Interreg
North Sea Region
IMMERSE
European Regional Development Fund

EUROPEAN UNION

Report

Improving estuary governance

Comparison of the governance of the Elbe, Scheldt and Humber regarding estuary management

May 20, 2020

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Projectnummer	YD1905
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"This study was supported as part of the IMMERSE project- Implementing Measures for Sustainable Estuaries, an Interreg project supported by the North Sea Programme of the European Regional Development Fund of the European Union."

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wing partner in ruimte en ontwikkeling

Management Summary

Context and goal

Together with the partners of the European INTERREG Project IMMERSE (IMplementing Measures for Sustainable Estuaries), Hamburg Port Authority (HPA) is working towards sustainable management of estuaries in the North Sea Region. Governance structures and processes are among other aspects important factors that influence estuary management and the implementation of measures. This study focusses on the comparison of the Elbe, Scheldt and Humber estuaries and on what lessons can be learned from this comparison.

At the Elbe estuary, mistrust and different interests across various actors prevent that coordinated action amongst the actors grows towards a more sustainable management of the estuary. As one of the actors, HPA has a strong interest to investigate how the governance of the Elbe can be improved.

Therefore the motivation for HPA was to compare governmental and decision making structures and processes of the three estuaries and analyse what valuable lessons can be learned from estuaries with comparable physical, economical and societal characteristics (and hence comparable challenges and tensions between actors and their interests) although if different governance structures and cultures may exist. Goal of the study is to find examples or good practices on three aspects, that could be transferred and translated to the context of the Elbe estuary:

a. The interaction between stakeholder platforms and formal decision-making by governmental authorities. How is this organized, what are the benefits and problems?
b. Which structures of power are in play and how these influence the interaction between formal and informal decision-making.
c. The development of longer-lasting vital networks of stakeholder participation. How can this be done and what are the requirements to do so?

Content of the report

This report drafts the results and conclusions of a study comparing the governance of the three estuaries on the above mentioned aspects. The report is structured as follows:

- Chapter one elaborates the research goal and questions, the research consortium, and gives a first introduction on the three estuaries and the reasons why these three are compared.
- Chapter two describes the research methodology and important theoretical backgrounds about governance. In particular this study uses the policy arrangement approach (Van Tatenhove, et al., 2000) which focusses on actor configurations, the resources of actors, the discourse between them, and the rules of the game (the written and unwritten rules that determine the interactions between actors).
- Chapter three gives an elaborate description of the three estuaries on the following aspects: management responsibilities and environmental legislation framework; tensions (for example conflicting interests), actors (the governmental and non-governmental organisations in play), and processes and events (moments in decision-making that turned out to be important and guiding for future developments).
- Chapter four presents the results of the comparison of the three estuaries on the key-variables researched in this study: (1) hierarchy vs. self-organisation, (2) enhancing rule compliance through creating responsibility, (3) extent of fragmentation and coordination, (4) extent of

stakeholder involvement (from informing to co-decision-making), (5) structures/measures for dealing with conflict, (6) encouraging adaptation and change.

- Chapter five reflects on various aspects of estuary governance and draws lessons based on the comparison regarding (1) the configuration of actors, (2) the organisation of stakeholder participation, (3) the way knowledge can be developed (as an important resource for actors) in a cooperative manner, and (4) modes that promote higher levels of integration in the context of quite high levels of fragmentation.
- Chapter six draws conclusions and drafts recommendations for the Elbe estuary in particular. This chapter introduces a stepwise manner to further improve stakeholder involvement in the Elbe in a way that fits the German context. The joint development of knowledge forms the central recommendation on which the proposed steps are based.

Conclusions of the comparison

The comparison led to the conclusion that the governance of the three estuaries show many similarities as well as some important differences. The most important similarities and differences are summarized below:

	Elbe	Scheldt	Humber
hierarchy vs. self-organisation	Hierarchical, with large role for governmental actors		Hierarchical, with room for bottom-up initiatives
Fragmentation and coordination	High levels of fragmentation		
	coordination is present but not fully developed	coordination is present and further developed	coordination is at a low level
Stakeholder involvement	Overarching stakeholder platform is in place with limited scope	Overarching stakeholder platform is in place with a broader scope	Stakeholder participation is organised at the level of concrete projects
enhancing rule compliance	Formal procedures through permitting is the basis for rule compliance		
	In some cases treaty agreements are closed and some informal meetings exist	Joint development of knowledge enhances 'voluntary' compliance	Lower tensions between different activities and ecological goals
structures for dealing with conflict	A combination of court appeals, and political deals are the dominant mode		Bottom-up resolution at level of board of directors
	A broad stakeholder platform is organised with a limited scope	More collaborative mode developed over time based on joint development of knowledge	
encouraging adaptation and change.	No broad long-term vision focus on concrete problems and measures	Broad long-term vision, medium term plan and concrete measures	No long-term vision focus on concrete problems and measures

Lessons for the three estuaries

Based on the comparison, this study draws four lessons about estuary governance. First lesson is that **differences in mutual dependencies between actors and cultural differences affect governance modes.** The study revealed that in a hierarchical and fragmented governance mode (as found in all estuaries) **a more collaborative and integrated mode of governance can grow over time**. In the Scheldt appreciation for a collaborative approach grew after jointly drafting a long and medium-term vision by The Netherlands and Flanders. In the Elbe the need for collaboration is also recognized but constrained partly due to the governmental system of powerful federal states. As a result authorities are hesitant to abandon formal powers and to apply a more collaborative approach. Additionally, it may be part of a strong cultural pattern in Germany that emphasises the importance of formal procedures and planning based on the formal distribution of powers and tasks. Therefore, the collaborative approach as found at the Scheldt, fundamentally does not fit the context at the Elbe. Stronger collaboration at the Elbe can only grow over time and above all forms of cooperation, and a mode has to be found that fits the formal and legalistic approach.

Second lesson is that **effective stakeholder participation is a chicken-egg problem**. The comparison between the Elbe and Scheldt suggests that stakeholder involvement in the Elbe is currently at a level of involvement that was the case in the Scheldt 10 to 15 years ago during the phase of the joint vision making. In the Scheldt stakeholders experienced a positive impact of the collaboration of the Netherlands and Flanders and of participation through a stakeholder council. For the Elbe this 'proof' of positive impact is not yet available. The stakeholder platform at the Elbe has to 'prove' the value of its existence by showing how decision-making can be improved and made more time efficient. Comparing Elbe and Scheldt to the Humber shows that a more centralised platform for stakeholder participation makes sense for estuaries with higher levels of conflicting interest (Elbe and Scheldt) then for estuaries with lower levels of conflict (Humber).

Third lesson is that **a joint knowledge base promotes conflict resolution and collaboration.** This study revealed that a focus on having a knowledge base that is based on joint fact-finding (as used in the Scheldt) was very effective in reducing and/or preventing conflicts. As actors agree on the knowledge that is used for decision-making possible conflicts about these decisions are better understood amongst actors and therefore also less pronounced. Even more joint development of knowledge helps understand different interests better and hence enhances collaboration between actors. In the Elbe, both the knowledge as well as monitoring are organised more fragmented then in the Scheldt. For both estuaries the implementation of joint fact finding is interesting to explore.

Fourth and last lesson is that **long-term visions can contribute to the integration of policy issues.** The experience with the long-term vision in the Scheldt shows that it is a powerful intervention to create conditions for good governance as it facilitates the integration of issues and creates a basis for actors for a common understanding about conflicting issues such as sediment management or nature development. Another important benefit of the long-term vision has been the joint development of a knowledge base. As stated above this also contributed to the conflict resolution between actors. However, long-term visions are not the most obvious interventions for Elbe and Humber at this moment, as actors are not acquainted with this type of visions and associated merits. We think that current conditions at the Elbe and Humber are not suitable to commence a process to draft a long-term vision unless certain circumstances are met. The required circumstances for the Elbe are described as part of the recommendations for the Elbe.

Recommendations for the Elbe

Reasoning from the perspective of the Elbe estuary, higher levels of collaboration are desirable. However, reasoning from the perspective of the actors, a sense of urgency for more collaboration is not present as mutual gains are not easily recognized when multiple actors have different stakes. This is why we conclude that a structure for collaboration as found in the Scheldt estuary is not directly applicable at the Elbe. Furthermore, we also conclude that the drafting of a long-term vision for the Elbe is not feasible at this moment as it does not fit the current political agenda. Therefore, we would like to recommend four other interventions that could increase collaboration of state and non-state actors along the Elbe and can eventually lead to conditions/circumstances in which it is more logical to draft a joint vision. We believe that the development of a joint knowledge program about the tidal part of the Elbe is the way forward to achieve higher levels of collaboration. The general idea of these four interventions is that they succeed each other in time. In this sense these interventions are also steps to take and each step is essential to take before the next step can be taken.

Step 1: Start informal consultations between state actors to develop a joint research agenda for the Elbe. Questions for the informal consultations could be: What mutual interests are at stake? What issues require joint decision in the future? What kind of knowledge about the estuary as a system is desired and necessary to prepare the decisions in the future?

Step 2: Strengthen the position of the "Forum Tideelbe" by formulating a clear order for the Forum that also addresses the responsibilities of the state actors towards the Forum (such as means for doing research, conditions that have to be met to adopt recommendations of the Forum). First order towards the Forum could be to draft an advice about the research agenda and the way this agenda could be executed in a joint knowledge program.

Step 3: Execute the research agenda in the form of a joint knowledge program (as drafted during step 1 and completed during step 2) involving the actors represented in the Forum.

Step 4: Assign "Forum Tideelbe" with a specific task concerning the knowledge program. There are of course several possibilities to concern, important issues here are: the dissemination of knowledge towards non-state actors and the participation of non-state actors when drafting research questions towards knowledge institutes.

Final recommendation considers the **required circumstances to draft a joint long-term vision.** This study shows that only under the condition that mutual trust between state or main responsible actors and between state and non-state actors is grown, the formulation of a joint long-term vision for the Elbe can be feasible. Mutual trust however is not the only requirement, commitment to the joint vision is another important factor. The Scheldt case showed that at the beginning one actor (the Netherlands) believed in this approach whilst another important actor (Flanders) did not believe in the success. This led to the situation that the vision at first was met with great hesitation. This situation will also almost certainly occur in the Elbe estuary. This means that the actor that will promote the idea of a long-term vision, must consider that large investments in time and trust building will be needed to convince other actors to cooperate in the vision making. This is why we recommend commencing with a long-term vision only if steps 1 to 4 have led to sufficient trust, urgency and commitment to a common approach to estuary management.

Content

1. Introduction

1.1. Context and goal of the study

Together with the partners of the European INTERREG Project IMMERSE (IMplementing Measures for Sustainable Estuaries), Hamburg Port Authority (HPA) is working towards sustainable management of estuaries in the North Sea Region. Therefore, new management strategies have to be developed, existing ones need to be improved and the acceptance of stakeholders for management measures needs to be enhanced. In order to do so, existing governance structures and processes within these estuaries have to be analysed, followed by an assessment of what could be learned and whether these lessons can be transferred to other estuaries.

At the Elbe estuary, mistrust and different interests across various actors prevent that coordinated action amongst the actors grows towards a more sustainable management of the estuary. For example, the approval and implementation of the 9th fairway deepening/adjustment (please note: the Elbe is not only deepened but also broadened at certain locations) took almost 20 years as it led to very opposing opinions and a long legal struggle between the responsible governmental institutions, such as the national Ministry of Transport and Digital Infrastructure (BMVI) and the City of Hamburg at one side, and different actors such as municipalities of the federal state of Lower Saxony, environmental non-governmental organisations, fishermen, at the other. As one of the actors, HPA has a strong interest to investigate how the governance of the Elbe can be improved. Therefore, the governance of the estuaries of the Scheldt (the Netherlands and Flanders) and Humber (United Kingdom) was studied and compared with the situation at the Elbe estuary. In this context, legislative and technical aspects across different management jurisdictions and various stakeholders play a role and need to be taken into account. Furthermore, potential different political, ecological, cultural, societal and ethical imperatives have to be considered.

As it is assumed that a carefully designed mix of formal decision-making and stakeholder processes will lead to better, efficient and more supported decision-making, HPA is interested in the investigation of the interaction between stakeholder platforms and formal decision-making by governmental authorities. Although connecting formal and informal decision-making appears desirable for governance, it can bring along associated risks, e.g. the feeling of losing control, time-consuming processes of stakeholder participation and (fear of) delayed decision-making. Additionally, an established hierarchical manner of thinking and proceeding in a way as it has been done for the last decades, is considered to be quite typical for German institutions. Therefore, HPA wants, secondly, to know which structures of power are in play and how these influence the interaction between formal and informal decision-making. Third, HPA wants to learn about the development of longer-lasting vital networks of stakeholder participation. Further HPA is interested in lessons learnt from the Scheldt and Humber, in order to know how stakeholder participation in relation to formal decision-making can be improved in the future.

1.2. Characterisation of the three estuaries

The river Elbe origins in the Czech Republic and passes several German federal states before the tidal influence starts at the weir of Geesthacht, located a few kilometers upstream of the City of Hamburg. This study focusses on the Elbe estuary beginning at the territory of Hamburg down to the

Wadden Sea. The estuary is located in the area of the city state Hamburg, and the federal states Lower Saxony at its southern shore and Schleswig-Holstein at its northern shore.

The Scheldt has its source in France and flows through Flanders (Belgium) and the south-west of the Netherlands. It has tidal influence from the North Sea up to the weir in Gent. The Flemish part is called the Sea Scheldt, the Dutch part Western Scheldt. For this study the focus is on the Western Scheldt, where the governance situation is especially interesting regarding sediment management and international collaboration between the two national states Netherlands and Belgium and the role of local and regional authorities as part of this collaboration. For deepening and maintenance of the fairway in the Netherlands the Flemish government requires permits from the Netherlands.

The Humber is located at the east coast of Northern England. It is formed by the confluence of the tidal rivers Ouse and Trent. From there to the North Sea, it forms part of the boundary between the East Riding of Yorkshire county on the north bank and North Lincolnshire on the south bank. Estuary management is the responsibility of the local branches of the national bodies Defra (Department for environment, food and rural affairs) and the Environment Agency

1.3. Why a comparison between Elbe, Scheldt and Humber?

The IMMERSE partner estuaries of Elbe, Humber and Scheldt have already been analysed and described in the European INTERREG IV B project TIDE (www.tide-toolbox.eu). They have comparable important socio-economic and ecologically environments. Historically, they have been modified by human activities such as land reclamation, fairway deepenings, cut-off of tributaries and are heavily used by navigation, fisheries, infrastructure, urban development, tourism and recreation. To deal with the different interests of the various parties, stakeholder platforms have been set up at all three estuaries. Hence it is interesting to compare the governance of these three estuaries and investigate how stakeholder involvement in relation to formal decision-making of responsible authorities is organised.

Due to their specific location and existing governance cultures, the three estuaries show differences concerning administration and management in how public authorities collaborate and/or coordinate their decision-making. This governance context is of high importance for understanding the role of stakeholder involvement in decision-making in the three estuaries. For instance, in the transnational Scheldt estuary, a cross-border cooperation between the Dutch and Flemish authorities is in place for policy and management of the estuary. In the Elbe estuary different mechanism are in place to coordinate the decision-making of the federal states of Schleswig-Holstein, Lower Saxony and Hamburg as well as the Waterways and Shipping Administration (WSV), belonging to the federal Ministry of Transport and Digital infrastructure (BMVI). And finally, in the Humber (U.K.) the overall responsibility for the management is located at the national bodies Defra (Department for environment, food and rural affairs) and the Environment Agency.

The differences described above, make it very interesting to compare the governance of the estuaries. Several tensions between different aspects of the use of the estuaries are very similar. And furthermore, overall governance characteristics, such as the extent of hierarchical decision-making, the extent of (policy) fragmentation are very similar. Especially between the Scheldt and Elbe, several similarities can be found, for example the presence of an important port that is situated relatively far

inland, strong sedimentation processes, and several deepenings of the fairway that led to tensions between stakeholders. In the Elbe estuary, stakeholders, very often, refer to the governance of the Scheldt as a good example. The management of the Humber is confronted with other types of tensions between ecology and economy, such as flood risk management and depolderisation or realignment. Especially the latter is interesting for HPA, as the existing stakeholder platform for the Elbe ´Forum Tideelbe´ is currently discussing possible locations for realignment or reconnection of anabranches in order to improve the estuarine system.

1.4. The research consortium

The research consortium, that executed this study consists of the research team from Wing Process consultancy, three estuary experts and a scientific advisory board. Dr. Ytsen Deelstra, dr. Maartje van Lieshout and dr. Linde van Bets are from the Wing research team. They were assisted by three estuary experts, one for each estuary included in this project; Jens Enemark, independent consultant for the Elbe, Marcel Taal, programme manager and advisor at Deltares, for the Scheldt and Mike Elliot, professor at the University of Hull, for the Humber. The research consortium is further completed by the scientific advisory board to ensure good scientific quality of the work. It consists of Prof. dr. dr. Lasse Gerrits, associate professor at the Department of Public Administration and member of the research group Governance of Complex Systems at the University of Bamberg. At the start of the research project also prof. dr. Jan van Tatenhove and Mr. Roger Morris were involved, respectively for the purpose of research methodology and finding relevant sources for our analysis of the Humber estuary.

1.5. Research objective & questions

The research objective is to investigate and compare the governance of the European estuaries Elbe, Scheldt and the Humber. The study took up the following objectives:

1. A description of the governmental decision-making structures and processes of the three estuaries, including the historical developments which have resulted in the current governance system, also compromising the set-up of communication processes, for example within established estuary partnerships (e.g. ‘Forum Tideelbe’) or the ‘Flemish-Dutch Scheldt Committee’ or the ‘Humber Nature Partnership’ (formerly the ‘Humber Management Scheme’).
2. An analysis of governmental actions and outcomes and provision of examples for both cases in each of the estuaries, showing both best practices as well as barriers of the existing structures and processes. This includes the analysis of background information on other processes and developments (economic, political, societal, etc.) that have had influence on these processes.
3. Explanations why certain structures work well at one estuary but not at the other, i.e. why experiences made at one estuary cannot simply be transferred to another one.
4. Recommendations for improvements for the management and decision-making structures of the estuaries with emphasis on the Elbe.

2. Research methodology

In this project we analysed the governance structures and processes of the three estuaries, carried out a comparison, and synthesised all results in overarching recommendations for the three estuaries with an emphasis on the Elbe. For this purpose, we proposed a research approach, consisting of three phases:

1. Phase A: description of governmental decision-making structures and processes;
2. Phase B: analysis of governmental actions and outcomes;
3. Phase C: recommendations for improvement of governance and explanation which structures are transferable and which are not.

In the sections below we describe the theoretical and methodological basis of each phase. In Table 1 you find the definitions for key terms in this study. These definitions were developed by and agreed upon by the research consortium and the client, HPA.

Table 1: Definitions of key terms used in this study

Governance The manner in which you organise the steering – formal and informal – of a certain theme, subject or issue.
Integrated management Management taking into account all functions (and functioning) of a natural system.
Actor Entity (state or non-state) in a decision-making process.
Stakeholder Actor with an interest in relation to the issue at stake.
Institutions / Institutional context (Unwritten) rules which determine the acting of people and organisations.
Discourse A line of ideas, which is unconsciously present and recognizable in language, words and the manner of thinking of actors in governance.
Rules of the game The rules and regulations (both formal and informal) that influence decision-making and how actors position themselves in relation to each other.

2.1. Phase A: description of governmental decision-making

Based on the framework of Common Pool Resource Management of Ostrom (2010), the estuaries were compared using the following aspects (Table 2). To be able to compare the estuaries on these aspects) a description of the governance structures and processes was made for each estuary.

Table 2: Key definitions for governance variables

Hierarchy vs. self-organisation Hierarchical is defined as: one or more state (national level) actors hold responsibility for policy Those policies are top-down enforced on both users as well as public organisations that are in charge of concrete estuarine management/executive tasks. Self-organisation is defined as: actors at the level of managing the estuary have (a certain degree of) freedom in setting goals and solutions in a networked fashion. Industries apply self-regulation, NGO's and industries work together, NGO's critically reflect on self-regulation, responsible policy actors at the state / national level define goals on broad lines and hold responsibility for the functioning of the governance system. Governments at the regional or local level hold executive tasks.
Enhancing rule compliance through creating responsibility In what ways are users of the estuary made responsible for the effects of their own actions i.e. self-monitoring, compulsory compensation, setting own goals / self-regulation, benefits for applying most environmentally friendly technologies?
Extent of fragmentation and coordination The number of organisations involved with formal policy and management/executive tasks. More organisations means a higher extent of fragmentation of tasks and responsibilities. The presence of an infrastructure (institutionalized or not) to align/coordinate policies and/or actions of several actors means there is a form of coordination. A higher number of issues aligned by this infrastructure leads to a higher extent of coordination.
Extent of stakeholder involvement (from informing to co-decision-making) Make use of a collaboration or participation ladder; i.e. information, feedback, consultation, joint planning, citizen/self-control.
Structures/measures for dealing with conflicts Policy and execution/management: ways to discover conflicting interests or conflicting uses of the estuary. Policies that are meant to regulate use and hence resolving conflicts. Rules or deals/appointments to resolve conflicting uses at the executive level. Legal possibilities: special courts such as sector specific/self-regulating disciplinary courts, etc.
Encouraging adaptation and change Policies and institutions that are explicitly aiming at improving and adapting formal goals and management programs to external change.

Based on the concept of policy arrangements coined by Van Tatenhove et al (2000), the ´policy arrangement approach´ aims at linking structural social and political changes in society to changes in the day-to-day practice of policy processes. This approach has its roots in the field of environmental policy and functions as a 'meso level approach' for analysing and understanding change and stability in policy processes (Leroy and Arts, 2006). A policy arrangement is therefore defined as "the temporary stabilization of the content and organisation of a particular policy domain at a certain policy level or over several policy levels" (Leroy and Arts 2006). Four interrelated dimensions are used to describe the policy arrangement. The organisational dimensions are (1) the actors and actor coalitions involved in the policy domain, (2) the rules and regulations (both formal and informal) that play a role and (3) the (division of) resources (e.g. money, knowledge, facilities) and related power. The substantive dimension is the (4) discourses, which are a set of ideas that capture the view and narratives of actors involved (Liefferink, 2006). When one of the four dimensions changes, the other dimensions will change accordingly (Liefferink, 2006). The interrelation between the four dimensions

is illustrated by means of the tetrahedron as depicted in Figure 1 below. In this study this concept is used in a practical manner by first focusing on actors and coalitions, resources of the actors and partly on the formal rules of the game. A detailed analysis of the discourse and the rules of the game was not part of this study as this was too time consuming in the current context.

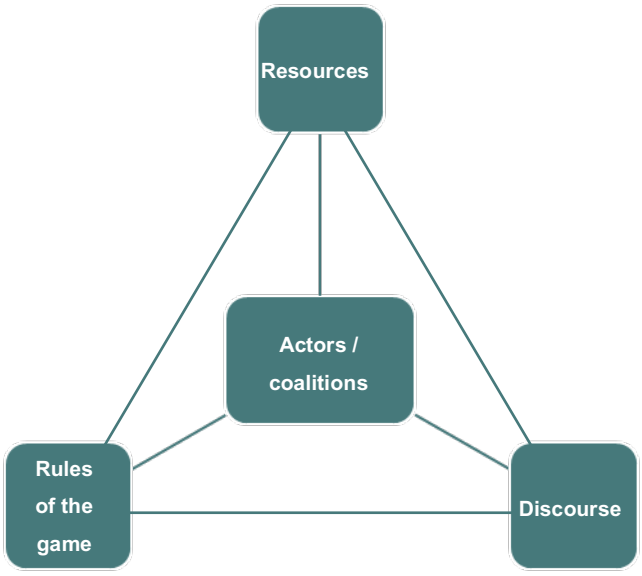

Figure 1: The policy arrangement approach (Van Tatenhove, et al., 2000)

The following research activities were executed:

4. Desk study based on relevant literature, suggested by the estuary experts.
5. Based on a first desk study which resulted in questions, the Wing research team had expert interviews/conversations with estuary experts to get answers on these questions and to narrow down the research scope for each estuary.
6. Additional desk research of primary sources, such as policy documents and press articles.
7. The descriptions of governmental decision-making structures and processes for all three estuaries were discussed in a consortium meeting, to get a feeling for similarities and differences.

2.2. Phase B: analysis of governmental actions and outcomes

The comparison of the three estuaries (Phase A) has led to a further scoping of the research. The following scope for additional research in phase B was chosen:

I. A more general comparison of the three estuaries on the following questions:

d. Stakeholder participation: How was stakeholder participation organised in relation to the decision-making process and in general over the past 20 years? What are interesting lessons when comparing the three estuaries, what are good conditions for organising participation, what are good practices, for example the stakeholder participation concerning the realignment/ depolderisation in the Humber?

e. Development of knowledge: what are good examples of jointly developed knowledge that helped to overcome different interests? What role does scientific knowledge play in the process?
f. To what extent do long term plans/visions help to ingrate functions and is this idea transferable to the Elbe context?

II. A more in-depth comparison of the Scheldt and Elbe on the execution of political power through the system of permits for dredging and disposal of dredged material, focusing on:

g. Rules of the game, political debate and interests of different actors
h. Lessons that can be learned to reduce fragmentation

Regarding studying the rules of the game, the main focus in this report is on public authorities and institutionalized stakeholder platforms, because they are key players in decision-making. The more in-depth comparison of Scheldt and Elbe related to sediment management issues arising from the fairway deepenings will be used to conduct a more informed analysis whether stakeholder participation organised at the Scheldt is transferable to the context of the Elbe.

In line with the above, the following research activities were executed:

8. Further desk study based on additional relevant literature, suggested by the estuary experts.
9. In-depth interviews with key actors for each estuary, resulting in five interviews for the Elbe, two for the Scheldt and three for the Humber. The interviews were focused on a general overview of stakeholder participation processes in relation to decision making, the extent to which different functions of the estuary are integrated and the role of knowledge in relation to estuary governance for all three estuaries. In addition, the interviews focused on the rules of the game regarding sediment management for the Elbe and Scheldt. The interviewed organisations can be found in the literature list.
10. Adjustments of the first descriptions of governmental decision-making structures based on new insights from the interviews.
11. The in-depth comparative analysis of all three estuaries was conducted.

2.3. Phase C: recommendations for improvement of governance

In a second workshop the results of phase B were discussed with the estuary experts of the Scheldt and Elbe and the scientific supervisor. During this discussion lessons were drawn for the Elbe regarding stakeholder participation, the joint development of knowledge by stakeholders in the estuaries and the use of long-term visions. The in-depth analysis of Scheldt and Elbe regarding sediment management was used to assess the possibilities of transferring good practices of the Scheldt and partly from the Humber to the context of the Elbe. In this phase we also investigated the transferability of practices from one estuary to another, taking into account all three estuaries.

3. Description of governance of the three estuaries

For the description of governance of the three estuaries the following structure is used:

12. As the governance of all three estuaries is steered by European legislation, in 3.1 the structures that implement the European Directives and key management plans for each estuary that are most relevant for this study are described to provide the context for estuary governance.
13. In 3.2-3.4 the governance for respectively the Elbe, Scheldt and Humber estuary is described as follows:
    a. The main tensions experienced in governance,
    b. The actors involved and
    c. The important processes and events which illustrate how governance took place for each estuary.

In Appendix 1 an elaborate timeline with important events for governance is described for each estuary as background information. The description below is based on the desk research during phase A and B of this study. Particularly the important processes and events are derived from the interviews that were part of Phase B of the study. As the different interviews together were used to gain more in-depth understanding of the processes and events, we will not refer to individual interviews in the description below.

3.1. Legislation & management plans

Due to the dynamic nature and the considerable ecological values that estuaries host - besides to their economic development -, governance is subject to several EU Directives, such as Natura 2000 (Birds- & Habitat Directive), the Water Framework Directive (WFD), the Marine Strategy Framework Directive (MSFD) and the Flood Risk Management Directive (FD) being the most important ones in the context of this study. Although the same legislation is applicable to all three estuaries, implementation by the responsible authorities may be different, as the EU gives its member states the freedom of choosing the way how they implement it in their national legislation. Below this will be illustrated by describing the key management plans for each of the three estuaries. Additionally, before focussing on the key management plans, first a short introduction about the responsible public actors for each estuary is given that have to deal with their implementation.

3.1.1. Elbe

The tidal Elbe flows through the three neighbouring federal states of Schleswig-Holstein, Lower-Saxony and Hamburg. They are responsible for the implementation of European and federal policy, i.e. the implementation of the WFD, MSFD and Natura 2000 obligations, and therefore they are also responsible of providing permits for planned activities in the estuary. Maintenance of the Elbe as national waterway is the responsibility of the Waterways and Shipping Administration (WSV), being part of the national German Ministry of Transport and Digital infrastructure (BMVI). Another important actor is HPA, who has to fulfil the same responsibilities as the WSV limited to the vicinity of the federal state of Hamburg. It is important to note that HPA has additional administrational functions. As a public entity it is in charge for facilitating the accessibility of its part of the Elbe estuary and providing the overall port infrastructure. As a private actor it is responsible for running the port economically.

River engineering and sediment management concept (2008)

From 2004, sediment management became a more important issue, because the high amount of sediment transported by a powerful flood current (tidal pumping) from the North Sea into the upper estuary and port, increased. To address this complex issue, HPA and WSV, in cooperation with the federal states, developed the “River engineering and sediment management concept” for the estuary (2008). As HPA and WSV were challenged by high and costly maintenance of both the shipping channel and the port, the objective of this plan was to reduce the amount of sediments and the related costs of the maintenance dredging and deposition of the dredged materials.
To reduce sediment cycles and to relieve the inner estuary of fine sediments, an additional disposal site for dredged material from Hamburg had to be established. The state of Schleswig-Holstein was willing to temporarily allow the disposal of the dredged material in the North Sea, approximately 20 km offshore.
It has to be noted, that the “Strombau – und Sedimentmanagementkonzept” was not part of the planning for the 9th deepening of the fairway which was already in a formal planning process.

River basin management plan for the Water Framework Directive (2009-2015, 2016-2021)

In 2000 the ‘Directive 2000/60/EC´ establishing a framework for community action in the field of water policy (Water Framework Directive or WFD) came into force. It has been transposed into the Federal Water Act (Wasserhaushaltsgesetz (BGBl. I S. 2585)). The overriding goal of the Directive is that water bodies of Member States should aim to achieve “Good Chemical and Good Ecological Status" or in case of Heavily Modified Water bodies (HMWB) such as the Elbe estuary “Good Chemical Status” and "Good Ecological Potential" and also to prevent further deterioration in the status of those water bodies. The WFD Bund-Länderarbeitsgemeinschaft Wasser (LAWA) has developed national guidelines on the WFD to support and to some extent harmonise the activities of the individual federal states. For the set-up of the management plan for the Elbe catchment area, stakeholders were involved in the official way required by the European and national legislation, that means they have the possibility to issue an official statement on the plan. However, the degree of commitment differs between the various federal states.

Directives for dealing with dredged material in coastal and inland waters, resp. (GÜBAK, 2009 and HABAB 2017)

The Joint Transitional Arrangements for the ´Handling of Dredged Material in German Federal Coastal Waterways´ (“GÜBAK”) has been agreed upon by the national Ministry of Transport and Digital Infrastructure (BMVI) and the federal states that have access to the coast (Bremen, Hamburg, Lower Saxony, Schleswig-Holstein and Mecklenburg-Vorpommern). The objective is to define common criteria and minimise negative effects of sediment disposal on the marine environment while at the same time allowing maintenance of waterways and ports for sea going vessels. There is a common understanding that the input of pollutants has to be reduced and the quality of sediments has to be improved. Basis for this document is the OSPAR Convention, current legislative instrument regulating international cooperation on environmental protection in the North-East Atlantic as well as the requirements of the LONDON Convention.
A guideline for handling dredged material also exists for federal inland waters (“HABAB”).

Natura 2000: Integrated management plan Elbe Estuary (2012-2022)

The Natura 2000 related Habitat and Bird directives have been transposed into German national law through the Federal Nature Conservation Act (BNatSchG 2010) and into law in the conservation acts of the federal states Lower Saxony (NAGBNatSchG 2010), Schleswig-Holstein (LNatSchG 2010), and Hamburg (HmbNatSchG 2010).

Due to their joint responsibility for the Elbe estuary, the three federal states together with WSV and HPA initiated the set-up of a joint management plan to fulfil the international responsibilities for Natura 2000, that means reaching a favourable status for designated habitats and species in the Elbe, but also to provide guidelines for actions for the federal states in relation to nature conservation. From 2008 until 2011, the set-up of the plan was accompanied by an official stakeholder participation process which ensured the consideration of the interests of the involved parties (environmental NGO´s, fishermen, farmers, and many more) that delivered contributions ("Fachbeiträge") in the plan. It is important to note that this plan does not have any legally binding status and therefore private parties have no direct obligations to implement this plan. Nevertheless, the plan has a high political status since all collaborating authorities agreed to implement the integrated management plan and developed long-term objectives.

Marine Strategy Framework Directive

In 2008, the Marine Strategy Framework Directive (MSFD) (2008/56/EC) was adopted. The MSFD seeks to establish an integrated framework for the management of marine species and aims at achieving or maintaining a good environmental status for community waters by 2020 at the latest (OJ L 164/19, Chapter I, Article 1.1; 2008).
The MSFD and FD have been transposed into the Federal Water Act (Wasserhaushaltsgesetz (BGBl. I S. 2585) from 31 July 2009, last amendment 24 February 2012 (BGBl. I S. 212).

3.1.2. Scheldt

The Scheldt has tidal influence up to the weir in Gent (Flanders). Several governmental bodies are responsible for policy and management for this estuary: the Dutch Ministries of Infrastructure and Water Management (and its executive organisation Rijkswaterstaat) and Agriculture, Nature and Food Quality, the Flemish Ministry of Mobility and Public Works (especially the Maritime Access Division and the Coastal Division), the Flemish Inland Waterways Agency, the Flemish Agency of Nature and Forest and the Dutch Province of Zeeland. From governance viewpoint it is especially interesting that for deepening and maintenance of the fairway in the Netherlands the Flemish government requires permits in the Netherlands. This was the main driver in developing joint bilateral policy documents, starting with a Long Term Vision (LTV).

Long Term Vision Scheldt estuary 2030 (adopted 2001) and Development Sketch 2010 (adopted 2004)

In 1998 Flanders and the Netherlands agreed to work on a joint vision for the Scheldt estuary in 2030 (the LTV) and agreed on the objective of a healthy and multifunctional estuary with three most important user functions: accessibility, water safety and naturalness. The result aims:

1. To guarantee a higher level of safety against flooding.
2. To improve the accessibility of the ports along the Scheldt estuary.
3. To increase naturalness of the physical and ecological system of the Scheldt estuary.

The LTV did not only describe the desired situation in 2030 for the Scheldt estuary, but also indicated the range of possibilities for policy and management on the medium-term to be taken on the road to 2030. Subsequently the Development Sketch 2010 (DS2010) was developed, which consisted of a package of measures and projects, to be executed between 2005 and 2010 and contributing to the development of a sustainable and vital Scheldt estuary in 2030. The implementation of the DS2010 was put in treaties. The four main components were:

d. Projects on safety along the Sea Scheldt with the execution of the Sigma Plan
e. The deepening of the shipping fairway to improve accessibility
f. The execution of nature development
g. Cooperation on policy and management, with the Flemish Dutch Scheldt Committee as platform

After the DS2010 several new Flemish and Dutch management plans were made. The following are highlighted due to their relevance for governance of the Scheldt estuary:

Delta Programme

The flooding in 1953 urged the Netherlands to develop the Deltaplan (1955). Its successor is the Delta Programme (which is update every year since 2011), aiming at water safety, freshwater supply and the spatial development in 2050 to be climate resistant and water robust. The Delta Programme does not influence the agreements in the Scheldt estuary treaties.

Masterplan coastal safety (2011) and the complex project coastal vision

These plans deal with the coast of Flanders. The masterplan focuses on flooding in the coastal region until 2050, calculating with a moderate scenario of sea level rise of 80 cm with high tide. The development of a coastal vision has a wider scope, beyond 2050 and also considers extreme sea level rise and spatial development. The Flemish Ministry of Public Works is responsible for the execution of both.

Sigma plan

Floodings in 1976 resulted in the Flemish Sigma plan to prevent new water safety disasters. In 2005 the Sigma plan was adjusted based on recent scientific insights. Since the revision of the Sigma plan in 2005, based on recent scientific results, the scope of the Sigma plan broadened and has, next to a controlled flood management strategy, also a stronger focus on nature management. Therefore, it contributes significantly to the implementation of Natura 2000 obligations for Flanders. Next to water safety and nature management, safe living and working and recreation are two important pillars of the plan. The plan runs until 2030, with every five years the initiation of a new round of projects which contribute to the goals of the plan. The water management duties are executed by the Flemish water ways company, while the Flemish agency of nature and forest is in charge of the execution of nature management projects.

River basin management plan Scheldt (2010-2015, 2016-2022)

To meet the objectives of the WFD a river basin district management plan is made for the Scheldt. The first plan had a time period from 2010-2015, its successor runs from 2016-2022. Water quality is the responsibility of several water authorities that collaborate and coordinate their actions in of the International Scheldt Committee. As we decided to focus on sediment management and nature

compensation as main tensions to investigate further, this issue will not be further addressed in this report.

Natura 2000 management plan deltawateren (2016-2022)

In November 2016 the Minister of Infrastructure and the Environment adopted the Natura 2000 management plan deltawateren 2016-2022. The Natura 2000 area Western-Scheldt and Saeftinge is, next to the old Meuse, Haringvliet, Hollands Diep, Grevelingen, Eastern-Scheldt, Lake Veere & Saeftinghe, part of the overall delta. The plan provides an important foundation for nature conservation and the use of valuable nature areas. Rijkswaterstaat developed this plan in collaboration with the Ministry of Economic Affairs, the Provinces of North-Brabant, Zeeland and South-Holland and regional stakeholders.

Vision on the expanded Zwin (2014)

The cross-border project of expansion of the Zwin (Natura 2000 area) was explicitly mentioned in the treaty on the DS2010. The expansion consists of 120 ha new nature, with 110 ha in Flanders and 10 ha in the Netherlands. A vision on the expanded area was developed by the Flemish government, the Maritime Access Division and the Coastal Division, the agency of nature and forest and in cooperation with the Province of Zeeland. In Flanders the agency of nature and forest will execute the vision, in the Netherland the Zeelandic Landscape Foundation is in charge.

Nature package Western Scheldt

Similar to the expansion of the Zwin, the Netherlands has a plan for the expansion of estuarine nature with 600 ha. This area is reserved at three locations: the Hedwigepolder, nature area the Zwin (already explained above) and the middle area of Zeelandic Flanders with amongst others the Perkpolder and the Waterdunen. Both the Hedwigepolder and the Zwin are part of the Scheldt-estuary Treaty. With this nature package the Netherlands complies to both the Scheldt-estuary Treaty and its obligations for the Natura 2000 area Western Scheldt and Saeftinge in 2010. For the execution of this package the Netherlands and the Province of Zeeland made a covenant. Part of this covenant concerns compensation funds for nature restoration (200 million euros) and for infrastructural development (100 million euros).

3.1.3. Humber

The national Department for Transport is responsible for strategy and planning policy for all ports in England and Wales. Environmental aspects of estuarine management of the Humber are the responsibility of the Department for Environment, Food & Rural Affairs (DEFRA), together with its statutory consultees Natural England (NE), the Environment Agency (EA) and the Marine Management Organisation (MMO). While Natural England is occupied with the designation of various nature conservation statutes, under Natura 2000 and Ramsar for the Humber, the Environment Agency is occupied with the implementation of the MSFD and WFD obligations for the Humber. Another important national institute is the Marine Management Organisation, responsible for licencing, regulating and planning marine activities in the English waters and the English marine area.

Three management plans are currently in use in the Humber Estuary: the Humber Management Scheme, Planning for the Rising Tides and the Humber River Basin Management Plan.

Humber Management Scheme

The Humber Management Scheme (HMS) was established under the Habitats Regulations to allow those organisations with statutory duties to work together to deliver the management of the Humber Estuary European Marine Site through one single management plan.
The objectives of the Humber Management Scheme are to deliver the sustainable management of the Humber Estuary European Marine Site:

- To manage the estuary to meet the requirements of the conservation objectives.
- To bring people and organisations together to deliver the sustainable management of the Humber Estuary European Marine Site.
- To raise awareness and educate stakeholders about the Humber Estuary European Marine Site and increase participation in its management.
- To identify information gaps and research requirements and to promote sharing and availability of data for the management of the Humber Estuary European Marine Site.
- To ensure a coordinated approach to the management of the estuary and its hinterlands including planning for the future in respect to the features of the Humber Estuary European Marine Site.

As in the other estuaries also in the Humber Estuary developers with plans that could affect the estuary, have to meet the requirements of the Habitats Regulations. That means, they have to determine the impact of the development on the species and habitats protected as Special Protection Area (a designation under the EU Directive on the conservation of wild birds), Special Area of Conservation (a designation under the Habitats Directive) and Ramsar site designations. In addition, they have to provide the information needed for the 'Competent Authority' i.e. body they are obtaining consent from, such as the Local Planning Authority, to carry undertake a Habitats Regulations Assessment that sets out any measures to avoid impacts that may be required.

Planning for the Rising Tides

Planning for the Rising Tides (PftRT) provides a long-term strategy for managing the flood defences surrounding the Humber Estuary. This plan sets the objectives for the purpose of managing the flood risks and it proposes measures for the achievement of these objectives. The plan describes the issues the estuary faces, including the effects of sea level rise relative to the land, and sets out the proposed actions to address them. The Humber Flood Risk Management Strategy outlines the Environment Agency's plans to protect communities and businesses surrounding the Humber Estuary from tidal flooding. The plan emphasises the importance of keeping a system of defences around the estuary to protect the large number of people, the extensive commercial and industrial facilities and the large area of very productive agricultural land at risk from flooding. However, defending the coastline with hard engineering defences causes what is known as 'coastal squeeze', which can result in a reduction in protected intertidal habitat such as mudflat and saltmarsh. To compensate for this, the Environment Agency has a programme of 'managed realignments' in place to create new habitat to compensate for that lost due to coastal squeeze. A number of sites have already been created including sites at Paull Holme Strays and Alkborough. The Environment Agency is not the only organisation to provide managed realignment in the Estuary. Any organisation, developer or agency that develops land that has an effect of reducing the protected habitat in the estuary must provide compensation against this.

A Coastal Habitat Management Plan (CHaMP) for the Humber Estuary was prepared in May 2005 to inform the Humber Flood Risk Management Strategy. The CHaMP identifies the scope of works that

are required to protect the Humber Estuary Special Protection Area (SPA), Special Area of Conservation (SAC) and Ramsar sites from the effects of coastal squeeze that would otherwise occur because of the maintenance of the existing line of flood defences.
Currently the PftRT is being completely revised. Basically, a new strategy is being developed by the Environment Agency together with 12 Local Authorities. The new strategy works toward the development of a new plan for managing tidal flooding. It will include a programme of on the ground defence / improvements: How to manage flooding? Where does the water go? Which land may be flooded? How to deal with climate change and sea level rise? It is a long-term plan for the coming 100 years, more detailed for the coming 25 years.

Humber River Basin Management Plan

The purpose of a river basin management plan is to provide a framework for protecting and enhancing the benefits provided by the water environment (implementing the WFD). To achieve this, and because water and land resources are closely linked, it also informs decisions on land-use planning.

3.2. Governance of the Elbe estuary

3.2.1. Tensions

In 1999 the 8th deepening of the Elbe was finalised. In 2002, however, it became apparent that a 9th deepening – to be correct the adjustment of the fairway as it will be broadened at certain locations - of the Elbe was necessary for economic reasons. The Port of Hamburg had to maintain its competitiveness in the north range and therefore be made able to maintain the accessibility for the ever-growing large vessels. Discussions about the 9th deepening had among other issues (the naturalness and economic necessity) to do with the surplus of fine sediment in the upper estuary and in the Port of Hamburg resulting from the effect of tidal pumping. As one consequence of the controversial discussions, the responsible authorities for maintenance, HPA and WSV, were and still are facing serious challenges for the disposal of dredged sediment. HPA is still looking for additional sites in the lower tidal Elbe and the North Sea. Sediment management is still a contentious issue, complicated by concerns about the quality of sediment which needs to be disposed. A common sediment management plan for the entire tidal Elbe has never been fully implemented.

The contaminated sediments originating from the upper catchment area of the Elbe river are a second issue for tensions, as they mix mainly in the port area with clean marine sediments transported from sea to the upper estuary. Relocation of this sediment mixture to the two appointed disposal sites within the water of the Elbe or the North Sea, poses difficulties for HPA. Though fresh sediments are much cleaner now, required quality standards cannot always be fulfilled and older sediments still have to be treated and disposed of on land at high costs. As a result, there is an ongoing conflict between Hamburg and the federal states upstream, as well as with the Czech Republic, on the responsibilities for remediation measures at the sites of the source of pollutions instead of externalizing the costs to Hamburg. Ten years ago, Hamburg already started an initiative, the ELSA project (Schadstoffsanierung Elbsedimente) to improve the sediment quality already at the source. Despite the ELSA project, the issue of sediment management is not yet completely solved. In addition, sediment disposal of the port suffers from the fact that it is still labelled as ‘contaminated mud’ by the public, despite immensely improved sediment qualities and the intensive monitoring which ensures that only sediment is relocated which meets the required quality standards.

The third tension in the Elbe concerns water quality. High loads of nutrients in the River Elbe originating from the use of manure and fertilizers in intensive agriculture, and the resulting algae blooms, lead to oxygen deficiencies in the Hamburg area and beyond. This causes problems for fish migration and may lead to fish mortality. Since water depth and turbidity are factors for oxygen-related processes, the fairway deepening and the maintenance dredging are often claimed responsible for any critical situation. This tension leads to frequent protests of environmental NGO´s and to restrictions for the maintenance dredging of the Port of Hamburg. A long-term solution could be enforced by the national government, relying on the aims of the WFD and/or the Nitrate Directive. The Court of Justice of the EU (CJEU) ruled in 2018 that Germany has violated the limits in the EU's nitrates directive aimed at reducing water pollution caused by nitrates from agricultural sources by allowing an excessive use of manure as a fertiliser.

It can be summarized, that the governance of the Elbe estuary is challenged by an inherent tension between economic interests (and maintenance dredging as their prerequisite) and nature conservation, both equally legitimate societal concerns.

3.2.2. Actors

Dominant administrative actors for estuary governance of the Elbe are the governments of the federal states of Schleswig-Holstein, Lower Saxony and Hamburg and the WSV - the responsible administration of the federal Ministry of Transport and Digital Infrastructure (BMVI) - and HPA.

The **BMVI** and its executive bodies (e.g. **WSV**) is politically responsible for all aspects of German road, rail, waterway and aviation policy and for the roll-out of digital infrastructure and therefore also for the maintenance of the largest part of the Elbe estuary (except for the section of the Elbe estuary that is delegated to the **federal state Hamburg and subsequently HPA**). Since the Elbe estuary is situated in three federal states, these are important actors for governance. **Schleswig-Holstein** is a federal state that mainly drives on agriculture and tourism. As such the state has an interest in nature conservation, tourism and recreation (beaches) and good water quality. **Lower Saxony** also mainly drives on agriculture, but has also a vital car industry and tourism in the mouth of the estuary and adjacent Wadden Sea. Related to the area along the shores of the Elbe estuary it is important to mention that the state has several ports within the estuary and a relatively new build port closer to the North Sea: the competing deep-water Jade-Weser-Port. Furthermore, Lower Saxony has important orchards located at the Elbe which depend on Elbe water for irrigation. Both federal states, however, benefit largely from the Port of Hamburg as a major employer and economic hub. The **city state of Hamburg** prospers largely from trade and industry, with the port as the most important location factor, but is also known for its service sector, media and tourism.

Concerning the **whole river Elbe**, there is an **International Commission for the Protection of the River Elbe** (ICPER = Internationale Kommission zum Schutz der Elbe, IKSE) that consists of German, Czech, Polish and Austrian representatives. Poland and Austria play a minor role as both countries only contribute with 2 % to the total area of the international catchment area of the Elbe. NGOs can apply for getting an observer status. The decisions of the ICPER are prepared by several German-Czech working groups and sub working groups. The administrative and financial responsibility for measures etc. lies in each country. All decisions of the ICPER must be made unanimous.

For the **German section of the river Elbe** there is the overall "**Flussgebietsgemeinschaft Elbe" (FGG, River Basin Community Elbe)** that consists of ten federal states. Its task is to implement the WFD and the FD within the national River Elbe. The FGG itself functions as a coordinator for the meetings and common papers (management plan and program of measures) as well as the monitoring only. All decisions of the FGG must be made unanimous. Due to the German Constitution the administrative and financial responsibility as well as the implementation of measures lies within the authority of each of the ten federal states and is voluntary.

Within the organisational structures the highest level of the FGG Elbe to take decisions within the implementation process of the WFD and the FD, is the Elbe-Minister-Conference (Elbe-Minister-Konferenz), consisting of the ministers for environmental affairs of the ten federal states. The Elbe-Council (Elbe-Rat) consists of the water management department leaders. They take decisions based on the documents of the Coordination Council. The Coordination Council (Koordinierungsgruppe, KorTel) consists of the water management sub-department leaders of the ten federal states. Their decisions are based on papers developed in several sub-working groups on several issues. They prepare the Elbe -Council meetings and their decisions.
KorTel is responsible for the implementation of the National River Basin Management Plan and tries to coordinate the activities in the context of WFD and FD within the **Tidal Elbe**. It consists of sub-department leaders and different experts of the three federal states and stakeholders (WSV, HPA, Fishery, Agriculture, Industry, Water Sports, Hunting, NGOs etc.). Their decisions are based on papers developed in several sub-working groups on several issues.
Further there is another working group, the **AG TES (AG** Tideelbestrom) that consists of employees of the three federal states and different local NGOs. It gathers every six years ahead of the new Management Plan to put together a (non-binding) list of possible measures to help improve the good ecological potential and chemical status of the estuary.

For the implementation process of the **integrated Natura 2000 plan of the estuary**, representatives of the involved parties (three federal states, HPA and WSV) meet twice a year to report and discuss the development and implementation of environmental measures that are described in the plan.

Further exchange on various subjects, for example sediment management and maintenance of the Elbe, and preparation of political decisions takes place on various levels in between representatives of the federal states of the estuary, WSV and HPA participate. The environmental ministries of the federal states take on a key role in this exchange because most reservations are related to potential environmental impacts. Therefore, a regular meeting is held in between the heads of the directorate-general of the environmental ministries, WSV and HPA ("Abteilungsleitertreffen").

The Senate of Hamburg established the **foundation 'Stiftung Lebensraum Elbe'** in 2010. The aim of this foundation is to contribute to the improvement of the ecological status of the Elbe through different measures, in particular by creating shallow waters and recreating lost ecologically valuable areas in the estuary. By establishing this foundation, the government of Hamburg wanted to generate additional money to the running budgets, commit HPA to the aims of the IMP Natura 2000 and create goodwill with the neighbouring states and other stakeholders. The foundation is funded by the state government and HPA and receives an annual percentage of the income of the port. The foundation is led by a steering committee of different stakeholders as well as organisations with management

responsibilities like Hamburg Ministry for Environmental Affairs, HPA, the WSV and others (https://www.stiftung-lebensraum-elbe.de/).

A large number of non-state actors / stakeholders take interest in the Elbe estuary, for instance organisations concerning agriculture, economy, fishery, environment, nature (such as WWF, NABU and BUND), recreational sailors. A detailed stakeholder analysis of the Elbe is conducted as part of the INTERREG IVB-Project "Tidal River Development" TIDE project. Alongside their own possibilities to influence decision-making through lobbying and legal appeal, these organisations are also actively involved since December 2013 through the '**Forum Strombau- und Sedimentmanagement Tideelbe'** (FOSUST, Fig. 2). Both state (federal state ministries, HPA, WSV, municipalities) and non-state actors are members of this forum. The objective of the forum was dealing with a) system understanding, b) sediment management (including treatment/restoration of contaminated sediments) and c) river engineering measures. This broad scope was necessary because the amount of sediment could only be reduced by several measures, for instance establishing flooding areas or other suited river engineering measures. In 2016 the forum was succeeded by the **'Forum Tideelbe'** while the previous forum was initiated by WSV and HPA, this partnership was initiated and financed by the involved ministries of the city of Hamburg (BUE, BWVI), that take part in it together with other important stakeholder groups (more or less similar to the previous forum). Its members are represented in the Steering Committee, Plenary and several working groups. A secretariat supports the process that acquires the necessary resources and commissions projects.

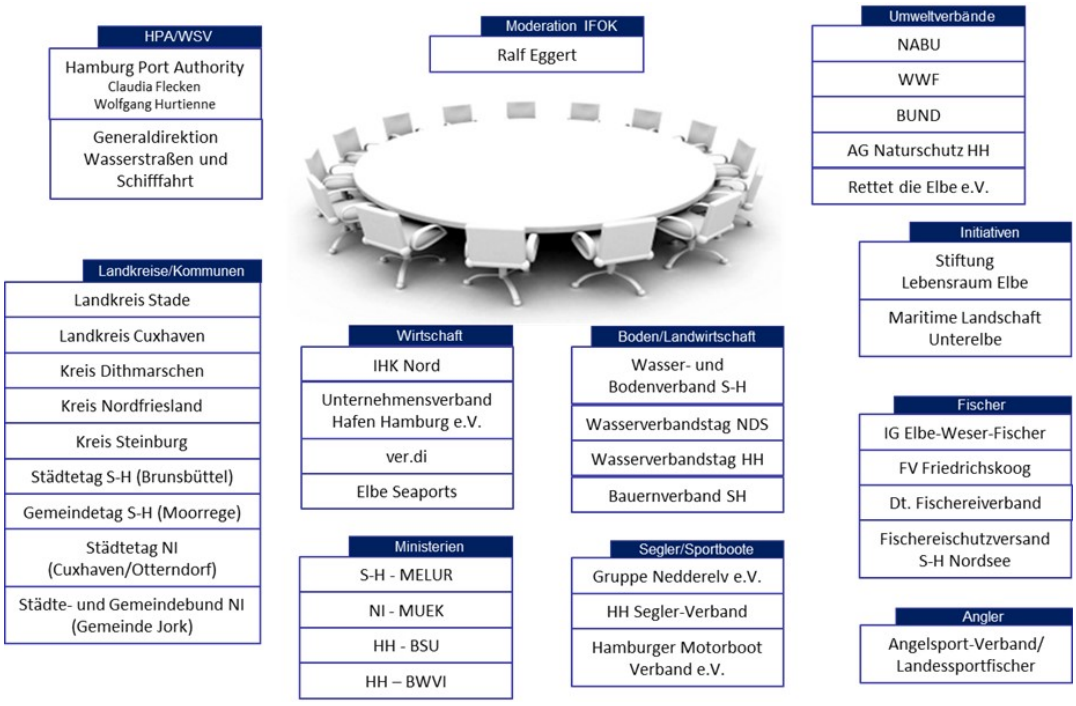

Figure 2: Organisation chart of the Forum Strombau- und Sedimentmanagement Tideelbe

3.2.3. Processes and events

How actors influence governance and position themselves will be illustrated by zooming in on the 9th deepening of Elbe, the implementation of Natura 2000 obligations and the issue of sediment management.

9th deepening

The permitting process for the 9th deepening of the Elbe has been one of the most contentious infrastructural projects in German history. Because of the status of the Elbe as a federal waterway, the federal state of Hamburg and WSV submitted the application for the 9th deepening (and partly broadening) to the licensing authorities of the Federal Ministry of Transport and the Ministry of Economy, Transport and Innovation (BWVI) of the City of Hamburg in 2006. The permit was granted after a 12 year process, characterised by significant opposition, to WSV and HPA and the implementation of the project could only start in 2018. The process was contentious both politically and with respect to the content. Many complaints, (mainly) submitted by environmental non-governmental organisations, have led to several planning amendments and court decisions by the Federal Administrative Court. This has resulted in additional environmental compensatory measures and riverbank protection measures but did not lead to changes of the channel adjustment itself. A coalition of three well organised nature organisations (WWF, NABU and BUND) together with emancipated, outspoken citizens created much resistance. Most complaints related to flood protection, others stated that the project did not comply with the obligations ensuring from, in particular, the EU Birds and Habitats Directives (Natura 2000) and the Water Framework Directive. The federal state of Lower Saxony agreed to the planning approval procedure, but its municipalities of Cuxhaven and Otterndorf lodged a complaint against the procedure, mainly because of worries regarding their tourism. They lost at court but are still against the project. In addition, the different interests and dependencies of the Federal States complicated the process. In this context it is important to note that sediment disposal of national waterways was considered as part of the permit for deepening of the estuary.

Sediment management

Sediment management is another import tension to be addressed by the governance of the Elbe. Although deepening of the Elbe and an increased need for sediment disposal are related, these discussions are explicitly addressed as separate issues, as the latter is part of the general maintenance of waterways. Sediment management is therefore focused on future solutions for the deposition of the dredged sediment.
The first discussion process with stakeholders regarding the handling of contaminated dredged material on land, e.g. finding a suitable location in Lower Saxony, took place in 1994 (“Niedersächsisches Elbschlickforum”). However, no agreement could be found and the treatment and disposal of contaminated sediments still is done only in Hamburg.

HPA has only one permanent (but seasonally limited) disposal site for its dredged sediments which is located at the downstream state border of Hamburg. As the sediment disposal in the Elbe estuary took already place before the implementation of the WFD and Natura 2000, the permitting procedure for this site did not require stakeholder participation, only a joint agreement with the responsible administration of the Ministry of Environment and Energy (BUE) of the City of Hamburg. Due to environmental restrictions the site cannot be used during summer. During this time HPA depends on an additional site. To find this place, negotiations with the adjacent federal states of Lower Saxony and Schleswig-Holstein took place. Potential locations ranged from the outer estuary to locations in the North Sea, such as “Tonne E3” near Helgoland. During the discussions the latter option, under the jurisdiction of Schleswig-Holstein, turned out to be a favourable location. From 2005 till 2010 the HPA was permitted by the federal state of Schleswig-Holstein to deposit the sediments at the location “Tonne E3” in the North Sea. The permission was not extended, which partly had been related to a dispute about the windmill´s exhibition (TAZ, 23.10.2012: “Tausche Schlick gegen Messe”, Kieler

Nachrichten 01.05.2013:"Erbitterter Streit beigelegt"). In addition, the Wadden Sea Advisory Board reacted a bit sceptical to the implementation of this urgency measure before. Only after carrying out the communication process "Forum Strombau- und Sedimentmanagement Tideelbe" (in which among others the suitability of other disposal sites was discussed) in 2013 and additional negotiations, HPA continued 2014-2015 with the sediment disposal at the agreed location "Tonne E3".
In 2016 HPA formally applied for another period of bringing sediments to "Tonne E3" and passed the formal permitting procedure of Schleswig-Holstein. Although the location in the North Sea was located further away from Natura 2000 areas, potential effects had to be assessed as well as those in context of the MSFD. The application process resulted in an agreement between the federal states of Hamburg and Schleswig-Holstein ("Eckpunktepapier"), a temporary permission for five years and max. 5 million tons of dredged material with strong monitoring obligations and a payment of 5€/t of sediment to a foundation for the protection of the Wadden Sea. Also the "Forum Tideelbe" was established in 2016 as part of the deal. Both fora are further explained below.

Fora Strombau- und Sediment management Tideelbe (2013-2015) and Tideelbe (2016-2020)

The establishment of both fora form two important events in governance. The first forum (FOSUST) had a relatively broad scope. It worked towards a shared understanding of the facts and developments regarding the estuary. Besides the official processes related to the implementation of the European directives, it was the first voluntary cooperation between different stakeholders regarding estuarine management. This contrasts with the stakeholder participation of the WFD and Natura 2000 processes, where stakeholders had to be involved and where they were involved on different levels, ranging from pure information until contribution to the set-up of the management plans. Although progress had been made by the forum, due to time constrains the tasks of the forum could not be completed.

With the establishment of the second forum, the partnership "Forum Tideelbe" the cooperation of the different parties was further institutionalised. The partnership works towards sustainable estuarine management with the main objective to identify and prioritise river engineering measures by 2020 which will advance the sustainable development of the estuary by taking into account hydro-morphological, water and nature protection aspects as well as regional developments. The partnership therefore has a more focussed remit than the preceding dialogue forum. The implementation of the discussed measures by the "Forum Tideelbe" will then depend on the decisions of the responsible administrative governmental authorities. They play an important role because they have the possibility to veto such a measure if they deem the feasibility of the measure to be highly unlikely, e.g. due to lacking support by the locals.

3.3. Governance of the Scheldt estuary

3.3.1. Tensions

Conflicts between the Netherlands and Flanders on the Scheldt estuary have a longstanding history and are dominated by the accessibility of the port of Antwerp through the Western Scheldt. Since the end of the 1970s, along with the increased attention for the environment across the globe, environmental concerns regarding deepening and maintenance of the fairway also gained attention.

In 1998 Flanders made use of the consideration of the need for further deepening in the treaty of the 2nd deepening of the Western Scheldt (1995) and submitted a request for the 3rd deepening of the

Western Scheldt to the Netherlands. At this moment the works for the 2nd deepening were still ongoing and also a commission was still looking for nature compensation measures required by the permit for the 2nd deepening.

3.3.2. Actors

Flemish Dutch Scheldt Committee

Since 2008 the main governmental actors for the Scheldt collaborate in the Flemish-Dutch Scheldt Committee (in Dutch: Vlaams-Nederlandse Schelde Commissie -VNSC). The VNSC has a hierarchical and formal structure with a political college, official college and a coordinating working group policy and management. It facilitates political collaboration (responsible Ministers meet in the political college) and on a two-times-per-year basis in meetings of top Flemish and Dutch civil servants. Participating Flemish authorities are the Flemish Department of Mobility and Public Works (including the Maritime Access Division and the Coastal Division), the Flemish Inland Waterway Agency and the Agency of Nature and Forest. Finally, a delegate of the Flemish government in the Netherlands participates in the Flemish delegation, as a diplomat on behalf of the Ministry of Foreign Policy. Participating Dutch authorities are the Ministry of Infrastructure and Water management and its executive body Rijkswaterstaat, the Ministry of Agriculture, Nature and Food Quality and the Province of Zeeland. Within the organisation several working groups are occupied to work on various topics, such as a new lock at Terneuzen, research and monitoring, flexible disposal and others (Fig. 3). Stakeholder participation takes place in the Scheldt Council (´Schelderaad´). Although stakeholders are consulted by the different working groups, stakeholders are not part of these working groups. Therefore stakeholder participation has only an advisory role and is prescribed in an hierarchical manner, by the VNSC.

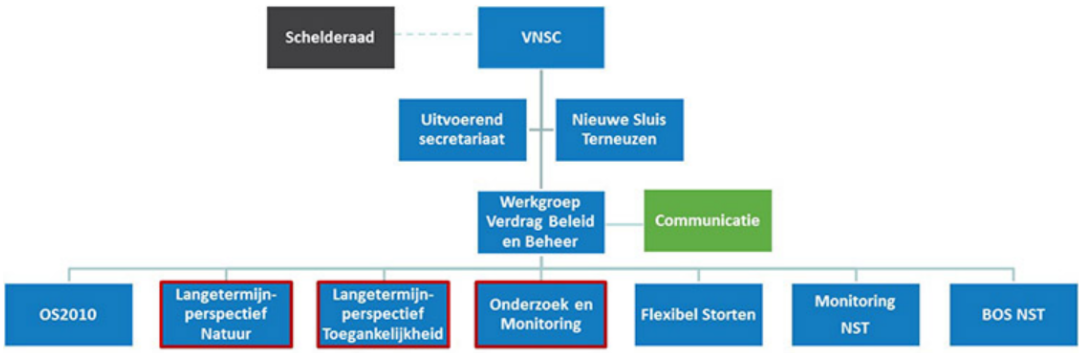

Figure 3: Organisation chart of the VNSC (Source: VNSC)

The establishment of the VNSC is the result of the joint development of the LTV, the DS2010 and the treaties that followed. These processes will be explained in detail in 3.3.3.

Consultation Advisory Parties

During the process of the DS2010 from 2002-2004, the stakeholder platform the ´Consultation Advisory Parties (CAP)´ was established. With the delivery of the DS2010, the CAP ceased to exist. An episode of political deal-making started, towards the treaties in 2005. With discussions being highly political (negotiations between nations), full-scale stakeholder participation was not expected to further facilitate progress.

With the treaty on common policy and management bilateral collaboration was further institutionalized (establishment of the VNSC, see before). Stakeholder participation became less intensive as the VNSC was mainly the platform for collaboration between governmental bodies and research and monitoring.

Scheldt Council

In 2013, the first VNSC evaluation underlined the need for re-establishment of stakeholder participation, which was key in the past to get support from stakeholders for policy and management of the Scheldt. As result the Scheldt Council was established in 2014 as the independent official advisory body of the VNSC. The chair and secretary of the Scheldt Council are taken care of by the Secretariat-General of the Benelux Union. In the Scheldt Council, similar to the CAP, stakeholders with a direct relation to the three functions of the Scheldt participate. In preparation of the meetings of the Official College, the Scheldt Council provides advice. It has also the opportunity to advise directly the Political College. The relationship between the VNSC and the Scheldt Council is based to a large extent on joint fact finding. The preferred procedure is that the input of the Scheldt Council has been shared through the working group Policy & Management, where also consensus is reached. After this step it is put on the agenda of the meeting of the Official College. In order to do so, the VNSC informs the stakeholders and the stakeholders, vice versa, provide the VNSC with input. As such the Scheldt Council looks after the interests of political organisations at local and regional level and of sectors like ports, agriculture and nature.

3.3.3. Processes & events

Long Term Vision Scheldt estuary 2030 (adopted 2001)

The need for an integral perspective is strengthened by the designation of the entire estuary as Natura 2000 area, which obliges one to address the estuary as one natural system for policy and management. The idea for the LTV originated from the following motives. The commission that dealt with the nature compensation measures of the 2nd deepening of the Scheldt heard about the LTV in interviews with Rijkswaterstaat. Another motive is said to be a political deal between Flanders and the Netherlands about the tuning of two transboundary and politically sensitive dossiers: the route of the high-speed train line connecting Flanders and the Netherlands and the LTV for the Scheldt estuary. It is also important to note that working towards a LTV by means of negotiations was already part of Dutch tradition. When the Netherlands imposed this way of planning, which was rather self-evident for them, Flanders was not acquainted with such processes and therefore more suspicious or perhaps more careful. In fact, they shared the opinion that the development of the LTV was a means to delay the 3rd deepening. However, Flanders agreed to collaborate on the LTV and during the process both countries found a way to move forward jointly. Personal relationships and trust-building by working closely together for several years was a decisive factor in this regard.

The LTV, which was adopted by Flanders and the Netherlands in 2001 did not only describe the desired situation and goals, but indicated as well a range of possibilities for policy and management on the short- and medium-term on the road to 2030. Afterwards a development sketch 2010 had to be developed enlisting different routes with medium-term measures to achieve the desired situation in the LTV.

Development Sketch 2010 (adopted 2004)

A project direction (Proses) was established to facilitate this process of the Development Sketch 2010 (DS2010) in which representatives from the Flemish and Dutch Ministries responsible for shipping and waterways, water safety and nature conservation took place. The project direction expressed its need for expertise and advice, other than from political actors, with the start of the DS2010, in line with the LTV. This resulted in the establishment of the Consultation Advisory Parties (CAP) as stakeholder forum from 2002-2004, under supervision of two independent chairs from Flanders and the Netherlands. The establishment of CAP was inspired by the process of the Project Mainport Development Rotterdam. In the CAP societal organisations, interest groups and non-client governments with a direct relation to one of the three functions of the Scheldt estuary (safety, accessibility and naturalness) could participate.

The process of the DS2010 was marked by a few crucial moments, which were key for estuary governance.

First, representation of stakeholders in the CAP broadened. In the beginning Brabantian and Zeelandic employment associations and the Flemish agricultural organisations were not included, due to their indirect relation with the three key functions of the Scheldt. However both were directly affected by decisions made by Proses and CAP. For example, de-polderisation of agricultural land would create room for the river to improve water safety. In the fall of 2004 both the Flemish agricultural sector and both the Brabantian-Zeelandic business community managed to become part of the CAP.

Second, the process turned out to be successful due to use of systemic knowledge and joint fact finding. The assumption is that a jointly agreed research approach and analysis of facts is essential for further discussions about policies and measures. The development of the DS2010 is said to be driven by a combination of process, knowledge and structure steering. In this context joint fact finding was a means to achieve both process and knowledge steering. Through joint fact finding stakeholders were informed from the beginning, were activated to share their own experience and knowledge, next to expert-knowledge, and invested time to agree on the research methodology. As a result this enabled process steering at the same time because joint fact finding did not aim to find consensus on the solution, but rather on the required knowledge and intended approach. During this process, stakeholders gained understanding for other's stakeholders' point of view and reached compromises.

Third, the changed attitude of the port authority of Antwerp as key economic actor. Initially the port authority shared the opinion that working on the DS2010 would only delay the process, while juridical procedures would advance progress. In the end, it realised a deliberative instead of a juridical process would facilitate progress.

The changed attitude of the port authority of Antwerp, as key economic actor, was closely related to the fourth crucial moment, i.e. the development of the flexible disposal strategy. This strategy revealed that sediment disposal and nature restoration could strengthen each other instead of being perceived as opposing and therefore incompatible interests. This strategy will be further explained in detail below. This marked a significant turning point in the process for all stakeholders.

All together these important moments resulted in the fifth and most crucial moment, the fact that CAP managed to deliver an unanimous advice. In the end, the DS2010 consisted of a package of

measures and projects, to be executed between 2005 and 2010, which contributed to the development of a sustainable and vital Scheldt estuary in 2030. Guaranteeing increased water safety required additional measures which could range from heightening local dykes to creating controlled flooding areas. As result the natural dynamic processes needed to gain more space in the future. This implies to preserve the multiple channel system of the Western Scheldt and the meandering character of the Sea Scheldt estuary. Discussions about naturalness focused on the selection of areas for nature conservation (ranging from the entire estuary to the parts of the estuary with the highest nature values) and measures to be taken for nature restoration. Discussions about accessibility were focused to facilitate a smooth passage for container ships in the Western Scheldt, independent of the tide. Options varied from no deepening at all, deepening in two phases with a re-launch after the first deepening until deepening in one time until the maximum depth, with the option to repair potential damage afterwards. The latter option turned out to be the preferred option in the DS2010 and resulted in a deepening of 13,1 meters. This was partly due to the discovery of the so-called flexible disposal method.

Flexible disposal strategy

The Flemish Maritime Access Division is responsible for applying for the necessary permits for deepening and maintenance of the fairway, both in the Lower Sea Scheldt and the Western Scheldt. The latter are requested on Dutch territory, to Rijkswaterstaat, for the Water Act, and to the Ministry of LNV, for the Nature Protection Act.

With the permit for the third deepening of the Western Scheldt it was agreed to use a flexible disposal strategy. Dredged material is deposed in a smart way, in order to facilitate all user functions. Basically, the following principles were followed-up during the first period in which this strategy was applied: 1) deposit as much as possible at the edges to increase the ecologically valuable area 2) afterwards deposit in the main channel 3) to be continued by deposition in the side channels.

To facilitate flexible disposal, three decision-making structures exist.

1. The working group flexible disposal, consisting of Dutch and Flemish experts, advise the Flemish and Dutch authorities on the follow-up of the permits in place, especially on the use of locations for flexible disposal. This group cooperates with the working group research & monitoring. They investigate the interaction between deposition of sediment with autonomous morphological development in the Western Scheldt. The monitoring results are used to fine-tune the strategy for flexible disposal. Progress reports are published every two years.
2. An independent Committee Monitoring Western Scheldt (consisting of experts from both Flanders and Netherlands) is in place for advice to the working group, like modifications to the deposition strategy.
3. Technical issues regarding dredging are discussed in ‘technical dredging meetings’, in which employees of the Flemish Maritime Access Division and Rijkswaterstaat participate. They meet once every two months and during deepening works this was once a month.

Finally, it can be mentioned that a pilot is prepared for disposing sandy material from dredging works in the Sea Scheldt in the Western Scheldt. Should this be successful, it can result in stopping the sand mining in the Lower Sea Scheldt.

Political deals

The execution of the agreements in the treaties resulted again in political deal-making. Especially the creation of 600ha of new estuarine nature to restore the nature values in the surroundings of the Western Scheldt, as part of the obligations according to the Birds and Habitats Directive, resulted in a new episode of wheeling and dealing as conflicting interests and distrust still dominated the collaboration between the Netherlands and Flanders and conflicting interests arose between different actors in the Netherlands as well.

To realise this measure, de-polderisation of agricultural land, among others the Hedwigepolder, would be needed to guarantee water safety. The Province of Zeeland, which a strong tradition and lobby in agriculture, opposed this political decision. The Dutch government at that time, also with a strong agricultural lobby due to the ruling political party ´Christen-Democratic Appeal´ in the cabinet, decided not to adhere to the agreements made in the treaties and looked for alternative solutions for the creation of new estuarine nature. The deviation of the treaty agreements forced the ´Zeelandic Environmental Federation´ and ´Bird protection Netherlands´ to exercise influence by means of legal instruments, such as court cases. After a long juridical battle, the High Council rejected the Dutch objections against de-polderisation and argued that de-polderisation was an international agreement to which the Netherlands should comply, in relation to their obligations according to the Birds and Habitats Directive.

The Province of Zeeland, which was asked by the Dutch government to take the lead in the nature development projects to restore the nature values in the Western Scheldt, felt serious disproportionalities in the distribution of advantages (for the Port of Antwerp) and disadvantages (for the Province of Zeeland and its agricultural industry). To be compensated for this burden, they negotiated a covenant with the Dutch government. As result the Dutch government confirmed the reservation of 200 million euros for nature conservation and 100 million euros for infrastructural development, such as duplication of the roads towards and from the Western Scheldt tunnel.

3.4. Governance of the Humber

3.4.1. Tensions

The analysis showed that over the last twenty years limited or no comparable tensions to those at the Elbe or Scheldt occurred regarding estuary governance of the Humber. This can be explained by the following two reasons. First, dredging of the Humber is quite different compared to the Elbe and the Scheldt, because the Humber is largely self-maintaining the navigation channel. Second, the Elbe and Scheldt have ports (Hamburg and Antwerp) that correspond to Goole for the Humber whereas the ports of Hull, Grimsby and Immingham are in the outer estuary (more similar to Rotterdam). Nevertheless, there is a constant tension between economic development and nature conservation.

Flood risk management could be seen as the common concern for the estuary and more widely climate change with rising sea-levels. Especially as most of the coastline needs defending against fluvial and tidal flooding and the area also suffers from pluvial flooding as in 2007. So sea-level rise seems the concern driving towards more integrated management in the future. This can already be observed in strategic planning regarding flood risk management, which increasingly includes nature conservation and morphological modelling of the estuary. This shows resemblance with the Flemish Sigmaplan which scope changed from purely flood risk management towards the coupling with nature

conservation and recreation goals. With regard to managing tidal flood risk and the creation of habitats to comply with the Habitats Regulations and the Habitats Directive, competition between the Environmental Agency and commercial developers looking for the same land exists.

3.4.2. Actors

Key public actors

As explained above DEFRA sets the policy for the estuary which is implemented at the next level down by statutory bodies depending on the sector (EA for environment and flooding; NE for nature conservation; North Eastern Inshore Fisheries and Conservation Authority for fisheries; Internal Drainage Boards for land drainage, etc). Natural England and the MMO (Marine Management Organisation) are the environmental conservation and marine regulators for the estuary.

Humber Management Scheme

1997 marked an important moment for estuary governance, as the first Humber Estuary Management Scheme (HEMS) a thick report consisting of the foundations for integrated management, based on strategic principles, was published. It was a strategic political compromise rather than tangible actions. “HEMS was a brave but unsuccessful attempt at achieving an integrated plan for management of the Humber Estuary.”(Morris & Barham, 2007) The project suffered from many problems, and was particularly challenged because it was non-statutory and led to tension between sectoral interests that could not be resolved at any level apart from overall strategic objectives. For example HEMS was perceived by different organisations as a nature conservation strategy of the EA. In addition different perspectives existed on the future focus, which inclined more towards nature conservation than to an integrated approach. Subsequent implementation of the strategy through the development of a management plan proved impossible and the project was disbanded in 2001. By this time, however, the legal frameworks provided by the Birds and Habitats Directives changed the rules of engagement in project planning. The positive result of the HEMS was that different stakeholders now talked to each other.

Humber Nature Partnership

Currently the Humber Management Scheme (HMS), shown in Figure 4, is administered and overseen by the Humber Nature Partnership, which was established in 2004. The Humber Nature Partnership is one of 48 Local Nature Partnerships around England. The establishment of Local Nature Partnerships has come about as a result of commitments made by Government in the Natural Environment White Paper 2011. The Humber Nature Partnership aims to protect and enhance the Humber Estuary’s world class environment for wildlife, the UK economy and people, gaining benefits for all. The HMS and the work of the Humber Nature Partnership helped to coordinate different interests, but with a focus on biodiversity around the Humber estuary.

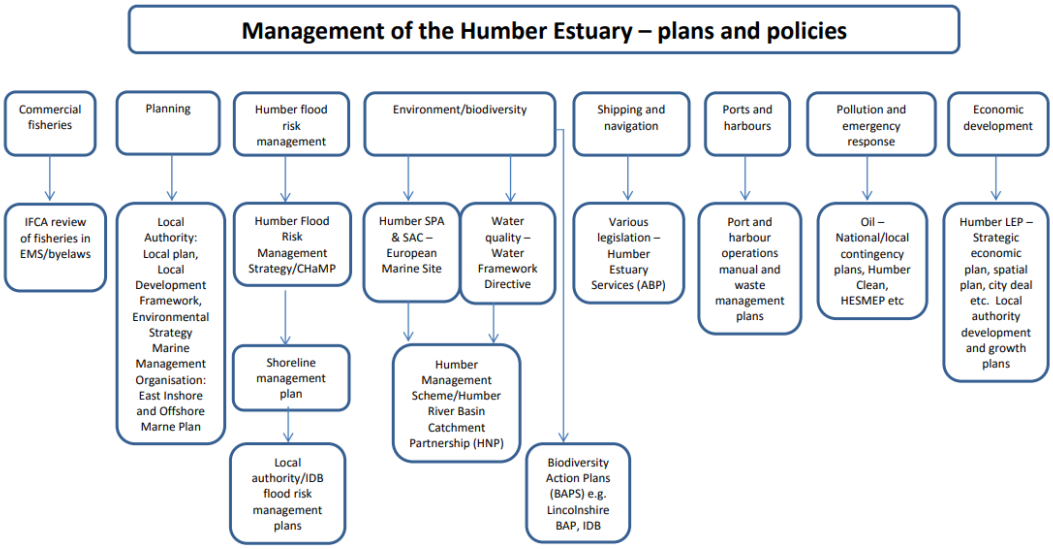

Figure 4: Humber Estuarine Management Scheme (Source: Humber Nature)

3.4.3. Processes and events

There are not that many processes and events to describe for estuary governance of the Humber. Nevertheless, one can observe the shift in scope of the flood risk management strategy in 2000. The EA puts great emphasis on working with all stakeholders to ensure that the resulting scientific understanding could be used as the basis for making decisions about the future of flood defences in the estuary. This process involved helping stakeholders to understand that their own aspirations for the estuary must be influenced by a greater understanding of what estuary morphology was trying to achieve; that is that the management of the estuary would move more towards a position of 'working with nature'. (Morris & Barham, 2007) Outputs from morphological modelling led to the publication of a first strategy in 2000. This was a fundamental change to strategic planning, and although it is not a statutory document it does provide clear guidance for flood risk managers, industry and nature conservation on what needs to be done, and what the possibilities are for improved management of wildlife resources. This turn has important implications for key commercial interests: notably the ports because it shows where there are potential opportunities for threefold benefits from realignments of flood banks to create new habitat. These benefits include accommodation space for rising seas, development of mudflats and saltmarshes that provide improved flood defences as well as new wildlife habitat, and a means of offsetting habitat loss elsewhere (through new port development) (Morris & Barham, 2007).

Next to the implementation of these management plans, planning and permitting is arranged via formal channels and procedures as for example environmental impact assessments. In general, the relevant authority receives new plans and organises the permitting process. Major projects need permitting through the National Infrastructure Commission. In these formal planning processes stakeholder participation is mandatory.

The Humber Management Scheme and Humber Nature Partnership bring people together to talk about environmental and conservation issues. The Humber Local Economic Partnership brings people together to discuss defined plans and projects. Thus, long existing partnerships form an

adequate basis for coordination between responsible parties. Next to these fora are the competing interests of different ports discussed in the Associated British Ports, as statutory and privately-owned commercial organisations. At first it was resistant to the idea of environmental responsibility (especially regarding bird protection), but they engaged in dialogue to be informed.

Besides flood defence and habitat loss/gain, there are no urgent problems or conflicts between sectors, the dynamics between different actors are not offensive nor difficult and the need for more coordination by one single body is low. Different groups know how to find each other, through responsible authorities based on long-term, informal and non-statutory partnerships. These relationships and the contacts between the different groups in general are used to discuss the different issues.

4. Comparative analysis of the three estuaries

4.1. Introduction to the comparison

The variables used to compare governance across the three estuaries were based on the analytical framework, which was proposed in the quotation for this project. To a large extent it is based on the framework of Common Pool Resource Management (Ostrom 2010), because the use of estuaries for various purposes can be considered as common pool resources (rivalrous and non-excludable). Ostrom (2010) discerns five prerequisites for adaptive governance necessary for sustainable management of common pool-resources: 1) achieving accurate and relevant information, 2) dealing with conflict, 3) enhancing rule compliance, 4) providing an infrastructure, and 5) encouraging adaption and change. These prerequisites are combined with other aspects of governance which are important for estuarine management, such as type of governance, extent of division of tasks and responsibilities, extent of coordination and stakeholder involvement.

The six variables for these are:

1. Hierarchy versus self-organisation
2. Extent of fragmentation and coordination
3. Extent of stakeholder involvement
4. Rule compliance
5. Conflict resolution
6. Encourage change and adaptation

The results in the paragraphs below are based on this qualitative analysis. The definition of the variables is given in table 2. Important and/or remarkable results of the analysis below are made **bold.**

4.2. Hierarchy versus self-organisation

In terms of hierarchy and self-organisation the Elbe and Scheldt are quite similar. Both estuaries have a very hierarchical organised form of governance in which public authorities dominate the decision-making due to their responsibilities. The governance of the Humber leaves more room for the self-organisatory capacity of the network.

Estuary governance of the Elbe can be characterised as hierarchical and formal, with a dominant role for the governments of the federal states. The federal states fulfil several tasks (implementation of WFD, N2000, FD and others) due to their formal role in policy, planning and permitting processes. To a lesser extent this also applies to WSV being part of the Federal Ministry of Transport and Digital Infrastructure, as an operational agency due to its responsibility for the management of the fairway. As described in Chapter 3, also non state actors and institutions are involved in governance for issues of sediment management and river engineering measures (“Forum Strombau und Sedimentmanagment Tideelbe”/FOSUST and “Forum Tideelbe”) as well as in the implementation of the European directives of Natura 2000 and WFD. All communication or participation networks were/are steered in a formal manner, but in contrast to the processes related to the European directives the two fora were/are created by governments on a voluntary base. At the same time the

fora were/are steered in a formal manner as well, with prescribed tasks when the fora were appointed.
A similar situation is observed regarding estuary governance of the Scheldt. The governance is hierarchical and formal. **A difference with the Elbe is that cooperation between state actors is organised through the VNSC, where key political actors meet**. **The VNSC has an undisputable position which is not only explained by the treaty (political commitment of the two nations), but also on the involvement of a larger network of stakeholders, through the CAP and later the Scheldt Council. In a sense in the Elbe the KorTel fulfils the same function of the VNSC, however the intensity of cooperation is less than in the VNSC and there is no formal connection between KorTel and the Forum Tideelbe.** The network of the VNSC has a large degree of formalisation, by means of a Scheldt Council (realised and facilitated under of the responsibility of the VNSC) and participation of (also non-governmental) stakeholders in processes preparing policy (especially the development of a Long-term Perspective) and the possibility to visit meetings where results of dedicated Scheldt research are discussed and priorities for new research are formulated. (see also 4.1.3. extent of stakeholder participation).

For the Humber also one can speak of hierarchical steering, on the one hand. DEFRA sets policy which is implemented at a lower level by the statutory bodies responsible for the sectoral issue: EA for environment and flooding, NE for nature conservation, EIFCA for fisheries; Internal Drainage Boards for land drainage, etc). At the other hand, one can observe self-organisation in the Humber by responsible authorities based on long-term, informal and non-statutory partnerships (people know each other). The main difference between the Humber and the other two estuaries is thus the involvement of the network in a rather self-organisatory manner. This difference can be attributed to the fact that estuary governance of the Humber is less conflicting. If conflicts take place in the Humber, it is on a rather local scale, which results in local solutions which are based on self-organisatory capacity.

4.3. Extent of fragmentation and coordination

As result of hierarchical and formal governance as dominant mode for each of the three estuaries, the extent of division at the highest level of policy-making involved is quite low and clear. Lower in the hierarchy of policy-making, more governmental bodies become involved, with as main reasons: 1) due to different jurisdictions, more ministries of different federal states for the Elbe, different countries for the Scheldt and different local authorities for the Humber; 2) due to a sectoral approach for maintenance of the estuary, nature management, water safety, recreation and other issues. This is similar for all three estuaries and related to the organisation of tasks within different departments of the responsible ministries. This is illustrated by the sectoral management plans for all three estuaries as described in chapter 3. Hence the fragmentation in all three estuaries is rather high. We also observe that non-state actors organize themselves around the policy silos, i.e. compartmentalised organisation of public planning. However, the unique position of the VNSC and its focus on three main user functions (navigability, flood protection and nature) makes that the fragmentation in the Scheldt is lower than in the Humber and Elbe. Nevertheless, fragmentation is also present in the Scheldt as most management plans are prepared by different authorities. For example, flood protection, water quality, marine management and coastal safety are not the responsibility of the VNSC, but the VNSC, as a platform, can facilitate discussions about these issues and enable the connection between different institutions. How governance of the three estuaries copes with

fragmentation differs. **Coordination for the Scheldt is mainly organised by the VNSC, which streamlines the scope and measures included in the various management plans. A working group exists (named 'policy and management') that prepares the overarching decisions made by the VNSC.** If agreement about certain topics at the level of (the highest) civil servants is not possible, the VNSC structure allows for escalation to higher political levels involved. As such the VNSC structure facilitates coordination of both content and political interest across two countries. The availability of a good and intensively maintained basis of system knowledge, based on joint fact finding as method, is an important factor, also in enabling coordination. **The successful functioning of the VNSC is not self-evident however, it is the result of experience of the actors for 15 years with this governance model and initially met quite some opposition and doubts.** In 2005, after signing the treaty, the national governmental bodies of Flanders and the Netherlands were already strongly committed to common policy and management. At the regional and local level the specific interests of one or more user functions were more prominent (e.g. the harbour of Antwerp and the wish to avoid depoldering in Zeeland) and strong conflicts were still experienced. **The result is that governance can also be characterised by political deals, both between countries, at national level as well as between regions. The need for coordination in the early years of the VNSC was therefore also driven by endless decision-making process in the aftermath of nature compensation for the 2nd deepening of the Western Scheldt.** The impression is that, due to the success of the VNSC, currently conflicting issues and interests in the Scheldt are less pronounced and politicised. We hypothesise that this is due to the fact that actors are experiencing that joint decision-making through the VNSC is more time-efficient than resolving conflicts through political deals (that still require formal implementation through i.e. the permitting processes, with the risk of long delays). **Hence: the political urgency for coordination resulted therefore in political commitment to collaborate. This was a change that took time.** One can argue that it took actors in the Scheldt up to 10 years (and some probably more) of collaboration to experience and value the coordinating role of the VNSC.

Elbe and Humber are more alike in terms of extent of coordination. Compared to the Scheldt the coordination is less intensive and less institutionalised. First, no real coordination exists between the different directives, e.g. between the targets of the BHD and the WFD or the MSFD, as they have different intentions and different management plans for it. For example, the WFD focusses on different groups of flora and fauna plus water chemistry parameters and hydromorphology, but the BHD looks at single species of flora and fauna and habitats. Due to the nature of the chosen criteria integration is difficult, but this is true for all European countries and is not specific for Germany. What distinguished the Elbe from the Scheldt is the less important position of the KorTel compared to the VNSC and in the Elbe the "Abteilungsleitertreffen" where coordination of issues can take place at the level of the governmental managers is not institutionalised. For the Humber neither an integrated management nor a governance strategy exist which results in rather sectoral policy-making. Although compared to the Elbe, there is more willingness to coordinate these sectoral bodies and plans by the Humber Nature Partnership though the Humber Management Scheme, it does not have statutory power to do so. Coordination is therefore constrained both in terms of political mandate as well as content. For the Humber we conclude that as there are fewer conflicting interest, the current mode is of coordination is adequate for this estuary.

Apart from issues concerning water quality, ecology/nature and sediment management, port development is organised in a different manner in the three estuaries. In the Scheldt (perceived)

competition between the ports of Rotterdam and Antwerp led to the idea that there were conflicting interests between the Netherlands and Flanders, fuelling the urge to make political deals between the two states. And in the Elbe a similar pattern of interests exists with competition between the Jade-Weser Port and Port of Hamburg. In the UK Harbour Authority is centralised with local branches resulting in less competition between harbours.

Comparing Elbe and Scheldt the difference in (perceived) interdependency between actors is striking. In the Elbe the federal states use their position related to the permitting process as a lever for political deals about several issues. Such deal-making was also the case in the Scheldt before installation of and in the early years of the VNSC, however this mode of governance became less dominant in the Scheldt in later years under the successful operation of the VNSC. We conclude that the interdependency between (state) actors is the driving force for this in the Scheldt. **Hence, we conclude that in the context of the Elbe the urgency for further coordination and collaboration is lesser than in the Scheldt as a result of this attitude towards political deal-making/exchange under the condition of a lower perceived interdependency between the federal states.** As result, the state actors in the Elbe have more freedom to follow individual agendas in negotiations than in the Scheldt. The different interest of the federal states towards the development of their ports are an example of these individual agenda's.

4.4. Extent of stakeholder involvement

The necessity to take up stakeholder processes in all three estuaries is mainly caused by the obligation to organise participatory process as part of the implementation of Natura 2000, WFD and FD. The implementation in the Elbe and Scheldt is very similar, the situation in the Humber is different. The similarity between Elbe and Scheldt is that both have stakeholder platforms in place that have an advisory role towards the decision-making actors / governments.

In the Scheldt the stakeholder platform is the Scheldt Council. The Council is established jointly by the Ministers of both countries and has a statutory role in relation to the VNSC. It can provide unsolicited advice in relation to water safety, accessibility/navigability and naturalness of the Scheldt. **The governments committed themselves to make accountable to what extent they adopted the advice of the Scheldt Council in policy- and decision-making.** As a result the advices of the Scheldt Council are taken very serious and are often adopted. However, it should be noticed that the number of advices given by the Scheldt council is yet still limited. In the period before the Scheldt Council the CAP played a similar role as stakeholder platform and was also effective. **Both advices of the CAP and the Scheldt Council were adopted.** The most important one being the advice about the DS2010. **The unanimity of advices was an important factor for this impact.**

This is different in terms of agenda-setting and statutory role of the stakeholder platform in the Elbe, where the "Forum Tideelbe" is responsible for the identification, prioritisation and recommendation of river engineering measures addressing sediment transportation and improving ecology. It is the successor of the Forum "Strombau und Sediment Management", which dealt with knowledge about the estuary as a system, sediment management and river engineering measures. Both fora have been set up for a specific time and objective. Although these years of cooperation within the communication processes have created more trust and resulted in a better understanding between the different stakeholders, still the different sectoral views and interests exist that complicate

cooperative integrated management. **The difference with the Scheldt is that the CAP was asked to draft an advice about the development sketch, which had a much broader scope than the issues both fora in the Elbe were asked to formulate advices about. Hence the impact of advices of the fora on decision-making by the authorities is less than in the Scheldt**

In the Elbe another type of stakeholder involvement is organised through the foundation “Lebensraum Elbe”. This foundation is established by an act of the state of Hamburg and is responsible for the implementation of measures to improve and reinforce the ecosystem of the Elbe. The foundation “Lebensraum Elbe” implements measures and projects as decided by the stakeholders represented in the Board of Trustees – it does not provide advice like the fora and aims more at the operational level.

For the Humber stakeholder participation is merely facilitated in line with formal planning procedures. Stakeholder participation in the Humber is mostly done via the formal environmental impact assessments, and only exceptionally via less formal panels. **There are many partnerships, but these can only raise issues, have an advisory role and need other parties to implement these due to the lack of any statutory power.** For example, the Humber Management Scheme and Humber Nature Partnership advise on environmental and conservation issues; the Humber Local Economic Partnership is consulted on economic issues; and the Humber Nature Forum brings the non-statutory groups together especially the recreation groups.

4.5. Rule compliance

Rule compliance is rather formal for all three estuaries, mainly through the system of permitting economic activities that potentially could affect the Natura 2000 areas and other objectives such as the WFD. Compliance is for instance enforced through mandatory environmental impact assessments and compensation measures when ecological valuable areas are or will be lost. Both in the Scheldt and the Elbe this applies to sediment management (and all other activities planned in the estuary too), which is quite complicated. This also applies to the Humber, however in this estuary tensions between economic activities and ecological goals are smaller as there is less need for dredging. There is no need for dredging in the Humber to achieve the required depth for shipping due to the morphological equilibrium of the estuary.

However, there are some interesting differences between the Scheldt and the Elbe. **First, in contrast to the Elbe, the management of the Scheldt is enforced through the treaty agreements and second the method of joint fact finding in the Scheldt enhances rule compliance.** This is explained as both the treaty as well as joint fact finding enable a higher acceptance of the outcomes of environmental impact assessments among the actors (both state and non-state).

4.6. Conflict resolution

The Elbe, Scheldt and Humber show similar as well as different approaches for conflict resolution. In all estuaries the legal possibilities (i.e. court appeals) are more a less the same. The way in which the legal possibilities are used are different. Furthermore, also other modes of conflict resolution are used. **In both Scheldt and Elbe court appeals and political deal-making were the dominant modes for conflict resolution.**

The political deal-making in the Scheldt and Elbe concerns deal-making between nations (as the case in the Scheldt) or federal states (as the case in the Elbe). The political deal-making was in both cases necessary to create possibilities for port / fairway development and regular maintenance under the condition of conflicting interests between the nations / federal states. The underlying reason for this is the mutual dependency between the actors (as stated in 4.1.2.). In the Scheldt this led to a deal where Port of Antwerp financially contributed to infrastructure and nature development in the Netherlands. In the Elbe this led for instance to a deal about the disposal of sediment outside the estuary on the territory of Schleswig-Holstein, “Tonne E3”, including payments from one federal state (Hamburg) to another (Schleswig-Holstein) and the funding of the foundation “Lebensraum Elbe”. And of course after the deal the formal legal procedures for a disposal permit had to be followed. In the Humber, as a result of less tensions, the mode of conflict resolution through the formal consultation and court appeal does not lead to problematic situations that occurred in the Scheldt (i.e. the legal struggle about nature compensation) and Elbe (i.e. the legal struggle about the 9th deepening). In the Humber conflicts are resolved in a bottom-up manner. This is explained as the conflicts are smaller, especially because the need for dredging is less. Issues can be raised and discussed with Humber Nature Partnership Board of Directors. However, this board only has a limited span of control and influence. But there is no statutory conflict resolution in the Humber. Plans or projects requiring an EIA and ES may go to a Public Inquiry in which the planning Inspectorate then resolves conflicts and takes a decision. If it is a very large project, the National Infrastructure Commission comes into play.

Interestingly in the Scheldt, due to the position of the VNSC, another mode of conflict resolution came up. In the last ten years in the Scheldt the tensions became less politicised. Instead of political deal-making new plans are developed in a more collaborative way. The plan for a long-term vision about nature is an example of this. At the same time the possibilities for court appeal of course still exist and can be used by actors. We conclude that an explanation for the difference between the now less politicised situation in the Scheldt and the still very politicised situation in the Elbe can be found in differences in the (perceived) mutual dependency between the governmental actors. In the Elbe, Hamburg is dependent on other federal states to find an agreement for sediment disposal downstream the state border. Hence, concerning this matter, Hamburg is strongly dependant of Schleswig-Holstein and Lower Saxony – more than the latter are dependant of Hamburg. This asymmetry is not so much the case in the Scheldt. Of course, Flanders is dependant of the Netherlands for the deepening of the Scheldt, however on other topics the Netherlands is also dependant of Flanders and takes that into account.
The shift to a more collaborative governance mode for the Scheldt became clear during the first stages towards decision-making about the 3rd deepening. In that phase actors started to prefer collaboration above political deal-making. After starting to work jointly on a long-term vision for the entire estuary, actors experienced that sharing knowledge creates a common basis and helped to speed up the process of decision-making. As a result, the tendency towards deal-making declined. Almost all actors now recognise that collaborative decision-making through the VNSC works more efficiently. More and more conflicts are resolved in an earlier stage, when civil servants are preparing policies jointly.

4.7. Encourage change and adaptation

The Elbe, Scheldt and Humber are different in respect to change and adaptation, partly because of cultural differences. In the Scheldt one can observe incorporation of adaptation and change by the definition of a long-term vision, with both short- and medium-term measures and a six-yearly evaluation of both the plans and the governance of the estuary (including the role of the VNSC). Adaptation and change are also encouraged by a flexible disposal strategy and a research agenda for the future. Currently discussions take place how to include climate change in relation to the decision-making for the estuary. The development of a joint knowledge base is an important factor in this regard. Joint knowledge development is agreed upon in and steered by the treaty of common policy and management and its 5 yearly evaluations (in 2013 and 2018 respectively). It aims to conserve the natural dynamic of the physical system characteristics of the estuary. To achieve this, monitoring will be conducted based on a joint research plan. Monitoring aims to follow-up and preserve the morphological evolution, to provide a scientific framework for research plans, programmes and projects and to verify the effects of the ongoing and finished projects. Important research programs and projects in this context are: the MOVE project and investigations in relation to the LTV 2030 (prior to the establishment of the treaty) and more recently investigations in relation to the flexible disposal methodology and the long-term perspective for safety & accessibility (2014).

For the Elbe we observe a tendency to focus on existing problems and projects. This results in less focus on adaptation and change and smaller budgets to develop and maintain a knowledge base about the (functioning of) the Elbe system - compared to the Scheldt. In the Elbe, the goals for knowledge development and monitoring are set in a rather sectoral way. Research is therefore more related to projects and filling in knowledge gaps. Developing knowledge that requires a long-term commitment, is more difficult. This creates a situation in which it is also more difficult to pursue joint fact finding.

This is comparable to the Humber, where adaptation is rather fragmented. Each sectoral body has a vision and there are sectoral indicators such as for the WFD. Each body carries out monitoring or requires the developer to undertake monitoring as licence conditions. Monitoring is done on a six-year cycle but may be light-touch unless there have been major developments. The development of the new Humber Flood Risk Management Strategy at this moment is currently the best example of integrated policy development, taking adaptation and change into account. Stakeholders are included in the Flood Risk Management strategy and planning.

5. Lessons about estuary governance

This research has been executed to give:

a. A description of the governmental decision-making structures and processes of the three estuaries, including the historical developments which have resulted in the current governance system.
b. An analysis of governmental actions and outcomes and provision of examples for both cases in each of the estuaries, showing both best practices as well as barriers of the existing structures and processes.
c. Recommendations for improvements for the management and decision-making structures of the estuaries with emphasis on the Elbe.
d. Explanations why certain structures work well at one estuary but not at the other.

Drawing lessons for estuary governance, based on the analysis in Chapter 4, the following overarching topics (good practices and barriers) arise:

14. Differences in mutual dependencies between actors affect governance modes;
15. Relationship between decision-making and stakeholder participation;
16. A joint knowledge base promotes conflict resolution and of collaboration.
17. Long-term visions affect the integration of policy issues;

The lessons for these four topics are elaborated below.

5.1. Differences in mutual dependencies between actors affect governance modes

5.1.1. Reflections

An important difference between Scheldt and Elbe is the (perceived) mutual dependency between governmental actors involved in estuarine management and more specifically the disposal of sediment. On several issues Flanders is depending on the Netherlands and vice-versa, for example the navigability of the Scheldt, ecological goals and flood protection are strongly connected. This is also the case for the Elbe, however the conflicting interests lead to another configuration of mutual dependencies, where the federal State of Hamburg is more dependent on Lower Saxony and Schleswig-Holstein then the other way around. For the Humber mutual dependencies are of less importance as interests of actors are less conflicting. We hypothesise that this has a large impact on the willingness to commence a collaborative approach.

Due to the higher interdependency the collaborative decision-making of governmental actors through the VNSC became more valued by actors over time. This helped the VNSC to grow into a coordinating platform with a strong institutional position which is also perceived legitimate by all important stakeholders. Initially political deal-making was dominant, however the role of political deal-making in resolving conflicts decreased, when the VNSC became a more accepted part of the governance structure. An explanation for this high (perceived) mutual dependency is the fact that strict European ecological requirements “forced” Flanders and the Netherlands into a mode of collaboration after the political deal about nature compensation and infrastructural development was made. In the Elbe the strict (European) requirements for deepening and the disposal of sediment are

in place as well. However, at the Elbe “collaborative decision-making“ did not emerge. We will explain this below.

At the Elbe a stronger tendency towards political deal-making, as mode of conflict resolution is found in the case of sediment management. As mentioned earlier, due to the German Constitution there is no overarching institution that can force the federal states to cooperate or come to a solution. The lower perceived interdependency between the federal states on sediment management can be explained by the strong policy silos / compartmentalisation and associated fragmentation which prevent that the federal states experience that mutual dependencies (for example on other issues such as economic growth and employment provided by the Harbor) are relevant for resolving conflicts about sediment management.

5.1.2. Lessons: collaborative approach flourishes in the right political and cultural context

The most striking difference between Elbe and Scheldt is the level of institutionalized collaboration due to political and cultural context. We observed that in the context of the Scheldt the urgency of collaboration between actors due to the external pressure of European ecological requirements is higher than in the Elbe. This difference between Elbe and Scheldt is fundamental. The main governmental actors both in the Netherlands as well in Flanders learned to appreciate the collaboration through the VNSC. This appreciation grew after jointly drafting the LTV 2030 and DS 2010. In the Elbe the need for collaboration is recognized by actors but constrained because the authorities are hesitant to abandon formal powers. This is part of a strong cultural pattern in Germany which can be characterised as legalistic and emphasises the importance of formal procedures and planning based on the formal distribution of powers and tasks. The situation found at the Elbe derives from this cultural pattern. **Therefore, the collaborative approach as found at the Scheldt, fundamentally does not fit the context at the Elbe. Stronger collaboration at the Elbe can only grow over time and above all forms of cooperation have to be found that respect the formal and legalistic approach.**

5.2. A stronger relationship between decision-making and stakeholder participation attributes to a longer standing involvement of stakeholders

5.2.1. Reflections

In the Scheldt and the Elbe stakeholder participation is on a higher level than in the Humber. Both have (semi-)permanent stakeholder platforms with an advisory role. In the Humber participation is organised as part of the procedures to draft sectoral plans. In the Scheldt and the Elbe participation is organised estuary-wide. The Scheldt Council gained a statutory role due to institutional embedding within the VNSC structure. The Elbe platform (Forum Tideelbe) has a statutory role but is less influential and has a more limited mandate. The Forum and its topics of discussion and tasks is established as a stakeholder platform closely connected to the federal states: the states determine the tasks of the Forum and the topics that are discussed. **The biggest difference is that the governmental actors in the Scheldt committed themselves to be accountable if and how they adopt recommendations of the Council. This gives the council a strong position.**

An interesting observation is that for the Scheldt it took actors up to 10 years to appreciate the governance mode of the VNSC and associated stakeholder participation, as a means to have efficient and less time-consuming decision-making. Stakeholder involvement was high during the 2002-2004

period when the Development Sketch 2010 was undertaken. In this period there was also discussion about the representation of the CAP. Employment associations and agricultural organisations were eventually not part of the platform and were added later. When the Development Sketch was completed the stakeholder involvement through the CAP ended, probably due to governmental actors having focus on the translation of the Development Sketch 2010 into new arrangements in a treaty between the two countries, with tiresome discussions. With the first evaluation of the treaties in 2013 was realised that a stakeholder platform was still needed, and it was established again in 2014. This platform was called the Scheldt Council. We hypothesise that the success of the collaboration through the VNSC that persuaded the actors to accept the coordinating role and position of the VNSC and an advisory role of stakeholders through the Scheldt Council. Moreover, the stakeholders did not lose any of their formal or informal powers to influence decision-making by participating in the Scheldt Council. This also holds true for an influential stakeholder as the Port of Antwerp, who observed that collaboratively drafting the Development Sketch 2010 instead accelerated the formal decision-making (permitting) processes.

In the Elbe the dynamics in stakeholder participation were different. First, the change in scope is striking. The “Forum Strombau und Sedimentmanagement” dealt with system understanding, sediment management and river engineering measures. The following “Forum Tideelbe” rather zoomed in the prioritisation of river engineering measures, addressing sediment transport and improving ecology. Hence the broader scope of the first forum was converted into a smaller scope by zooming into measures. **Second, the interviews showed that the appreciation of the possibilities for participation provided by the forum differs among participants.** Some forum members perceive the establishment of the first Forum as an additional check and balance in the decision-making that was created according to the political agreement about Tonne E3. For others, the Forum is a serious opportunity for stakeholder participation. And others have doubts about the limited scope in terms of context and stakeholder representation of the fora as they reflected that transport/shipping companies as the major clients of the Harbour, should also be part of the stakeholder participation. **These different appreciations can be explained by a lack of accountability by decision-making actors that participants experience if and how advices of the Forum will be adopted. This creates different perceptions about the functioning and role of the Forum.**

5.2.2. Lessons: effective stakeholder participation is a chicken-egg problem

A comparison between the Elbe and Scheldt suggests that stakeholder involvement in the Elbe is currently at a level of involvement that was the case in the Scheldt 10 to 15 years ago during the phase of the Development Sketch and de CAP. In the Scheldt stakeholders experienced a positive impact of the collaboration through the VNSC and of participation through the Scheldt Council. For the Elbe this ‘proof’ of positive impact is not yet available. The Forum has to ‘prove’ the value of its existence by showing how decision-making can be improved and made more time efficient. Unfortunately, this leads to a kind of a chicken-and-egg-question. Can we improve decision-making through collaboration in such complex situation when there is no trust yet that the collaboration is favourable for the stakeholders and governmental actors?

Comparing Elbe and Scheldt to the Humber shows that a more centralised platform for stakeholder participation makes sense for estuaries with higher levels of conflicting interest (Elbe and Scheldt) then for estuaries with lower levels of conflict (Humber).

5.3. A joint developed and maintained knowledge base

5.3.1. Reflections

For the Humber and Elbe it is observed that system knowledge about the estuary is developed in a rather sectoral and fragmented way. **Interviews show that, according to several actors, research budgets are quite low. Moreover, in the Elbe much research is done by a state-owned institute of which some studies became disputed during decision-making about the 9th deepening. This is a big difference with the Scheldt where joint fact finding, also as part of the treaty on management and collaboration, has led to a continuous and substantial investment in system knowledge.** Research is conducted by a strong network of experts and institutes that are cooperating frequently in giving advice and answering questions about the physical and ecological functioning of the Scheldt estuary. Knowledge dissemination to joint fact-finding stakeholders is actively pursued and, using the Scheldt Council, they also have an influence on the research agenda. Also, they are stimulated to share their own experience and knowledge. In the on-going process of developing jointly a long-term perspective for nature in the estuary the focus until now has been on consensus on the state and functioning of the estuary, not on measures. **With the aim of defining required knowledge and the intended approach, it was easier for actors to gain understanding for the points of view of other actors. In this stage agreements are easier established in comparison with collaborating on working out concrete measures or solutions.**
In the collaboration between government actors the joint development of knowledge proved a very effective manner to resolve conflict or better to prevent that perceived conflicts are raised since the start of making the long-term vision.

5.3.2. Lessons

In the Elbe an important source of knowledge about the estuary is the research by state-owned institutes that primarily work with (advanced) models of the estuary that are in most cases applied with regard to the deepening of the estuary. This is an undesirable situation as it potentially fuels possible conflicting interests between actors. Nevertheless, the “Forum Strombau und Sedimentmanagement” has proved that for the sediment issue, joint fact-finding and joint assessment is possible.

The focus on having a knowledge base that is based on joint fact-finding used in the Scheldt was very effective in preventing conflicts. A fitting form of joint fact finding for the Elbe seems also desirable. **An approach consistent with the tasks assigned to the first stakeholder forum for the Elbe, that looked into the working of the estuary as a system, is advised. This however requires a major investment in knowledge. In comparison to the Scheldt, main issues on the Elbe to develop more knowledge about are: (1) due to its relevance for the whole system sediment management i.e. more flexible disposal strategies not being related to administrative borders but steered by natural conditions, and where sediment also can be used as building material for other functions, for instance strengthening of dikes or heightening of natural areas such as sandbars and salt marshes, and (2) general understanding of the estuary system in terms of dynamic equilibria, driving forces and trends.**

Also, the Humber suffers with fragmented knowledge and monitoring and a decline of budget. In the Humber joint fact finding is in theory easy to implement as there are little conflicting interests.

However, as urgency for an integrated management approach for the Humber is low, a joint collaborative approach to research is not very likely for the Humber.

5.4. Integrated long-term visions can help to integrate policy issues

5.4.1. Reflections

The LTV for the Scheldt estuary integrated policy and management issues by giving equal importance to the three user functions and stating that they all depend of sustainable estuarine management, meaning that its physical characteristics were maintained. The policy intervention to formulate and adapt such a vision is not made in the Elbe and the Humber. In these estuaries decision-making is based on sectoral policymaking and actors are less acquainted to making long-term visions besides the ambitions of the Natura 2000 management plan, that in the Elbe has not any legally binding status and therefore private parties have no direct obligations. Also, in relation to the WFD management plan, which is valid for the whole Elbe catchment, the sectoral policymaking of federal states can be observed. For example, the upstream located federal states, as well as the Czech Republic, don´t take the responsibilities for remediation measures at the sites of the source of pollution within their territories, which results in apparent problems i) for the maintenance of the estuary – high costs for the treatment of contaminated sediments - and ii) when the sediments at the end enter the North Sea, where difficulties arise to meet the water quality objectives of the MSFD, for e.g. nutrient concentrations due to the high input of (the riverine part of) the Elbe.
In the Scheldt the integration of issues urged stakeholders to participate in the process which resulted in the end in an equal level in the playing field (also related to system knowledge) for different stakeholders, which is not the case in the other estuaries. Also, **finding an agreement for a future that is a further away (20 to 30 years), proved to be a safe intervention and enabled integration of the three user functions (flood protection, accessibility, nature).** The process of collaboration on a long-term goal enabled that conflicting interests were addressed and investigated without the need for concrete solutions / immediate measures (with associated deal-making). **The real strength however was that the vision making was coupled with more concrete measures that were elaborated in the Development Sketch 2010 (as a first step in realization of the vision).** The basic assumptions were discussed in the long-term vision, that hence served as a framework for the Development Sketch.

It should be acknowledged that the Netherlands had more experience and belief in making a long-term vision. The Dutch policymakers insisted on making a long-term vision integrating three issues and various actors. This was conflicting with the attitude in Flanders where actors were afraid that the LTV was a strategy aimed at delay, being unfamiliar with this way of policymaking. An intervention at the start of the process of making the joint vision was getting a quick first result: an agenda for the vision. With the agenda in hand in the follow-up the actors were less hesitant to participate in the process. Nevertheless, must be emphasised that there was a setting in which those who were sceptic on the vision process had no other option, taking in account the position of the Netherlands in the debate. When one considers the implementation of long-term visions in other estuaries (or any large-scale natural system) these lessons have to be taken in account and it should be realised that one could meet comparable reactions of scepticism.

5.4.2. Lessons

The experience with the LTV in the Scheldt shows that it is a powerful intervention to create conditions for good governance as it facilitates the integration of issues and creates a basis for actors for a common understanding about conflicting issues such as sediment management. Another important benefit of the long-term vision has been the joint development of a knowledge base. As stated in section 5.3 this also contributed to the conflict resolution between actors.
However, long-term visions are not the most obvious interventions for Elbe and Humber at this moment, as actors are not acquainted with this type of visions and associated merits. We think that current conditions in Elbe and Humber are not suitable to commence a process to draft a long-term vision unless certain circumstances are met which will be described in the following chapter.

6. Recommendations for the Elbe

6.1. Towards a more collaborative approach for the Elbe?

When reasoning from the perspective of the Elbe estuary, higher levels of collaboration are desirable. Examples of topics that require more collaboration are solving the pollution of the water and sediments and the more flexible management of sediments within the estuary. However, reasoning from the perspective of the actor's sense of urgency for more collaboration is not present as mutual gains are not easily recognized when multiple actors have different stakes. This is why we conclude that a structure like the VNSC as found in the Scheldt estuary is not directly applicable in the context of the Elbe to realise higher levels of collaboration. Furthermore, we also conclude that the drafting of a long-term vision for the Elbe is not feasible at this moment as it does not fit the German political culture. Therefore, we would like to recommend four other interventions that could increase collaboration of state and non-state actors along the Elbe and can eventually lead to conditions/circumstances in which it is more logical to draft a joint vision:

Step 1: Start informal consultations between actors to develop a joint research agenda.
Step 2: Strengthen the position of the "Forum Tide Elbe"
Step 3: Execute this research agenda in the form of a joint knowledge program
Step 4: Assign "Forum Tideelbe" with a specific task concerning the knowledge program.

The general idea of these four interventions is that they succeed each other in time. In this sense these interventions are also steps to take and each step is essential to take before the next step can be taken. The four steps are elaborated in the next sections. In section 6.6. we will elaborate the idea of taking up a long-term vision on the Elbe estuary and the conditions that are needed to do so.

6.2. Step 1: Start informal consultations to develop a joint research agenda

We recommend starting informal consultation between actors as a first step in developing a joint research agenda. First the need for a common research agenda should be recognized and formulated. We recommend taking the following steps:

a. Start informal discussions between governmental actors (federal states of Schleswig Holstein, Lower Saxony and Hamburg, and WSV) about the issue concerning the estuary they want to solve in the next 10-20 years. It is very important that these discussions focus on the knowledge gaps that should be solved for the estuarine management of the future. What are crucial uncertainties? Knowledge gaps associated with specific projects at the short-term are explicitly not the aim.
   For example, this kind of discussion could be conducted in the "Abteilungsleitertreffen".
b. When the issues are clear for the governmental actors, broaden the discussion by inviting non-governmental actors to informally reflect on the issues. Use this discussion to draft a proposal for a research agenda for the next 10 years.
c. Then formally ask the "Forum Tideelbe" to draft an advice about the research agenda and draw final conclusions about the necessity of a longer standing knowledge program.

6.3. Step 2: Strengthening the position of “Forum Tideelbe”

We also recommend strengthening the position of the “Forum Tideelbe”. This requires the formulation of a clear order at the address of the administrations and the Forum Tideelbe. The first order can be the assignment to the forum to draft an advice about a joint research agenda. In addition, we recommend making the governmental actors accountable about the way they adopt the advice of the Forum. This recommendation could also be part of the clear order of the administrations towards the Forum. Such an order requires both transparency in hindsight: explain how advices are adopted. As well as transparency prior to consultation: explain in advance under what conditions the advice of the forum is promising or likely to become adopted.

6.4. Step 3: Execute this research agenda in the form of a joint knowledge program

We recommend that the research agenda is executed in the form of a joint knowledge program that is financed by the three federal states and the WSV together. This requires a joint order addressed to a broader consortium of knowledge institutes. This joint order should be developed using the existing coordinating structures in the Elbe estuary. We advise that part of the order consists of further articulation of the knowledge involved actors need and the questions they have. Other part of the order should provide requirements for the dissemination of the knowledge to other governmental actors and to non-state actors that have interests in the outcomes of the knowledge program. This knowledge program should be dynamic and flexible in that sense that new information and new insights can lead to the articulation of new questions and new needs for knowledge. Drawing lessons from the Scheldt actors should bear in mind that this knowledge program could take up 5-8 years to execute, as the main aim is to develop systemic knowledge about the behaviour of the estuary.

6.5. Step 4: Assign “Forum Tideelbe” with a specific task concerning the knowledge program

One of the lessons in the Scheldt was that longer involvement of stakeholders increases mutual trust and hence the success of a more collaborative approach. Also, a lesson was that success is a chicken-and-egg problem. Therefore, we recommend that the governmental actors create an opportunity for the “Forum Tideelbe” to have a prolonged role in the knowledge program and the decisions that will be made during the execution of this program. This requires a long-term investment in stakeholder participation and transparency of decision-making; trust only develops over longer periods of time. In case that the recommendation under 6.3, has led to the execution of a longer standing knowledge program, a prolonged role for the Forum is recommended. This prolonged role could consist of: discussing research outcomes of the knowledge program regularly, advising about follow-up research and advice about the formulation of research assignments. A clear role of the Forum Tide Elbe is recommended by assigning the Forum to review and interpret the research and formulate overall lessons.

6.6. A long-term vision for the Elbe estuary?

As stated in 6.1. we believe that only under the condition that mutual trust between state or main responsible actors like the federal states and WSV (and HPA) is grown and that mutual trust is grown between state and non-state actors, the formulation of a joint long-term vision for the Elbe can be feasible. Mutual trust however is not the only requirement, commitment to a joint vision is another important factor. The Scheldt case showed that that one actor (State of the Netherlands) believed in this approach whilst another important actor (Flanders) did not believe in the success. This led to the situation that the vision at first was met with great hesitation. This situation will also almost certainly occur in the Elbe estuary. This means that the actor that will promote the idea of a long-term vision, must consider that large investments in time and trust building will be needed to persuade other actors to cooperate in the vision making. This is why we recommend commencing with a long-term vision only if steps 1 to 4 have led to sufficient trust, urgency and commitment to a common approach to estuary management.

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- Representative from the Environment Agency, interviewed August 23, 2019
- Representative from the Forum Tideelbe, interviewed October 23, 2019
- Representative from the Humber Nature Partnership, interviewed August 23, 2019
- Representative from Ministry of Energy, Agriculture, the Environment, Nature and Digitalization, Schleswig-Holstein, interviewed October 23, 2019
- Representative from Ministry of Environment, Energy, Construction and Climate Protection of Lower Saxony, interviewed November 6, 2019
- Representative from NABU, interviewed November 15, 2019
- Representative from the foundation “Lebensraum Elbe”, interviewed October 23, 2019
- Representative from the University of Hull, interviewed December 2, 2019
- Representative from the VNSC, interviewed August 29, 2019

Appendix 1: timelines of Elbe, Scheldt and Humber

Timeline Elbe

In this paragraph we describe important historical milestones in the Elbe estuary in order to understand the current situation of how different parties interact. We start with some more general milestones but at a certain time (in the 2000s) different milestones regarding the last (9th) deepening of the Elbe estuary occurred parallel to the other events.

1962 and 1976: Storm surges and consequences

In 1962 and 1976 two severe storm surges hit the area of the Elbe estuary and led to a high amount of casualties and damages. As a consequence, protection measures were carried out to prevent future flooding. The measures included for example the construction of a weir at Geesthacht and new flood barrages, and large parts of the tributaries were cut off from tidal influence in order to protect the hinterland. However, these measures also prevented the marshlands to keep growing up through periodical sedimentation. In addition to the loss of marsh area, shallow water areas also decreased. In total the estuary evolved to a more rigid system with less space for the dynamic development of natural habitats.

1980-1990s: Extension of the port of Hamburg (construction of container terminal "Altenwerder")

Around this time the port of Hamburg wanted to build a new container terminal and therefore the village of Altenwerder, which was located in potential harbour development area, was evacuated and the terminal was built. Since then a lot of resistance and mistrust against the activities of the port of Hamburg and the City of Hamburg exists.

1999 8th deepening finished

Already in the 19th century, a navigational channel in the Elbe estuary was deepened several times. As a result of industrialization and the growth of the merchant fleet at the beginning of the 20th century, extensive river engineering measures were carried out including the modification and expansion of harbour basins. In 1999 the 8th deepening of the Elbe was finalised. Together with the measures mentioned above the repeated deepening of the navigational channel also contributed to a (ecological) degradation the estuary system.

Beginning of 2000: Extension of AIRBUS plant within the Mühlenberger Loch

For the extension of the AIRBUS plant located at the Elbe, a large part of the area of the Mühlenberger Loch was taken (land reclamation). The Mühlenberger Loch is a valuable nature area in the Elbe estuary downstream of the port. As a result, the land reclamation led to a lot of dispute with the local population, NGO´s and nature scientists.

2002-2019: 9th deepening/adjustment

In **2002** the federal State of Hamburg together with the Federal Waterways and Shipping Administration (WSV) started to work on the application for the "9th deepening" to the licensing authority of the Federal Ministry of Transport and of the Hamburg Ministry of Economy, Transport and Innovation to allow modern container ships to reach the port of Hamburg with more draft. The project

should result in the deepening of the shipping lane of approximately one meter and in a broadening of a very narrow part of the estuary to facilitate passages of very large ships. The whole planning process has taken several years to finalize (see below).
During the official planning period, which started in **2006**, the process of the 9th deepening has been delayed several times. It has been one of the most contentious infrastructural projects in the history of the Federal Republic of Germany.
In **2007** Lower Saxony did not want to approve the 9th deepening, before the consequences of the last fairway adjustments and the problems concerning dike safety were solved.
In **2011** the EU approved the 9th deepening, followed in **2012** by Schleswig-Holstein and Lower Saxony. With the approval by the federal states of Schleswig-Holstein and Lower Saxony the political hurdle regarding the 9th deepening had been overcome. However later that year the municipalities of Cuxhaven and Otterndorf together with nature conservation organisations appealed against the project in court. They managed to postpone all dredging activities as long as the process in court continued. The senate of Hamburg and the Federal Ministry of Transport maintained their view that the 9th deepening is necessary to keep the harbour in a competitive position.
In January **2013** the Leipzig court (Oberverwaltungsgericht/ Federal Administrative Court) postponed the handling of the appeal of the municipalities of Cuxhaven and Otterndorf together with nature conservation organisations and thus dredging activities still could not start.
In **2015** the new red-green government in Hamburg also committed to the 9th deepening.
In **2016** as a result of court processes about the several objections against the deepening, the applicants (City of Hamburg and the national state “Bundesrepublik”) made a new concession by promising not to dredge throughout the year (protection of the Natura 2000 fish species “ Fint”). However, the court did not accept this as sufficient compensation for the damage of the nature.
In February **2017** the Leipzig court decided to approve the 9th deepening in principle. It approved the planning permission in general but rejected one of the compensatory measures for the Schierlings-Wasserfenchel (an endemic species of the Elbe estuary: Oenanthe conioides). Consequently, HPA and WSV planned an additional compensatory measure.
This compensatory measure was permitted in August **2018** by way of an amendment to the original 2012 planning permission. The environmental NGOs who had appealed against the project in the first place filed a suit against the amendment but did not request the suspension of the works. Only now the Federal Waterways and Shipping Administration (WSV) and Hamburg Port Authority (HPA) were allowed to permit a dredging company to deepen the estuary.
Finally, in **2019** the permitting process was completed and the winning applicant was allowed to start dredging. But the case is not closed so far that means further compensation measures possibly can be requested by the court.

2008 - 2011 Hamburg area of the Wadden Sea nominated as UNESCO-World Heritage Area

Because of worries about the realisation of the 9th deepening the Hamburg senate decided not to cooperate in the proposal to make the Hamburg area of the Wadden Sea as UNESCO-World Heritage. But in 2010 the senate and the responsible ministries of the City of Hamburg had not further objections.

2008 “Strombau– und Sedimentmanagementkonzept für die Tideelbe“

In the early years of the 2000 decade the sediment problem became a topical issue. Due to sediment which is transported by a powerful flood current from the North Sea into the upper estuary and port area (tidal pumping), HPA and WSV are challenged by a high and costly maintenance effort of the

shipping channel and the port. The deposition of the dredged material is a mounting contentious issue. Locations for the depositions of HPA outside the state of Hamburg had to be found. The state of Schleswig-Holstein was willing to temporarily allow deposition of the dredged material in the North Sea.
To address this complex issue the HPA and the WSV, in cooperation with the state authorities of Hamburg and the adjacent states of Lower Saxony and Schleswig-Holstein developed a new river engineering and sediment management concept for the estuary ("Strombau – und Sedimentmanagementkonzept für die Tideelbe") in 2008. The objective of this plan was to reduce the amount of sediments and the related costs of the maintenance dredging and deposition of the dredged materials. The concept, in the form of a joint declaration, was approved and signed by the cooperating parties in June 2008 ("Gemeinsame Erklärung zwischen … zum Strombau und Sedimentmanagement für die Tideelbe"). Since the planning for the deepening of the estuary was already in a formal planning process, the "Strombau – und Sedimentmanagementkonzept" was not part of that ongoing project.

2010 Establishment foundation "Lebensraum Elbe"

Parallel to the adoption of the IMP, the government of Hamburg established an additional semi-public actor by an act of the Hamburg parliament: a foundation ("Lebensraum Elbe", 2010).

2012 Integrated Management Plan Elbe Estuary (IMP)

Since the federal states are responsible for nature conservation, and thus for the protection and management of the Natura 2000 network, Hamburg, Lower Saxony and Schleswig-Holstein, the WSV and HPA since 2004 cooperated closely to implement the EU-directives ("Lenkungsgruppe Norddeutscher Länder") and set-up a joint management plan based on two separate technical plans (one for Lower Saxony and another for Hamburg and Schleswig-Holstein) . This was a key process and the foundation towards a better cooperation between nature and economy ressorts and stakeholders - and also state-spanning as it addressed all german estuaries (Ems, Weser, Elbe).

2013 European Interreg Project "TIDE"

Within the European Interreg Tidal River Development (TIDE) project (2010-2013) different aspects of four European estuaries concerning ecological functioning, management measures and governance were compared. The latter subject of investigation comprises amongst others an integral assessment of the uses and conflicts, and how is dealt with these in the different estuaries, resulting in best practices and recommendations (www.tide-toolbox.eu). The main user conflicts for the Elbe found in the TIDE project were associated with the provision and maintenance of safe navigation requirements from the estuary mouth to the port of Hamburg and the Natura 2000 requirements.

2013- 2015 "Forum Strombau- und Sedimentmanagement Tideelbe (FOSUST)"

In August 2013 HPA and WSV established the "Forum Strombau- und Sedimentmanagement Tideelbe" as a consultation platform that consisted of about 40 governmental and non-governmental stakeholders. Its focus was on system understanding, river engineering measures and sediment management. In 2015 the "Forum Strombau- und Sedimentmanagement" presented its conclusions in a final report. In contrast to the earlier developed "Strombau- und Sedimentmanagementkonzept" (2008), this report was developed together with stakeholders and listed a number of unanimous recommendations for reducing and handling of contaminated sediments, river engineering measures and sediment management, e.g. dredging and disposal.

HPA and WSV have introduced the recommendations in different administrative structures to get these implemented in measures like remediation measures in the Elbe catchment.
Another recommendation was the establishment of an estuary partnership to institutionalize the dialogue with focus on the selection and implementation of potential river engineering measures.

2016 -2020 Estuary partnership "Forum Tideelbe"

In December 2016, the new estuary partnership "Forum Tideelbe" was established by the government of Hamburg. The establishment of the partnership "Forum Tideelbe" was jointly agreed upon by the three federal states of Hamburg, Schleswig-Holstein and Lower Saxony and the WSV representing the national Ministry of Transport and Digital Infrastructure. The participants of the former forum (FOSUST) equally participate in the estuary partnership. It is a non-statutory body as a project commissioned by its Ministry of Transport, Economy and Innovation and the Ministry of Environment and Energy. The project is financed by both ministries initially until 2020 and may potentially be extended.
Since its establishment in 2016, the "Forum Tideelbe" has discussed a number of river engineering measures and commissioned a few projects and studies. However, no conclusions are available yet, but the "Forum Tideelbe" has held two annual symposia to inform a wider audience of interested parties. In 2020 a report with recommendations on the preferred measures should be finished and handed over to the responsible administrations of the three federal states.
At the very moment everybody agrees that it is necessary to carry out measures to improve the (ecological and hydrological) situation of the estuary but when a potential site is discussed local resistance emerges ("not in my backyard").

Timeline Scheldt

The history of the conflicts around the Scheldt goes a long time back, since the independence of Belgium. Below the most important events will be elaborated on.

1839 Scheldt Treaty

The history of conflicts between the Netherlands and Flanders on the governance of the Scheldt dates back a long time. During the 80-year war between the Netherlands and Spain the Western Scheldt was closed, hence also the entrance to the port of Antwerp. This continued for two centuries. In the Treaty of London of 1839, the Kingdom of the Netherlands acknowledged the independence of the Kingdom of Belgium. As result the Netherlands guaranteed free shipping between the North Sea and the port of Antwerp, through the Western Scheldt. This was written down in the Scheldt Treaty and signed by both countries. In these times the cooperation about the Scheldt was merely focused on shipping, under the supervision of the Permanent Committee and the Technical Scheldt Committee.

1970 First deepening of the Western Scheldt

Between 1970-1975 the first deepening of the Western Scheldt took place. At that time Environmental Impact Assessments were not done yet. There were no discussions on mitigation measures or measures for nature compensation.

1995 Treaty second deepening of the Western Scheldt

In 1995 the Netherlands and Flanders, and no longer the Kingdom of Belgium, signed a Treaty about the second deepening of the Western Scheldt, allowing access for a depth of 11,6 meters, independent of the tide. This treaty took the additional need for one or more deepenings in the future into consideration. This time nature compensation was included in the treaty and caused persisting conflict between the parties involved. Exact measures were not specified. The possibilities that were investigated included several that implied depolderisation of land alongside the Western Scheldt. Debate about the necessary nature compensation was fierce and conflicting interests between actors led to a lengthy legal struggle between actors. One of the best-known examples is the conflict that arose about the depoldering of the Hedwigepolder. A conflict that even persisted during the planning for the third deepening.

1998 Request for third deepening of the Western Scheldt and the start of the long-term vision Scheldt estuary

1998 marks a turning point in terms of collaboration in the history of the governance of the Scheldt estuary. Conflicting interests between the Netherlands and Flanders were still flaring up and led to strong debate in the Netherlands. Direct cause of the third deepening was that Flanders made use of the consideration of the need for more deepenings in the treaty of 1995 and submitted a request for the third deepening of the Western Scheldt to the Netherlands. This request was made already when the constructions for the second deepening were still ongoing. The Netherlands argued that this third deepening should be considered in the context of an integral vision for the desired state of the entire Scheldt estuary on the long term. Flanders agreed. During the development of the Long Term Vision (LTV) was agreed that it will focus on the desired state in 2030 and on the three priority functions of the Scheldt estuary: safety, accessibility and naturalness. The LTV connects them in an integral

perspective, because all three depend on the functioning of the estuary (especially hydrodynamics and morphology) and on each other.

2001 Establishment project direction Development Sketch 2010 Scheldt estuary

In 2001 the LTV was approved by both parliaments. The following political-administrative enactment of the long term vision for the Scheldt estuary is a two-step process. In the Memoranda of Kallo and Vlissingen both countries made agreements about common procedures, policy and management and nautical management which were adopted in the Flemish and Dutch parliament in 2001. An important part of these agreements was the establishment of the bilateral project direction for the Development Sketch 2010 (DS2010). The LTV for the Scheldt estuary 2030 requires measures to be taken on the medium-term which function as cornerstones for the envisioned future of the Scheldt estuary. The project plan had a tight schedule of two years (2002-2004) to develop proper measures and projects for the development sketch, including an environmental impact assessment and a societal cost-benefit analysis.

2003 Establishment Consultation Advisory parties

A need for stakeholder participation was expressed by the project direction, because the organisation did not want to be solely dependent on advise by the government officials represented in the Technical Scheldt estuary Committee. As result an official and independent advisory body (the 'consultation advisory parties') was formed to act during the entire process of the DS2010.

Samenstelling Overleg Adviserende Partijen

E. Baldewijns en J.A.M. Hendrikx	Voorzitters
L.D. van den Berg	Secretaris
L. Timmermans	Adjunct-secretaris
H. Balthazar	Gouverneur Provincie Oost-Vlaanderen
L. Delwaide / E. Bruyninckx	Havenschepen Antwerpen / Afgevaardigd bestuurder Havenbedrijf Antwerpen
W. Van Gils (B. Martens*)	Beleidsmedewerker Bond Beter Leefmilieu Vlaanderen
W.J. de Graaf	Dijkgraaf Waterschap Zeeuws-Vlaanderen
A. van der Hek / G.L.C.M. de Kok	Voorzitter Nationale Havenraad Nederland / Voorzitter Zeeland Seaports
P. Janssens (L. Detiège*)	Burgemeester stad Antwerpen
V.A. Klap	Coördinator Werkgroep Schelde-estuarium
P.M. de Koeijer	Vertegenwoordiger Zeeuwse economie & Zuidelijke Land- en Tuinbouw Organisatie
M. Kramer (L. Coppoolse*)	Voorzitter Bestuurlijk Overleg Westerschelde
R. De Meyer (R. Restiau*)	Directeur Vlaamse Havenvereniging
C. Paulus	Gouverneur Provincie Antwerpen
L.C. Poppe-de Looff	Voorzitter Taakgroep Westerschelde Nederland
P. Symens	Beleidsmedewerker Natuurpunt Vlaanderen
Bij eindadvisering betrokken andere partijen:	
J.A. Groenink	Brabants Zeeuwse Werkgeversvereniging
P. Van Bossuyt	Boerenbond
A. Van Goethem	Algemeen Boeren Syndicaat
Waarnemers namens Proses	
H.H.P. van Zwam	Projectdirecteur ProSes
J. Claessens	Adjunct-projectdirecteur ProSes
H.R. van Huut	Procesmanager externe partijen ProSes

Figure 5: Composition Consultation Advisory Parties (Source: VNSC)

2005 Scheldt estuary treaty common policy and management

In 2005 the Netherlands and Flanders reached an agreement about all measures in the DS2010. This was sealed in four Treaties: the treaty regarding common policy and management, the treaty regarding common nautical management, the treaty regarding the execution of the DS2010 and the treaty regarding the decoupling of pilotage fees. The execution of the Development Sketch implied deepening the shipping lane of the Western Scheldt to 13,10 meters independent of the tide.

2006 Nature package Western Scheldt

With a nature package the Netherlands had a plan for the expansion of estuarine nature with 600 ha in order to meet the obligations for the Natura 2000 area Western Scheldt and Saeftinge. Both the

Hedwigepolder and the Zwin are part of the plan and the Scheldt-estuary Treaty, respectively. However the implementation of depoldering the Hedwigepolder, as nature compensation measure for the second deepening of the Western Scheldt, took until 2019 and was a reason of political disputes between the Province of Zeeland and the national Dutch government as well as between the Netherlands and Flanders Belgium. Further was accompanied by law suits of environmental NGO´s. Finally the European Court decided that the Netherlands had to set back the dikes.

2008 Establishment Flemish-Dutch Scheldt Committee

As a result of the treaty on common policy and management the Flemish-Dutch Scheldt Committee was established. It replaced the Technical Scheldt estuary Committee, but has a much broader scope.

2014 Establishment Scheldt Council

One of the recommendation of the first evaluation of the treaty on common policy and management was the need again for a stakeholder platform. As result the Scheldt Council was established in 2014. In the Scheldt Council the following organizations are represented: Province of Antwerp, Province of East-Flanders, Province of Zeeland, Water board Scheldt-estuary streams, Representative of Scheldt-estuary municipalities in Flanders and the Netherlands, Alfaport Antwerp, Port of Antwerp, North Sea Port, Brabant-Zeeland employment association, VOKA-VeGHO, Flemish port association, General Farmer's Syndicate East Flanders, Flemish farmer’s association, Southern Agricultural and Horticultural Organization (NL), Natuurpunt Vlaanderen, Bird protection in the Netherlands, Zeelandic Environmental Federation.

Timeline Humber

In this paragraph we describe important historical milestones in the Humber estuary in order to understand the current situation.

1988-1989 Nature Conservancy Council's Estuaries Review / Davidson Review

Before the Habitats Directive was enacted concerns had grown about the level of habitat loss on estuaries and what appeared to be a tidal wave of development proposals. In 1988? 1989, the Nature Conservancy Council (fore-runner of English Nature) published its 'Estuaries Review' that highlighted a worrying trend in the decline of the natural resources in England's Estuaries. Around the same time the major ports were privatised. This coincided with the rapid growth in the size of container vessels and the increase in imports from the Far East. Together with these port developments, the estuary review seems to be the kick-off point for thinking about sustainable management. This thinking was pushed by the newly formed 'English Nature' from around 1992/3 and followed up by the establishment of English Nature's Estuaries Initiative (with similar initiatives in Scotland and Wales) (see below).

1992 English Nature's ''Estuaries Initiative''

Estuarine management plans were promoted as a component of English Nature's ''Estuaries Initiative'' in 1992, which was a first attempt to get to grips with the different issues facing estuaries. As expressed in the ''Campaign for a Living Coast'' it was important ''to achieve the sustainable use of England's estuaries by all estuary users and regulatory authorities, through the preparation and implementation of integrated management plans that have been developed, and are supported, by those users and authorities themselves''. Estuarine management Plans, prepared by a partnership of statutory stakeholders and local users were proposed and a five-year funding program was established to promote the development of Estuary Partnerships. The stakeholders identified as potential funding partners included Local Authorities (local Government), the National Rivers Authority (now the Environment Agency), water companies, port authorities and major industry. However, consultancies were employed to develop the first Estuarine management Plans. These were not a success because they lacked the process of consensus-building and failed to gain ownership. There was a tendency amongst some Local Authority partners to view Estuarine management Plans as nature conservation plans, and some therefore offered representation by their ecologists rather than planners and economic development officers. Whilst Estuary Partnerships experienced a multitude of problems, they often provided the first forum that allowed adjacent Local Authorities and key stakeholders to talk to one-another, and to this extent they must be regarded as having been successful.

1994 The designation of the Humber Estuary as a Special Protection Area (Birds Directive)

The designation of the Humber Estuary as a Special Protection Area (Birds Directive) was a critical driver to start thinking strategically about managing the estuary. Until this designation, little attention had been paid to the impact of raising flood defences, expanding ports or deepening navigation channels. This Directive and the subsequent 'Habitats Directive' have been instrumental in driving integrated management, but at the time it did upset many traditional users of the estuary who had generally regarded the licensing process as a paper exercise and had at best paid lip-service to environmental matters.

1997 Humber Flood Risk Management Strategy

The Humber Flood Risk Management Strategy 'Planning for the rising tide' was an important plan with regard to the management of the Humber, because it was the first plan that asked for compensatory measures for the impact of proposed developments on flood defences. However it was not an integrated plan itself.

1997 first Humber Estuarine management Scheme (HEMS)

The first Humber Estuarine management Scheme (HEMS) was a thick report consisting of the foundations for integrated management, based on strategic principles. It was a strategic political compromise rather than tangible actions. "HEMS was a brave but unsuccessful attempt at achieving an integrated plan for management of the Humber Estuary."(Morris & Barham, 2007) The project suffered from many problems, and was particularly challenged because it was non-statutory and led to tension between sectoral interests that could not be resolved at any level apart from overall strategic objectives. For example HEMS was perceived by different organisations as a nature conservation strategy of English Nature. In addition different perspectives existed on what were the next steps the focussed was more on nature conservation than on an integrated approach to manage the estuary. Subsequent implementation of the strategy through the development of a management plan proved impossible and the project was disbanded in 2001. By this time, however, the legal frameworks provided by the Birds and Habitats Directives changed the rules of engagement in project planning. The positive result of the HEMS was that different stakeholders now talked to each other.

After 1998 from ports to riverside terminals

The developments in the shipping and container industry after 1998 asked for ports to expand into riverside terminals and consequently for deepening of the estuary.

2000 Flood Risk Management Strategy on the move

The Environment Agency put great emphasis on working with all stakeholders to ensure that the resulting scientific understanding could be used as the basis for making decisions about the future of flood defences in the estuary. This process involved helping stakeholders to understand that their own aspirations for the estuary must be influenced by a greater understanding of what estuary morphology was trying to achieve; that is that the management of the estuary would move more towards a position of "working with nature'. (Morris & Barham, 2007)
Outputs from morphological modelling led to the publication of a first strategy in 2000. This was a fundamental change to strategic planning, and although it is not a statutory document it does provide clear guidance for flood risk managers, industry and nature conservation on what needs to be done, and what the possibilities are for improved management of wildlife resources. This in turn has important implications for key commercial interests: notably the ports because it shows where there are potential opportunities for threefold benefits from realignments of flood banks to create new habitat. These benefits include accommodation space for rising seas, development of mudflats and saltmarshes that provide improved flood defences as well as new wildlife habitat, and a means of offsetting habitat loss elsewhere (through new port development). (Morris & Barham, 2007)

After 2000 various developments on the Humber

In the past forty years, ports have changed considerably. They bear little resemblance to the labour-intensive operations that serviced a fleet comprising a mixture of bulk carriers, oil tankers and general-purpose cargo vessels. An obvious difference in the business has been the shift towards

specialised and efficient cargo handling, which in turn has led to the introduction of much bigger vessels.
Today, in addition to general-purpose carriers, ships are confined to the carriage of particular commodities or to the use of specialised handling systems. An important consequence of these changes has been the shift in port design. Today‘s ports involve riverside terminals with deepwater dredged pockets that allow extremely rapid turnaround. Thus, historic port capacity is less well suited to many new forms of shipping and cargo handling and new infrastructure has been sought at many locations. It is not only changes in cargoes and cargo handling, but also changes in volumes imported and exported that fuel demand for new port capacity. In this changing port environment, the Humber ports have undergone a major evolution. Historically, the majority of port activity was centred upon the locked ports at Goole, Hull and Immingham. Petrochemical production led to the establishment of major jetties and facilities at Hull and Immingham.

By the early 1990‘s port expansion proposals started to emerge, coincident upon port privatisation and improved confidence in an industry that had been beset with poor labour relations in the 1970s and 1980s. The first significant changes on the Humber came at the port of Hull where new port capacity was proposed at Saltend (the eastern end of Hull docks). This proposal involved the loss of 9 ha of mudflat that at the time was outside the boundary of the Humber Estuary Special Protection Area (SPA). A proposed new riverside terminal at Immingham (Humber International Terminal) and new ro-ro facilities at North Killingholme adjacent to a former oil storage depot followed shortly afterwards. These three developments were significant because they took place in the period between the introduction of the Habitats Directive and its subsequent impact upon site selection for Special Areas of Conservation (SAC) and, therefore, although the Directive was implemented its full implications had not become clear. The Hull and Immingham proposals together led to the loss of some 31 ha of undesignated habitat and full offsetting measures were not secured (some land was allocated for new habitat creation but did not involve the development of new mudflats). It would be difficult to describe the outcome of these developments as sustainable when taking account of natural environment implications, but they were a first step in the transition.
For example a big development on North Killingholme haven, which destroyed a mud flat of international importance. The flat was the habitat of a large population bar-tailed godwit. This was an example of consent-decisions by the UK government made from a politically-economics rather than a sustainability perspective.

2002 The Humber Nature Partnership established

The Humber Nature Partnership (HNP) took over HEMS, but is strictly about nature conservation, not about sustainability. This still continues today.

About 2010 UK government into austerity

UK government cut budgets given to local authorities and organisations such as Environment Agency and Natural England. Environmental programs were cut first because of course the pain of these cuts was not felt so hard in the short term. And this was the start of the demise of integrated management.