganck dock project implementer;
- Local farmers' association of the Municipality of Kruibeke: stakeholders affected by flood control area development;
- Maritime access department of the Flemish Ministry of Mobility and Public Works: Deurganck dock project initiator;
- Waterways and Sea Channel department of the Flemish Ministry of Mobility and Public Works: Kruibeke flood control area implementer.

The following sampling technique was used for the interviews: one respondent per government institution/stakeholder organization listed above was interviewed using semi-structured interviews. We ensured that all actors were covered, including the opponents; by cross-checking the actors with each respondent and across document sources. To minimize bias in the presentation of the problem, we analysed project documents and chronologies from a variety of sources: project opponents and project initiators, as well as neutral actors not directly involved in the implementation of either projects (e.g. Flemish Nature and Forest Agency, Flemish Research Institute for Nature and Forest). Project documentation included Ministerial policy documents, reports, decisions and project designs. Data collection took place in February and March 2011.

Since project implementation in CIT is understood as an actor interaction process, we distinguish four stages of interactions among the implementers and target group. We do this by reconstructing the chronology of events, which is a special form of time series analysis (Yin, 2003, p.125). The objective of a chronology is to carefully reconstruct and trace the relationship of events over time. In our case, this is a relationship between the main variables of interest: national and the EU policies, project design, and implementation outcome. More specifically, we are interested in the effect of incidental events like Natura 2000 and Antwerp harbour development on local interaction processes that take place in the largely unchanged setting of scale, location and the actors involved in the interaction (Figure 6.5).

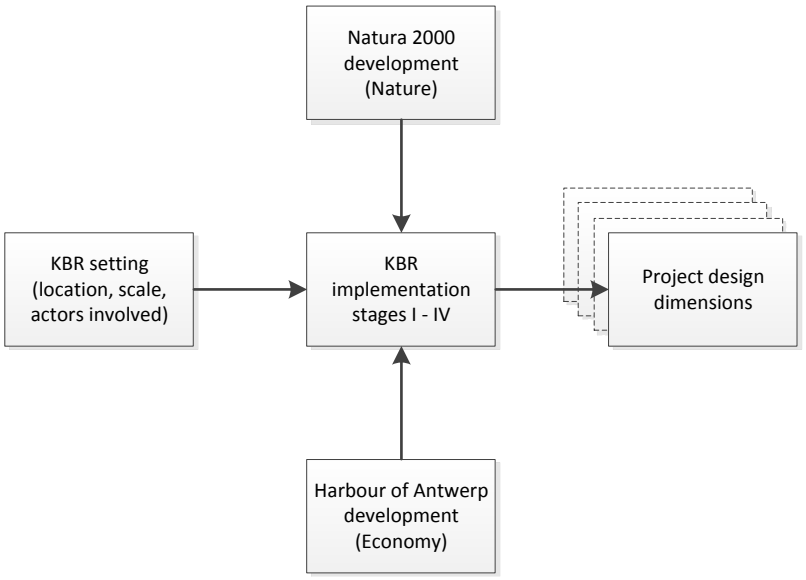


Figure 6.5. Case study design

We compiled the chronological sequence of events between 1977 and 2011, including administrative and political decisions on the flood control area and Deurganck dock projects, relevant historical events (e.g. floods), and designation decisions of the Flemish government under the requirements of Birds and Habitats directives. For each event or decision, we outline their goals and implications for the flood control area in Kruibeke. The chronology is based on the following references: Vlaamse Regering, 1999; Ministerie van de Vlaamse Gemeenschap, 2000; Soresma, 2001; Beheerscommissie Natuur Kruibeke-Bazel-Rupelmonde, 2009; Vlaamse Havencommissie, 2009. The chronology was then split into four implementation (interaction) stages, or embedded units of analysis (Yin, 2003,

p.43). For each stage of implementation, actor interactions are narrated alongside the characterizations of respective project design based on historical records and interviews. In conclusion, a series of project designs and outcomes are summarized and relationship patterns between them (if any) are observed. The character of this sort of inquiry is explorative and qualitative. The advantage of a qualitative technique applied to this case study is that it allows the researchers to account for a longitudinal development (flood defence area design evolution over a period of more than 30 years), while simultaneously including incidental events like Natura 2000.

The internal validity of our case study is confronted with two important threats, which are inherent to time-series research: history and maturation (Kratochwill, 1978). History is when extraneous factors occur concurrently with independent and dependent variables under study and produce change. Maturation occurs when physical and/or psychological changes occur within subjects over a period of time, which in turn may affect their performance on the dependent variable. This is especially applicable to our case study as it extends over a time period of more than 30 years. We assume that independent variables influenced project implementation, while it could very well be the case that the subjects (implementers and target group) have 'matured' over the years: they become older, possibly less motivated, anxious, bored, and so forth. A way to reduce historical invalidity and maturation is to analyse potential confounding historical influences that may have coincided with the intervention. This is done by careful reconstruction of chronological events.

Analysis

Implementation stage I: 1977-1991

Following the announcement of the Sigma plan, the Minister of Public Works charged the Zeescheldt Division to investigate alternative hydraulic solutions and to present engineering designs for all 13 flood control area projects, including Kruibeke. The purpose of the plan, and hence the motivation of the department, was security against flooding in the Zeescheldt basin.

The polder constitutes around a quarter of municipal territory and had always been used for the agricultural and recreational purposes; it was valued for its nature. The authorities' plans to turn a polder into a flood control area first came as a shock to the inhabitants, since nobody knew what exactly was going to happen. The plans were perceived as a direct attack on municipal territory (the polder) to increase flood security elsewhere. The peaceful and quiet atmosphere always associated with the polder is especially important to the working population of Kruibeke, who are employed predominantly in industry. Furthermore, the fact that the flood defence line would be relocated further inland and thus closer to the municipality's built-up area, did not fit into the perception of 'flood defence' among the inhabitants. The plan implied that the existing flood defence line would be lowered, which was shocking to them. With the exception of Rupelmonde, the municipality had never experienced a major river flood, but it had several times used the polder to absorb excess water from the local Barbier creek. The mayor of the municipality was the greatest opponent of the flood control area, and had his own ideas about the flood security measures that needed to be taken. He organized demonstrations against the flood control area every Tuesday, with the participation of farmers, nature enthusiasts and recreational anglers. At this point, the municipality was united against government plans under the mayor's slogan *'Over my dead body'*.

Faced with such a fierce reaction from the municipality, the department of Waterways and Sea Channels decided to implement the smaller flood control areas in the Sigma plan first. As a consequence, the building permit for Kruibeke was not applied for at this stage of implementation.

Concerning the design of the Kruibeke flood defence at this point: its only objective is flood security and its design is not geared to the ecological situation in the polder (0). The flood control area's design is an engineering solution (dykes and sluices), which is based on tidal dynamics in its operation (+), but does not take the ecological potential of the area into account (0).

In theoretical terms, this stage of implementation corresponds with situation no. 9: *non-implementation.* The implementing actor (Mi, Zeescheldt Division) hesitates to proceed (0), while the target actor is negative (Mt, the municipality). The results at this stage are summarized in Table 6.1.

Table 6.1. Implementation Stage I: 1977 – 1991

Specific context: design and nature			Actor characteristics				Outcome
Integration	Use of	Improvement	Mi	Mt	I+	Pi	
0	+	0	0	-			None

Implementation stage II: 1992-1999

After the floods of 1992, flood defence measures were once again on the political agenda. The 1994 decision of the Flemish government confirmed the construction of the flood control area in Kruibeke and aimed to integrate it as far as possible with existing ecologically valuable areas. Another ministerial report published in 1994 – on the environmental impact of the Sigma plan (AMIS report) – announced a step towards integrated planning. From then on, implementation of the Sigma plan and all its projects had to consider environmental benefits as far as possible alongside flood security goals. For Kruibeke this meant that the project goals expanded to include nature alongside flood security. To incorporate both goals, the Institute of Nature Conservation worked out a change to the project's design (Ministerie van de Vlaamse Gemeenschap, 1999). It added the following elements to the previous design: a 260 hectare tidal inundation area with creeks and salt marshes; a 50 hectare open grazing area up the hill in Bazel; a 260 hectare varied landscape of grazing hills and wooded lowlands with freshwater streams. The plan proposed natural grazing by introducing large grazing mammals (wild horses, bovines, deer, and beaver) in the area. The underlying idea of the plan was to recreate the original riverine landscape with appropriate flora and fauna. The subsequent Environmental Impact Assessment (EIA) assessed this design against an alternative of continuing the existing agricultural land use; it recommended the combination of nature and flood security. This choice was confirmed by the Flemish government in December 1999.

In the meantime, demonstrations under the mayor's leadership were still continuing. With other flood control areas in the Sigma plan nearing completion, the Zeescheldt Division tried to rethink its Kruibeke strategy. One of the groups involved in this exercise were the nature protection associations. The greater environmental focus of the latest government decisions and the renewed project design offered an opportunity to create more support for the flood control area among the

nature protection associations. Furthermore, the EIA report contained data on the levels of soil pollution in areas of the polder used for agriculture. The combination of flood security and nature goals offered by the flood control area did indeed secure the support of the nature protection groups. However, the mayor maintained that the polder was never part of the original riverine landscape, the existing nature would be ruined by bulldozers, and the flood control area had no added value. Even with the nature protection groups in favour of the plan, the majority of polder users still supported the mayor at this stage.

The balance of power did not resolve the situation. A public inquiry, which is part of a building permit procedure under the Flemish Spatial Planning Decree, would be sure to receive objections from the municipality. A construction permit application with its attached technical dossier is handled by the Department of Town Planning and there is no time limit stipulated by law to issue a permit. The mayor is an elected post in Flanders and the current mayor has been in office since 1983. His party had received the majority of votes and it was against the flood control area. With the impending risk of the mayor bringing proceedings before the Court of Appeal, the Department of Town Planning did not issue a permit and construction did not start. Up to six permit applications were attempted, with no final decision.

At this stage of implementation, the project's objectives had expanded as environmental concerns received attention alongside flood defence measures (+). Moreover, the proposed plan became even more dynamic in terms of natural processes, as the large grazers would do the maintenance work (++). The reconstruction of the original riverine landscape would improve the ecological situation in the area (++).

In theoretical terms, this stage of implementation corresponds with situation no. 4: *opposition.* Kruibeke being the last unimplemented flood control area under the Sigma plan, the implementing actor is willing to complete it (Mi, +), but the target group is still negative (Mt, -). Given the information the cognitions of the positive actor are sufficient (I+, renewed flood control area design), so the character of interaction process depends on the balance of power between the two actors (Pi). A relatively equal balance of power (Town Planning's hesitancy to issue the construction permit vs. elected mayor with majority of votes) will lead to opposition and a stalemate (Table 6.2).

Table 6.2. Implementation Stage II: 1992 – 1999

Specific context: design and nature			Actor characteristics				Outcome
Integration	Use of	Improvement	Mi	Mt	I+	Pi	
+	++	++	+	-	+	0	Opposition

Natura 2000 requirements: Deurganck dock compensation

In 1988 the polders of Kruibeke, Bazel and Rupelmonde were designated a special protection area (SPA) under the Birds Directive. In 1996 they were designated a special area of conservation (SAC) under the Habitats Directive. Both designations were proposed by the Institute of Nature Conservation and ratified by the Flemish government. However, the practical implications of these

decisions were not part of the information available to the actors in Kruibeke, Bazel, and Rupelmonde at the time the designations were passed. Moreover, the practical consequences only became clear during the events surrounding the Deurganck dock. Afterwards the EIA concluded that designation took place based on the ecological potential of the area, while the majority of designated ecological values were not present in the area at the moment of designation (Soresma, 2001).

The Deurganck dock decision making has been analysed in the literature (Neumann *et al*., 2002; Sahin, 2007), so this paper will give only a factual summary of key events and decisions based on interviews and document analysis.

The container traffic in the port of Antwerp expanded by 80% between 1980 and 1990, and a further 80% growth was expected by 2005. As the right bank of the river Scheldt had already reached maximum capacity, the location for a new dock was sought on the left back. Flemish Ministry of Public Works and Mobility took the lead in this project of 'overriding national interest' that would ensure the competitive position of the port of Antwerp. It commissioned the EIA to investigate different location alternatives based on strategic, planning, technical, nautical, social, ecological and legal parameters. The EIA listed the Birds Directive under the legal parameters, while the assessment of ecological effects was based on indicators and models from the scientific literature. The assessment states that the 'planned operations have a negative effect on the ecological values in the area' (Milieu en Veiligheid, 1996, Deel 6, p.85). EIA concluded with the choice of an alternative location which, according to the Maritime Access Division, was a realistic consideration of the natural and environmental surroundings of the area. The decision of the Flemish government of 20 January 1998 confirmed the construction of the dock according to the chosen alternative. This decision also established a working group for the preparation of the Strategic Plan for port development (Scheldt Left bank), including representatives from adjacent municipalities and environmental institutes. The strategic plan drawn up by the working group stated that 'there is a string of (large) nature areas being created and maintained by the environmental institutes in consultation with various actors. [...] The total port area, with the exception of an outer 100 metre buffer zone, will be excluded from designation under the Birds and Habitats Directives. The compensation for this (including the Deurganck dock) will be provided by nature development projects under construction' (Werkgroep Strategisch Plan Linkerscheldeoever 1999, p.13-14). This stage of implementation is characterized by the balance and administrative agreement among those involved, with a succession of decisions by the Flemish government to implement these agreements: approval of the strategic port development plan (25.5.99); regional zoning plan amendment (01.06.99); and amended Birds Directive decision to designate the whole polder area as a Birds Directive area as compensation for partial loss of ecological value of Special protection area as a result of Deurganckdok construction (23.06.98). The construction of the dock commenced in 1999.

The events that unfolded in 2000 and 2001 were the complete opposite of the balance and agreement in the previous stage. The inhabitants of the adjacent village of Doel and nature protection associations made use of all the legislative instruments (including Birds and Habitats Directives) at their disposal, at national and European level, to delay or postpone the dock's construction. Amendments to the regional plan and construction permits were suspended by the Flemish Council of State in 2000 and 2001.

To end the conflict, Antwerp port authority commissioned a new EIA and sought solutions for the inhabitants of Doel. The nature protection associations were involved in preparing the new EIA and the new compensation plan. The revised EIA took account of the 600 hectare SPA under the Birds Directive and the Habitat SAC along the coast. It stressed that compensation had to be implemented before or at least simultaneously with the construction of the dock, and featured Kruibeke as one of the compensation measures (Milieu en Veiligheid *et al.,* 2001). The revised EIA was ready by September 2001 and was approved in October 2001. On 14 December 2001 the Flemish Parliament approved by a majority of votes a Validation Decree enabling work on the Deurganck dock to resume. Work resumed on 13 April 2002.

Implementation stage III: 2000-2002

The Deurganck dock compensation had consequences for the situation in Kruibeke. The Validation Decree of the Flemish Parliament (14/12/2001) and the Resolution of the Flemish government (20/02/2002) ensured the construction and exploitation of the Deurganck dock on condition that the requirements of the Birds and Habitats Directives were met. The decree linked each construction permit for infrastructure works with a permit for nature compensation measures. The permits were guaranteed and could not be challenged in the court of appeal. Moreover, the decree provided a detailed matrix of responsibilities for each actor at each stage of implementation of the compensation measures. It also launched a monitoring programme and maintenance commission to ensure that compensation goals were attained. The Resolution of the Flemish Government facilitated the implementation of compensation measures in Kruibeke as well as on the Left Bank of the river Scheldt. The following compensation measures were assigned for Kruibeke: 300 hectares of mudflats and marshes, a 150 hectare meadow for birds, and 40 hectares of forest compensation. This meant a change in the project design compared to the 1999 proposal. The statement to the European Commission of the position of Kruibeke in Natura 2000 (Soresma, 2001) was commissioned by the Zeescheldt Division. A varied landscape of grazing heights and wooded lowlands had to be replaced with a more pronounced separation of forest and grassland to accommodate 100 breeding pairs of meadow birds. A set up like this requires grassland to be maintained to keep it from growing over.

The first construction permit for the Kruibeke flood control area was issued in 2002. However, expropriation decisions were also needed for the farming plots and this could take time. Unaware of the implications of the Validation Decree, the majority of polder users were still opposed to the project and unwilling to cooperate. Flemish Dyke law permits the authorities to start work while expropriation decisions are still underway, and the Zeescheldt Division made use of this instrument. Work commenced on the first farming plots by locating building materials, a shed and hiring a contractor. This was a tactical move to show that flood control area had moved from preparation into the realization stage. Farmers on whose plots the work started were the first to react, as they could no longer access their plots while construction literally took place in their backyard. They knew all too well that the financial compensation offered by the government for expropriation was not a viable solution for all 72 farmers in the area and could result in considerable income loss. Eventually, negotiations between the authorities and the farmers opened and dyke law was in the end enforced on fewer than 10 farming plots out of 1385.

At this stage of implementation, the project's flood defence and ecology objectives were linked to a project of overriding public interest (the Deurganck dock), thereby indirectly increasing the societal

ambition of the flood control area (++). At the same time, the project's ecological design was reformulated to accommodate the compensation measures, becoming less dynamic as the open meadow birds area required different maintenance and meant less variation of landscape. However, the tidal inundation area with mudflats and marshes remained almost intact compared with the previous stage (+). The added ecological value would still be considerable compared to the existing situation in the polder, although it would not fully restore the original riverine landscape (+).

In theoretical terms, this stage corresponds to situation no. 3: *forced cooperation.* The balance of power changed in favour of the implementing actor (Pi, Validation decree, Dyke law, and eventually Expropriation decisions) and led to forced cooperation. Other parameters remained unchanged (Table 6.3).

Table 6.3. Implementation Stage III: 2000 – 2002

Specific context: design and nature			Actor characteristics				Outcome
Integration	Use of	Improvement	Mi	Mt	I+	Pi	
++	+	+	+	-	+	+	Forced cooperation

Implementation stage IV: 2003-2011

With the construction permit issued and the expropriation decisions finalized, implementation of the flood control area was secured. The Zeescheldt Division was now motivated to return ownership of the project to the local level, involve the inhabitants and make them 'ambassadors' for the project. The largest group of land users in the polder were the farmers, who were looking to maintain their income, even if only temporarily. The negotiations with the farmers were already open and both actors together sought common solutions and options to make optimum use of the construction time, which it was estimated would take up to ten years. As the negotiations progressed, each farmer's situation was analysed case by case. Apart from financial compensation for the farmers who moved out of the area, two solutions were agreed for those who could remain, given the area's new functions: temporary maintenance contracts for mowing and grazing the grasslands during construction time, and dung subsidies for stock farmers affected by expropriation. As a result of these measures 43 of 72 farmers signed maintenance contracts and are still active in the area at the time of writing. Aside from economic benefit, the farmers perceived the relocation of individual plots closer together and removal of trees in the polder as advantageous.

With these measures in place, the farmers no longer supported the mayor of Kruibeke, who still remains strongly opposed to the project. Two groups emerged within the municipality at this stage: 'believers' and opponents (the mayor's party). Believers support the project's flood security and nature goals. They believe that existing nature will benefit from the implementation and have a more pronounced function in the long term. They value the new forest that is being created and see new opportunities for tourism and nature. The mayor's party does not support either of these goals: existing nature is being destroyed and the flood security calculations by the authorities are not to be trusted. Furthermore, nature and flood security cannot be combined in one area. Engineering solutions to the problem involve storm dams, not flood control areas. In the last elections in 2007 the

mayor's party no longer gained the majority of votes and the new coalition took a positive stance on the flood control area project.

The EIA for the remaining construction permits was finalized in 2006 and permits were issued for all works. There is regular consultation between the municipality and the Zeescheldt Division within the project management committee, where current issues and the state of affairs are discussed. The committee was installed under the Validation Decree and the representatives of Agriculture, Environmental Affairs and the Agency for Wildlife and Forests are also represented on it.

At this stage of implementation, the Zeescheldt Division integrated the project design even further by coupling the economic interests of local stakeholders with the projects ecological objectives, despite the fact that the goals of agriculture are often considered to be at odds with nature (+++). In theoretical terms, this stage corresponds with situation no. 1: *cooperation.* The target group (Mt) is now neutral to implementation now. The remaining parameters are unchanged (Table 6.4).

Table 6.4. Implementation Stage IV: 2003 – 2011

Specific context: design and nature			Actor characteristics				Outcome
Integration	Use of	Improvement	Mi	Mt	I+	Pi	
+++	+	+	+	+/0	+		Cooperation

Discussion and conclusions

The central research question of this thesis - how is the extent of Building with Nature related to the implementation of Natura 2000 requirements – has been addressed in this chapter through a longitudinal case design. The findings of the case study are summarized in Table 6.5.

Design IV, which will be implemented, combines the most project objectives compared with previous designs: flood security, ecology, economy (via Deurganck dock) and local stakeholder interests (partly economic). It reflects a gradual progression of project objectives over the years: in terms of flood security, design I would be sufficient. In terms of ecology, the optimum (dynamic and naturally maintained ecosystem) would be design II. In terms of economy, the Deurganck dock would sooner be realized without extra costs for compensation (without design III) and legal tussles. The biggest local stakeholder, the farmers of Kruibeke, would opt for no flood control area at all, because even with the maintenance measures in place they suffer a net economic loss. However, none of these designs could be implemented: the authorities were cautious to proceed with design I; design II faced opposition; the Deurganck dock faced a legal battle; and no flood control area was not an option, given the flood security risk. The design thus evolved towards a balance among the interests of flood defence, ecology, economy and local stakeholder interests.

Equal distribution along the three components of Building with Nature design does not seem to account for successful implementation. Design II had the most equal distribution among the three defined components. However, the target group did not respond to this design, nature and flood security as project goals lacked political support leading to none-implementation. Design IV, on the

other hand, scored heavily on the component that design II was missing (considerably more economic interests were at stake, including the local). The implementation outcome of design IV was cooperation even though it relied less on nature dynamics to achieve project objectives and had the most unequal distribution along the three components. Overall, it seems that especially the first component of 'Building with Nature' design – integration of nature and societal goals – is correlated with the positive outcome of implementation.

The most obvious role of the EU Natura 2000 was in providing the link to a project of overriding public interest (Deurganck dock). This link changed the balance of power in favour of the implementer (Zeescheldt Division), moving implementation from opposition and non-application into a forced cooperation stage. The move from forced cooperation to a cooperation stage was the initiative of the implementer, but to some extent it was made possible by the compensation requirements for the meadow birds, which offered an opportunity to introduce maintenance contracts. This would not have been possible under design II, which envisaged maintenance by large grazing mammals and excluded any agricultural option.

Table 6.5. Summary of case study findings

Stage		Project objective(s)	Project design			Outcome of implementation
			Integration	Use of	Improvement	
I.	1977-1991	Flood security	0	+	0	None
II.	1992-1999	Flood security Nature	+	++	++	Opposition
		Natura 2000 requirements: Deurganck dock compensation				
III.	2000-2002	Flood security Nature as compensation for the project of overriding public interest	++	+	+	Forced cooperation
IV.	2003-2010	Flood security Nature as compensation for the project of overriding public interest Local stakeholder involvement	+++	+	+	Cooperation

Chapter 7. Reflections and conclusions

In this chapter, the research findings are discussed. The discussion opens by placing the problem definition in perspective and reflecting on the learning process. It continues by examining the role of structural and specific contextual factors in a project's outcome. Building on this discussion, it proposes a practical guide for applying Building with Nature principles in the context of EU Natura 2000 implementation. Following this, the issue of representativeness is addressed and suggestions for further research are made. Finally, the conclusions that answer the research questions will be presented.

Problem definition in perspective

The practical problem as defined in the original research proposal was grounded in an academic, political and practical debate that was current in 2008: the fact that the implementation of European environmental directives was causing project delays and cancellations, including in the field of water infrastructure. Project disruptions were particularly frequent in northwest Europe, including in the Netherlands, the UK and France. Indeed, studies contained numerous examples of disrupted projects, in particular projects that had failed to comply with the provisions of the Birds and Habitats Directives. With such evidence from the field, the EcoShape consortium expected the Natura 2000 requirements to hinder Building with Nature projects just as they hindered projects in the past. A possible solution would be to modify legislation to fit better with Building with Nature principles and thus prevent bottlenecks.

However, having assessed fourteen projects in terms of the two main variables – the application of Article 6 of the Habitats Directive and the respective project design – a slightly different picture started to emerge. The majority of projects that were successful in applying this article had at least some features of the Building with Nature ideas in their design. A more detailed examination of two Dutch projects – Zeewolde and Harderwijk – confirmed that a project with a more-integrated nature design had a greater chance of being approved by the administrative courts provided that certain conditions were met. Following this, an in-depth case study of the Kruibeke flood control area showed a gradual progression of project design from a pure engineering concept towards a Building with Nature-type plan that integrated goals linked to nature with local and national economic goals and flood control. A shift towards this more-integrated approach in Kruibeke was triggered by a national policy initiative (Sigma-plan update), but Natura 2000 requirements clearly had a role in pushing the design towards a Building with Nature solution.

During the period of research, the European Commission issued Guidelines for implementing the Birds and Habitats Directives in estuaries and coastal zones (European Commission, 2011). The guidelines explicitly call for a 'working with nature' approach that would benefit both Natura 2000 areas and social and economic project goals. The guidelines reflected a consensus among the member states, stakeholder organizations and environmental NGOs that integrated projects are a way forward in and around EU estuaries and coasts. This development, combined with the accumulating evidence from this research, were pointing in a new direction, quite different from the initial idea that Natura 2000 rules were a bottleneck to Building with Nature. This new direction was

that Natura 2000 regulations actually provided opportunities for Building with Nature projects. Instead of modifying the legislation, which would be a long-term strategy that would probably require examples of Building with Nature attempts being obstructed in the current regulatory setting, one could chose to pro-actively work with the legislation. Such a strategy requires a change in perception from seeing regulations as 'barriers' to Building with Nature to viewing regulations as 'opportunities' for Building with Nature. Among the practical reasons for seeing Natura 2000 regulations as an opportunity rather than a barrier are the following. Firstly, the EU policy process is well known for being a difficult route for effecting radical change. Much EU policymaking and decision-making (including Natura 2000) displays a deep gradualism and incrementalism. It is simply not possible to initiate bold new plans and significant departures from the *status quo* and expect them to be accepted without being modified significantly (Nugent *et al*., 2003). As the representative of the European Commission's DG Environment put it, "Natura 2000 is just starting to work, and the Directives are perfect". Although the claim of perfection might be going too far, it is true that the attention, knowledge and awareness of the Directives' requirements have increased in the past decade, as have practical experience and case law. As such, the initial claims that they obstructed economic developments have started to subside. Secondly, preliminary results of related Building with Nature governance research has shown that Building with Nature initiatives are more difficult to pursue outside Natura 2000 protected areas, at least in the Netherlands (Smit, 2011). When there is no obligation to take the ecological system into account, decision-makers tend to see nature as a 'luxury' and exclude it from a project. Lastly, in times of budget cuts in the area of nature policy, environmental regulations could be an argument in favour of Building with Nature design as a means to live up to the goals of Natura 2000 and attract other sources of funding. Perhaps Natura 2000 will be the only way to get any nature development implemented at all?

Thus, one could argue that the research that started from the idea that there was a problem in that Natura 2000 requirements obstructed integrated Building with Nature developments concluded with evidence of Natura 2000 regulations and Building with Nature ideas supporting one another in practice. The research results suggest that a broad learning process is taking place at multiple levels and scales in society.

Learning process

Initially, public and private actors within the water infrastructure sector resisted the designation of Natura 2000 sites, tried to downplay the negative effect of projects or even ignored Natura 2000 requirements altogether. Examples of such an attitude are evident in some early cases (Southampton Dibden Bay, Western Scheldt container terminal and Antwerp Deurganck dock). After these developments were taken to court, and their plans then rewritten to include a proper effects assessment, it became clear to project implementers that a negligent attitude towards Natura 2000 regulations was not a cheap option. This signified a change of approach towards including a greater environmental focus in projects, and this enabled movements such as Building with Nature, Working with Nature and Flanders Bays to emerge.

At the EU level, workable solutions were sought that would address the accumulated misunderstandings linked to Natura 2000 requirements and that would be acceptable to the member states, stakeholder organizations and environmental NGOs. The discussions within the expert "Working Group on Estuaries and Coastal Zones" recommended Working with Nature as an approach

and this has been incorporated in the 'Guidelines on the implementation of the Birds and Habitats Directives in estuaries and coastal zones' (European Commission, 2011).

The Kruibeke, Bazel and Rupelmonde case study shows how a similar learning process took place on the project level. At the national level, a project implemented predominantly for economic benefit (the Deurganck dock in this example) was facing the environmental requirements of Natura 2000, while local flood defence projects (the Kruibeke flood control area) were accorded low political priority. When the Deurganck dock project failed to meet the Natura 2000 requirements, the flood control project adjusted its design to incorporate the compensation requirements so that both projects could be implemented and both nature and socioeconomic goals fulfilled.

Speaking in the theoretical terms of Contextual Interaction Theory (CIT), the learning process can be attributed to a shift in the 'cognitions' of project implementers about Natura 2000 requirements. Figure 7.1 depicts this process. Initially, cognitions were diffuse, with Natura 2000 being perceived as a threat (C threat) with implementers' economy-driven projects (M economy) being bounced off the 'wall' by Natura 2000 procedures. After a feedback loop, project implementers have learnt that taking nature into account, alongside economic motives, in project design (M economy, nature) in fact increases the likelihood of a project being resistant to Natura 2000 obstructions (C opportunity). While this requires more resources at an early project stage (RR), at the same time it prevents possible significant negative effects or allows them to be accounted for in a way acceptable to all stakeholders. Consequently, project implementers have come up with alternative approaches, one of them being Building with Nature (BwN), that place ecological goals at the start of the planning process.

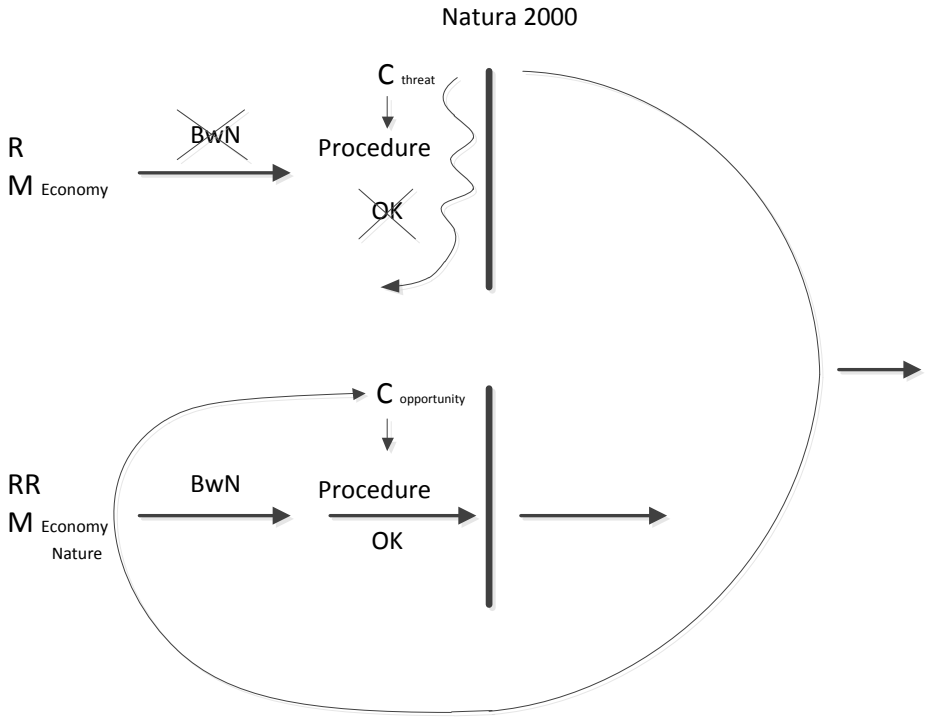


Figure 7.1. Natura 2000 – Building with Nature learning process (C = cognitions, M =motivation, R = resources, BwN = Building with Nature).

The active role of the European Commission in advocating the application of Working with Nature in port development and dredging (European Commission, 2011) and recently also for inland waterway development (European Commission, 2012) is a phenomenon analysed in the Europeanization literature. Specifically, encouraging best practices and models of behaviour, as a strategy pursued by the European Commission, is argued to be efficient for building its 'technocratic' legitimacy (Radaelli, 2000). Imitating the national policy model perceived as the most successful, known as 'mimetism', is instrumental in providing technocratic legitimacy. The Commission cannot be accused of trying to impose 'the view of Brussels' if it follows a policy design that is already in place somewhere in the EU. Although Building with Nature is more of a project-level approach than a policy design, it has its roots in Dutch water management. In 2008, the Commission appointed by the Dutch Government to address the long-term threats of climate change (the Delta Commission) recommended the application of Building with Nature principles for beach and shore nourishments as the primary measure to guarantee the long-term safety and development of the coast (Delta Commission, 2008). As such, advocating Building with Nature at the EU level, albeit under the name Working with Nature, follows the path of imitating a perceived successful national approach.

In addition, according to diffusion of innovation research, it is not unusual that an emerging approach such as Building with Nature finds its way into European Commission Guidelines. According to Tews *et al.* (2003), international environmental agreements and aspirational recommendations often reflect the 'high' environmental standards of pioneering countries and the agenda-setting power of ambitious, well-organized private actors from those countries. The national adoption of policy innovations practised in other countries, or modelled on internationally promoted 'best practices', are also facilitated by non-state actors. In the case of 'Working with Nature', the World Association for Waterborne Transport Infrastructure (PIANC) fulfilled this role (PIANC, 2011). However, what are the chances of Building with Nature ideas being adopted in other member states given the weak enforcement mechanisms of the European Commission Guidelines? It could be that the adoption of Building with Nature ideas is favoured by the underlying problem structure: unwanted outcomes in the form of project delays and cancellations associated with water infrastructure development in estuaries and coasts within Natura 2000 areas are directly visible and widely discussed by politicians and the public. Once new approaches to environmental policy are practiced in 'forerunner' countries, it becomes increasingly difficult for countries to resist adopting the same approach without threatening their image as legitimate members of an environmentally responsible global society. As a consequence, national environmental policies tend to converge on the level attained by 'forerunner' countries (Tews *et al.*, 2003). As such, despite the weak enforcement mechanism, Building, or Working, with Nature has the potential to become a water management best practice in Natura 2000 areas.

An issue recently raised in the legal literature is that flexibility in the Natura 2000 regime should be sought in actively realizing Natura 2000 goals (van Wijmen *et al*., 2011). Flexibility requires a more pro-active attitude towards Natura 2000 objectives, and could be realized through 'smart implementation'. Such an implementation is characterized by the intention to achieve the goals of the directive in the most efficient and successful way. This view is supported by the results of the case studies in this research that show that, once the Natura 2000 legislation is implemented, room can and should be sought within the existing framework to realize both economic and ecological

goals. Moreover, the feedback loop discussed above illustrates how such pro-active attitudes result from a learning process at the EU, sector and local level.

The analysis presented in this thesis does not necessarily contradict the top-down view on EU policy implementation discussed in Chapter 3. Rather, it shows that it is possible to understand the outcomes of policy implementation in a local, project context even with the complexity of Natura 2000 governance. In so doing, both CIT and a case-study strategy are helpful in identifying the likely causal path.

In addition, the analysis has shown that the impact of EU policy on national developments cannot be isolated from local factors and further that the claims of the EU having a tremendous impact on national developments are unfounded. This finding is supported by other research on the effects on national developments of EU policy (Haverland, 2006) and also by the findings of quantitative impact studies in the Dutch literature. These include a review of lawsuits in the Netherlands between 2003 and 2008 in which the Birds and Habitats Directives have played a prominent role (Algemene Rekenkamer, 2007, Beunen, 2006, Kistenkas and Kuindersma, 2005 cited in Beunen *et al.*, 2009), a review of permits issued under Article 19d of the Dutch Nature Conservation Act between October 1, 2005 and July 31, 2008 (Broekmeyer *et al.*, 2008) and of the overall impact of EU directives on Laws, Royal Decrees and Ministerial decisions in the Netherlands (Bovens and Yesilkagit, 2010), all of which speak of a fairly limited impact.

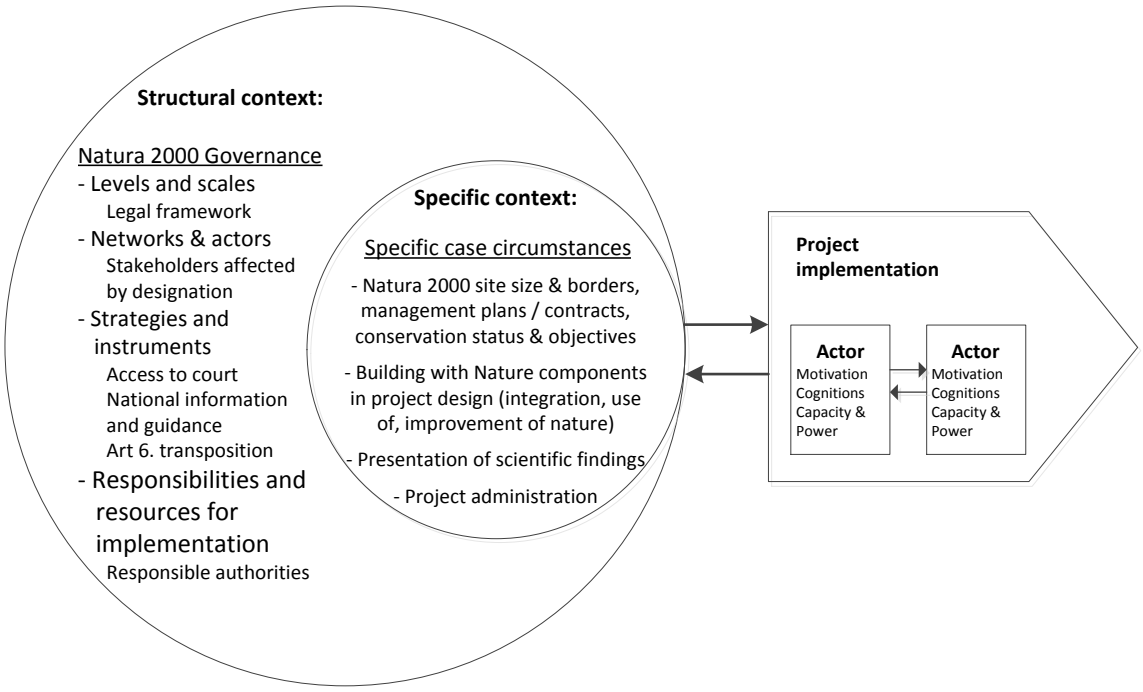


Figure 7.2. Natura 2000 contextual factors

Contextual factors in project outcomes

In Figure 3.5 (Chapter 3) Natura 2000 governance factors were categorized according to the contextual layers of CIT. The analysis of both the Waterfront Harderwijk and the coastal zone Zeewolde cases added two more factors of specific and structural context: project administration and the presentation of scientific data. The analysis of the Kruibeke, Bazel and Rupelmonde case

illustrated how the distribution of Building with Nature components in a project design evolved over time. These research insights are added to the Natura 2000 governance factors in Figure 7.2.

Case study results are somewhat inconclusive regarding the role of *stakeholders affected by designation*. In the Harderwijk case, a local NGO was involved in project preparation, and several agreements between the authorities and the NGO were drawn up as a result of negotiations. Zeewolde authorities, on the other hand, in another case only informed the same NGO in the final project stage. However, in both approaches, none of the strategies satisfied the NGO, which lodged appeals against both projects. In the Kruibeke study, local farmers and environmental groups had a history of protesting against the authorities' plans. However, it was not until the obligation to compensate for the Deurganck dock was in place that negotiations with farmers were opened, leading to the farmers' involvement in maintaining the meadow bird area (a Natura 2000 site). By linking Antwerp's overriding economic interest with less urgent flood security and a nature project in Kruibeke, Natura 2000 indirectly forced more cooperative interaction among the stakeholders. Looking back, one can say that earlier cooperative interaction among environmental NGOs, farmers and the authorities in Antwerp, as well as in Kruibeke, would have avoided a lot of frustration and legal challenges. In the absence of conclusive case study results, the role of stakeholders needs to be determined on a case-by-case basis.

Access to court determines the possibilities for the general public or those affected to legally contest a project decision. Courts in some member states are more accessible than in others, but where there was a possibility to contest a decision, the public would often do so.

Authorities responsible for Natura 2000 implementation in a member state. According to the literature, it makes a difference whether Natura 2000 implementation is delegated territorially (as to the provinces and to NGOs in the Netherlands) or functionally (as to English Nature in the UK). The latter has been argued as more efficient for the preparation of management plans and for the application of Article 6 of the Habitats Directive. However, this research found cases with negative outcomes in the UK as well as in the Netherlands. It is plausible that national agencies and regional authorities played a role in the negative outcomes by failing to provide sufficient *national information and guidance* regarding Natura 2000 requirements in the member state. The European Commission published its first implementation manual for Article 6 in 2000, regional guidance documents in the Netherlands (such as for the Wadden Sea area) followed in 2002 but national guidance only in 2004 and 2005 (LNV, 2004, 2005). The original gap between the Directives' requirements and practice has largely been addressed through several successive guidance documents (national as well as European), the growing experience with applying Article 6 and the increasing case law. *National responsible authorities* are now abreast of Natura 2000 assessment requirements, and in many cases are responsible for issuing permits for intended plans and projects.

Specific contextual factors

The case studies show that resistance by project implementers to designation, and attempts to change *Natura 2000 sites' sizes and borders,* are associated with negative implementation outcomes (project delays and cancellations). The designation of Natura 2000 sites has to be based on ecological data and any decrease in their size is allowed only in exceptional cases (Leybucht case C-57/89). On the other hand, projects that did not oppose designation resulted in NGOs withdrawing their

objections. As such, a more pro-active attitude towards designation (and Natura 2000 in general) can be a beneficial strategy for project implementers.

The case studies failed to find any influence of *Natura 2000 management plans* on project implementation. This may be due to the fact that, in many cases, the management plans were still in preparation. The possibilities and ways of including Building with Nature initiatives in management plans deserves further investigation.

Natura 2000 site conservation status and objectives were closely related to the application of A*rticle. 6 of the Habitats Directive* in specific circumstances. The implementers of all the successful projects discussed in Chapter 4 (Table 4.1) ensured that Natura 2000 conservation goals for the site would be achieved within their project designs, whether it was a compensation project or one with no significant established effect. Hence, *the site's conservation objectives* should be used alongside other project objectives as a starting point in any proposed development. This can be seen as specifying the first component of the *Building with Nature design* in a Natura 2000 context, which extends its definition to the *integration* of socioeconomic project objectives with Natura 2000 site conservation objectives. Case study results show that successful projects adjusted their design to reflect Natura 2000 conservation objectives and contributed to achieving these objectives (as in Zeewolde). Less successful projects, on the other hand, tried to create new habitat based on existing nature development initiatives to neutralize the habitat lost due to project work (as in Harderwijk). It would therefore seem that a project design is more successful if it is fine-tuned to Natura 2000 conservation objectives, especially when a project requires a reduction in the size of a Natura 2000 area (such as with the 10 ha decrease of bird forage and sanctuary area due to construction in the Zeewolde case).

Presentation of scientific data to prove that the coherence of the Natura 2000 network has been ensured and that conservation objectives have been achieved appears to be required for successful project implementation. Such data are often part of an ecological effects assessment, at either the pre-assessment or an appropriate assessment stage. The Waterfront Harderwijk and coastal zone Zeewolde comparison illustrates that some uncertainty was present in the assessment of each project's ecological effects. For a successful project outcome, the data showing that the Natura 2000 conservation objectives and the overall coherence of the Natura 2000 network were ensured were more important than investigating the 'significance' of effects to the full depth of available scientific knowledge. In this process, drawing on previous experience and using a consistent vocabulary, both in scientific reports and in written court defences, proved useful.

Project administration is another factor that could influence the likelihood of a successful project implementation. The analysis of Waterfront Harderwijk and coastal zone Zeewolde cases shows that integrating socioeconomic and project goals requires a tailor-made approach, which is more easily achieved by project administrations that are flexible and more rapidly react to changing circumstances. In less flexible and more traditional administrations, the development focus often shifts away from a consistent nature development plan towards industrial and residential development needs.

The results of the in-depth case studies, in particular the Kruibeke, Bazel and Rupelmonde case, suggest that the first component of *Building with Nature design* – the *integration* of nature and

socioeconomic goals – is strongly related with a positive implementation outcome. Using this insight, an almost similar distribution of implementation outcomes would emerge if one redrew Table 4.1 (the results from multiple cases studies) using just the first component of the Building with Nature design. In terms of the remaining components, it should be noted that the *integration* of nature and socioeconomic goals often coincided with *improved* nature values, and less often with the *use* of nature dynamics. The link between *integration* and *improvement* is straightforward: to improve nature values, a project developer first needs to acknowledge and then integrate nature goals into a project design. The role of the *use* of nature dynamics is expected to increase as the knowledge gained in the Building with Nature research programme becomes more widely available. A more thorough understanding of ecosystem dynamics and processes, and the application of this knowledge in practice, will boost the *use* of nature dynamics and thereby increase its role in project outcomes. The scientific expertise related to the three design components will also be an added value of Building with Nature approach compared to those approaches that aim solely for integration.

Practical guidance

The practical goal of this research has been to gain insight into how the Building with Nature concept could be applied in Natura 2000 areas. Naturally, an understanding of Natura 2000 goals and procedures is necessary for the successful application of Building with Nature ideas in Natura 2000 areas. An understanding of the interrelatedness between specific contextual factors of Natura 2000 areas and Building with Nature concepts, as depicted in Figure 7.2 and discussed above, is applicable equally to all three components of Building with Nature design. The proposition that the *improvement of* nature values should be related to the Natura 2000 conservation objectives is in line with the case study results presented in this thesis. As for the claim sometimes made in the literature (Ledoux *et al*., 2000, Lee 2001 cited in Beunen *et al.*, 2009) that the static approach reflected in the Birds and Habitats Directives could conflict with the *use of* nature dynamics, this research failed to find any evidence that dynamics which do *not* contradict the coherence of Natura 2000 network and its conservation objectives are *not* possible.

The practical guidance offered here for the application of Building with Nature concepts in Natura 2000 areas builds on the above discussion of specific contextual factors. Habitat assessment under Article 6 is perceived as the main instrument for the Natura 2000 network and this includes a number of steps that have been transposed into the national legislation of all member states. As such, it is a good starting point for a guidance document that would outline the 'logic' of decision-making according to Building with Nature principles in the context of Natura 2000 areas. This guidance is meant for public and private authorities intending to carry out a project and can be used within the broader context of structural Natura 2000 contextual factors as outlined in Figure 7.2 (background information on the factors is provided in Chapter 2).

There are at least two opportunities for introducing Building with Nature ideas into the Habitats Directive Article 6 procedure. The first possibility is in the pre-screening phase of a project, when Building with Nature concepts could be useful in avoiding significant adverse effects on the Natura 2000 area. The following questions could be helpful at this stage:

1. How can we adjust the Building with Nature design so that it contributes to Natura 2000 conservation objectives?

2. How can we make our Building with Nature initiative beneficial for the management of the Natura 2000 site?

3. How can we tailor the Building with Nature design to the size of and effects on the Natura 2000 site (such as through step-by-step realization)?

4. How can we upscale or downscale the Building with Nature initiative to safeguard the overall coherence of the Natura 2000 network?

An outcome of such adjustments could be a Building with Nature design that supports the favourable conservation status of protected habitats and species.

The second possibility could be adopted when adjustments at the pre-screening phase have failed to produce a design that excludes significant negative effects. This could occur for developments with an overriding economic interest (such as with navigation channel deepening or port development). With an absence of alternative solutions, possibilities could be explored to fulfil Building with Nature principles alongside, or as part of, a compensation plan. The benefit of the Building with Nature concept here is that it could generate local stakeholder support and/or create new possibilities for area development. It could provide a platform for cooperative interactions among the stakeholders and prevent frustrations and legal contests later in the process provided such interactions start as soon as it becomes clear that compensation actions are unavoidable. The following questions could be helpful at this stage:

1. What are the possibilities for incorporating Building with Nature ideas as part of a compensation plan?

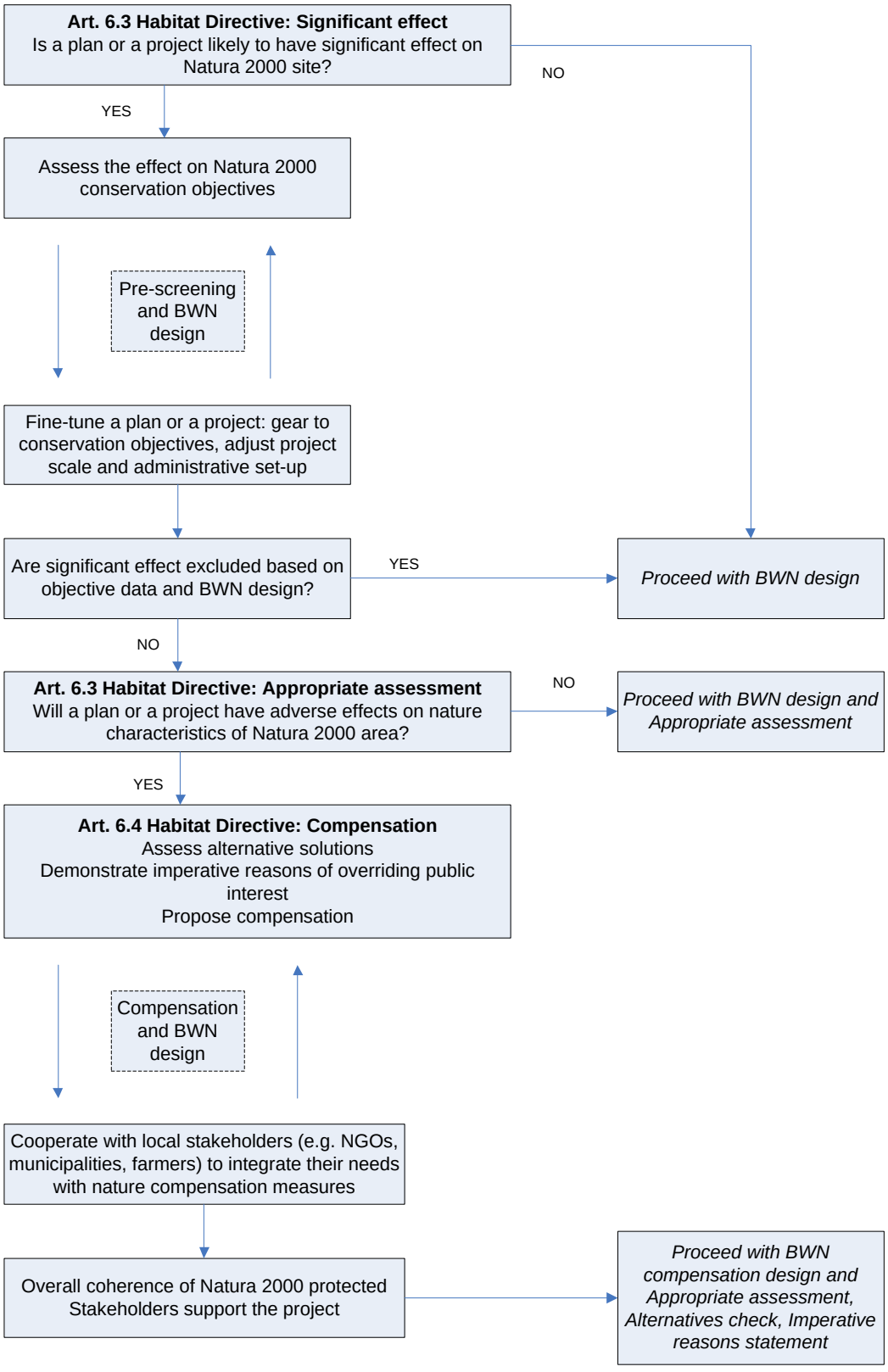
2. How can we adjust the Building with Nature design to benefit local stakeholders' interests?

3. How can we use Building with Nature concepts to facilitate cooperative interaction among stakeholders?

The flow chart in Figure 7.3 summarizes the proposed decision-making logic in the context of assessment according to Article 6 of the Habitats Directive.

Representativeness

In this research, a non-probability sampling technique was used to select the cases to be studied and no effort was made to ensure that the sample was representative of a larger population in the statistical sense of the word ‘representative’ which relies on random sampling. The objective in the case selection was to achieve a sufficient degree of explanatory richness to enable generalizations that apply to well-defined types, or sub-types, of cases, or to be able to make cumulatively contingent generalizations (George and Bennett, 2005). The case sub-type in this research was defined, in terms of the main variables of interest, as water infrastructure projects with various Building with Nature designs that faced meeting Natura 2000 requirements in the northwest Europe



BWN = Building with Nature

Figure 7.3. The Building with Nature design principles applied to the decision-making logic of Habitats Directive Assessment Article 6.

estuaries and coasts. Fourteen cases, including examples in the Netherlands, Flanders, the UK and Germany were studied. This sub-set is very comprehensive in terms of the population of designs with a high level of Building with Nature content, as the number of such designs is extremely limited. For the in-depth case studies (in the Netherlands and Flanders), information-rich cases where the relationship of interest was evident were selected. The projects studied are necessarily unrepresentative of wider populations in terms of the requirements of quantitative methodologies, but they do enable contingent generalizations for project subtypes similar to the cases studied. To the extent that there is an issue with the representativeness or a selection-bias problem in a particular case study, the danger is perhaps better described as the problem of 'overgeneralizing' findings to types or subclasses of cases that are unlike those actually studied (George and Bennett, 2005).

Further research

Further research within the specific field of this thesis could address the limitations present here linked to a small-N methodology and test whether the conclusions of this research hold for a larger universe of cases. Here, quantitative large-N comparative research on a wider geographical scale could be a valuable undertaking, although the number of projects incorporating a high level of Building with Nature design could be limited. Further research could also undertake qualitative in-depth studies of cases from the sub-set presented in Chapter 4. On the qualitative side, it would be useful to explore the *use* of the nature dynamics component of Building with Nature in Natura 2000 areas once this aspect has been applied on a larger scale.

From the perspective of the Building with Nature research programme as a whole, the carrying out of pilot projects developed by Eco Shape Foundation – specifically the Holland Coast, South-West Delta and the Marker and IJssel lakes in the Netherlands (see Chapter 1, box 1) – promises fruitful data on the challenges faced during project execution and monitoring. Future lines of research could focus on understanding the pilot projects' evolution, the feasibility and acceptance of Building with Nature ideas in existing governance settings, the assessment of their effectiveness, and the possibilities of export of Building with Nature concepts.

Conclusions

The central research question of this thesis was:

How is the extent of Building with Nature design related to the implementation of Natura 2000 requirements in water infrastructure projects in northwest Europe's estuaries and coasts?

The main assertion formulated in Chapter 1 was that the more that Building with Nature ideas are incorporated in the design of a project, the better it will fulfil the requirements for Natura 2000 sites.

To answer the central research question, sub-questions were formulated, and their answers are summarized here:

Q1: Which Natura 2000 governance factors, at the level of the member states, define the context for implementing water infrastructure projects in estuaries and coastal zones?

In Chapter 2, the factors which constitute the Natura 2000 policy field within the EU member states were identified based on a review of the recent literature. Although the implementation of Natura 2000 varies among member states, the core differences can be described in terms of the following nine factors: the size and borders of the designated Natura 2000 sites; national, federal or regional legislation transposing the Directives' requirements into the legal order of the member state and the possibility of Directives' direct effect; the transposition of Article 6 of the Habitats Directive into the legal orders of a member state; the responsible national agency or regional authority formally charged with Natura 2000 implementation in the member state concerned; stakeholders affected by the designation of a Natura 2000 site and their involvement in negotiations; site management plans and/or contracts; the conservation status and objectives of the site; access to the courts by the general public to contest the application of Article 6 of the Habitats Directive; and national information and guidance on Article 6 of the Habitats Directive in the member states concerned.

Q2: How does Contextual Interaction Theory (CIT) order and structure Natura 2000 governance factors and Building with Nature in implementation processes, and what are the implications for research methodology?

With the help of CIT, the factors outlined in Chapter 2 were categorized based on specific case circumstances and structural contextual factors. The specific context includes case-related circumstances and geographical characteristics of the place, while the structural context refers to the governance factors. In this research, the Natura 2000 site size, management plans and/or contracts, the conservation status and the objectives were defined as specific contextual factors. The extent of Building with Nature in the design is also part of the specific context according to CIT. The remaining factors were categorized under the structural context. CIT was used in this thesis as a framework, or conceptual lens, to guide the exploration of the linkage between the extent of Building with Nature design and the outcome of implementing Natura 2000 requirements at the project level. CIT was not used to generate and test a hypothesis related to the operation of this linkage, and method triangulation was used to increase the confidence in the research results with the linkage analysed using three different case study designs. The character of the inquiry presented within each case study is qualitative and exploratory.

Q3: How is the extent of Building with Nature related to the implementation of Natura 2000 requirements? (answered using a multiple case study design)

In Chapter 4, a total of fourteen water infrastructure projects in Natura 2000 estuaries and coasts in the Netherlands, Flanders, the UK and Germany were systematically assessed in terms of the values of the main research variables. A multiple case-study design included analysing each case within its geomorphological, ecological and socioeconomic contexts. The results of the analysis showed that projects with more Building with Nature components in their design were more successful in meeting the Natura 2000 requirements.

Q4: How is the extent of Building with Nature related to the implementation of Natura 2000 requirements? (answered using a quasi-experimental case study design)

In Chapter 5, two Dutch cases were compared in a quasi-experimental design setting: Waterfront Harderwijk and a coastal development in Zeewolde. The modus operandi method of analysis was

used to rule out rival independent variables identified with the help of CIT. The analysis confirmed that the integration of nature and socioeconomic goals (the first component of Building with Nature design) can increase the likelihood of coastal zone development projects being approved if their fulfilment of Natura 2000 requirements is challenged in court.

Q5: How is the extent of Building with Nature related to the implementation of Natura 2000 requirements? (answered using a longitudinal case study design)

In Chapter 6, the implementation of a flood control project in the Scheldt estuary in Flanders was used as the basis for carrying out a theory-guided analysis of project chronology in a longitudinal design setting. The project was analysed at four different points in time to reveal changes in the extent of Building with Nature design and the outcomes of project implementation. The analysis showed that the extent of including Building with Nature ideas gradually increased in the design of this flood control area, leading to a successful implementation outcome. More specifically, the first component of Building with Nature design (the integration of nature and socioeconomic goals) showed a consistent increase.

The research presented in this thesis supports the assertion that adopting a Building with Nature design is related to the successful implementation of Natura 2000 requirements in water infrastructure projects in estuaries and coasts in northwest Europe. Specifically, applying Building with Nature design contributes to successful project-level outcomes in Natura 2000 areas and, conversely, Natura 2000 requirements encourage and enable Building with Nature designs.

References

Aarninkhof S.G.J., Dalfsen J.A. van, Mulder J.P.M. and Rijks D. (2010) *Sustainable Development of Nourished Shorelines.* Innovations in Project Design and Realisation. Paper presented at PIANC MMX Congress, Liverpool UK.

Andrews J.E., Burgess D., Cave R.R., Coombes E.G., Jickells T.D., Parkes D.J., Turner R.K. (2006) Biogeochemical value of managed realignment, Humber estuary, UK, *Science of The Total Environment*, Vol 371, Nr 1-3, pp 19-30

Arentsen M.J., J.T.A. Bressers and O'Toole L.J., Jr. (2000) Institutional and policy responses to uncertainty in environmental policy: A comparison of Dutch and US styles, in: Rosenbaum, Walter A. and J.T.A. Bressers (Eds.), Uncertainty and environmental policy, Symposium, in: Policy Studies Journal, Vol. 28, No. 3, 2000, pp. 597-611.

Arnouts R.C.M. and Kistenkas F.H. (2011) *Nederland op slot door Natura 2000: de discussie ontrafeld.* Bijlage bij WOt-paper 7 – De deur klemt. Werkdocumetn 236. Wettelijke Onderzoekstaken Natuur & Milieu, Wageningen: Alterra

Babbie E. (2004) *The Practice of Social Research*. 10th edition. Belmont, CA: Thomson-Wadsworth

Backes C., M-J. Bogaardt, T. Nijmeijer and J. Vader (2007) *De Habitattoets Getoetst.* LEI rapport 20407, den Haag: LEI.

Backes Ch. W., Freriks A.A. and Nijmeijer A.G.A. (2006) *Article 6 Habitats Directive – a comparative law study on the implementation of Article 6 Habitats Directive in some member states.* Utrecht, Centrum voor Omgevingsrecht en Beleid/NILOS

Bastmeijer C.J. and Verschuuren J.M. (2004) 'Juridische knelpunten bij de bescherming van natuurgebieden', *Milieu en Recht*, jaargang 31, nr.3

Bastmeijer C.J. and Verschuuren, J.M. (2003) *Knelpunten bij de Uitvoering van de Natuurbeschermingswetgeving in Nederland.* Eindrapport in opdracht van Ministerie van Financiën. Centrum voor Wetgevingsvraagstukken, Tilburg, Universiteit van Tilburg

Beheerscommissie Natuur Kruibeke-Bazel-Rupelmonde (2009) *Jaarverslag 2009.* Gent: Beheerscommissie Natuur Kruibeke-Bazel-Rupelmonde.

Beijen B.A (2010) *De Kwaliteit van Milieurichtlijnen. Europese Wetgeving als Oorzaak van Implementatieproblemen*. PhD thesis, University of Utrecht. Den Haag, Boom Juridische Uitgevers

Beunen R., van der Knaap W.G.M. and Biesbroek G.R. (2009) 'Implementation and Integration of EU Environmental Directives. Experiences from the Netherlands', *Environmental Policy and Governance*, 19, pp. 57-69

Beunen R. (2006) 'European Nature Conservation Legislation and Spatial Planning: For better or for worse?', *Journal of Environmental Planning and Management*, vol 49, no 4, pp 605-619

Beunen R. and de Vries, J.R. (2011) 'The governance of Natura 2000 sites: the importance of initial choices in the organization of planning processes', *Journal of Environmental Planning and Management*, vol 54, no 8, pp 1041-1059

Blaikie N.W.H. (1991) A critique of the use of triangulation in social research, *Quality & Quantity*, 25, 115-136

de Boer C. and J.T.A. Bressers (2011) *Complex and dynamic implementation processes. Analyzing the renaturalization of the Dutch Regge river.* Enschede: University of Twente

Bouwma I.M., Kamphorst D.A., Beunen R. and van Apeldoorn R.C. (2008) *Natura 2000 Benchmark. A comparative analysis of the discussion on Natura 2000 management issues.* Rapport 90. Wettelijke Onderzoekstaken Natuur & Milieu, Wageningen, Alterra

Bovens M. and K. Yesilkagit (2010) 'The EU as Lawmaker: the Impact of EU Directives on National Regulation in the Netherlands', *Public Administration*, 88, 1, 57-74

Bressers J.T.A. and Kuks S.M.M. (2004) *Integrated governance and water basin management: Conditions for regime change towards sustainability*. Dordrecht-Boston-London: Kluwer Academic Publishers.

Bressers J.T.A. (1998) The choice of policy instruments in policy networks, in: B. Guy Peters and Frans van Nispen (Eds.), *Public policy instruments*, Cheltenham: Edward Elgar, pp. 85-105.

Bressers J.T.A. and A. Ringeling (1995) Policy implementation, in: Walter Kickert and Frans van Vught (Eds.), *Public policy and administration sciences in the Netherlands*, London: Prentice Hall / Harvester Wheatsheaf, pp. 125-146.

Bressers J.T.A. and K. Lulofs (2010) *Governance and complexity in water management: Creating cooperation through boundary spanning strategies*, Cheltenham: Edward Elgar, 2010.

Bressers J.T.A. and O'Toole L.J., Jr. (1998) 'The selection of policy instruments: A network based perspective', *Journal of Public Policy*, Vol. 18, No. 3, pp. 213-239.

Bressers J.T.A. (1983) Beleidseffectiviteit en waterkwaliteitsbeleid, Enschede: Universiteit Twente.

Bressers J.T.A. (2004) Implementing Sustainable Development: How to Know What Works, Where, When and How, in: W.M. Lafferty (ed.), *Governance for Sustainable Development: The Challenge of Adapting Form to Function*. Cheltenham, Northampton MA: Edward Elgar, pp. 284–318.

Bressers J.T.A. (2009) From Public Administration to Policy Networks: Contextual Interaction Analysis, in: S. Nahrath and F. Varone (eds), *Rediscovering Public Law and Public Administration in Comparative Policy Analysis: a Tribute to Peter Knoepfe.,* Bern: Haupt Verlag, pp. 123-141

Bressers J.T.A. and P.J. Klok (1988) 'Fundamental for a theory of policy instruments', *International Journal of Social Economics*, Vol. 15, No. ¾, pp. 22-41.

Bressers J.T.A. and S. Kuks (2003) What does “governance” mean? From conception to elaboration, in: Hans Bressers and Walter Rosenbaum (Eds.) *Achieving sustainable development: The challenge of governance across social scales*, Westport, Connecticut: Praeger, pp. 65-88.

Bressers J.T.A. and W. Rosenbaum (2000) ‘Innovation, learning and environmental policy: Overcoming “a plague of uncertainties”, *Policy Studies Journal*, Vol. 28, No. 3, pp. 523-539.

Bressers J.T.A. and W. Rosenbaum (2003) Social scales, sustainability, and governance: An introduction, in: Hans Bressers and Walter Rosenbaum (Eds.) *Achieving sustainable development: The challenge of governance across social scales*, Westport, Connecticut: Praeger, pp. 3-24.

Bressers J.T.A., O’Toole L.J., Jr. and Richardson J. (1995) Networks as models of analysis, in: Hans Bressers, Laurence J. O’Toole, Jr. and Jeremy Richardson (Eds.), *Networks for water policy: A comparative perspective*, pp. 1-23.

Broekmeyer M.E.A., Griffioen A.J. and Kamphorst D.A. (2008) *Vergunningverlening Natuurbeschermingsrecht.* Een overzicht van aanvragen en besluiten art. 19d Natuurbeschermingswet 1998 sinds 1 oktober 2005 tot 31 Juli 2008. Alterra-rapport 1748. Wageningen: Alterra

Case 127/02 Landelijke Vereniging tot Behoud van de Waddenzee, Nederlandse Vereniging tot Bescherming van Vogels vs. Staatssecretaris van Landbouw, Natuurbeheer en Visserij [23.10.2004] OJ C 262 p. 2

Case 200706044/1 and 200706194/1 Waterfront-Noord [22.10.2008] Administrative Jurisdiction Division of the Council of State, Afdeling Bestuursrechtspraak

Case 200800948/1 Kustzone Polderwijk Zeewolde [29.04.2009] Administrative Jurisdiction Division of the Council of State, Afdeling Bestuursrechtspraak

Case 57/89 Commission vs. Federal Republic of Germany [28.02.1991] E.C.R. p. I-00883

Case 57/89 Commission vs. Federal Republic of Germany [28.02.1991] E.C.R. p. I-00883

CBS (2006) Centraal Bureau voor de Statistiek. Staat van instandhouding Habitats en Soorten. Online at: www.compendiumvoordeleefomgeving.nl

Chapin F.S. III, Zavaleta E.S., Eviner V.T., Naylor R.L., Vitousek P.M., Reynolds H.L., Hooper D.U., Lavorel S., Sala O.E., Hobbie S.E., Mack M.C. and Diaz S. (2000) ‘Consequences of changing biodiversity’, *Nature*, Vol. 405, pp.234-242

Collier D. (1995) ‘Translating Quantitative Methods for Qualitative Researchers: The Case of Selection Bias’, *American Political Science Review*, Vol. 89, No.2, pp.461-466

Council Directive 2000/60/EC of 23 October 2000 establishing a framework for Community action in the field of water policy (Water Framework Directive), OJ L 327, p. 1

Council Directive 2008/56/EC of 17 June 2008 establishing a framework for community action in the field of marine environmental policy (Marine Strategy Framework Directive), OJ L 164 pp.19-40

Cox T., Maris T., De Vleeschauwer P., De Mulder T., Soetaert K., and Meire P. (2006) 'Flood control areas as an opportunity to restore estuarine habitat', *Ecological Engineering*, 28 (1), 55-63

Decleer K. (2007) *Europees beschermde natuur in Vlaanderen en het Belgische deel van de Noordzee: Habitattypen, dier- en plantsoorten*. INBO M.2007.01 Brussel, Instituut voor Natuur- en Bosonderzoek

Delta Commission (2008) *Working together with water. A living land builds for its future: Findings of the Deltacommissie 2008. Summary and conclusions.* Delta Commission: the Hague. Available on-line at: http://www.deltacommissie.com/doc/deltareport_summary.pdf [Accessed 2 August 2012]

Deltares (2009) *Towards sustainable development of deltas, estuaries and coastal zones. Trends and responses.* Deltares: Delft

Denzin N.K. (1970) *The Research Act in Sociology : a theoretical introduction to sociological methods.* London: Butterworths

DHV (2007) *Projectnota MER Delflandse kust.* Dossier W3487-02.001, DHV B.V., Amersfoort, Netherlands.

Dimitrakopoulos D. and J. Richardson (2001) Implementing EU public policy, in: Richardson J. (Ed.) *European Union. Power and Policy Making.* 2nd edition. Routledge London/New York

Easton D. (1966) *Varieties of Political Theory.* Upper Saddle River, NL: Prentice Hall

EcoShape (2009) *Oyster reef implementation plan for artificial reefs in the Oosterschelde.* Internal Memo. Dordrecht: EcoShape

EcoShape (2012) Available on-line at: http://ecoshape.nl/examples.html

EEC (1979) Council Directive 79/409/EEC of 25 April 1979 on the Conservation of Wild Birds, OJ L 103 pp. 0001-0018

EEC (1992) Council Directive 92/43/EEC of 22 July 1992 on the Conservation of Natural Habitats and of Wild Fauna and Flora, OJ L 206 pp. 0007-0050

European Commission (2000) *Managing Natura 2000 sites: the provisions of Articles 6 of the Habitats Directive 92/43/EEC.* Luxembourg, Office for official publications of the European Communities.

European Commission (2002) *Assessment of plans and projects significantly affecting Natura 2000 sites. Methodological guidance on the provisions of articles 6(3) and (4) of the Habitats Directive 92/43/EEC.* Luxembourg: Office for official publications of the European Communities.

European Commission (2007a) *Guidance document on article 6(4) of the 'Habitats Directive' 92/43/EEC. Clarification of the concepts of: alternative solutions, imperative reasons of overriding public interest, compensatory measures, overall coherence, opinion of the Commission.* Luxembourg: Office for official publications of the European Communities.

European Commission (2007b) *Guidance document on the strict protection of animal species of Community interest under the Habitats Directive 92/43/EEC.* Luxembourg: Office for official publications of the European Communities.

European Commission (2011) *Guidelines on the Implementation of the Birds and Habitats Directives in Estuaries and Coastal Zones; with Particular Attention to Port Development and Dredging.* Luxembourg, Office for Official Publications of the European Communities.

European Commission (2012) *Guidance on Sustainable Inland Waterway Development and Management in the context of the EU Birds and Habitats Directives.* Luxembourg: Office for official publications of the European Communities.

European Communities (2006) Nature and Biodiversity case rulings of the European Court of Justice. Luxembourg: Office for Official Publications of the European Communities. Available on-line at: http://ec.europa.eu/environment/nature/info/pubs/docs/others/ecj_rulings_en.pdf [Accessed 11 July 2012]

European Dredging Association (2005) Dredged material and Environmental Regulations in the EU. Working paper 05/0271. http://www.european-dredging.eu/Publications

European Dredging Association (2012) About dredging, on-line. http://www.european-dredging.eu

Flyvbjerg B. (2006) 'Five Misunderstandings About Case-Study Research', *Qualitative Inquiry*, Vol. 12, No. 2, pp. 219-245

Freriks A. (2004) Gebiedsbescherming op grond van de Vogelrichtlijn en de Habitatrichtlijn: implementatie in Nederland, in: F.C.M.A. Michiels and L. Lavrysen (eds.) *Milieurecht in de lage landen.* Den Haag, Boom Juridische Uitgevers

Gemeente Harderwijk (2006) *Bestemmingsplan Waterfront-Noord.* Harderwijk/Amersfoort: Bügel Hajema adviseurs

Gemeente Zeewolde (2007) *Ontwerp Bestemmingsplan Kustzone Polderwijk. Toelichting.* Amsterdam: Royal Haskoning Nederland BV, Ruimtelijke Ontwikkeling

General Administrative Law Act (Algemene Wet Bestuursrecht) [online]. Available from: http://www.justitie.nl/onderwerpen/wetgeving/awb [Accessed 20 November 2009]

George A.L. and Bennet A. (2005) *Case Studies and Theory Development in the Social Sciences.* Cambridge, Massachusetts; London, England: MIT Press

Gerring J. (2007) *Case Study Research: Principles and Practices.* New York: Cambridge University Press

Goggin M.L., A. O'M. Bowman, J.P. Lester and L.J. O'Toole, Jr. (1990) *Implementation theory and practice: Toward a third generation*, Glenfield Ill. USA: Scott, Foresman.

Gregg B. (1999) 'Using Legal Rules in an Indeterminate World: Overcoming the Limitations of Jurisprudence', *Political Theory*, vol. 27, nr. 3, pp.357-378

Gschwend T. and F. Schimmelfennig (2007) *Research Design in Political Science. How to Practice what they Preach.* Basingstoke: Palgrave Macmillan

Hamburg Port Authority and WSD-Nord (2006) *Concept for a sustainable development of the Tidal Elbe River as an artery of the metropolitan region Hamburg and beyond.* On line at: http://www.tideelbe.de/files/strategiepapier_tideelbe_komplett_english_final_020408.pdf.

Haverland M. (2006) 'Does the EU cause domestic developments? Improving case selection in Europeanization research', *West European Politics*, 29(1), 134-146

Hjern B. (1982) 'Implementation research— the link gone missing', *Journal of Public Policy*, Vol. 2, No. 3, pp. 301-308

Hjern B. and C. Hull (1982) 'Helping small firms grow', *European Journal of Political Research*, Vol. 10, pp. 187-198

Hommes S. (2006) *Role of stakeholders' perspectives in complex water issues. A case study: Project Mainport Rotterdam, Appropriate Assessment Wadden Sea,* CE&M research report 2006W-004/WEM-008. University of Twente, Enschede, Netherlands.

Hommes S., Hulscher S.J.M.H., Mulder J.P.M., Otter H.S. and Bressers J.T.A (2009) 'Role of perceptions and knowledge in the impact assessment for the extension of Mainport Rotterdam', *Marine Policy*, 33, 146-156.

Huitema D., Egas W., Hanegraaff S., Kuks S. and Lulofs K. (2006) *Coupling strategies in water management. An exploration on the basis of literature from the policy sciences and related fields.* Institute for Environmental Studies (IVM), Amsterdam, 46 pp.

International Association of Dredging Companies (IADC) (2010) *Facts About Building with Nature.* An Information Update from the IADC – Number 3

Johnson B.L. (1999) 'The role of adaptive management as an operational approach for resource management agencies', *Conservation Ecology,* Vol. 3, Issue 2, Nr. 8. Available online at: http://www.consecol.org/vol3/iss2/art8/

Jordan A. (1993) 'Integrated Pollution Control and the Evolving Style and Structure of Pollution Control in the UK', *Environmental Politics*, 2, 3, 405-427

Jordan A. (1995) *Implementation failure or policy making? How do we theorize the implementation of European Union (EU) environmental legislation?* CSERGE Working paper GEC 95-18

Jordan A. (1999) 'The Implementation of EU Environmental Policy: a Policy Problem without a Political Solution?', *Environment and Planning, Part C, Government & Policy*, vol. 17, issue 1, p. 69-90

King G., R.O. Keohane and S. Verba (1994) *Designing Social Inquiry. Scientific Inference in Qualitative Research.* Princeton, New Jersey: Princeton University Press

Klok P.J. (1991) *Een instrumententheorie voor milieubeleid*, Enschede: Universiteit Twente.

Knill C. (1998) 'European policies: the impact of national administrative traditions', *Journal of Public Policy,* vol. 18, issue 1, p. 1-28

Knill C. and Liefferink D. (2007) *Environmental Politics in the European Union.* Manchester University Press. Manchester/New York

Krämer L. (2007) 'Better Regulation for the EC Environment: on the Quality of EC Environmental Legislation', *Milieu en Recht,* jaargang 34, nr.2

Kratochwill T.R. (1978) Foundations of Time-Series Research. Single Subject research, in: T.R. Kratochwill (Ed). *Strategies for evaluating change.* New York: Academic Press, 2-100

Kruk R.W., de Blust G., van Apeldoorn R.C., Bouwma I.M. and Sier A.R.J. (2010) *Natura 2000. Information and Communication on the designation and management of Natura 2000 sites.* Summary Main report 2: Organizing the management in 27 EU member states. Alterra-rapport 2044.1./INBO.R 2010.28. Wageningen, Alterra

Lieberson S. (1991) 'Small N's and Big Conclusions: An Examination of the Reasoning in Comparative Studies Based on a Small Number of Cases', *Social Forces*, 70, 2, 307-320

Ligteringen J. (1999) *The feasibility of Dutch environmental policy instruments*, Enschede: University of Twente.

LNV, Ministerie van Landbouw, Natuur en Voedselkwaliteit (2004) *Werken aan Natura 2000. Handreiking voor de bescherming van Vogel- en Habitatrichtlijngebieden.* Concept. Ministerie van Landbouw, Natuur en Voedselkwaliteit. Directie Juridische zaken: Den Haag

LNV, Ministerie van Landbouw, Natuur en Voedselkwaliteit (2005) *Algemene Handreiking Natuurbeschermingswet 1998.* Ministerie van Landbouw, Natuur en Voedselkwaliteit. Directie Natuur: Den Haag

Lulofs K. and J.T.A. Bressers (2010) Innovations in water management requiring boundary spanning: roots and concepts, in: J.T.A. Bressers and K. Lulofs (Eds.) *Governance and complexity in water management: Creating cooperation through boundary spanning strategies*, Cheltenham: Edward Elgar.

Lulofs K.R.D. (2001) Implementing Command and Control Directives: the case of Directive 89/429/EEC, in: Glachant M. (Ed.) *Implementing European Environmental Policy.* Cheltenham: Edward Elgar, pp. 99-133.

Majone G. (1996) *Regulating Europe.* Routledge, London & New York

Mastenbroek E. (2003) 'Surviving the Deadline: the Transposition of EU Directives in the Netherlands', *European Union Politics*, Vol. 4, nr. 4, pp.371-395

Mazmanian D.A. and P.A. Sabatier (1983) *Implementation and Public Policy*. Glenview, Illinois: Scott, Foresman.

Meffert M.F. and Gschwend T. (2012) Experimental Triangulation of Coalition Signals: Varying Designs, Converging Results, in: Bernhard Kittel, Wolfgang J. Luhan, Rebecca B. Morton (Eds.) *Experimental political science: principles and practices.* New York : Palgrave Macmillan

Milieu en Veiligheid (1996) *MER Containerdock-West.* Genk: Milieu en Veiligheid vzw

Milieu en Veiligheid, DvL Milieu en Techniek, Aeolus (2001) *MER Linkerscheldeoever – Deurganckdok.* Genk: Milieu en Veiligheid vzw; Weert: DvL Milieu en Techniek B.V.; Genk: Aeolus bvba

Millennium Ecosystem Assessment (2005) *Ecosystems and human well-being, current state and trends*. Vol 1. Island Press, Washington, DC

Ministerie van de Vlaamse Gemeenschap (1999) *Gecontroleerd overstromingsgebied Kruibeke- Bazel-Rupelmonde; naar een vrij toegankelijk natuurgebied en een vergroting van de veiligheid.* Brussel: Ministerie van de Vlaamse Gemeenschap, Afdeling Natuur en het Instituut voor Natuurbehoud

Ministerie van de Vlaamse Gemeenschap (2000) *Aanleg van een Gecontroleerd overstromingsgebied in de polders van Kruibeke, Bazel en Rupelmonde.* Antwerpen: Ministerie van de Vlaamse Gemeenschap, Afdeling Zeeschelde

Ministerie van Economische Zaken, Landbouw en Innovatie (2011) *Implementatie Natura 2000 in Nederland. Analyse naar aanleiding van het Regeerakkoord en de motie van der Staaij c.s. naar nationale koppen, rek en ruimte in de Natura 2000-implementatie.* Den Haag: Ministerie van Economische Zaken, Landbouw en Innovatie

Mink F.J. (2007) *Maritime Infrastructure and Marine Coastal Zones – Issues with the Habitats Directives.* European Dredging Association Paper 06-0347, European Dredging Association, Brussels.

Mohr L.B. (1999) 'The Qualitative Method of Impact Analysis', *American Journal of Evaluation*, vol. 20, nr.1, pp.69-84

Morris R.K.A. and Barham P. (2007) *The Habitats Directive as a Driver for Sustainable Development in the Coastal Zone: the Example of the Humber Estuary*, In: *Sustainable Development Research Advances*, Larson B.A. (Ed.), Hauppauge, Nova Science Publishers, New York.

Natura 2000 Barometer (2010) On-line at:
http://ec.europa.eu/environment/nature/natura2000/barometer/index_en.htm

Nature Protection Act (Natuurbeschermingswet) [online]. Available from:
http://wetten.overheid.nl/BWBR0009641 [Accessed 20 November 2009]

Neumann F., Maes F. and Siciliano F. (2002) *Paralia Nature. Report Phase 1*. Brussels: Institute for Infrastructure, Environment and Innovation

Neven M.G.G., Kistenkas F.H. and van Apeldoorn R.C. (2005) *Eurosites Insights. Image, implementation, interpretation and integration of Natura 2000 in European perspective.* Alterra-rapport 12222.1. Wageningen, Alterra

Nugent N. (2003) *The Government and Politics of the European Union*. Fifth Edition. Durham: Duke University Press

O'Toole L.J., Jr. (1986) 'Policy recommendations for multi-actor implementation: An assessment of the field', *Journal of Public Policy*, Vol. 6, No. 2, pp. 181-210.

O'Toole L.J., Jr. (2000) 'Research on Policy Implementation: Assessment and Prospects', *Journal of Public Administration Research and Theory*, 10, 2, 263-288.

O'Toole L.J., Jr. (2004) 'The Theory-Practice Issue in Policy Implementation Research', *Public Administration*, 82, 2, 309-329

Owens K. (2008) *Understanding how actors influence policy implementation: A comparative study of wetland restorations in New Jersey, Oregon, the Netherlands and Finland.* PhD thesis, Enschede: University of Twente

Paavola J. (2004) 'Protected areas Governance and Justice: Theory and the European Union's Habitats Directive'*, Environmental Sciences*, vol 1, no 1, pp 59-77

PIANC (The World Association for Waterborne Transport Infrastructure) (2011) *PIANC Position Paper "Working with Nature"* [online]. Available from: http://www.pianc.org/workingwithnature.php [Accessed 31 July 2011]

Plancke Y. and Ides S. (2006) 'Pilootproject "Stortstrategie Walsoorden": een nieuwe benadering voor het beheren van de morfologie van de Westerschelde', *Tijdschrift Water,* 26, 61-65, Available on-line at: http://www.tijdschriftwater.be/water26-14HI.pdf.

Pressman J.L. and A. Wildavsky (1973) *Implementation*. Berkeley: University of California.

Radaelli C.M. (2000) 'Policy transfer in the European Union: institutional isomorphism as a source of legitimacy', *Governance, 13*(1), 25-43.

Royal Haskoning (2005) *Visie Kustzone Zeewolde. Eindrapport.* Royal Haskoning Nederland BV, Ruimtelijke Ontwikkeling. Amsterdam

Sahin F. (2007) *The comparative study: the implementation of the Directives 92/43/EEC on the conservation of natural habitats and of wild flora and fauna and 79/409/EEC on the conservation of wild birds in Flanders, France, the Netherlands and the UK.* Brussels: Institute for Infrastructure, Environment and Innovation

Schucht S. (2001) What can we learn from economics and political science analysis on the efficiency and effectiveness of policy implementation? in: Glachant, M. (Ed.) Implementing European Environmental Policy. Edward Elgar Cheltenham, UK; Northhampton, MA, USA

Scriven M. (1976) Maximizing the power of causal investigations: the modus operandi method, in: Glass G.V. (Ed.) Evaluation Studies Review Annual. Vol.1. Sage Publications, Beverly Hills/London

Seawrigh J. and Gerring J. (2008) 'Case Selection Techniques in Case Study Research: A Menu of Qualitative and Quantitative Options', *Political Research Quarterly*, Vol. 61, No. 2, pp. 294-308

Senden L.A.J. (2006) 'De lidstaten en de kwaliteit van Europese wetgeving: geen consumenten, maar co-actoren', *Sociaal-Economische Wetgewing*, vol. 54, nr. 2, p.46-60

Smit M.R.H. (2011) *Lessons Learned and Building with Nature Guidelines GOV 2.1.* Draft version September 2011. Enschede: CSTM, Unviersity of Twente

Smith A. (2000) 'Fitting in with Brussels: Implementing the Urban Waste Water Treatment Directive in England and Wales', *Journal of Environmental Policy and Planning*, 2, 115-134

Soresma (2001) *Kennisgevingsdossier. Afweging aanleg Gecontroleerd Overstromingsgebied te Kruibeke aan de bapalingen van NATURA 2000. Definitief rapport.* Antwerpen: Soresma NV

Soresma (2006) *Project-MER: Zeeschelde L.O. te Kruibeke: realisatie van een gecontroleerd overstromingsgebied. Definitief-MER tekstbundel.* Antwerpen: Soresma NV

StAB, Stichting Advisering Bestuursrechtspraak voor Milieu en Ruimtelijke Ordening (2008) *Verslag ex artikel 8:47 Algemene wet bestuursrecht voor Kustzone Polderwijk Zeewolde* (Deskundigenbericht). StAB / 38039/ H

Steunenberg B. and W. Voermans (2006) *The Transposition of EC directives: a comparative study of instruments, techniques and processes in six member states.* Leiden: Universiteit Leiden

Stoker R.P. (1991) *Reluctant Partners: Implementing Federal Policy*. Pittsburgh, PA: University of Pittsburgh Press

Tauw (2009) *Startnotitie MER Waterfront Harderwijk. De start van een integrale ruimtelijke procedure.* Tauw, Deventer

Tews K., Busch P. and H. Jörgens (2003) 'The Diffusion of New Environmental Policy Instruments', *European Journal of Political Research*, 42: 569-600

van Apeldoorn R.C., Kruk R.W., Bouwma I.M., Ferranti F., de Blust G. and Sier A.R.J. (2010) *Natura 2000. Information and Communication on the designation and management of Natura 2000 sites.* Summary Main report 1: the designation in 27 EU member states. Alterra-rapport 2043.1./INBO.R 2010.24. Wageningen, Alterra

van Apeldoorn R.C. (2011) *Natura 2000 en Recreatie. Voorbeelden van Recreatieactiviteiten in en nabij Natura 2000-gebieden.* Alterra-rapport 2160. Wageningen: Alterra

van der Zouwen M. and van Tatenhove J.P.M. (2002) *Implementatie van Europees natuurbeleid in Nederland.* Planbureaustudies nr.1. Wageningen, Natuurplanbureau

van Hoorick G. (2004) De implementatie van 'Natura 2000' in het Vlaamse Gewest, in: F.C.M.A. Michiels and L. Lavrysen (eds.) *Milieurecht in de lage landen*. Den Haag, Boom Juridische Uitgevers

van Hooydonk E. (2006) *The impact of EU environmental law on waterways and ports.* Sixth Framework Programme Sustainable Surface Transport document M22.00.24.052.001. Antwerp, Maklu Press.

van Slobbe E., de Vriend H.J., Aarninkhof S., Lulofs K., De Vries M. and Dircke P. (forthcoming) 'Building with Nature: in search of resilient storm surge protection strategies', *Natural Hazards,* Vol. 65, pp.947-966, DOI 10.1007/s11069-012-0342-y (published on-line)

van Wijmen, Backes Ch.W., Bastmeijer C.J., Nijmeijer A.G.A. and Schaminée J.H.J. (2011) '*Implementatie van Natura 2000 in Nederland' Review. Bijlage bij Implementatie Natura 2000 in Nederland.* Den Haag: Ministry of Economic Affairs, Agriculture and Innovation

Verschuuren J.M. (2003) 'Nogmaals kokkels, hamsters en woelmuizen: recente ontwikkelingen rond de implementatie van de Vogel- en Habitatrichtlijn in Nederland', *Nederlands Tijdschrift voor Europees Recht*, vol. 9, nr. 1-2, pp. 34-38

Verschuuren J.M. (2004) 'Implementatie milieurichtlijnen: Nederland raakt achterop', *Nederlands Tijdschrift voor Europees Recht*, vol 10, no 12, pp 348-351

Vidaurre R., Naumann S., Bräuer I. (2008) *Compensation for the development of the Airbus facility within Mühlenberger Loch/Germany*, 6th Framework programme Resource Equivalency Methods for Assessing Environmental Damage in the EU report 022787, On line at: http://www.envliability.eu/docs/D12CaseStudies/D12_REMEDE_Airbus%20facility_Oct%2008.pdf.

Vlaamse Havencommissie (2009) *Ontwerp aanbeveling Vlaamse planprocessen.* Brussel: Vlaamse Havencommissie

Vlaamse Regering (1999) *Aanleg van het gecontroleerd overstromingsgebied in de polders van Kruibeke, Bazel en Rupelmonde (Zeeschelde LO).* Nota VL/FM/007-ZS23. Beslissing VR/99/17.12/DOC.1145. Brussel: Vlaamse Regering

Ward N., Buller H. and P. Lowe (1995) *Implementing European Environmental Policy at the Local Level.* CRE Newcastle: University of Newcastle

Waterman R.E. (2008) *Towards an Integrated Coastal Policy via Building with Nature.* Delft: Waterman.

Waterman R.E. (2010) *Integrated Coastal Policy via Building with Nature.* PhD dissertation. University of Delft.

Werkgroep Strategisch Plan Linkerscheldeoever (1999) *Principes met betrekking tot het Strategisch Plan Linkescheldeoevergebied.* Antwerpen: Werkgroep Strategisch Plan Linkerscheldeoever

Werkgroep Strategisch Plan Linkerscheldeoever (2004) *Geactualiseerde Principes Strategisch Plan Linkescheldeoevergebied.* Antwerpen: Werkgroep Strategisch Plan Linkerscheldeoever

Xanthaki H. (2001) 'The Problem of Quality in EU Legislation: What on Earth is Really Wrong?' *Common Market Law Review*, 38: 651-676

Yin R. (2003) *Case study research: design and methods.* 3rd edition. Thousand Oaks, CA. Sage.

Zonneveld W., Trip J. J. and B. Waterhout (2008) *Impact van EU-regelgeving op de Nederlandse ruimtelijke ordeningspraktijk; Vijf voorbeelden van gebiedsontwikkeling.* Onderzoeksinstituut OTB, TU Delft.

Interviews (Chapter 4)

Interel, Brussels

European Dredging Association (EuDA), Brussels

European Commission, Brussels

Institute for Infrastructure, Environment and Innovation (IMI), Brussels

Hamburg Port Authority, Hamburg

Agentschap voor Natuur en Bos, Departement Leefmilieu, Natuur en Energie van de Vlaamse Overheid, Brussels

Senator für Wirtschaft und Häfen, Bremen

Senator für Umwelt, Bau, Verkehr und Europa, Bremen

Peter Barham Environment, Bulwick

Departement Mobiliteit en Openbare Werken van de Vlaamse Overheid, Antwerp

Departement Waterwegen en Zeekanaal van de Vlaamse Overheid, Antwerp

Boskalis, Rotterdam

Municipality of Harderwijk, Harderwijk

Province of Flevoland, Lelystad

Interviews (Chapter 5)

The municipality of Harderwijk

The municipality of Zeewolde

The Province of Flevoland

The Province of Gelderland

Bird protection NGO (Vogelbeschermingswacht Noord-Veluwe)

The Dutch Ministry of Agriculture, Nature and Food Safety

Interviews (Chapter 6)

The Flemish Ministry of Environment, Nature and Energy

The Municipality of Kruibeke (board member, political party CD&V)

The Municipality of Kruibeke (the mayor, political party D.E.N.E.R.T.)

The Flemish Nature protection society (Natuurpunt Vlaanderen)

Antwerp port Authority (Havenbedrijf Antwerpen)

Local farmers' association of the Municipality of Kruibeke

Maritime access department of the Flemish Ministry of Mobility and Public Works

Waterways and Sea Channel department of the Flemish Ministry of Mobility and Public Works

List of publications Vera Vikolainen

International peer-reviewed journals

Vikolainen V., Bressers J.T.A. and Lulofs K. (2012) 'The role of Natura 2000 and project design in implementing flood defence projects in the Scheldt estuary', *Journal of Environmental Planning and Management*, DOI:10.1080/09640568.2012.724014 (paper version forthcoming)

Vikolainen V., Bressers J.T.A. and Lulofs K. (2012) 'Implementing EU Natura 2000 at the project level: lessons from the Veluwe Border lakes in the Netherlands', *Public Administration* Published, DOI: 10.1111/j.1467-9299.2011.01971.x (paper version forthcoming)

Vikolainen V., Bressers J.T.A. and Lulofs K. (2011) 'Management aspects of Building with Nature projects in the context of EU Bird and Habitat Directives', *Environmental Engineering and Management Journal*, Vol. 10, Nr. 11, pp. 1675-1686

Dutch peer-reviewed journals

Lulofs K., Smit M. en Vikolainen V. (2011) 'Innovatie op de grens van Land en Water: Bouwen met de Natuur'*, Water Governance,* Jaargang 1, No. 2, pp. 36-43

Book chapters

Vikolainen V., Bressers J.T.A. and Lulofs K. (2013) The transfer of Building with Nature approach in the context of EU Natura 2000, In: C. de Boer, J. Vinke-de Kruijf, G. Özerol and J.T.A. Bressers (Eds.) *Water Governance, Policy and Knowledge Transfer. International Studies on Contextual Water Management,* Earthscan – Routledge (forthcoming)

Project reports

Coenen F.H.J.M., Vikolainen V., Andringa W. en Hoppe T. (2011). *Evaluatie van het Economisch Beleid van de Gemeente Enschede (in Dutch).* Enschede: Universiteit Twente, CSTM Studies en Rapporten, CSTM-SR nr. 365, pp. 1-119.

Bruijn T. de, Bressers J.T.A., Vikolainen V. (2008) *Handhaving Leeuwarden. Een onderzoek in opdracht van de Rekenkamer Leeuwarden (in Dutch).* Enschede: Universiteit Twente, CSTM Studies en Rapporten, CSTM-SR nr. 338, p.1-49

Vikolainen V., Coenen F., Lulofs K. (2008) *Baten van Waterbeheer voor Regionale Innovatie en Regionale Economie (in Dutch).* Enschede: Universiteit Twente, CSTM Studies en Rapporten, CSTM-SR nr. 348, p.1-67

Conference papers

Institute for Innovation and Governance Studies (IGS) Conference Resilient Societies – Governing risk and vulnerability for Energy, Water and Climate Change, 19-21 October 2011, Enschede, the Netherlands. Paper titled 'Building with Nature experiences in North West Europe in the context of EU Bird and Habitat Directives', Integrated coastal development: Towards Building with Nature? panel

Institute for Innovation and Governance Studies (IGS) International Conference Tentative Governance in Emerging Science and Technology, 28-29 October 2010, Enschede, the Netherlands. Paper titled 'Integrated nature design: lessons from the Veluwe border lakes in the Netherlands', Limits and Implementation of (Regulatory) Governance panel

3rd Graduate Conference of European Consortium for Political Research (ECPR), 30 August - 1 September 2010, Dublin, Ireland. Paper titled 'Integrated nature design in Natura 2000 areas: the case of Veluwe border lakes in the Netherlands', National Environmental Politics and Policies panel

Samenvatting

De huidige stand van zaken in Noordwest Europese estuaria en kustzones wordt gekenmerkt door een spanning tussen activiteiten van sociaaleconomische aard en de doelstellingen op het gebied van natuurbeleid. Het bereiken van sociaaleconomische ambities, zoals het realiseren van infrastructuur ten behoeve van industrie en recreatie of maatregelen om het overstromingsrisico te verlagen, wordt vaak gezien als een bedreiging voor de natuurwaarden. Deze spanning komt nadrukkelijk op de agenda tijdens het uitvoeren van de waterinfrastructuur projecten in Noordwest Europese estuaria en kustzones die zijn aangewezen als beschermingsgebieden in het kader van het Natura 2000 biodiversiteit beleid van de Europese Unie (EU). De spanning leidt tot conflicten die onder meer uitgevochten worden tijdens rechtszaken bij de nationale en Europese rechtbanken, maar leidt ook tot maatschappelijke en politieke conflicten die weer leiden tot vertragingen of schorsingen van waterinfrastructuur projecten. Het in balans brengen van de sociaaleconomische en ecologische ontwikkelingen in Natura 2000 estuaria en kustzones in Noordwest Europa is daarmee noodzakelijk geworden. In dit onderzoek wordt nader ingegaan op de situatie en ontwikkelingen in de volgende Noordwest Europese landen: Nederland, België, Verenigd Koninkrijk en Duitsland.

De druk op Europese estuaria en kustzones bevordert de totstandkoming van nieuwe manieren van projectontwikkeling die de ecologische doelstellingen in acht nemen naast de sociaaleconomische opgaven. Deze nieuwe manier van denken is afkomstig uit de wetenschappelijke discourses die de relatie tussen de mens en de natuur opnieuw beschouwen, zoals de discourses over de sociaalecologische systemen en de ecosysteem services, maar ook de ingezette slag naar adaptief water management. Deze nieuwe inzichten hebben de initiatieven zoals *Bouwen met de Natuur, Werken met de Natuur* en *Vlaamse Baaien* teweeggebracht, die op zoek gaan naar de innovatieve manieren van projectontwikkeling om het bereiken van de sociaaleconomische doelstellingen in harmonie met de natuur mogelijk te maken.

De mate van *Bouwen met de Natuur* in een projectontwerp voor de ontwikkeling van waterinfrastructuur is de onafhankelijke variabele van dit onderzoek. De mate van *Bouwen met de Natuur* wordt gedefinieerd volgens het idee van de grondlegger (Waterman, 2008, 2010) en de definities van de initiatiefnemers (EcoShape, 2012; Aarninkhof *et al*, 2010) en houdt drie componenten in:

4. Het ontwerp verkent de mogelijkheden voor natuurontwikkeling in de voorbereidingsfase van een project door de sociaaleconomische en ecologische doelstellingen te integreren

5. Het ontwerp maakt gebruik van de aanwezige natuurdynamiek en natuurlijke materialen om projectdoelstellingen te bereiken, gegeven de hydrologische en morfologische context van het projectgebied

6. Het ontwerp creëert mogelijkheden voor het ontwikkelen van de nieuwe natuur en verbetert de huidige ecologische waarden in het projectgebied

De drie componenten, tevens de indicatoren van de mate van *Bouwen met de Natuur* afgekort als *de integratie, het gebruik maken van* en *de verbetering van* de natuur, worden gemeten in het projectontwerp. De meting van de indicatoren betreft beargumenteerde oordelen die zijn gebaseerd op de gegevens afkomstig uit projectvoorstellen, projectrapportages, projectevaluaties, samenvattingen en technische projectontwerpen, verkregen insider informatie van projectmanagers en expert oordelen van de geïnterviewden. Als gevolg van de meting van de drie componenten wordt het projectontwerp geplaatst op de *Bouwen met de Natuur* schaal van ongewogen scores van '0' tot '+++'. Omdat *Bouwen met de Natuur* een vrij recente ontwerpmethode is, zijn er niet veel projecten te vinden die op elk van de drie hoofdcomponenten een '+' scoren, dus een totale score van '+++'. De projecten zijn echter te vinden op alle mogelijke plaatsen op de schaal: '0', '+', '++' en '+++'.

De afhankelijke variabele van dit onderzoek betreft de toepassing van Natura 2000 procedures op een waterinfrastructuur project. De toepassing van Natura 2000 op projectniveau kan verschillende uitkomsten hebben in verschillende stadia van het project, welke indicatief zijn van hoe goed het project voldoet aan de vereisten van Natura 2000. De toepassingsstadia bestudeerd in dit onderzoek zijn de Artikel 6 Habitatrichtlijn beoordeling voor plannen en projecten, de rechtsuitspraak inzake deze beoordeling en de compensatieopgave opgelegd aan de lokale projectimplementatie. Vanuit het projectniveau bezien is de implementatie van de Natura 2000 succesvol wanneer het doel van de initiatiefnemer is bereikt, oftewel water infrastructuur is gebouwd.

De centrale vraagstelling van dit onderzoek luidt:

Hoe is de mate van Bouwen met de Natuur in een projectontwerp gerelateerd aan de implementatie van Natura 2000 in een water infrastructuur project in Noordwest EU estuaria en kustzones?

De centrale hypothese van dit onderzoek is dat er een positief verband bestaat tussen de mate van *Bouwen met de Natuur* in een projectontwerp en de implementatie van Natura 2000 in een water infrastructuur project: hoe hoger de mate van *Bouwen met de Natuur* in een project, des te beter deze voldoet aan de vereisten van de EU Natura 2000.

Om de robuustheid van onderzoek betreffende de relatie tussen de centrale variabelen te vergroten wordt in dit onderzoek de triangulatie van methoden toegepast: de relatie tussen de mate van *Bouwen met de Natuur* in een projectontwerp en de implementatie van Natura 2000 op projectniveau wordt geanalyseerd met gebruik van drie verschillende casus ontwerptechnieken (vergelijk de sub-vragen 3 tot en met 5). Triangulatie, oftewel de combinatie van methoden in een onderzoek van één (zelfde) fenomeen, wordt in sociale wetenschappen toegepast om de betrouwbaarheid van conclusies te vergroten en de kans op een onjuiste beoordeling van hypotheses te minimaliseren. Als een hypothese een confrontatie van meerdere complementaire methoden doorstaat, wordt de onzekerheid in de interpretatie van onderzoeksbevindingen verkleind en de betrouwbaarheid van resultaten naar verwachting vergroot.

Om de centrale vraagstelling te beatwoorden worden de volgende sub-vragen geformuleerd:

Sub-vraag 1: Welke aspecten van de implementatie van Natura 2000 door de lidstaten bepalen de context voor de implementatie van water infrastructuur projecten in estuaria en kustzones?

In Hoofdstuk 2 worden de variabelen waarmee het Natura 2000 beleid en beleidsveld in een EU lidstaat in kaart wordt gebracht geïdentificeerd op basis van een literatuurstudie. Hoewel de implementatie van Natura 2000 varieert in verschillende lidstaten, de kernverschillen zijn te vinden langs de volgende negen variabelen: de omvang en de grenzen van de aangewezen beschermingsgebieden; de omzetting van de Richtlijnen in de nationale, federale of regionale wetgeving van de lidstaat en de kans op de rechtstreekse werking van de Richtlijnen; de omzetting van Artikel 6 van de Habitatrichtlijn in de rechtsorde van de lidstaat; de nationale of regionale overheden die verantwoordelijk zijn voor de implementatie van Natura 2000 in de lidstaat in kwestie; de belanghebbende partijen bij de aanwijzing van Natura 2000 beschermgebieden en hun betrokkenheid bij de onderhandelingen; de aanwezigheid van beheerplannen en/of contracten voor Natura 2000 gebieden; de beschermstatus en de doelstellingen van de Natura 2000 gebieden; de toegankelijkheid van de het nationale rechtssysteem voor de burgers om beroep aan te tekenen tegen de beslissingen gebaseerd op Artikel 6 Habitatrichtlijn; en de aanwezigheid van de nationale handleidingen en informatie over de toepassing van Artikel 6 Habitatrichtlijn in de praktijk. De literatuur uiteengezet in Hoofdstuk 2 geeft geen duidelijkheid over de mate van invloed van elk van de negen variabelen op de implementatie van waterinfrastructuur projecten in Natura 2000 gebieden. Om de centrale vraag de beantwoorden is een theoretisch kader nodig die het mogelijk maakt om de geïdentificeerde variabelen te categoriseren en tegelijkertijd inzicht geeft op hoe ze de projectimplementatie kunnen beïnvloeden. Contextuele Interactie Theorie (CIT) is een kader die aan deze kenmerken voldoet.

Sub-vraag 2: Hoe worden de factoren zoals de Natura 2000 en de Bouwen met de Natuur ontwerp door de Contextuele Interactie Theorie (CIT) geordend en gestructureerd in de implementatieprocessen en wat betekent dat voor de onderzoeksmethodologie?

Het theoretisch kader voor dit onderzoek – de Contextuele Interactie Theorie (CIT) – kan als de 'derde generatie' implementatietheorie afkomstig uit de beleidswetenschap worden beschreven. Het theoretisch kader wordt voornamelijk gebruikt om de variabelen geïdentificeerd in Hoofdstuk 2 in te delen volgens lagen van contextuele factoren om op deze manier het beleidsveld te 'lezen' en de variabelen in verband te brengen. Daarmee dient het theoretisch kader als een conceptuele 'lens' om het causaal verband tussen de onafhankelijke en afhankelijke variabelen te visualiseren en te verkennen. De eerste laag van factoren, de specifieke context, betreft de casus-specifieke omstandigheden en de geografische kenmerken van de locatie. In dit onderzoek worden de volgende factoren onder deze laag gebracht: de omvang en de grenzen van de aangewezen Natura 2000 beschermgebieden; de aanwezigheid van beheerplannen en/of contracten voor Natura 2000 gebieden; de beschermstatus en de doelstellingen van de Natura 2000 gebieden en de mate van *Bouwen met de Natuur* in het projectontwerp. Overige factoren worden ingedeeld als structurele context, ook wel 'governance' context genoemd.

Om de onderzoeksvragen te beantwoorden, is er gekozen voor een onderzoek op basis van empirische casussen. De empirische casussen zijn steeds kwalitatief en verkennend van karakter. De relatie tussen de onafhankelijke en de afhankelijke variabelen wordt onderzocht door de empirische casussen op drie verschillende manieren te analyseren. Het causaal verband, ook wel causaal mechanisme genoemd, tussen de variabelen wordt vanuit een kwalitatief perspectief benaderd: het doel van dit type onderzoeken is om te begrijpen *hoe* het causaal verband tussen de mate van

Bouwen met de Natuur en de uitkomst van de Natura 2000 implementatie op projectniveau functioneert (in tegenstelling tot onderzoek naar het causaal effect). Voor de verzameling van de gegevens waren twee bronnen van belang. Allereerst zijn aan de hand van projectdocumenten de casussen gereconstrueerd en gemeten langs de *Bouwen met de Natuur* indicatoren. De tweede belangrijke data bron betreft de persoonlijke, semigestructureerde interviews met de betrokkenen bij de projectrealisatie.

Sub-vraag 3: Hoe is de mate van Bouwen met de Natuur gerelateerd aan de implementatie van Natura 2000 op projectniveau in een meervoudig casusontwerp?

Het toegepaste meervoudig casusontwerp is gebaseerd op de analyse van 14 waterinfrastructuur projecten in hun geo-morfologische, ecologische en sociaaleconomische context in Natura 2000 estuaria en kustzones in Nederland, Vlaanderen, het Verenigd Koninkrijk en Duitsland. De casussen zijn geselecteerd om de volledige variatie van de afhankelijke en onafhankelijke variabelen (X,Y) en hun relatie (X/Y) te omvatten. De geselecteerde casussen vormen een sub-set van een populatie van casussen van waterinfrastructuur projecten in Noordwest EU estuaria en kustzones. De selectie van casussen met een hoog *Bouwen met de Natuur* gehalte binnen deze sub-set is zo goed als compleet, want het aantal van deze casussen is beperkt. De casussen zijn geselecteerd om de volledige spreiding van de mate van *Bouwen met de Natuur* (X) en de implementatie van Natura 2000 op een projectniveau (Y) zo goed mogelijk te bereiken. Om sub-vraag 3 te beantwoorden, wordt de systematische analyse van de kernvariabelen toegepast als data analysetechniek. De conclusies uit de meervoudige casusanalyse laten zien dat de projecten met een hoger gehalte van *Bouwen met de Natuur* in hun ontwerp meer succesvol waren in de implementatie van de Natura 2000 vereisten.

Sub-vraag 4: Hoe is de mate van Bouwen met de Natuur gerelateerd aan de implementatie van Natura 2000 op projectniveau in een quasi-experimenteel casusontwerp?

Een quasi-experimenteel casusontwerp kwam voort uit de vergelijking van twee casussen die op alle kenmerken, behalve de waarden van de hoofdvariabelen, vergelijkbaar zijn. Deze casussen – Waterfront Harderwijk en kustzone Zeewolde – zijn strategisch gekozen naar aanleiding van de analyse in Hoofdstuk 4 welke op hun informatieve inhoud wees. De tegenovergestelde uitspraken van de Raad van State voor Harderwijk en Zeewolde leken te maken te hebben met gevarieerde waarden op de onafhankelijke variabele. De modus operandi analysetechniek wordt gebruikt om de aanwezigheid van rivaliserende verklaringen, geïdentificeerd met behulp van de CIT, vast te stellen. De analyse heeft bevestigd dat de integratie van ecologische en sociaaleconomische doelstellingen (de eerste component van *Bouwen met de Natuur*) de kans op goedkeuring door de Raad van State kan vergroten in geval dat de implementatie van de Natura 2000 in een kustzone ontwikkelingsproject in twijfel wordt gebracht.

Sub-vraag 5: Hoe is de mate van Bouwen met de Natuur gerelateerd aan de implementatie van Natura 2000 op projectniveau in een longitudinaal casusontwerp?

Het longitudinaal casusontwerp is tot stand gekomen op basis van een theorie gestuurde analyse van de realisatie van een gecontroleerd overstromingsgebied in de dorpen van Kruibeke, Bazel en Rupelmonde in het Vlaamse gedeelte van het Schelde estuarium. Deze casus is strategisch gekozen naar aanleiding van de analyse in Hoofdstuk 4 die een waardevolle projectchronologie van meer dan

30 jaar beloofde, waarin de verandering in de waarden van de onafhankelijke variabele heeft plaatsgevonden. In Hoofdstuk 6 wordt deze casus geanalyseerd op vier tijdstippen waarop de verschillen in de mate van *Bouwen met de Natuur* en de uitkomst van projectimplementatie duidelijk te meten zijn. De analyse heeft laten zien dat de mate van *Bouwen met de Natuur* in het ontwerp van het gecontroleerde overstromingsgebied langzamerhand toeneemt en heeft geleid tot een succesvolle implementatie uitkomst, vooral de eerste component van *Bouwen met de Natuur* (de integratie van ecologische en sociaaleconomische doelstellingen) liet een consistente toename zien.

In tegenstelling tot de probleemstelling in het oorspronkelijke projectvoorstel – dat Natura 2000 de integrale ontwikkelingen van *Bouwen met de Natuur* zou tegenhouden – kwam dit onderzoek tot de conclusie dat *Bouwen met de Natuur* en Natura 2000 elkaar in de praktijk ondersteunen. De onderzoeksresultaten wijzen aan dat er een breed maatschappelijk leerproces op meerdere schaalniveaus gaande is. Zowel publieke als private partijen zijn tot een inzicht gekomen dat rekening houden met de natuur naast sociaaleconomische projectopgaven de naleving van de Natura 2000 eisen in de hand werkt. Al vraagt het mogelijk in eerste instantie om extra financiële middelen, zal het op lange termijn de mogelijke significante negatieve effecten met hogere zekerheid uitsluiten of ermee helpen omgaan op een manier die acceptabel is voor alle betrokken partijen.

De resultaten van dit onderzoek bevestigen de hypothese dat de mate van *Bouwen met de Natuur* en de implementatie van Natura 2000 op projectniveau positief gerelateerd zijn. Namelijk, de toepassing van *Bouwen met de Natuur* principes draagt bij aan een succesvolle implementatie van Natura 2000 vereisten in waterinfrastructuur projecten en andersom: Natura 2000 bevordert en maakt *Bouwen met de Natuur* mogelijk. Hoewel de casussen bestudeert in dit onderzoek niet representatief zijn voor de hele populatie van casussen (alle water infrastructuurprojecten in Noordwest EU), gelden de conclusies van dit onderzoek voor het subtype van casussen die vergelijkbaar zijn met diegene betrokken bij dit onderzoek.

De onderzoeksresultaten zijn geformuleerd als een leidraad voor de toepassing van *Bouwen met de Natuur* principes bij het ontwikkelen van waterinfrastructuur in Natura 2000 kusten en estuaria (zie bijlage in dit boek). Deze leidraad, Regulatory Governance Manual genoemd, maakt deel uit van de algemene *Bouwen met de Natuur* handleiding. De definitieve versie daarvan wordt na afronding van het onderzoeksprogramma on-line gepubliceerd (www.ecoshape.nl). Tot de doelgroep van de handleiding behoren de initiatiefnemers van projecten, ecologen, ingenieurs, adviseurs, aannemers met een rol in project- ontwerp en ontwikkeling, overheden, beleidsmakers, bestuurders, standaard instituties, milieuorganisaties en financiers.

Annex

Case study questions (in Dutch)

Vragen aan respondenten

1) Wanneer is het project van start gegaan? Wie is de trekker van het project? Welke actoren zijn bij het project betrokken?

2) Wat waren de oorspronkelijke projectdoelstellingen; zijn deze in de loop der tijd veranderd? Zo ja, waarom en hoe?

3) Wie is verantwoordelijk voor het (technische) projectontwerp? Is het in de loop der tijd veranderd (zo ja, wat was de aanleiding)?

4) Wat zijn de mijlpalen in de projectgeschiedenis en wat is het tijdpad? (bijv. projectvoorstel; goedkeuring; bestemmingsplan; beroep; uitspraak Raad van State, e.a.)?

5) Hoe kwamen de vereisten van de EU Natura 2000 voor het eerst in het spel en hoe werkten deze door in het proces en ontwerp?

6) Hebben de vereisten van de EU Natura 2000 invloed gehad op de besluitvorming, bijv. met betrekking tot:

   - de houding ten opzichte van de projectdoelstellingen; de druk om projectdoelen te bereiken en de haalbaarheid van de projectdoelstellingen (motivatie).

   - de perceptie van de functies, effecten en de vereisten van EU Natura 2000 (cognities)

   - de beschikbaarheid van hulpbronnen (geld, tijd en expertise) en/of de formele machtsposities van actoren (hulpbronnen)

7) Op welke formele gronden is de beroepsprocedure gestart? Wat heeft de beroepsprocedure teweeggebracht?

   Bespreken:

   - het project (specifieke context): ontwerp, besluitvorming, procedures

   - de structurele context: de vereisten van de EU regelgeving, de nationale implementatie en concrete nationale administratieve en juridische procedures

8) Wat waren de gevolgen van de beroepsprocedure waar het:

   - De benodigde tijd, kosten en afloop betreft (organisatorisch)

   - De ecologische kwaliteit/aantrekkelijkheid van het ontwerp (de integratie van natuurdoelen, het gebruik van de dynamiek en/of de verbetering van de natuur) betreft

9) Welke andere factoren (anders dan de EU Natura 2000) zouden tot hetzelfde projectafloop geleid kunnen hebben? (bijv. factoren van politieke, economische, technologische aard)?

   Wat zijn de kenmerkende waarnemingen daarvan (van deze rivaliserende verklaringen)?

10) Controleren van alle relevante documentatie over het project / potentiële interview kandidaten

<u>Vragen over concrete casussen</u>

11) Welke factoren waren bepalend voor het projectresultaat? In welke mate is de EU Natura 2000 bepalend geweest? Wat zijn de kenmerkende waarnemingen daarvan?

12) Hoe sluit dit aan bij de discussie over de rol van de EU Natura 2000 in de locale/nationale besluitvorming?

<u>Vragen over patronen in verschillende casussen</u>

13) Wat zijn de grootste verschillen / overeenkomsten tussen de casussen?

14) Hoe beïnvloedt het ecologisch verantwoord ontwerp de besluitvorming (de kansen voor succes)?

Eco-Dynamic Design examples[8]

Rich Revetment

Biological monitoring has shown that some artificial hard coastal structures, such as dikes, harbour extensions, piers, dams and groynes provide a habitat for valuable and diverse species communities. Continuously, coastal structures are maintained, repaired or upgraded. This affects existing hard substrate communities and can result in long term degradation of hard substrate habitat diversity. Standard design is not optimized to provide ecological values in addition to the main civil engineering objectives. The diverse dike concept explores the possibility of optimizing hard structures for habitat creation. By selecting substrate characteristics that aim at the improvement of habitat diversity for organisms living on and under the water level, the bio-productivity and the biodiversity can be increased.

Eco-dynamic Design	Traditional Design
	
In the perspective of total cost of dike upgrade, the additional cost of introducing water retaining pools, additional types of limestone and additional sorting in the berm is marginal. In the eco-engineering design this berm is engineered to produce variable profiles (in slope, material and sorting) in both perpendicular and alongshore directions. Monitoring has shown that water retaining pools with additional sorting of limestone increases the biodiversity dramatically in the intertidal zone. The pools function as sheltering habitat for many shrimp and smaller fish species. Algae productivity is increased in the pools.	In a standard design, the required safety level is maintained by parts of dike construction situated above the average high water mark. Lower zones, such as the intertidal berm are not crucial to safety and allow degrees of freedom in the design process. In the traditional design this berm is engineered to produce monotonous profiles (in slope, material and sorting) in both perpendicular and alongshore directions.

[8] Source: Ecoshape Building with Nature wiki: http://publicwiki.deltares.nl/display/BWN/Building+with+Nature

Harbouring Opportunities

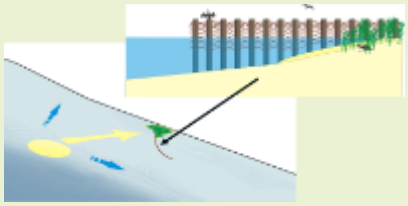
Harbours are often seen as an a-biotic environment where everything is optimized for economic activities. While this is sometimes true, harbours can often also provide a habitat for many species. Simple measures can do a lot to provide other, attractive values.

Eco-dynamic Design	Traditional Design
 Suspended artificial surfaces can enhance habitat diversity and filter feeder biomass, if port water quality is good enough (like in Rotterdam). Constructions made of standard nylon ropes, strategically strung between the piles of a jetty, are a cheap way to do this. Depicted are such ropes four months after they have been installed.	 Smooth steel and concrete structures, like sheet-pile walls or jetty piers, provide little grip for mussels and sea anemones. Further, compared to natural rocky habitats, artificial structures lack cracks and crevices, and profile variation.

Soft sand engine IJsselmeer

In 2009 the planning of three so-called 'sand engine experiments' along the Frisian IJsselmeer coast started. These sand engines are potential adaptation measures for a coast under the influence of rising water levels due to climate change. The implementation is governed by a coalition of regional and national actors, led by It Fryske Gea. The objective of the experiment is to test the functioning and effectiveness of different lay-outs and designs of sand engines in combination with bioengineers.

Eco-dynamic Design



Creation of semi natural flood plains in lakes in front of existing dikes may help to dissipate wave energy, thus positively influencing wave related overtopping. Additional positive effects are created by pioneer species colonising these new habitats and recreationists visiting the new beaches. Depending on the specific situation, sand is nourished a few hundred metres offshore. The design utilizes the wave related sediment transport capacity as an ecosystem service. Furthermore Bio-engineers are stimulated to grow on the new sediments, thus preventing erosion.

Traditional Design

To reduce the storm-related risk of flooding in Delta Lakes and Reservoirs, a traditional and proven solution is to raise the level of the (older) dikes. The strengthening of dikes usually involves raising as well as broadening the dike, which can have a profound impact on the landscape and the cultural values present. Despite the fact that dike strengthening enhances the safety level of a given area, the impacts on the landscape and user functions of such projects can trigger adverse reactions from local stakeholders.

Wave reducing Eco Dike

As part of the project "Room for the River", the 1600 ha Noordwaard-polder will become a part of the floodplain of the River Nieuwe Merwede. In order to do so the river dike near Werkendam will be partly removed. This will cause the Noordwaard to be inundated yearly, during events of high water level on the River Nieuwe Merwede. In case of a 1/2000 year discharge event, the Noordwaard 'bypass' will reduce the Nieuwe Merwede water level upstream in Gorinchem by 0.3 meter.

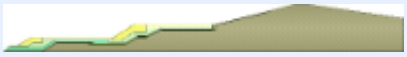
A new primary river dike is required in the North Eastern corner of the Noordwaard to protect the inhabitants at Fort Steurgat. During a 1/2000 year discharge event the average water depth in the polder will be 3 meter whereby, in combination with a severe storm, waves up to 1 meter high are expected near Fort Steurgat. A first 'traditional' dike design around Fort Steurgat resulted in a dike height of 5.5 meter above NAP, with concrete blocks as armouring layer, leading to protests from the local population.

To create an ecodynamic design that provides safety, that provides additional values for nature and recreation and that is practical from the viewpoint of costs and durability.

Eco-dynamic Design

The hybrid dike is integrated in the landscape, willow trees are common in the area. The armoured dike is now replaced by a lower clay covered dike resulting in a cheaper solution. The combination of clay dike and willow plantation is generating additional natural and landscape values. In line with sustainability objectives of Dutch government, production of biomass for energy as result of regular maintenance of the willow plantation is seen as a bonus of the project. It is expected that the new design will add to recreational value of the area for local residents.

Traditional Design



The dike has been optimized from landscaping point of view. On the inside (right hand side of profile drawing) the slope is very gentle in order to provide an impression of a sloping meadow for the residents of Fort Steurgat. The traditional design on the side exposed to high waterlevels and wave impact is fortified with a concrete armouring layer to resist waves with a Hs of 1.1 meter.

Galgeplaat nourishment

Tidal flats are valuable habitats for different plants and animals. However, the total area of tidal flats is decreasing worldwide due to various problems like sea level rise, coastal squeeze, subsidence by gas extraction and erosion initiated by manmade constructions like the storm surge barrier in the Estearn Scheldt. Nourishing tidal flats might be a promising solution.

To test this approach, the Galgeplaat, a tidal flat in the Eastern Scheldt is nourished in 2008 with 130.000 m3 sand dredged from adjacent channels over a total area of 150.000 m2.

As the processes of sediment spreading and benthic recolonisation are coupled and interact with each other.The design challenge is to find an optimum in the initial impact of the nourishment on the benthic fauna, the distribution of the sand over the tidal flat by wind and waves and the recovery of benthic life.

Eco-dynamic Design

The nourishment on the Galgeplaat was designed circle shaped. First a protective bund of sand of approximately 1 m high was built, forming a ring with a diameter of 450 m. This ring was filled with sand during the flood phase of the tidal cycle and spread by bulldozers during the ebb phase. This allowed for a controlled construction of the nourishment, as an increase in the concentration of suspended matter had to be avoided because of nearby commercial mussel beds.

Traditional Design

Traditional work methods, while effective from a technical perspective, provide less control over the spreading of fines than the current workmethod with the circle shape protective bunds.

Natural Capping of the landfill Volgermeerpolder

A ‘natural cap’ concept has been developed as an innovative solution for remediation and management of waste dump pollution. The ‘natural cap’ concept combines natural peat development, waste capsulation and degradation of pollutants in the peat layer, and as such the Volgermeerpolder is one of the largest wetland development sites in the world.

The Volgermeerpolder, North of Amsterdam, is an area that has been used as a toxic waste deposit site for years. The area used to be a peat excavation site where peat was exploited for fuel. In order to cope with toxic leakage from the 6 meter thick waste layer into the surrounding groundwater system, monitoring was initiated and a plan was developed to cover the mound. Monitoring of the water and soil quality showed that peat prevents leakage due to its impermeable character. This led to the innovative ‘natural cap’ design. The concept is tested further the coming years to be able to verify and prove the full working of the concept.

Eco-dynamic Design

The natural cap concept consists of the application of nature development to cover toxic materials. By stimulating wetland development, peat formation is initiated that serves as a natural barrier against infiltration. The peat layer absorbs almost all the precipitation, therefore almost no water infiltrates in the ground and through the waste material. This results in no or less risk of leakage. In the concept degradation of pollutants can take place in the peat layer because of bacterial processes.

Traditional Design

In traditional designs, rubbish dumps are capsulated with metal or concrete sheets, bottom sealing and foil that has to be replaced over time. This is a very costly, inefficient and unnatural method.

Wieringerrandmeer

In the north of the province North Holland, The Netherlands, a man-made peripheral lake was planned between the polder Wieringermeer and the higher land of the former island Wieringen. This lake was meant to give a boost to the area, socially and economically as well as ecologically. Next to improving the water management of the area, extra recreational, residential and commercial activities should enhance the socio-economical situation and should attract both the present and new inhabitants. Moreover, the ecological value was to be raised by creating more diverse nature. In the meantime, the authorities responsible have cancelled the project. Yet, the plan is worth considering from a building with nature perspective.

Eco-dynamic Design

This project uses an integrated approach to give the area a socio-economic boost, improve the water management and increase the ecological value by enabling the establishment of a more diverse nature.

Traditional Design

In a traditional project only the water management problem would be considered and solved with a technical solution (which would probably be a new pumping station). Other aspects of the region, such as the socio-economical situation, would be addressed in other projects by other institutions.

Perkpolder

Perkpolder, near Hulst and on the coast of the Westerschelde used to be a busy-ferry port. However, due to construction of a tunnel, the ferry was shut down and the area deteriorated. To revive the area economically and environmentally, a renovation project was proposed.

Eco-dynamic Design	Traditional Design
	
The Eco-dynamic design approach is one in which all three P's are addressed; the people in terms of improved residential areas, the planet is addressed by creating different natural areas with additional ecological value; and the approach advantages the profit by adding extra economical value to the area, through residential, recreational and commercial activities.	In a traditional situation, most likely the solution would be to do nothing. Perhaps the Westerschelde dikes would have been raised to protect the land, but other than that the area would have been left to deterioration.

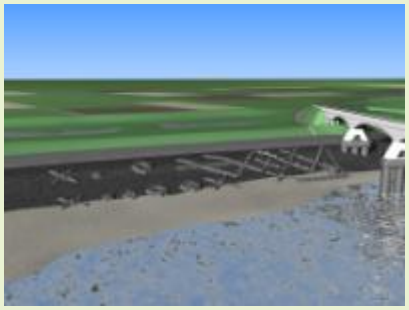
Eastern Scheldt dike foreshore strengthening works

For several locations along the Eastern and Western Scheldt the dike foreshore needed to be strengthened in 2009. The requirements for this D&C contract to ensure the dike stability was originally focussed on economical aspects only. This lead to a straight, technical design, making use of the economical and technical effective material steel slag, which is a stonelike residual product created during the production of steel. The environmental impact of steel slag was widely discussed, mainly by action groups who claim that the ecological effects of the large-scale application of this material, especially the effects on the flora and fauna living on this material, are not studied completely.

Notwithstanding the fact that from protection laws there was no necessity to adjust the technical design, the special ecological value of 2 locations in the Eastern Scheldt was recognized. Van Oord and Public Works have therefore joined forces with delta technology institute Deltares and consulting marine researchers GiMaRIS to design and construct an underwater ecological landscape on a scale unparalleled in the world.

The partners' approach to enriching the foreshore involved creating as many different habitats as possible. The engineering design called for a variety of different materials, gradients and shapes to create differences in height, hiding places, and variations in the exposure to and shelter from the current. To ensure flexibility, the engineers came up with a modular system of building blocks consisting of round, criss-crossed and atoll-shaped piles of stones and linear elements, all in varying sizes. Combining these building blocks made it possible to achieve more variety at a larger scale.

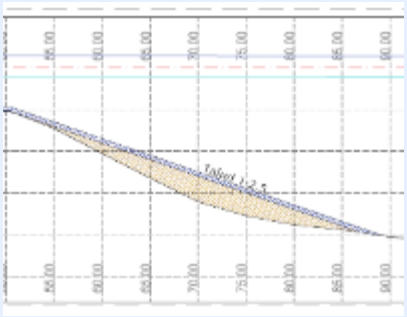
Eco-dynamic Design



Over a technically stable foreshore design, specialized shapes of rock armour stone are created so that a modular system creating variation on different scales.

Information panels detail the construction and design process as well as informs the public about the underwater ecology.

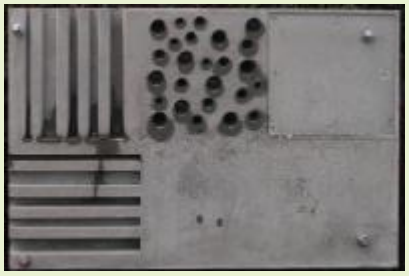
Traditional Design



In the traditional, technical design the design compromises of a straight, minimal slope to be created by recycled materials such as steel slag, a material stable against currents and wave attack.
However, the top layer is rather plain, which does hardly allow hiding places for organisms to settle or recover, leading to a low overall bio-density with limited variability in the landscape.

Eco-concrete

The breakwaters of the entrance of the North Sea Channel at IJmuiden (The Netherlands) protect the port against wave attack. The breakwaters consist of regularly placed 2x2m concrete blocks. The surface of the blocks, and cracks and spaces between these blocks are habitats for a diversity of marine flora and fauna like algae, insects, crabs, shellfish, fish and birds. Because of this, it is important that after renovation of the breakwaters, the ecological system will recover quickly. This can be stimulated by the use of special concrete blocks, which is investigated in this pilot study.

Eco-dynamic Design	Traditional Design
 Concrete blocks with eco-friendly surfaces, roughened with various textures and geometric shapes, that stimulate fast and diverse colonization by macro-algae and macro-fauna	 Traditional concrete blocks with relative smooth surfaces.

Sand engine Workumerwaard

June 2011 marked the beginning of the construction of the first soft sand engine in lake IJsselmeer. These sand engines are potential adaptation measures for a coast under the influence of rising water levels due to climate change. The implementation is governed by a coalition of regional and national actors, led by It Fryske Gea. The objective of the experiment is to test the functioning and effectiveness of different lay-outs and designs of sand engines in combination with bioengineers.

Eco-dynamic Design

Creation of semi natural flood plains in lakes in front of existing dikes may help to dissipate wave energy, thus positively influencing wave related overtopping. Additional positive effects are created by pioneer species colonising these new habitats and recreational enthusiasts visiting the new beaches. Sand is nourished roughly 200 m in front of the coast. The design utilizes the wave related sediment transport capacity as an ecosystem service. Furthermore Bio-engineers are stimulated to grow on the new sediments, thus preventing erosion.

Traditional Design

To reduce the storm-related risk of flooding in Delta Lakes and Reservoirs, a traditional and proven solution is to raise the level of the (older) dikes. The strengthening of dikes usually involves raising as well as broadening the dike, which can have a profound impact on the landscape and the cultural values it represents. Despite the fact that dike strengthening enhances the safety level of a given area, the impacts on the landscape and user functions of such projects can trigger adverse reactions from local stakeholders.

Sand Engine Onrustgeul

The coast at Onrustpolder, Zeeland has been subject to structural erosion for approximately the past 40 years. This erosion is principally caused by the migration of the Onrust tidal channel towards the coast at Onrustpolder. In the past the coastline has been nourished by frequent beach nourishments to compensate for the structural erosion problem. EcoShape initiated and facilitated a workshop with the objective of developing innovative solutions to the maintenance problem at the coast at Onrustpolder.

During the EcoShape workshop a promising conceptual design was developed for a sand engine in the Onrust channel. Previous analysis of the hydrodynamics and sediment transport around the Onrust area suggested that the Onrust channel is forced open by a substantial tidal current in the channel. In the conceptual design of the sand engine it was proposed to restrict the tidal flow in the channel by squeezing the western and eastern entrance by means of an underwater nourishment. It was suggested that in an ideal situation this would lead to gradual sedimentation in the Onrust channel and a migration of the Onrust shoal towards land.

In order to aid further design and assess the effectiveness of this sand engine design and its effect on the surrounding area, a numerical model was set up to simulate sediment transport in the Onrust channel and shoal.

Eco-dynamic Design

Large scale nourishments in deeper areas of the Onrust channel that aid the natural shoreward movement of the Onrust shoal in the long term and provide short term relief to the sand-starved coastline.

Traditional Design

Maintenance and strengthening of the coastline by means of beach nourishments, or channel nourishments and reinforcing sea defences. Although such methods are well tested, the financial and social costs are becoming increasingly prohibitive.

Marshes along the Friesche IJsselmeerkust

Due to sea level rise a raising of the water level in the IJsselmeer of 1 meter is foreseen for the not so distant future. If no action is taken, the valuable marshes that have formed in if front of the dikes surrounding the IJsselmeer will disappear.

Eco-dynamic Design	Traditional Design
 The marshes are continuously nourished by adding excess material (sand and shells) from sand mining activities to strategic locations. Natural processes gradually distribute these sediments, so natural growth can keep up with the lake level rise. Because of the wave reduction caused by the weeds, bushes and trees, wave action near the dike is reduced significantly. This reduction of wave action can be such that the current dike level is sufficient: the dikes need not be raised.	 The traditional action to take when dikes are too low is to raise them with heavy machinery. As dikes usually have gentle slopes, this also means that the dike has to be widened considerably.

Eco-dynamic Design and Development Guideline

Governance - Regulatory context

Table of Contents

General

BwN alternatives should not only be appealing, but also fit into existing regulations. This chapter informs on how to scan regulations and deal with emerging regulatory barriers. The content of the various sections can be summarized as follows:

- The section General (this page) offers a general perspective on the structure of regulatory systems and the role of perceptions of regulations in project development processes.
- The section Guidance discusses the **scanning of and dealing with regulatory barriers**. Backward mapping from the required approvals and permits provides a view on the legal procedures and assessments which ultimately lead to approval or rejection. It is crucial for BwN-developers to know how decision-making is framed with regard to authorities, procedures and applied standards. The EU Birds and Habitats Directives is used as example.
- The section Examples elaborates how a BwN developer can make use of existing regulations, using the EU Birds and Habitats Directives as an example. The real-life examples illustrate the complexity and the challenges to be handled.
- The section References presents references to more detailed reading.

Structure of regulatory systems

Preparing and executing projects is normally done by the executive power; the legislative and juridical powers are the contextual powers in this system.

For further reading on some basic notions, click the link structure of the regulatory systems for an overview of legal systems and how BwN-relevant legal decisions such as conditioned approval (a permit) are embedded in this system.

In the context of applicable constitutional and administrative legislation, multiple primary and secondary legislations, informal regulations (also called pseudo-regulation) and sometimes case law (verdict of a court on how to interpret rules) can be relevant and need to be scanned.

Most of the guidance presented herein is based on a study of the EU Birds and Habitats Directives, which aim at conservation of all species of naturally occurring birds in the wild state and natural habitats of wild flora and fauna in the European territory of the member states. Nonetheless, the observations made, conclusions drawn and guidance presented are also relevant to other international (non-EU) situations, where other relations are applicable.

Regulatory context

Regulations can be considered as the institutional sediment of previous perspectives and discussions. Present-day regulatory systems are often organized by sector and therefore fragmented. It is fashionable to use add-on coordination instruments to at least have some kind of cross-sector integration. There is a similar role for policy documents and plans. As far as the ecosystem is concerned, these usually aim at conservation of ecological quality, they hardly ever take a dynamic developmental perspective. BwN-principles, if effectively advocated, are likely to eventually influence the institutional context in which decision making takes place.

BwN is therefore confronted with a large number of rules and standards at various levels. Three characteristics make scanning this regulatory context a demanding task:

- Even if a BwN-initiative is of a local nature, multi-level regulations will apply.
- BwN-alternatives often serve multiple interests, but primary and secondary regulations are often organized by sector. Inter-sector coordination and integration are often organized by rather procedural secondary (if not informal) regulations.
- Procedures (when, what, how) can be as important as content.

Well-known additional bottlenecks with regards to regulatory context are:

- Vague regulations
- Conflicting and overlapping regulations
- Unspecified regulations
- Interpretation of regulations

Furthermore, as the text box suggests, regulations may well reflect paradigms and perspectives of the past, which makes it difficult for innovative approaches like BwN to fit in. For example, the static short-term perspectives often found in nature conservation regulations seem to (but not necessarily do) contradict the dynamic long-term approach advocated by BwN.

How do different perceptions of regulations influence the process?

It is important for a BwN-developer to realize that regulations, which in the beginning are often viewed as *barriers* for development, may just as well be *opportunities* for development. Usually, this is a matter of perception. In practice a developer will tend to feel constrained by regulations rather than favoured by them. Different perceptions of regulations lead to different strategies to deal with them:

1. If a developer perceives regulations as barriers, he/she could try to remove them by striving to have legislation revised according to BwN principles – this is a long-term strategy that requires examples of BwN attempts in the current regulatory setting.
2. If a developer perceives regulations as opportunities, he/she could try to make optimum use of them – this is a short-term strategy of working with the legislation in a pro-active manner.

BwN requires a change of a developer's perspective from perceiving regulations as *barriers* to perceiving them as *opportunities*. An example of the EU Birds and Habitats Directives, which form the legal basis for Natura 2000 network of protected areas, will be used to illustrate the challenges of regulations as well as possible schemes to handle them.

The application of the EU Environmental Directives by the member states, regional authorities and project developers has not always been successful. In particular, the Birds and Habitats Directives have created many negative feelings when they were called upon in national courts and a lot of projects were delayed or cancelled (see Nature and Biodiversity cases). Hence the Birds and Habitats Directives constitute perhaps one of the biggest perceived challenges for BwN in the European Union member states. Yet, there are several reasons to (try and) perceive these Directives as opportunities instead of barriers:

- the EU policy process is well known for its inability to effect radical change. Much EU policy and decision making (including Natura 2000) displays a deep gradualism and incrementalism. It is just not possible to initiate bold new plans and significant departures from the *status quo* and expect them to be accepted by all member states without being modified significantly;
- Initial lack of attention, knowledge and awareness of the requirements of the Birds and Habitats Directives has been overcome as practical experience and case law increased;
- Recent guidance documents published by the European Commission (European Commission, 2011, 2012) encourage BwN in estuaries and coastal zones, port development and inland navigation;
- Case studies and BwN pilot projects show that BwN-type developments are possible within the existing regulatory framework;
- Preliminary results of the study on the feasibility of BwN in local arenas (GOV 2.1) show that outside protected areas BwN is more difficult to pursue, as there is no necessity to take the ecological system into account as much as in habitat areas (also see Networks Guidance, lesson learned 5, adaptive use of pro BwN arguments);
- In cases where funding for ecological project-components is limited, environmental regulations could serve to ‘push’ for a BwN-approach as a means to live up to environmental obligations (e.g. the goals of Natura 2000).

Guidance

In this section we provide guidance on how to map and monitor the legal salience of BwN and how to handle (perceptions of) regulations strategically in order to seize regulatory opportunities and handle regulatory obstacles. The section is structured along the following lines:

- How to get grip on applicable regulations and concrete requirements?
- How and where to find or create 'space for BwN' in existing regulations/legislation, if it is not (yet) there?
- Do's and don'ts

How to get grip on applicable regulations and concrete requirements?

> "*You* have to *learn the rules of the game*..." Albert *Einstein*

A developer should monitor closely whether alternatives developed fit into the prevailing legislation and regulations. The check on legislation and regulations includes obligatory approval procedures (Permits and licenses), applicable formal and informal regulations, and a planning system. Seen from a project perspective, the regulatory system determines how decisions will be taken, which procedures are in place and which standards will be applied to this case. In most legal systems, applicable standards can be found in primary and secondary laws and informal regulations on issues such as air quality of air, water and subsurface quality, the use of resources and other economic activities, among which constructing and operating infrastructures. Especially relevant are the procedures involved and the assessments required, such as nature tests, multi-criteria analysis on costs and benefits and Environmental Impact Assessments.

> Whether and to what extent supra-national regulations are relevant varies by country and situation. For instance, membership of supra-national organizations, conventions and treaties is of relevance. On the International level one could think of the London, Ospar, Helcom and Barcelona Conventions, all dealing with marine protection, or the Basel Convention on export of hazardous waste, or the Ramsar Convention on wetland protection, or the EU-legislation. Some supra-national regulations can be of direct relevance to local projects and alternatives and thus for BwN-developers. Sometimes such regulations first have to be integrated in national legislation before they become legally binding.

Scans of regulations take time and require some expertise in this field. One might consider outsourcing this task to a capable and trustworthy specialist, or let such a person give a second opinion. For the Birds and Habitats Directives, such a scan could include:

- Identification of Natura 2000 areas designated in or around the proposed project site (maps of Natura 2000 are available at the Ministry responsible), in order to assess whether the corresponding regulations are applicable.
- Conservation objectives, conservation measures and management plans (if available) for these areas (usually found in national designation document of the responsible Ministry);
- National, federal or regional legislation implementing the Habitats Directive (in particular the crucial Article 6) in the Member State;
- The authority which is to approve the project; this authority may also provide further advice on how to proceeding the project in this particular area;

- Case law and recent studies on Natura 2000 can provide useful insights and lessons learned.
- Access to courts and participatory arrangements in the country concerned.

Awareness of case law can provide more precise guidance, as it gives insight into the interpretation of legislation in specific situations. In addition, documents such as explanatory memoranda are usually available for every piece of primary and secondary law, explaining intentions and goals. Sometimes additional guidance is issued later on, for instance the guidance document of the European Commission (European Commission, 2011). Such documents clarify how national primary or secondary legislation, for instance on water quality, should be implemented in a specific region. Further guidance may be available in handbooks and manuals.

How and where to find or create 'space for BwN' in existing regulations/legislation?

> "*You* have to *learn the rules of the game*. *And then you have to play better than anyone else*." Albert *Einstein*

BWN approach: Talk with the regulators

BwN alternatives span geographical and time scales. Be aware that this may increase complexity seen from a regulatory perspective, as uncertainty is seldom welcomed. Make clear that BwN is flexible and steerable if actual dynamics exceed legal standards. Do not hesitate to interact with regulators, who are often frustrated by counter-productive fragmentation and rules and quite willing to seek for creative solutions. Moreover, such meetings signal that certain regulatory settings might be worth reconsidering.

Identify formal requirements

A scan of regulations will give a general idea of regulatory environment and perceived regulatory risks and opportunities. The actual texts of regulations could provide an initial idea of the requirements that BwN initiative has to meet. Obtaining this information could be outsourced to a consulting specialist or done by seeking contact with authorities. See the example of Formal requirements of the Birds and Habitats Directives

Talk with the authorities

The actual implementation of regulations by the authorities responsible and the effect on development practice is not always evident from the text of the regulation only. Therefore it is advisable to consult the authorities in charge of specific regulations and discuss whether their interpretation is correct and complete, and whether creative options can be found to navigate the regulatory obstacles. It may also help to draw on the experience of reputed experts.

> The culture of permitting and the formal and informal regulatory setting differ strongly by region. Some countries have 'perfect' regulatory settings but hardly any implementation; other counties have flexible or irrelevant

regulations that leave huge discretionary room to the authorities, but also include a high risk of arbitrary decisions.

Adjust and fit the BwN design

Once formal requirements and their practical implications are clear, possibilities can be sought to adjust and fit the BwN design to this regulatory context. Below we elaborate the possibilities of adjusting and fitting a BwN design to the requirements of the EU Birds and Habitats Directives; for other regulations similar procedures can be followed.

Once the regulation scan has identified Natura 2000 areas in or around the proposed project location, there are at least two possibilities to fit a BwN design into the corresponding regulatory requirements.

The first possibility is in the pre-screening phase of a project, when BwN can be helpful to exclude significant adverse effects on the Natura 2000 area. The following questions may be helpful at this stage:

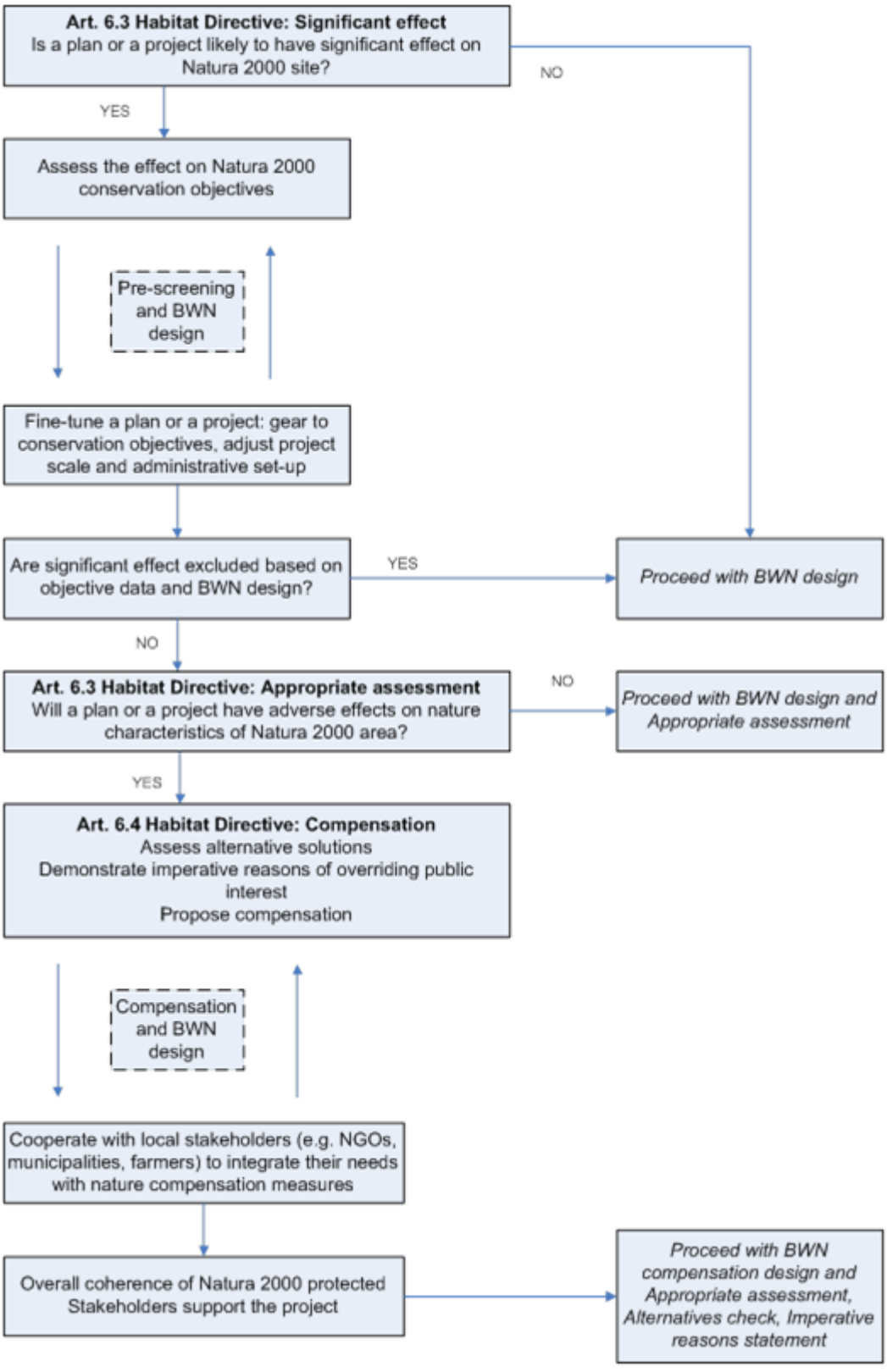
1. Can we adjust the BwN design so that it contributes to the Natura 2000 conservation objectives?
2. Can we make our BwN initiative beneficial for the management of Natura 2000 sites?
3. Can we split the BwN design and realise it in separate stages (sub-projects), while keeping in mind the cumulative effect on Natura 2000?
4. Can we upscale or downscale the BwN initiative in order to safeguard overall coherence of the Natura 2000 network?

An outcome of such adjustments could be a BwN design that supports the favourable conservation status of the protected habitats and species. If this is the case, the chances of its approval by administrative court in case of appeal increase (see case Veluwe Randmeren).

The second possibility can be used if adjustments in the pre-screening phase fail to produce a design that excludes significant negative effects. This may be the case for intrusive developments of overriding economic interest (e.g. fairway deepening, port development). In the absence of alternative solutions, possibilities could be explored to realise BwN principles alongside or as part of a compensation plan. The added value of BwN here may be that it generates local stakeholder support and/or creates new possibilities for spatial development. It may also provide a platform for cooperative interaction among stakeholders and prevent frustrations and legal fights later on in the process, as long as such interaction starts at the moment it becomes clear that compensation is unavoidable. The following questions may be helpful at this stage:

1. What are the possibilities for BwN as part of the compensation plan?
2. Can we adjust the BwN design to benefit local stakeholders' interests?
3. Can we use BwN to facilitate cooperative interaction among stakeholders?

The flow chart below shows the main steps in decision-making in Natura 2000 protected areas according to art. 6 of the Habitats Directive. Examples of two possibilities of BwN intervention are indicated on the flow chart and elaborated in more detail in the next chapter.



As referred to before, for other pieces of legislation the feasibility assessment can be done in a more or less similar manner. If a piece of legislation requires an Environmental Impact Assessment, or another kind of nature assessment, or a multi-criteria assessment, it is obvious that analogue reasoning can be used to assess whether BwN fits in.

Do's and Don'ts

To make a coastal development project successful in an ecologically sensitive area an BwN manager and/or project administration is advised to:

- Keep track of the latest legislative developments, case law, available guidance documents and recommendations; for BwN projects this can include multiple sectorial regulations (e.g. spatial planning, water management, marine policy).
- Be aware of the required information and data for applications and approvals; for BwN projects this can include multiple sectorial procedures (spatial planning, water management, environment) - integral procedures covering all interests will rarely be applicable.
- Anticipate the regulatory trajectory at an early stage and take this into account as requirements for further project development.
- Keep track of the multiple procedures that often have to be completed before a positive outcome can been reached. Forgetting and/or ignoring (parts of) procedures can lead to project delays or even termination.
- Anticipate the kind of legal requirements that could eventually come into play in case of legal appeal and the actors (stakeholders) who could potentially initiate the appeal (see Networks Guidance).
- Do not ignore the difference between hard rules and soft rules. Hard regulations should always be complied with and imply that a certain decision is inevitable; the soft regulations leave some room to adapt to the situation.
- Make use of discretionary room if available, for instance to judge whether information and data in a procedure is sufficient.
- Keep in mind that there is also something that can be called the 'regulatory game'. In nature assessments, for instance, the exact criteria have to be agreed upon and settled early in the process. Actively participating in this may ultimately favour the BwN-approach.

Assessment of the legal viability of a BwN initiative is a recurring activity, the scope can vary from a first-order reconnaissance up to a very detailed assessment.

- Hand in adequate information required by the regulatory procedure. Handing over great data does not help if the required information is not provided. If the requirements of a procedure are not precisely known, for instance regarding the information that has to be delivered, it is advisable to clarify this first and then proceed with the investigation.
- Draw on previous experience in the working area with regard to applicable regulations. Assessment of expected ecological effects always comes with uncertainty. Sometimes more research can reduce uncertainty, but if phenomena or effects are unpredictable, even cutting-edge research does not help. In the Dutch context, assessment of effects after a zoning plan had been approved by a municipal council and a permit had been issued for construction works is evidence of inappropriate decision-making as ruled by the Dutch Administrative court (see court ruling in the example Zeewolde Harderwijk). For more info about handling uncertainty see Knowledge Guidance.
- Be aware that the *complete* BwN design is presented in procedures, for instance approvals and permitting. Monitoring tends to be considered in a later stage, but the facilities and activities involved also need approval and permitting. Ignoring this will lead to unforeseen repairs and thus to unnecessary delay and additional costs.

Lessons learned with regard to specifically the EU habitats / species regulation and the appropriate assessment procedure:

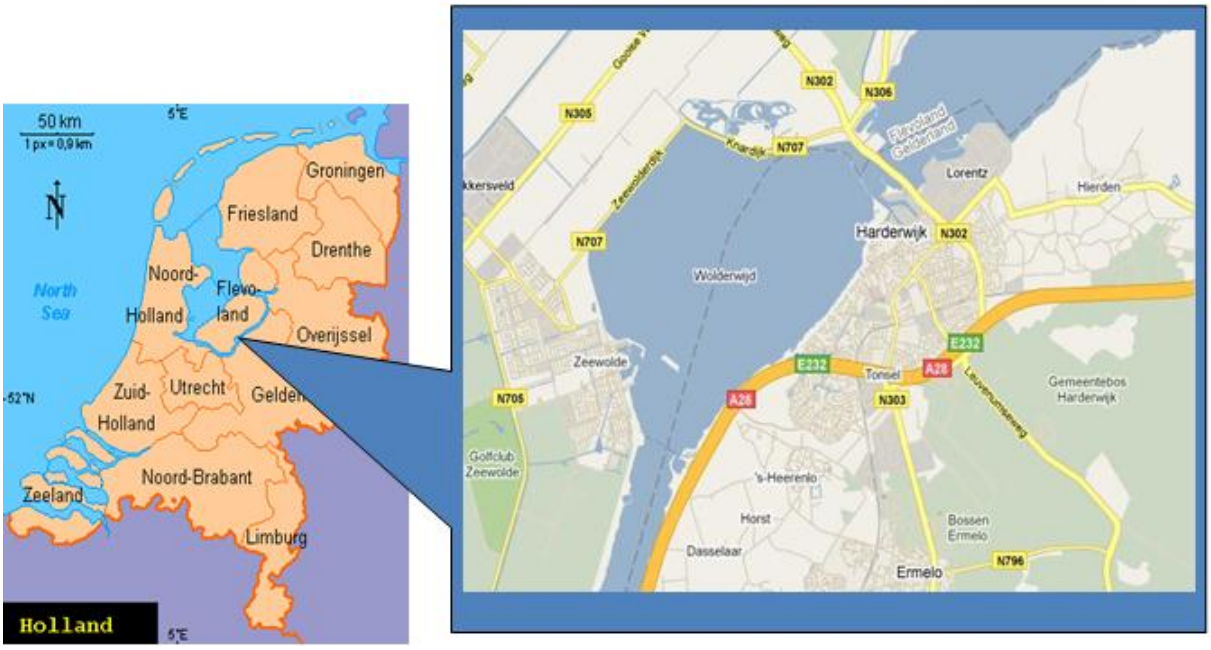
- In general for areas with a special conservation status the overall positive ecological effects on protected species and habitats shall exceed the (temporary) negative effects of the project measures (i.e. land reclamation), in line with the goals in the area. A well-founded case must be delivered, with explicit reference to the conservation objectives of the area.
- The assessment of ecological effects at pre-screening stage (see diagram: pre-screening and BwN design) must emphasise the BwN idea of a project, i.e. the fact that its measures do not threaten the favourable conservation status of habitats / species, or even support their recovery and/or improvement. The purpose of a pre-assessment stage is to investigate the possibility of significant negative effect and determine whether appropriate assessment would be needed. If significant effect could be avoided with the help of BwN design at this stage, the project can proceed, but should be consistent in the use of terminology and avoid terms like 'appropriate assessment' and 'compensation', which come at a later stage. If there is a chance of significant negative effect, the project should proceed with an appropriate assessment (see diagram: Art. 6.3 Appropriate assessment) or further according to Art. 6.4 with alternatives assessment, compensation plan and IROPI statement.
- If the pre-screening convincingly rules out significant effects or demonstrates that they are negligible, an appropriate assessment procedure is not necessary, even when a project implies the loss of Natura 2000 area (example project Zeewolde, see Examples). Otherwise, an appropriate assessment procedure should be carried out. This procedure is often outsourced to a specialized consultant. More information on what it entails can be found in the European Commission Methodological Guidance.

If Natura 2000 or comparable regulations are applicable, plans or projects should always be based on mutually beneficial strategies according to the 'working with nature' concept' (see Guidance document EC, 2011).

Examples

Comparison Zeewolde and Harderwijk projects, the Netherlands

The Veluwe Randmeren, i.e. the shallow lakes between the polder Flevoland and the mainland of the province of Gelderland, were designated as a protected area under the Birds and Habitats Directives in 2000 and 2003 (see Figure). Conservation objectives for Veluwe Randmeren were finalized in 2007. Two coastal developments took place in this area. The one in Harderwijk included the relocation of an old industrial area, improvement of recreation and housing facilities, and strengthening the natural and water functions. The one in Zeewolde – on the other side of the lake – envisaged a park zone, two beaches, an island with recreational facilities connected to the shore by a bridge or a dam, and a row of islands that would create an open lagoon area between the islands and the shore.



Both municipalities argued that a loss of Natura 2000 protected area (8.5 ha in Harderwijk and 10 ha in Zeewolde) had no significant effect on the integrity of the relevant Natura 2000 site. Both authorities took into account the requirements of Habitat assessment, have argued that an appropriate assessment was not necessary and seemed to have integrated nature into their design. However, there was a slight difference on how they have done it, which eventually led the Supreme Dutch Administrative Court to reject the Harderwijk development in 2008 and approve the Zeewolde development in 2009:

- The successful design was adjusted to Natura 2000 conservation objectives of the Veluwe Randmeren and contributed to achieving these objectives

  The municipality of Zeewolde maintained that a permanent loss of 10 hectares of sanctuary and forage area for birds does not threaten the favourable *conservation status*, since the coastal lagoon, parts of which have shallow water, will *support the recovery or even improve the habitat* of the protected species.

- The unsuccessful design tried to create new habitat to neutralize the loss of the existing one

  The municipality of Harderwijk argued that the loss of 8.5 hectares of habitat and forage areas can be *neutralized by the creation of* a green zone and nature-friendly areas, which would be suitable as *new habitat* for birds, fish and mussels, while the transformation of a nearby area of pastureland into marshes would make the area attractive for water- and grassland birds and create a water retention area.

- The successful development had a well-organized administration

  The municipality of Zeewolde administratively separated coastal development from residential area development and carried out residential development first. This step-by-step approach allowed for the rapid realization of the coastal zone project. The overall design of the coastal zone plan did not undergo any major changes, and in the short time span of development no significant legislative changes occurred. Early de-

coupling of residential interests shifted attention towards the more prominent role of nature in coastal development and a more tailor-made design.

- The unsuccessful design failed to provide solid scientific (ecological) argumentation

  The new habitat creation proposed by Harderwijk was just a collection of existing nature development initiatives in the area. With no consistent nature development plan in mind, authorities also failed to provide solid scientific argumentation that no adverse effects were to be expected. Instead, they tried to investigate the ecological effects to the depth of the available knowledge. In a successful project, on the other hand, BwN design indirectly contributed to the actors' confidence in their own project design and their certainty in the provided scientific underpinning (Zeewolde). The comparison of these two projects illustrates that the actors' interpretation of when exactly the required level of certainty is reached is an important factor for implementation sucess. The interpretation of scientific data can be further strengthened by the following factors: consistent use of terminology (appropriate assessment or not), actors' prior experience and the exact wording of reports, conclusions and the interpretation thereof by the Court.

In the context of Natura 2000 implementation in the Netherlands, BwN design principles can increase the chances of project approval in case of appeal to the Supreme Administrative Court. BwN-developers should consider the following steps:

Lesson 1: Start by adapting the BwN-design to the Natura 2000 conservation objectives of the area.

Lesson 2: Demonstrate that the proposed BwN-design contributes to the achievement of the conservation objectives, or even beyond.

Lesson 3: Work on excluding any significant negative effect on the conservation objectives and provide scientific argumentation for this in the pre-assessment report.

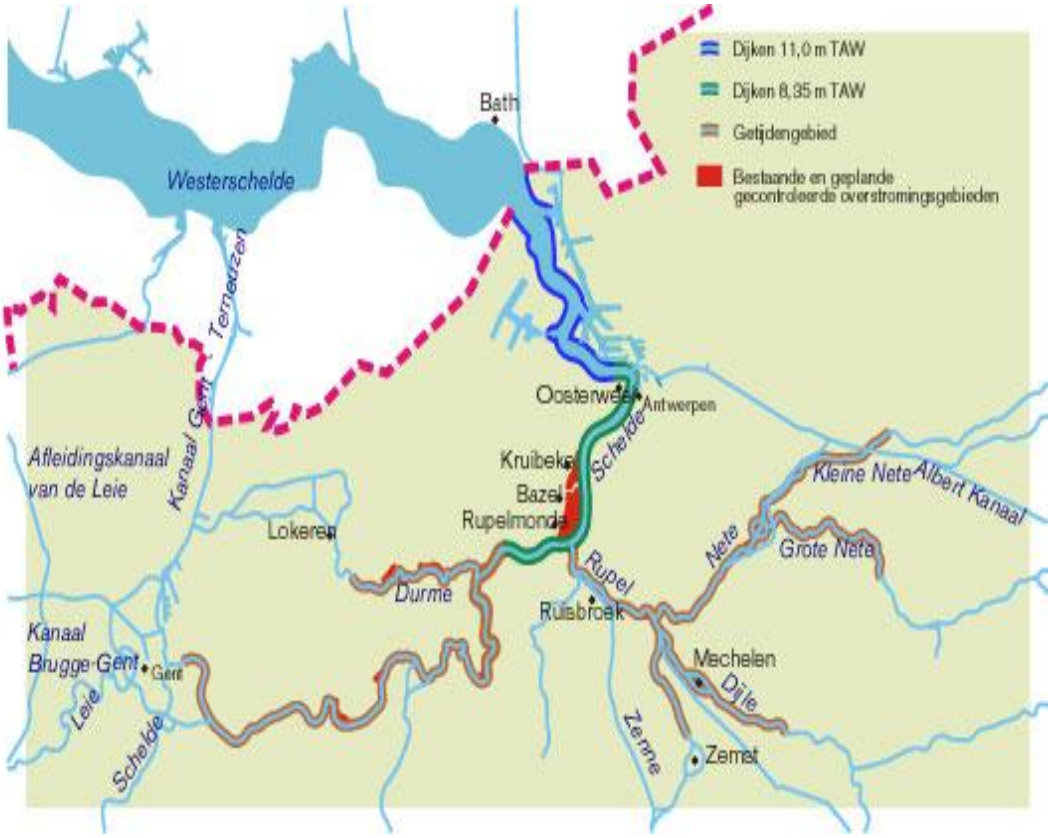
Lesson 4: If abovementioned steps can be completed successfully, no appropriate assessment is necessary, even if the project implies a loss of Natura 2000 area.

Lesson 5: If possible, consider splitting the projects in stages (so called administrative de-coupling), but remain aware of possible cumulative effects.

Lesson 6: Anticipate the legislative requirements that would come into play in the case of a legal appeal and pay attention to the latest legislative developments and case law.

Kruibeke, Bazel and Rupelmonde flood control area, Flanders (Belgium)

In 1988 the polders of Kruibeke, Bazel and Rupelmonde were designated a special protection area (SPA) under the EU Birds Directive and in 1996 they were designated a special area of conservation (SAC) under the EU Habitats Directive (see Figure). However, the practical implications of these designations only became clear after another project, viz. the construction of a new tidal dock on the left bank of the river Scheldt (the Deurganck Dock) had been implemented.



Although Deurganck Dock received a lot of public and professional attention, the 35-year history of its compensation project – the Kruibeke, Bazel and Rupelmonde flood control area – is more interesting from a BwN-perspective. It illustrates how the actors' learning strategies gradually broadened the project goals from flood defence to nature, the development of Antwerp harbour, and the goals of local stakeholders. Partly as a result of the involvement of Natura 2000, the project evolved towards a BwN-type design which balanced the conflicting interests of the past.

A chronological analysis reveals that projects implemented predominantly for economic benefit (Deurganck Dock) are confronted with the environmental requirements of Natura 2000. At the same time, local flood defence projects (Kruibeke flood control area) are accorded with low political priority. At the European level, workable approaches are sought to address the accumulated misunderstanding of the Birds and Habitats Directives by industry and the resulting case law. Placing ecological goals at the start of the planning process, as envisaged in BwN, could balance the previously conflicting interests and result in designs which are acceptable to most stakeholders. The BwN- approach can help the authorities to avoid conflicts of interests and speed up project implementation, provided that it is applied from early on in the planning and decision-making process.

Further reading on Kruibeke, Bazel, Rupelmonde

References

Literature

Lulofs K., Smit M. en Vikolainen V. (2011) 'Innovatie op de grens van Land en Water: Bouwen met de Natuur' *(in Dutch)*, *Water Governance,* Vol. 1, No. 2, pp. 36-43

Vikolainen V., Bressers J.T.A. and Lulofs K. (2011) ‘Management aspects of Building with Nature projects in the context of EU Bird and Habitats Directives’, *Environmental Engineering and Management Journal*, Vol. 10, Nr. 11, pp. 1675-1686

Vikolainen, V., Bressers J.T.A. and Lulofs K. (2012) ‘Implementing EU Natura 2000 at the project level: lessons from the Veluwe Border lakes in the Netherlands’, *Public Administration,* DOI: 10.1111/j.1467-9299.2011.01971.x

Vikolainen, V., Bressers J.T.A. and Lulofs K. (2012) 'The role of Natura 2000 and project design in implementing flood defence projects in the Scheldt estuary', *Journal of Environmental Planning and Management*, DOI:10.1080/09640568.2012.724014

Vikolainen V., Bressers J.T.A. and Lulofs K. (forthcoming) The transfer of Building with Nature approach in the context of EU Natura 2000, In: C. de Boer, J. Vinke-de Kruijf, G. Özerol and J.T.A. Bressers (Eds.) *Water Governance, Policy and Knowledge Transfer. International Studies on Contextual Water Management,* Earthscan – Routledge

Beunen R., van der Knaap W.G.M. and Biesbroek G.R. (2009) ‘Implementation and Integration of EU Environmental Directives. Experiences from the Netherlands’, *Environmental Policy and Governance*, 19, pp. 57-69

Bovens M. and K. Yesilkagit (2010) ‘The EU as Lawmaker: the Impact of EU Directives on National Regulation in the Netherlands’, *Public Administration*, 88, 1, 57-74

Internet

Broekmeyer M.E.A., Griffioen A.J. and Kamphorst D.A. (2008) Vergunningverlening Natuurbeschermingsrecht. Een overzicht van aanvragen en besluiten art. 19d Natuurbeschermingswet 1998 sinds 1 oktober 2005 tot 31 Juli 2008. Alterra-rapport 1748. Wageningen: Alterra

COUNCIL DIRECTIVE 92/43/EEC on the conservation of natural habitats and of wild fauna and flora

DIRECTIVE 2009/147/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL on the conservation of wild birds

Eric Van Hooydonk (2006) The impact of EU Environmental Law on Waterways and Ports

European Comminities (2006) Nature and Biodiversity Cases. Ruling of the European Court of Justice

European Commission (2001) Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC

European Commission (2011) Guidelines on the implementation of the Birds\- and Habitats Directives in estuaries and coastal zones; with particular attention to port development and dredging. Luxembourg: Office for Official Publications of the European Communities.

European Commission (2012) Guidance document on sustainable inland waterway development and management in the context of the EU Birds and Habitats Directives

IMI - Institute for Infrastructure, Environment and Innovation

Zonneveld, W., Trip J. J. and B. Waterhout (2008) Impact van EU-regelgeving op de Nederlandse ruimtelijke ordeningspraktijk; Vijf voorbeelden van gebiedsontwikkeling. Onderzoeksinstituut OTB, TU Delft.

About the author

Vera Vikolainen was born in 1982 in Saint-Petersburg, Russia. She obtained a Bachelor's degree in Business Administration (cum laude) from St. Petersburg State Polytechnic University in 2003 and a Master's degree in European Studies (cum laude) from the University of Twente in 2005. Her Master's thesis research focused on the EU regional policy and the possibilities of structural funds for urban development projects in Central and Eastern Europe. This research was combined with an internship at Witteveen+Bos consulting engineers in Deventer, the Netherlands. Between 2006 and 2007 Vera Vikolainen worked as an export account manager at the Dutch subsidiary of MEA Group AG in Zelhem, the Netherlands. In September 2007, she joined CSTM as a research assistant where she worked on several projects in the field of policy implementation and water management. The projects covered the societal benefits of water management, the evaluation of municipal economic policies, the effectiveness of municipal monitoring and enforcement policies, public administration programme curricula and competences development. Apart from carrying out her research tasks, she published research results in English, Dutch and Russian. In September 2008, she started her PhD research entitled 'Nature at Work. The feasibility of Building with Nature projects in the context of EU Natura 2000 implementation', which she completed in September 2012. During the research, she published as lead author in the Journal of Environmental Planning and Management, the Environmental Engineering and Management Journal and Public Administration, prepared a book chapter, presented three papers at international congresses and contributed to three research reports.