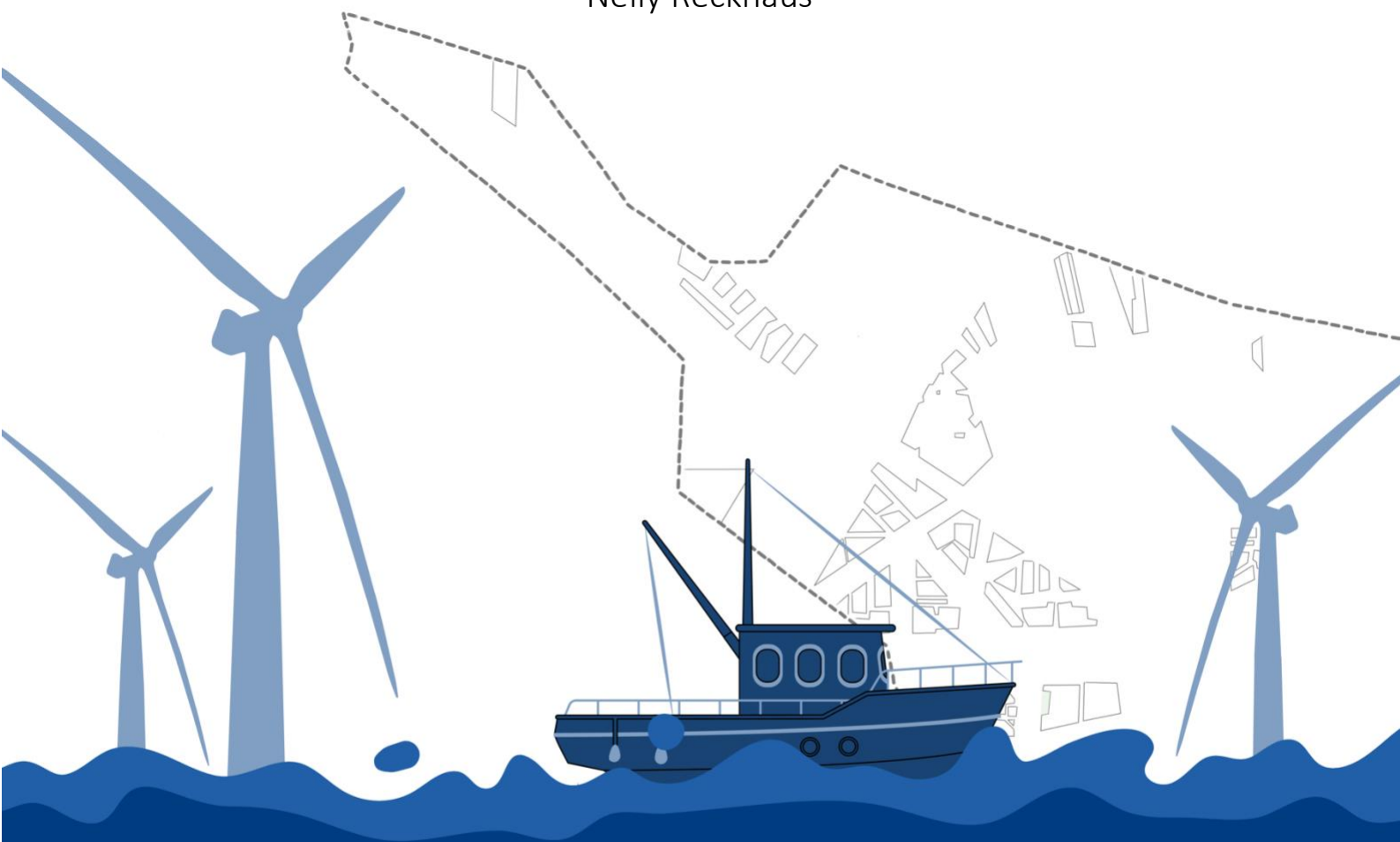


The Ongoing Conflict between Offshore Wind Farms and the Fishing Industry in the North Sea

*How to Manage and Distribute the Space of the
German Exclusive Economic Zone*

MASTER THESIS

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Abstract

The space in the North Sea is scarce and many actors are interested in using it for different activities. Also, in the German Exclusive Economic Zone, human activities increase, especially the development of offshore wind energy (OWE). Reasons such as the desired energy transition and climate change support the designation of marine space to offshore wind farms (OWFs). However, this rapid development has negative impacts on other actors in the North Sea such as commercial fishery. As of today, fishing activities within and around an OWF are not allowed. Large areas in the German North Sea are not accessible for fishermen anymore, which leads to a conflict between the sectors of OWE and fishery. This study aims to identify how this conflict can be minimized, and how the space of the North Sea can be distributed fairly. For this purpose, the theories of Marine Spatial Planning, institutions and the approach of boundary spanning were examined and researched how these can help to achieve this goal. Through a literature review, a stakeholder analysis and semi-structured interviews with actors involved in the conflict, information and perceptions were collected and analyzed.

The findings reveal that the perception of the two sectors of OWE and fishery have quite different perceptions on how the space in the North Sea should be used. While the representatives of OWE claim more space for the construction of OWFs, to be able to reach the climate target of 40 GW energy production by 2040, fishermen are concerned that they cannot sustain their livelihood in the future. This case study also shows that communication between the two sectors is missing and that current institutions hinder the process to find suitable solutions. Therefore, to minimize this conflict, discussions and collaborations are needed to find solutions which are suitable for both sectors. Boundary spanning could hereby present a promising approach to support this process of communication, to find a common ground and to develop ideas such as the co-use of areas.

However, without support from the government, the fishing industry will have major problems in the future, as more OWFs will be build and more space will be taken.

Key Words:

Marine Spatial Planning; Institutions; Boundary Spanning; Offshore Wind Energy; Fishery

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List of Abbreviations

BMEL	Bundesministerium für Ernährung und Landwirtschaft
BMI	Bundesministerium des Innern und für Heimat
BMUV	Bundesministerium für Umwelt, Naturschutz, nukleare Sicherheit und Verbraucherschutz
BMWK	Bundesministerium für Wirtschaft und Klimaschutz
BSH	Bundesamt für Seeschifffahrt und Hydrographie
BWO	Bundesverband der Windparkbetreiber Offshore
CFP	Common Fisheries Policy
EEZ	Exclusive Economic Zone
EU	European Union
EZDK	Erzeugergemeinschaft der Deutschen Krabbenfischer GmbH
GW	Giga Watt
IMP	Integrated Maritime Policy
MSP	Marine Spatial Planning
OWE	Offshore Wind Energy
OWF	Offshore Wind Farm
QCA	Qualitative Content Analysis
ROG	Raumordnungsgesetz
SeefiV	Seefischereiverordnung
SPSS	Collecting, Checking, Sorting and Subsuming
UK	United Kingdom
UNCLOS	United Nations Convention on the Law of the Sea
UNEP	United Nations Environment Programme
WAB	Offshore Windenergie-Agentur Bremerhaven/Bremen e.V
WindSeeG	Wind-auf-See-Gesetz
WVW	Wirtschaftsverband Windkraftwerke e.V.

1. Introduction

1.1. The German North Sea

The North Sea is an important habitat and system for nature and humans. Living creatures such as plankton, benthic and seabird communities, mammals as well as diverse fish species live in the North Sea and use its resources (Clark & Frid, 2001). In addition, human uses, and activities, such as shipping, fishing, extraction of resources like oil and gas, and recreational activities have a long tradition. In the last decades, the anthropogenic use of the North Sea has even increased and activities such as the development of offshore wind farms (OWFs) and intensive shipping make the North Sea to one of the seas with the most activities on earth (Halpern et al., 2008).

To divide the space and regulate the activities on the North Sea, parts of it are designated to every state surrounding it. Littoral states are granted the freedom to use this area and its resources for economic purposes. These dedicated parts are known as the Exclusive Economic Zones (EEZ) of the countries. An EEZ reaches from the outer border of the territorial sea and out up to 200 nautical miles (Quince, 2019). There are certain activities, such as the freedom of navigation or the right of transit passage, which are valid for ships of foreign countries as well if these ships sail under a flag of a sovereign state (United Nations, 1982). To use the space of the EEZs efficiently and sustainably, the approach of Marine Spatial Planning (MSP) was introduced. Some countries, such as Germany already have a more advanced history of MSP, while countries like Denmark are relatively new in this field. In 2014, the European Union (EU) directive for MSP, *Directive 2014/89/EU* was approved. This directive committed every EU state around the North Sea to establish a marine spatial plan. Also, non-EU states such as Norway and the United Kingdom (UK) have established similar plans for their EEZ. Under the directive, the bordering countries of the North Sea had to develop a plan by 2021, to indicate how the space of their EEZ will be used and which parts are dedicated to certain sectors with the overall goal of sustainable development. Specified sectors in the EEZ are, among others, marine protected areas, military areas, shipping lanes, areas for the extraction of oil and gas, fishing areas or areas for the development of renewable energy (Kirkfeldt et al., 2020). In Germany, the Bundesamt für Seeschifffahrt und Hydrographie (BSH) (The Federal Maritime and Hydrographic Agency) is responsible for establishing this plan (BSH, 2022b).

In 2019 the European Climate Law under the European Green Deal was adopted with the aim to reduce the greenhouse gas emissions by 55% by 2050 and further, to have a climate-neutral economy and society (European Commission, 2021). To reach this objective, many countries in the EU are part of the energy transition from fossil fuels towards more renewable energy production. One example is Germany with its objective to expand the share of renewable energies in the electricity consumption to 65% by 2030. To reach this goal, new renewable energy plants need to be set up. Apart from solar power, the use of wind energy is a widely used technology (Unnerstall, 2017). However, wind turbines are highly visible in the landscape and their construction requires much space: to supply the Netherlands' energy demand exclusively through wind energy, around 83% of the country's landscape would need to be covered with wind turbines (Spijkerboer, 2021). To avoid this, sea space is increasingly used

as a substitute. In the North Sea, large parts are already dedicated to the building of OWFs and also in the marine spatial plan of the German EEZs large areas are dedicated to the building of OWFs, or as zones under investigation for such OWFs (BSH, 2021).

This increasing development of OWFs has a big impact on different sectors and ecosystems. One of these sectors, which is also important for Germany, is the fishing industry. Usually, the entry with vessels, unless necessary for the building or maintenance of the OWFs, is prohibited within OWFs, especially during the periods of building, maintaining, and dismantling of the turbines. Further, fishing is not allowed either. This rule applies for the wind farm itself as well as for a safety zone, which can extend up to 500 m around the OWF (Deutscher Bundestag, 2018). This leads to the problem that the fishermen either need to make detours to come to their fishing grounds and therefore lose time and money due to more fuel consumption, or that they even lose their fishing grounds completely. Additionally, with the decreasing space for fishing, the competition in the remaining areas increases. Therefore, a conflict occurs, between the development of OWFs, which are needed to achieve the EU climate targets, and the fishermen in the North Sea who need the space for fishing activities to earn their livelihoods (Van Hoey et al., 2021).

1.2. Relevance of the Study

As renewable energy is highly relevant and desirable today, the sector of offshore wind energy (OWE) becomes more relevant, also in the North Sea. OWFs require a lot of space, apparent for example in the biggest OWF in the North Sea, which is located in front of the coast of England and has a size of 462 km² (Orsted, 2020).

While renewable energies are crucial to achieve today's energy transition, other sectors like the fishing industry are important players in the North Sea as well, as many people are dependent on it. Therefore, the minimization of the conflict could lead to co-existence in the German North Sea.

To understand the root causes of this problem, the process of MSP as well as related institutional perspectives are considered in this study. Further, formal, and informal institutions are identified, which could create barriers but also opportunities to minimize the conflict. It is examined if the transformation of these institutions could support this goal and bring the two sectors of OWE and fishery closer together.

Additionally, external actors as assistance are considered in this research to examine if a mediation of the conflict between the sectors could support its minimization. More specifically, the concept of boundary spanning could hereby be a new approach to reach that goal. Currently, boundary spanning is not considered in the German MSP process. Therefore, this research aims to close this research gap and to examine if boundary spanning could contribute to the topic under study. Boundary spanning refers to an organization or an individual person, which can mediate between different parties in conflict. This thesis therefore examines if the role of a mediator in the process of MSP could positively influence the communications between the relevant actors and therefore help to strengthen connections and find more suitable solutions for the stakeholder involved in this conflict.

1.3. Goal and Scope of the Thesis

The overall goal of this thesis is to identify opportunities to minimize the conflict but also barriers to its solution. As the number of OWFs in the North Sea will rise due to influences such as the energy transition towards renewable energies, so will the conflict between the fishery sector and the sector of OWE.

The aim of this study is therefore to find an approach to minimize the conflict between the fishing industry and the OWE and to suggest how they can share the North Sea as a common space. Towards the end of the study, recommendations about how to improve the relationship between the two sectors will be drawn. Further, suggestions, how external factors can influence their co-existence, such as planners in the planning phase of an OWF or the government and policies, will be carried out.

To research this conflict in more depth, a case study of the German North Sea is used to investigate which steps are already included in the planning of OWFs to take the preferences and needs of fishermen and the energy sector into account, and what steps are currently missing to achieve a solution that is attractive for both sectors.

1.4. Research Questions

Primary Research Question

To find a suitable solution for the conflict between the OWE industry and the fishery sector, the thesis is developed from the following research question:

How can conflicts between the offshore wind industry and the fishing industry in the North Sea be minimized?

Secondary Research Questions

Next to the primary research question, the thesis answers the following sub-questions to enhance its deepness of the thesis and to highlight different important research sectors:

- 1. What does the current Marine Spatial Planning process look like in the German North Sea?*
- 2. Which actors are involved and what is their role in the conflict?*
- 3. How do the current formal and informal institutions in the Marine Spatial Planning process in the German North Sea influence the conflict?*

2. Theoretical Framework

2.1. Marine Spatial Planning

The management of the oceans is a complex undertaking. However, national rights and the distribution of responsibilities are clearly regulated in large parts of the sea. Nations which are located at the coast have jurisdiction over clearly defined parts of the sea. Behind the coastal zone, which reaches 12 nautical miles into the sea and enjoys national sovereignty, the EEZ starts and extends up to 200 nautical miles into the sea. These rules were prescribed by the United Nations Convention on the Law of the Sea (UNCLOS) in 1982. In the EEZ special rights apply in favor of the sovereign state. It is allowed to explore and use all marine resources in this area exclusively. These resources also include energy production through water and wind (Quince, 2019).

As the human use of the world's oceans increased in the last decades, the need for the coordination and distribution of marine space has become evident. Therefore, the approach of MSP was originally introduced in Australia and is nowadays widely acknowledged and used in large parts of the world's marine areas. MSP has a strong focus on the sustainable management and governance of the sea and has the aim to minimize conflicts between sectors and uses, but also between human actions and the environment (Santos et al., 2019).

MSP is commonly defined as “public process of analyzing and allocating the spatial and temporal distribution of human activities in marine areas to achieve ecological, economic, and social objectives that are usually specified through a political process” (Ehler & Douvere, 2009 p.18). In the last 40 years, the practice of MSP has been adopted by several countries around the world (Santos et al., 2019).

MSP in general is divided into seven main phases, which were defined in 2017. The phases consist of the pre-planning, the analysis for planning, the plan development, the plan completion, the approval, the implementation, and a final revision (Santos et al., 2019). The seven main phases can be seen in figure 1.

When a marine spatial plan is in place, its purpose and goal is to manage conflicts of the different uses of space. It is a multi-objective and multi-use planning process with the aim to integrate and balance the interests on sea, including economic, social, and environmental interests. Especially at the social level, MSP can help to improve stakeholder engagement in regard to ocean uses and management. Also, transparency in licensing and the increase in private investments can be seen as a benefit, especially for the economic sector. However, challenges also occur in the planning process of the marine environment. Challenges can be shortcomings in political and institutional frameworks, the balancing between economic development and the conservation of the marine ecosystems or the missing capacity to monitor and evaluate the plan and its outcome. Furthermore, stakeholder engagement and participation, transboundary issues or the adaptation of environmental change and its consequences can be difficult to manage. To achieve a long-term sustainable management of the sea, these issues have to be addressed and responses have to be found (Ehler & Douvere, 2009).

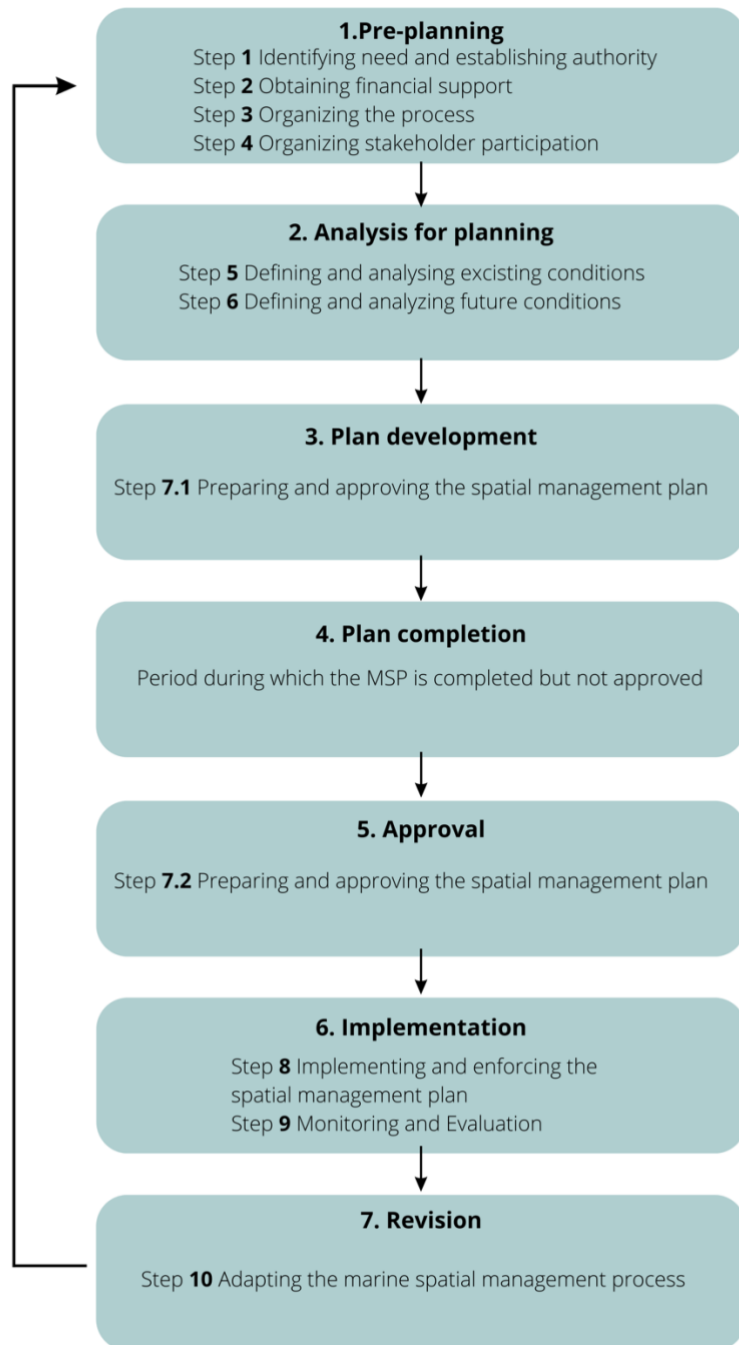


Figure 1 The seven main phases of MSP, including accompanying steps (made by author, modified from Santos et al., 2019).

Participation in MSP

One essential aspect of MSP is the inclusion and participation of (key) stakeholders. This is especially important as MSP is implemented to fulfill multiple objectives such as social, ecological, and economic ones. Different expectations, opportunities and conflicts are therefore combined in MSP and have to be taken into account to achieve its goal. Additionally, stakeholder involvement is important to gain a shared understanding about problems and challenges on the sea and to expand knowledge and understanding through local stakeholders

who can share their expertise of the area and traditional practices (Ehler and Douvère, 2009). Ehler and Douvère (2009) state that the extent to which stakeholders are involved in the process of MSP differs from country to country and depends, among others, on the legal requirements for participation in the country itself. As stakeholders in MSP, persons are considered, who are in some way affected by or interested in MSP. However, to take too many stakeholders into account at the same time can cause time delays and can result in a disturbance of and disadvantages for the planning process. Therefore, Ehler and Douvère (2009) suggest thinking about three guiding questions to answer before the involvement of stakeholders to create an efficient but fair inclusion: “Who”, “when” and “how” should stakeholders be involved?

First the responsible authorities have to decide who should be involved in the process. This includes individuals or groups who will be affected by the implementation process or the result of the plan, who are dependent on resources or space in the area or are active within the area. Groups with special interests such as environmental Non-Governmental Organizations should be taken into account as well as they can influence the process. However, stakeholder groups are not equally important in the planning process. Interests and possible impacts, also in the future, have to be weighed. To provide information, offer workshops or, for the more important stakeholders, direct dialogue and negotiation are effective ways of including these stakeholders (Ehler & Douvère, 2009).

In this thesis, MSP is acknowledged as a useful tool, to distribute the space of the sea and to share it among different interest groups which are related to this space, especially focusing on the interests of commercial fisheries and the development of OWE.

2.2. Institutions

It is crucial to consider institutions for an understanding of the current situation of the German North Sea. Institutions form the basis of regulations and are therefore important to understand. Institutions are mentioned in a wide range of literature. Also, in planning the theory of institutions and institutional change is important, already since the early 1990s (Buitelaar, et al., 2007). Scientists such as Bolan (1991) and Innes (1995) researched the topic of institutions and describe it as a central element of planning theory. However, different authors define institutions in different ways. Bromley (1991) who is seen as one of the main proponents of institutions, states that these equal relations which can be created intentionally. On the other side, Hayek (1960) sees institutions in a different perspective. He explains that institutions evolve through organic variation and are adopted because of their effectiveness. Scott (2013) defines institutions as social structures which have accomplished an extraordinary degree of resilience. In this view, institutions are transmitted by diverse types of carriers and operate on multiple levels, and they are subject to a constant incremental or discontinuous change (Scott, 2013).

Institutional theory also refers to institutions as rules or as the rules of the game in a society (North 1990). It can be said that institutions are important for human interactions as they can guide and provide stability while reducing uncertainty (Olsen, 2009). These definitions by North (1990) and Olsen (2009) are also definitions used in this thesis.

Often, the term “institution” is used interchangeably with that of “organization”. However, while organizations are groups and actors which share a common goal, institutions are more about the interaction and relation between actors and organizations themselves. Institutions are mainly influenced by political and social actions and interactions, which also means that they can and will change over time (Buitelaar et al., 2007).

The literature distinguishes between two different kinds, formal and informal institutions. The first kind in the institutional context designates formal institutions. Formal institutions can be seen as rules, which are established and enforced by the government and the legal system. Examples for formal institutions are written constitutions, laws and policies. However, institutionalization can be seen as an incremental process which is influenced by relations and interactions e.g., at the governance level. This incremental process is also applicable to the second kind of institutions (Buitelaar et al., 2007).

The second kind are informal institutions which are, unlike formal institutions, enforced by repetition of habits instead of by legal systems (Högberg, 2009). They are mainly unwritten, not codified and created and used outside the legal system. This includes traditions, moral values, beliefs, or norms, which are an important part of a local culture (Lauth, 2004; Helmke & Levitsky, 2006).

In this study, these two definitions of institutions will be adopted. This thesis examines how they can influence the conflict under study and the planning process of MSP in the German North Sea.

Institutional Change

To understand how these institutions can be changed and if a change could help to minimize the conflict under study, the concept of institutional change is introduced briefly in the following section.

Change, in this study, is understood as the conversion from one equilibrium to another (North, 1990). North (1990) states that institutional change and its process is also influenced by path-dependency, because ideologies, developments and learning are based on a particular set of formal and informal rules. Informal institutions, such as norms and traditions, change significantly slower than formal institutions. However, all kinds in the institutional context influence each other (North, 1990). Högberg (2009) argues that informal institutions are more influential and important than formal institutions as they are more consistent.

Additionally, Burch et al. (2003) distinguish different periods in processes that institutions undergo, namely periods of rupture and periods of stability. In the stable periods, institutions are more likely to be influenced by path dependencies, while periods of ruptures show higher chances to break these paths and an increased creation of new ones. They argue that while the change can be externally driven, it more often originates internally. When it comes to pressure in the institutional system, through reflection, proposals for redesign or promotions, incremental change can begin. Burch et al. (2003) call this a critical moment which enables the change leading to a critical juncture, driven by internal or external actors. Such a critical moment can occur when current institutions and politics are critiqued and at the same time strong alternatives and problem perceptions are available.

It is important to mention that the authors do not always perceive change as improvement. Still, it enables the identification of lock-in situations and path-dependency and can therefore avoid problems in the future (Han, 2010).

Institutions are considered important for the topic under study. Formal institutions contribute to the conflict as laws and regulations prohibit fishing activities within OWFs. At the same time, informal institutions create barriers which hinder the solution finding process. In this thesis, institutions and their barriers and opportunities will be identified, and it will be examined if a change of these institutions can help to minimize the conflict and enable the co-use of the German North Sea.

2.3. Boundary Spanning

To overcome the boundaries, which are present between the sector of fishery and the OWE sector, it is important to increase and improve communication, cooperation, coordination, and integration of the parties involved (Gustavsson, 2015). For this, the concept of boundary spanning is introduced to then examine in chapter 5., if it could help to bring the sectors closer together.

Boundary spanning was introduced and named by Tushman in 1977. However, the theory behind it was already researched and used from the late 1950s onwards. A boundary spanner is mostly an individual with the capability to bond parties within an organization or between different organizations (Tushman & Scanlan, 1981). The concept is already widely used, especially in the domain of project management (Gustavsson, 2015).

The concept of boundary spanning is deeply connected to the theories of networks and organizations (Van Meerkerk & Edelenbos, 2014). Van Dijk (2012) states that networks can be defined as “collection of links between elements of a unit” (p. 24). Hereby, elements are the social agents while links are the interaction between them, which creates relationships within a system (Van Dijk, 2012). If a network grows, the number of actors rises as well, which makes them interdependent to each other, and the sharing of information becomes even more important (Koppenjan & Klijn, 2004; Castells, 2004). In these networks, organizations evolve through the creation of sub-units which are responsible for the execution of homogenous tasks. Due to differences between these sub-units through culture, language and values, boundaries can emerge between them, which can lead to complications in communication and collaboration (Tushman & Scanlan, 1981).

To address these tensions and to improve the cooperation between organizations and their environment, boundary spanning is a promising approach. It is important to solve the tensions within and between organizations as organizations need sufficient information to base their decisions on. This information cannot always be found within the organization itself and therefore external communication and information sharing is needed. However, external information has often to be translated into useful knowledge for the organization (Tushman & Scanlan, 1981). Boundary spanners can then function as different actors, for example as a broker. A broker gathers information from different sources and perceptions and shares this collected information outside of the organizational boundary. This can help to find possible

problems and tensions within a network. Furthermore, a boundary spanner can function as a translator between organizations to create a mutual understanding between them and make sure that information is available and understandable for all parties involved. Additionally, boundary spanning can be executed by boundary spanners as synthesizers, who go further than translating information but combine several opinions to come to new solutions and ideas. Synthesizers can help to find common ground between organizations and help to improve collaboration (Feldman & Khademian, 2007).

To be successful in spanning the boundaries, it is important that boundary spanners are internally and externally well connected. This is important as they rely on gaining information from external organizations as well as from an internal team (Tushman & Scanlan, 1981). Additionally, it is important that the boundary spanner can emphasize with all stakeholders within the network to be able to sense tensions and problems in early phases and to react accordingly (Van Meerkerk, 2014). Tensions in organizations are unavoidable, as their different actors represent different values, goals, and opinions. Boundary spanners therefore operate in-between organizations to deal with them and balance them (Van Meerkerk, 2014).

Carlile (2004) distinguishes boundaries into three different kinds: syntactic, semantic, and pragmatic. Syntactic boundaries occur within an organization with known differences and dependencies between actors and a common language, which is used to share knowledge sufficiently. The boundary is therefore about *transferring* the knowledge (Winter, 1987). Semantic boundaries are more about actors who have a shared meaning while using a different lexicon of sharing their knowledge. Therefore, information has to be *translated* (Carlile, 2004). Pragmatic boundaries occur when different organizations have no common understanding and competing interests. Then knowledge must be *transformed* (figure 2) (Carlile, 2002).

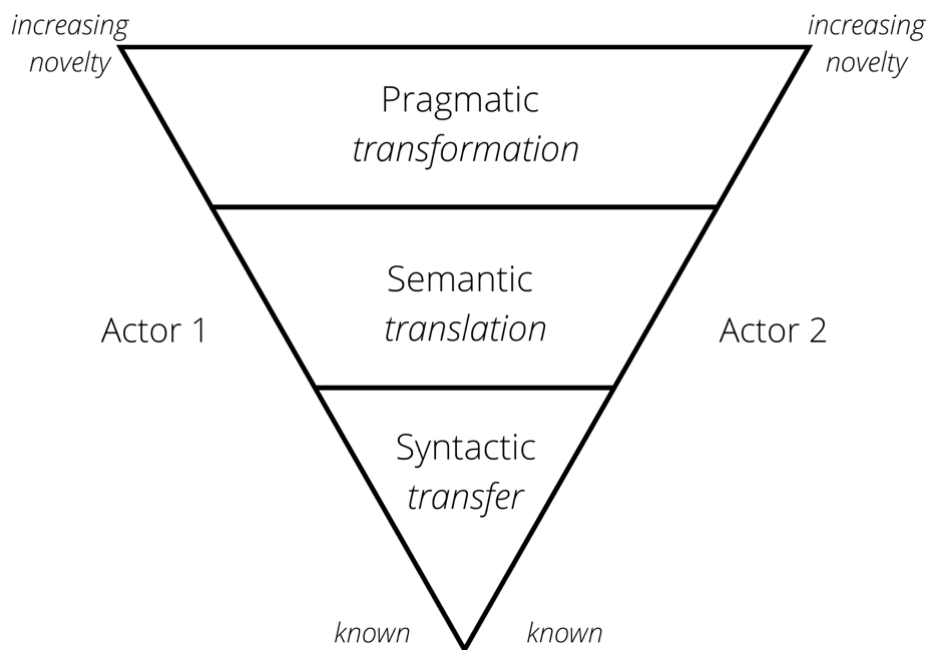


Figure 2 Framework on how to manage different kinds of boundaries (made by author, modified from Carlile, 2004).

To work as a boundary spanner, strategies to span these boundaries and resolve tensions have to be applied. As there are different kinds of tensions and boundaries, different strategies are

developed. Three possible strategies are the entrepreneurial, the mediating and the hierarchical strategy. The entrepreneurial strategy is about finding solutions and approaches to connect actors within organizations and organizations among each other. Boundary spanners who are acting like synthesizers, chose who to contact and rank important initiatives to avoid conflicts with the aim to open windows of opportunities for future changes without further tensions and with a shared goal (Carlile, 2004).

Further, the mediating strategy focuses on the common ground between the different actors. This can be reached through discussions, through bending rules and looking beyond the existing tensions or through trust-building and the creation of respect for all opinions. If the common ground is created, collaboration can be built upon. The boundary spanner is in the role of the mediator while having, again, characteristics of the synthesizer. The focus lays on aligning opinions and positions and making them understandable for everyone involved (Carlile, 2004). The hierarchical strategy is seen as the last approach to break through processes when other strategies and conversations did not bring the desired outcome. Leading managers are the main dialogue partners here, and the strategy is viewed as effective but not desirable for future interactions (Carlile, 2004).

The approach of boundary spanning is seen as a promising approach to minimize the conflict between the sectors of OWE and fishery. In the following thesis, it will be examined which boundaries are present in the conflict under study, which strategy is most suitable and which role of a boundary spanner could help to find common ground.

2.4. Conceptual Model

After introducing the theoretical framework of this thesis, a conceptual model is presented in figure 3. This conceptual model aims to visualize the introduced concepts and to connect the theories with the objective of the research.

The concept of MSP is chosen as it describes the process of distributing sea space while taking into account the interests of different sectors and the inclusion of stakeholders. This is important for this research as it shows the planning process and, to some extent, the basis of the conflict, as spatial exclusion and inclusion of actors are part of it. The same applies for institutions. Institutions are formal and informal rules, and therefore can create barriers in the conflict as they allow and prohibit certain activities which can lead to the conflict or its reinforcement. However, changing these institutions and examining the internal barriers could lead to new approaches in minimizing this conflict. The concept of boundary spanning was chosen as it can be an approach which aims to minimize conflicts. Support for better communication and the translation of interests and information can help to get one step further towards shared solutions. Therefore, this thesis examines if one or more of the strategies of boundary spanning can contribute to the minimization of the conflict under study.

The methodology used, such as semi-structured interviews and literature review, is presented in detail in the following chapter and is used to contribute to the attempt to answer the research questions of this study and if the introduced theories could help to do so.

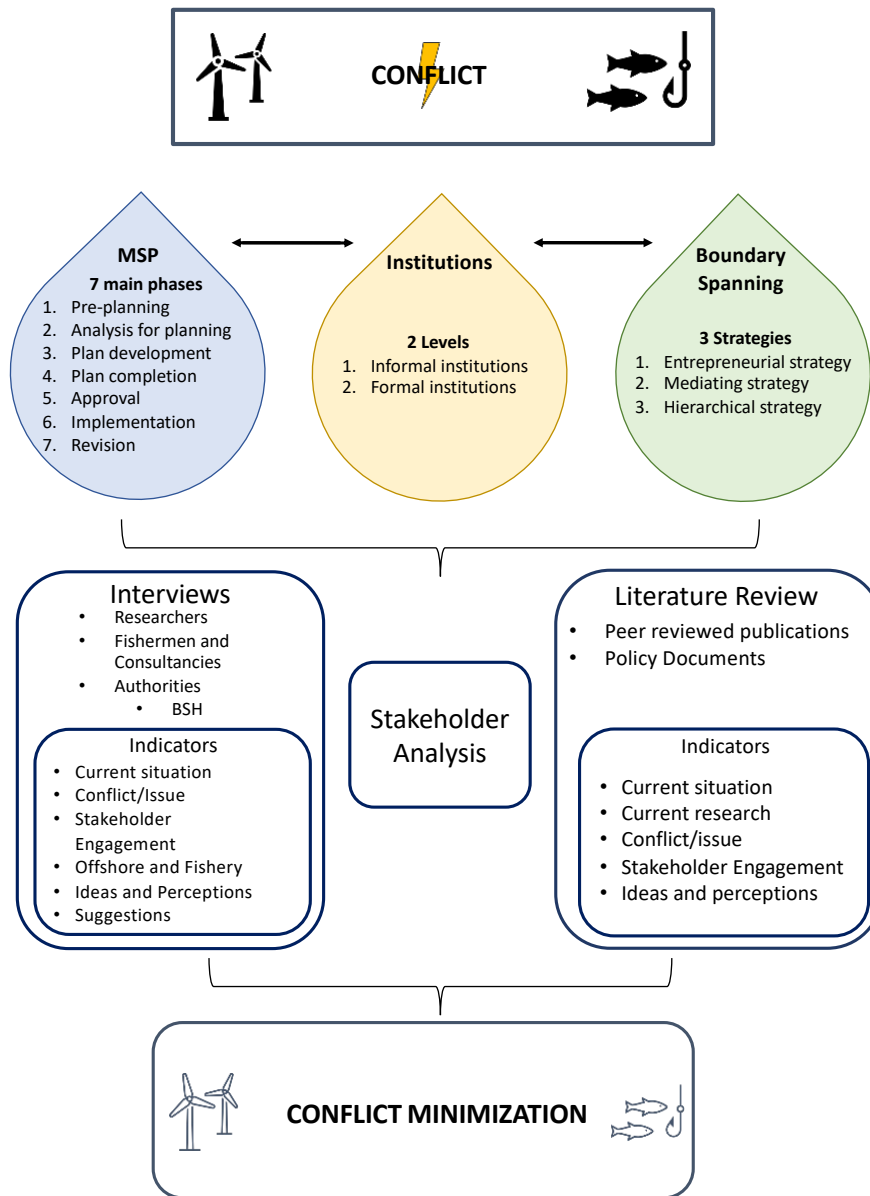


Figure 3 Conceptual model (made by author).

3. Methods

In order to answer the research questions of this thesis, the following methods and analyzing tools were used. First, a literature review was conducted to gain background information and identify relevant factors for developing a theoretical framework. Based on this information, semi-structured interviews were conducted to collect additional information and an in-depth understanding of the current issue, and the perspectives of the actors involved. To analyze the data, a qualitative content analysis was applied. Further, a stakeholder analysis was carried out to identify key actors which are involved in this conflict and to examine how to manage these. All steps are described and introduced in detail in the following chapter as well as the theoretical background of the case study.

3.1. Research Design

To conduct this study and to answer the introduced research questions, a qualitative research approach was applied. Qualitative research focuses on people's words and their behavior. Qualitative data is not analyzed through numbers but rather through words (Ashley & Boyd, 2006). As the topic of co-existence and conflict minimization is expressed through conversations and opinions, this approach fits the purpose to analyze expert-interviews and data, collected through observation.

To gain background knowledge of the topic and the current state of research, a literature review was conducted in the beginning of this thesis. This step was fundamental to understand the current issue and situation in the German North Sea and especially to collect information about the sectors of OWE and fishery. This literature review provided the basis for the semi-structured interviews, as the questions were developed based on collected information.

The ability to close knowledge gaps and to explore new knowledge and insights is one main advantage of qualitative research as it allows openness and a broad perspective in the research field. Additionally, it helps to understand social reality and "to draw attention to processes, patterns of interpretation and structural characteristics" (Flick et al., 2019, p. 14).

Further, this study used two kinds of reasoning, deductive as well as inductive reasoning, to maintain the flexibility of the research and the development of findings. While inductive qualitative research uses non-standardized and pre-defined measures, deductive reasoning uses concepts which are already known, and which are more concept-driven than data-driven (Schreier, 2012). In this study, the interview guide as well as the coding frame were initially created by deductive reasoning and extended inductively during the processes of the interviews and coding.

3.2. Case Study Design

For this thesis, a case study was employed. A case study presents a useful tool to connect the different theories, which are introduced in chapter two, and to explore them in practice. A case study is described as a context sensitive approach with multiple perspectives but still with the

determined focus on one region, which facilitates the analysis of the research topic in a feasible scope (Hussy et al., 2013). It also examines situations and issues in which relations between factors are not necessarily known (Gray, 2016). Case studies are mostly associated with qualitative research as it allows different views throughout the collection of data from various sources and through different methods (Lewis & McNaughton Nicholls, 2003). This is also the case in the present study, as different methods, such as semi-structured interviews, stakeholder analysis and a literature review, were applied. Even if the results cannot necessarily be generalized, they can provide relevant insights and might be useful or informative for other cases in future research.

Further, the following case study of the German North Sea is an embedded one, which means that the case study focuses on sub-units of a case instead of the whole situation on site (Platt, 2007). The sub-units examined in this case, are the two sectors of OWE and the fishing industry, which are both operating in the German North Sea. Furthermore, the components of the theoretical framework, introduced in chapter 2., and their interrelation can be seen as sub-units as well, which will be examined in more detail during the case study.

As already mentioned, the overall study is based on a combination of deductive and inductive reasoning which also matches with the method of a case study, as a framework was created which enables the collection of data and which is based on theory. These data help to analyze relationships which are identified in an inductive way. Multiple data sources are used, and the theoretical concepts are discussed in detail, which helps to ensure the validity of this thesis (Gray, 2016).

Case Study Selection and Demarcation

The German EEZ in the North Sea, with an area of 28,600 km² is an important habitat for animals, plants and also for humans. Many human interests are represented in the area and the space is managed and distributed through the marine spatial plan of 2021. However, conflicts remain, as the space is limited, and many actors want to be involved (Gimpel et al., 2015).

For this thesis, the German EEZ of the North Sea and in more detail the ongoing conflict of OWE and the fishing industry was selected. The German North Sea was chosen for the case study because of two main reasons. The conflict between the two mentioned sectors is currently relevant and assumed to become even more relevant in (near) future as the desired energy transition in Germany and the aim to produce 30 Giga Watt (GW) of energy through OWE until 2030 leads to a high prioritization of OWFs in the North Sea (Bundesregierung, 2022).

Next to the relevance of the topic, the geographical choice was of practical nature, as easy communication, understanding and availability of (policy) documents were important, such as the marine spatial plan, which has to be established for the German North Sea, based on the EU MSP Directive (BSH, 2022a). Therefore, the German EEZ, based on the administrative boundaries, determined by the UNCLOS was selected and can be seen in figure 4.

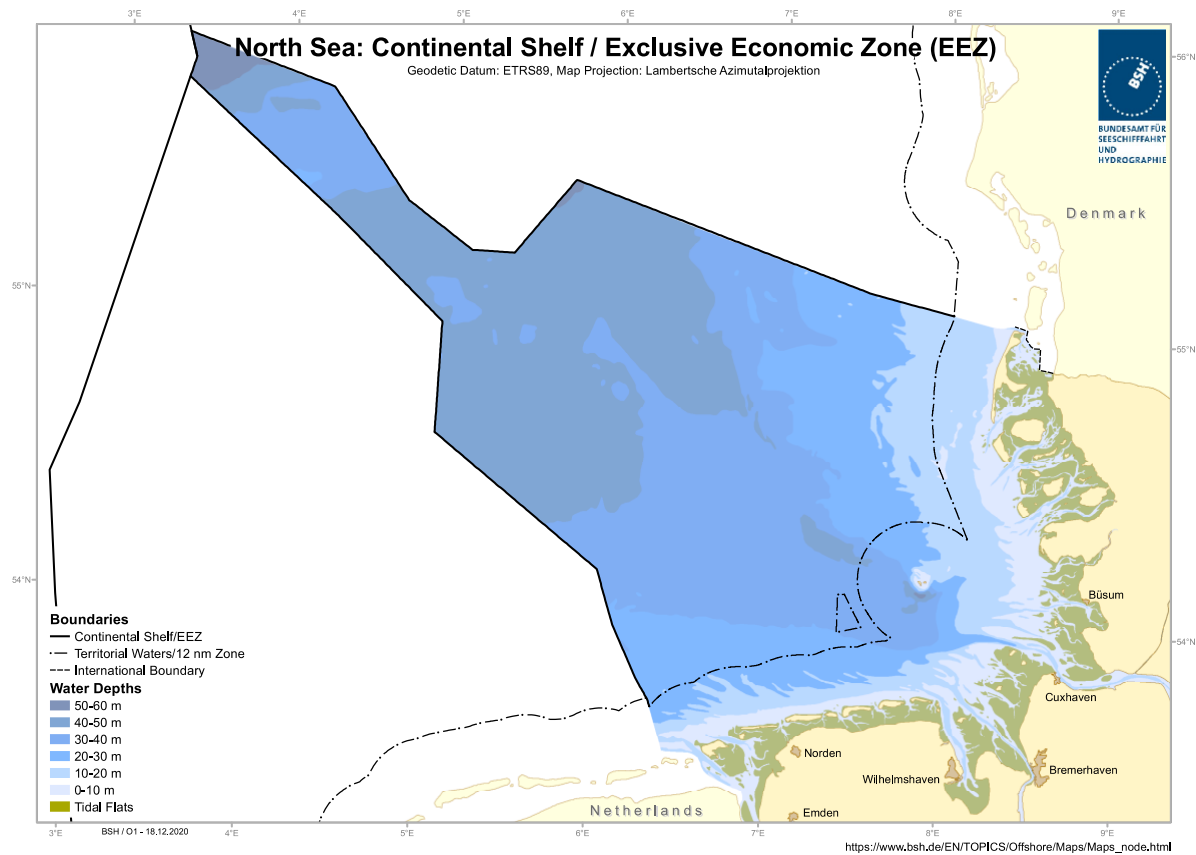


Figure 4 The boundaries of the German EEZ (Source: BSH, 2022d).

3.3. Data Collection

3.3.1. Literature Review

To create a database and to gain information which can help to answer the research questions of this thesis, a literature review was conducted. For that, numerous databases and search engines were used to find peer reviewed publications and literature which are relevant and address topics related to this research. The search engines which were used are “Google Scholar”, “Web of Science” and the provided online library service of the University of Groningen “SmartCat”. To find suitable literature, the following search terms were entered, individually as well as in different combinations: “Marine Spatial Planning”, “institutions”, “boundary spanning”, “conflict minimization”, “energy transition”, “offshore wind energy” “fishery” and “German North Sea”. Additionally, the reference lists of the publications were used through a snowball method to identify additional relevant publications.

To examine the relevance of these papers for this study, the titles were reviewed first, followed by reading the abstract to decide about their relevance.

Papers and articles, which were written in English and German, and focused on the geographical scope of the German North Sea were particularly considered for this research. Especially publications with the focus on co-use and conflicts between the sectors of OWE and/or fisheries were examined further. To gain additional information, statements authored by representatives of the OWE and fishery sector were used. After examining the publications in

more detail, only publications which had a direct link to the relevant topic were selected for further research. A list of the used literature, documents, and statements by the two sectors under study can be found in table 1, 2 and 3. While the literature offers a theoretical base of the current situation as well as possible opportunities to minimize the conflict, the policy documents show the legal framework as well as laws and targets which form the situation in the German North Sea. Finally, the sectoral statements show the perception of several stakeholders which are present in the conflict and how they experience the marine spatial plan of 2021. This helps to understand their role and position within the conflict.

Table 1 Publications used for the literature review.

Author	Title	Relevant Keywords	Year
Aschenbrenner and Winder	<i>Planning for a sustainable marine future? Marine spatial planning in the German exclusive economic zone of the North Sea</i>	Fishery The Conflict Marine Spatial Planning	2019
Berkenhagen et al.	<i>Conflicts about spatial use between wind farms and fisheries – what is not implemented in marine spatial planning</i>	Fishery The Conflict Institutions Future Outlook	2010
Berkenhagen et al.	<i>Decision bias in marine spatial planning of offshore wind farms: Problems of singular versus cumulative assessments of economic impacts on fisheries</i>	German North Sea The Conflict Offshore Wind Energy Fishery Marine Spatial Planning Institutions	2010
Gimpel et al.	<i>A GIS modelling framework to evaluate marine spatial planning scenarios: Co-location of offshore wind farms and aquaculture in the German EEZ</i>	Fishery Future Outlook Aquaculture	2015
Gray et al.	<i>Offshore wind farms and commercial fisheries in the UK: A study in Stakeholder Consultation</i>	The Conflict	2005
Gusatu et al.	<i>A Spatial Analysis of the Potentials for Offshore Wind Farm Locations in the North Sea Region: Challenges and Opportunities</i>	The North Sea Offshore Wind Energy The Conflict	2020
Gusatu et al.	<i>Spatial and temporal analysis of cumulative environmental effects of offshore wind farms in the North Sea basin</i>	The North Sea Offshore Wind Energy	2021

Jentoft	<i>Small-scale fisheries within maritime spatial planning: knowledge integration and power</i>	Fishery The Conflict Stakeholder Engagement Marine Spatial Planning Institutions	2017
Jentoft and Knol	<i>Marine spatial planning: risk or opportunity for fisheries in the North Sea?</i>	German North Sea Offshore Wind Energy Fishery Marine Spatial Planning Stakeholder Engagement Institutions	2014
Jongbloed et al.	<i>Identifying space for offshore wind energy in the North Sea. Consequences of scenario calculations for interactions with other marine uses</i>	The Conflict Institutions Future Outlook	2014
Kannen	<i>Challenges for marine spatial planning in the context of multiple sea uses, policy arenas and actors based on experiences from the German North Sea</i>	The Conflict Institutions Future Outlook	2014
Schupp et al.	<i>Fishing within offshore wind farms in the North Sea: Stakeholder perspectives for multi-use from Scotland and Germany</i>	German North Sea The Conflict Offshore Wind Energy Fishery Marine Spatial Planning Stakeholder Engagement Institutions	2021
Stelzenmüller et al.	<i>Co-location of passive gear fisheries in offshore wind farms in the German EEZ of the North Sea: A first socio-economic scoping</i>	German North Sea Offshore Wind Energy Fishery The Conflict Marine Spatial Planning Stakeholder Engagement Institutions	2016
Stelzenmüller et al.	<i>Sustainable co-location solutions for offshore wind farms and fisheries need to account for socio-ecological trade-offs</i>	Fishery The Conflict Marine Spatial Planning Future Outlook	2021
Stelzenmüller et al.	<i>From plate to plug: The impact of offshore renewables on European fisheries and the role of marine spatial planning</i>	The North Sea Offshore Wind Energy Fishery The Conflict Institutions Future Outlook	2022

Table 2 Policy documents used for the literature review.

Publisher	Title	Relevant Keywords	Year
BSH	<i>Anlage zur Verordnung über die Raumordnung in der deutschen ausschließlichen Wirtschaftszone in der Nordsee und in der Ostsee</i>	Marine Spatial Planning	2021
Bundestag	<i>Raumordnungsgesetz</i>	Marine Spatial Planning	2008
European Commission	<i>Overview of the effects of offshore wind farms on fisheries and aquaculture</i>	Offshore Wind Energy Fishery The Conflict Stakeholder Engagement Institutions	2018
European Commission	<i>Recommendations for positive interactions between offshore wind farms and fisheries - Short Background Study</i>	Offshore Wind Energy Fishery The Conflict Stakeholder Engagement Institutions Future Outlook	2020
European Commission and European MSP Platform	<i>Marine Spatial Planning Country Information - Germany</i>	The North Sea Marine Spatial Planning Stakeholder Engagement Institutions	2022
European Parliament and The Council	<i>Directive 2014/89/EU of the European Parliament and of The Council</i>	Marine Spatial Planning	2014
Organisation for Economic Co-operation and Development	<i>Fisheries and Aquaculture in Germany</i>	Fishery Institutions	2021
United Nations	<i>Paris Agreement</i>	Offshore Wind Energy Marine Spatial Planning	2015
Wasserstraßen und Schifffahrtsverwaltung des Bundes	<i>Richtlinie Offshore-Anlage zur Gewährleistung der Sicherheit</i>	Offshore Wind Energy Institutions	2021

Table 3 Overview of statements by the fishery sector and OWE sector, used for literature review.

Organization	Sector	Year
Aquaventus	Offshore Wind Energy	2020
Bundesministerium für Umwelt, Naturschutz und nukleare Sicherheit	Offshore Wind Energy	2020
Bundesministerium für Wirtschaft und Energie	Offshore Wind Energy	2020
Bundesverband der Windparkbetreiber Offshore e.V.	Offshore Wind Energy	2020
Offshore Windenergie-Agentur Bremerhaven/Bremen e.V	Offshore Wind Energy	2020
Wirtschaftsverband Windkraftwerke e.V.	Offshore Wind Energy	2020
Alfred-Wegener- Institut Helmholtz-Zentrum für Polar- und Meeresforschung	Fishery	2020

Bundesministerium für Ernährung und Landwirtschaft	Fishery	2020
Erzeugergemeinschaft der Deutschen Krabbenfischer GmbH	Fishery	2020
Erzeugergemeinschaft der Nord- und Ostseefischer GmbH	Fishery	2020
Landesfischereiverband Schleswig-Holstein	Fishery	2020
Landwirtschaftskammer Niedersachsen	Fishery	2020
Staatliches Fischereiamt Bremerhaven	Fishery	2020
Thünen-Institut für Seefischerei und Fischereiökologie	Fishery	2020

3.3.2. Semi-Structured Interviews

To get an in-depth understanding of the conflict under study as well as possible solutions and to gain experiences and individual patterns of interpretations, semi-structured interviews were conducted. Semi-structured interviews make it possible to ask open-ended questions and therefore to study personal experiences regarding the topic, from a smaller pool of stakeholders. The first step consisted of sampling interviewees. In this case, sampling means the selection of specific sub-sets of cases. These sub-sets can be persons but also groups, events or interactions which are examined at specific places and times, and which represent a specific set of facts (Schatzmann & Strauss, 1973). The qualitative method of sampling is described by Patton (2009). The author states that “qualitative inquiry typically focuses in depth on relatively small samples, even singles cases [...] selected purposefully” (Patton, 2009, p. 230). Through the sampling, a database can be selected, which has the aim to answer the research questions and to achieve the established research objective. The sample-units can then be established during the research, according to the theoretical aspects of the analysis and do not have to be determined at the beginning of the study (Przyborski & Wohlrab-Sahr, 2014).

All conducted interviews were based on the concept of semi-structured guided interviews. According to Helfferich (2011), a guided interview is used when two requirements are met. First, when everyday knowledge and subjective theories are reconstructed, and openness is ensured. Second, when topics are introduced by the interviewees and therefore the open narrative space is structured. A guide makes it also possible to standardize the content to structure the narrative in a sense, also facilitating the evaluation of the interview. Furthermore, a guide enables the comparison of sub-topics between the interviews (Helfferich, 2011).

Through the chosen semi-structured interview guide, leading questions serve as an orientation within the interview sections. However, the guide leaves space to change the order of the questions during the interview which means that the structure can change from interview to interview (Atteslander, 2008). Additionally, planned questions can be sorted out, if the respondent has already given sufficient answers while answering a previous question. Further, new questions can be added which emerge on the basis of the given answers. This allows for the principle of openness. Finally, to allow the respondent to freely answer the questions, open questions with no predefined answer options were used (Helfferich, 2011).

To ensure this principle of openness but also maintain a necessary structure for the research interest, Helfferich (2011) established the SPSS approach for developing an interview guide.

“SPSS” stands for the four steps of “collecting”, “checking”, “sorting” and “subsuming” (in German: “sammeln”, “prüfen”, “sortieren” and “subsumieren” (SPSS)).

The first step of this approach is to *collect* all questions that are related to the context of the research topic and can be of interest, whereby as many questions as possible are collected. This collection of questions is then reconsidered (*checked*) under aspects of prior knowledge to reduce the number of questions and to create a structure. The remaining questions will be *sorted* in the next step. For this, keywords and content aspects can be used to sort the questions accordingly. To each of these created question bundles, a single narrative prompt will be assigned, and the questions will be *subsumed* (Helfferich, 2011).

Based on this approach, the interview guide for the conducted interviews was established. The questions were based on the identified background information through the literature review and the theoretical framework. Additionally, introductory and concluding questions were formulated to structure the interview and to allow the respondents to introduce themselves and to add further information they consider as relevant.

Furthermore, the guideline was adjusted to every interviewee and customized to the field they represented and their field of knowledge. The guides can be found in the appendix 2.

As the studied conflict exists between the sectors of the OWE and the fishing industry, representatives of both sectors were requested as interview partners. For this purpose, representatives of fishery consultancies in German federal states which are located at the German North Sea coastline were contacted as well as different companies responsible for the establishment of OWFs in the German North Sea. About 15 people were requested as interview partners, two persons from the fishery sector responded to the requests and were willing to be interviewed. In addition, a representative of the BSH, was successfully contacted to get valid insights from an expert perspective. Additionally, scientific experts were contacted. In sociological research, experts are often defined by their function in society, for example if they fill a specific position in the educational sector. To select suitable experts as interviewees, two components should be met. Firstly, the expert should hold a position which is related to the study conducted and secondly, competences such as long-term experiences are beneficial (Mieg & Näf, 2006). Therefore, two researchers from two institutes were contacted which fulfilled the requirements as they research in the fields of MSP as well as the direct conflict OWE sector and the fishing industry in the German North Sea. Both requests were answered, and interviews were conducted.

In total, five interviews were arranged and carried out. Two interviews with scientists of two institutes, two interviews with representatives of the fishery sector and one interview with a representative of the BSH. Three of the five interviews were conducted by “Zoom” and were recorded. These interviews were held in German. Two of the interview guides were answered via e-mail. One of these two interviews was answered in English. If questions remained open after the first responding, further questions were asked via phone. To preserve the identity of the interviewees, they were anonymized by using IDs. Table 4 shows an overview of all interviewees, including their ID, and provides an orientation for later citation and quoting.

Table 4 Conducted interviews including the ID, expertise, organization, date, and the medium which was used.

ID	EXPERTISE	ORGANIZATION	DATE	MEDIUM
ID 1	Fishery	Carl von Ossietzky University Oldenburg	05.07.2022	Zoom
ID 2	MSP	Thünen-Institute	30.05.2022	E-Mail
ID 3	Fishery	Landwirtschaftskammer Niedersachsen	02.06.2022	Zoom
ID 4	Fishery	German Fishery Union	12.07.2022	E-Mail
ID 5	MSP	BSH	19.07.2022	Zoom

3.4. Data Analysis

3.4.1. Qualitative Content Analysis

The method of qualitative content analysis (QCA) was used to further analyze the collected data. The approach, which was introduced by Mayring (2015), aims to provide a concept for the evaluation of raw data collected within qualitative research and to render this data in an understandable and processable way so that it can be analyzed later on. For this method of analyzing, specific categories in a coding frame were established, to which the collected dataset was assigned to. This coding frame was used to filter the most important information out of the data pool of semi-structured interviews and the literature review (Mayring, 2015).

The first codes and concepts used in the research emerged through the data analysis itself, which makes it inductive, and data driven. Next to the inductive way of qualitative research, also deductive reasoning is possible but used less prominently. In deductive reasoning, concepts and codes are used which already exist and are known and therefore are more concept-driven than data-driven. In QCA, a combination of both, inductive and deductive reasoning, is often used (Schreier, 2012) and also in this thesis, a combination was used.

Mayring (2008) suggests three procedures to process and categorize the collected material, “explication”, “structuring” and “summary”. The first deals with individual parts of the text in question, for which more material is examined to obtain a more detailed view and discussion of these parts. Structuring is about certain aspects which are filtered out of the material and sorted according to certain criteria. The last concept, summary, aims to reduce the material, so that only the most important information remains. Through these steps, the data becomes manageable (Mayring, 2008).

Furthermore, the thesis is using open coding to approach the interview data. For this approach, the text parts, which were coded were highlighted and parts which were not relevant were omitted. Therefore, the text citations could be extracted already, and each passage could be named or labeled and assigned to one specific aspect. Berg and Milmeister (2008) describe coding as “putting the individual pieces together in piles that have a meaningful relationship to each other” (p. 14). The researcher begins with a vague idea of the order and connections which can be found in the text. If these connections are then identified, similar parts can be grouped together and can create the basis for recognizing categories (Berg and Milmeister, 2008).

To then create a comprehensible system of categories, terms were chosen to represent this information. These terms could be used to summarize the individual categories of the interviews. In order to do that, deductive categories were used first to get the initial idea. Other categories were then added, based on emerging contexts.

To analyze the material in this thesis, QCA dimensions were established to build the coding frame and to therefore structure the collected data. Additionally, the information was divided into different categories and meanings. To create a sufficient structure, the main categories were divided into sub-categories. This was done with the QCA software “ATLAS.ti”. The coding frame is listed in appendix 1.

3.4.2. Stakeholder Analysis

In order to answer the second sub-question, a stakeholder analysis was conducted. A stakeholder is considered an actor, who has a certain interest in the studied topic, who is involved or affected by this issue or who could have an influence on this situation or in the decision-making. Stakeholders can be individuals but also organizations or their networks. Varvasovszky & Brugha (2000) describe a stakeholder analysis as a tool to collect information and knowledge about actors. At the same time, their behavior, relations, and their interests as well as their influence and resources are examined.

In the beginning of the analysis all stakeholders which could be involved in the issue were charted to get a broad overview of the actors involved. These stakeholders were examined through published documents, articles, reports, and policy documents which were collected during the literature review. Additionally, snowball sampling was used to include further stakeholders that were mentioned by the interviews (table 4). After the broader overview was created, further details about the key stakeholders were added. Stakeholders were subsequently sorted into a matrix, depending on their interest, influence, support, or opposition to the issue as well as their assessed importance. The matrix can be seen in figure 5. This method aims to provide a guide on how to deal with the stakeholders, depending on their position.

Techniques for the contact with stakeholders can be involvement, collaboration, defending or monitoring. The right technique is important as the wrong handling of stakeholders can lead to risks when important stakeholders are not included or to missed opportunities. On the other hand, resources can be wasted if too many less relevant stakeholders are included (Varvasovszky & Brugha, 2000). In this study, the involvement of the supportive stakeholders means to include them in the planning process and to listen to their wishes and needs. The “mixed” stakeholders, those who have both a supportive as well as a non-supportive attitude, are important to collaborate with to strengthen their supportive opinion. Non-supportive stakeholders, who have a high influence but are unwilling to cooperate, are important to defend. The last group, the marginal stakeholders, refers to actors who do not have a high interest and neither a high influence on the case and therefore should be monitored if their threat or interest changes, although there is no need to involve them initially (Varvasovszky & Brugha, 2000).

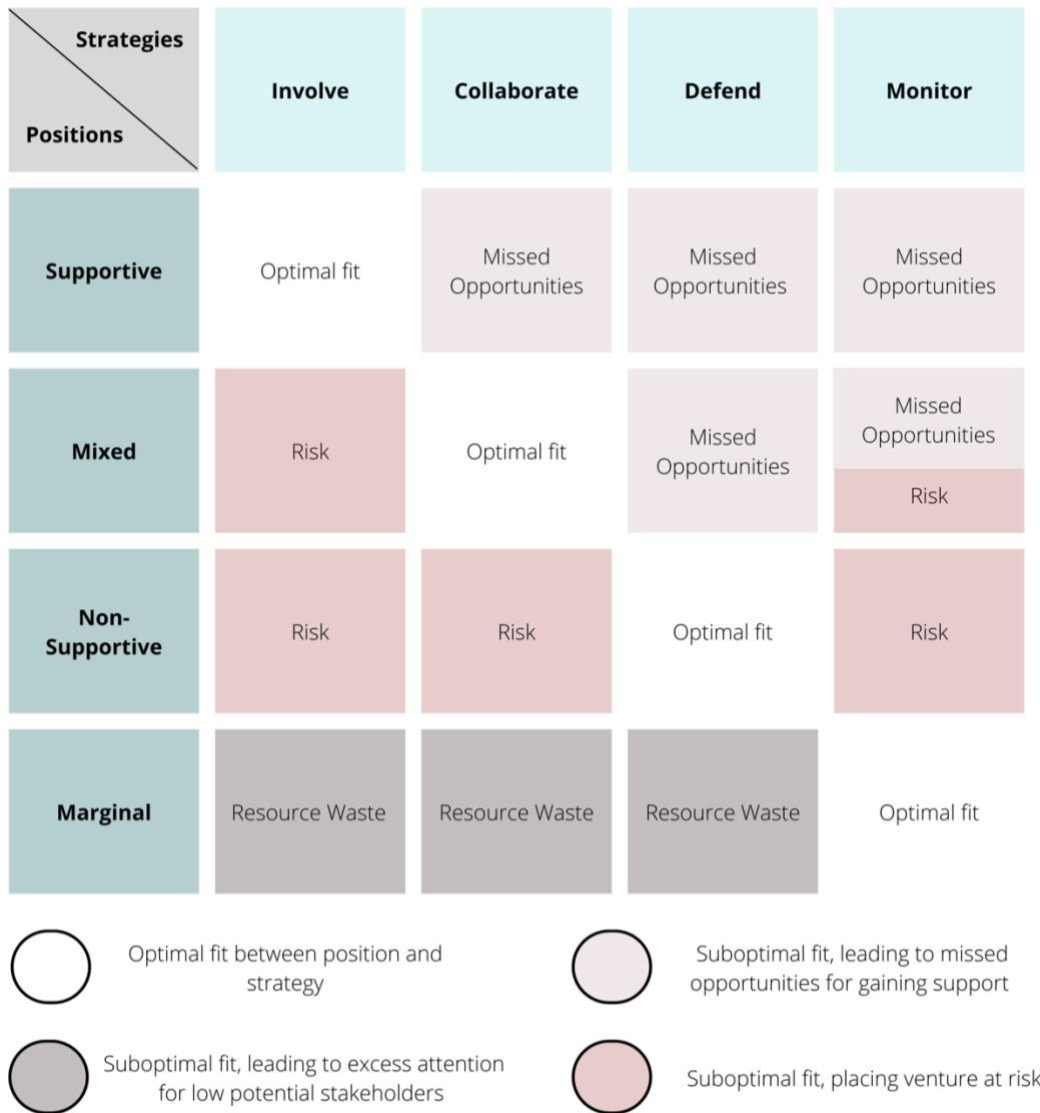


Figure 5 Strategies for stakeholder management (made by author, modified from Varvasovszky & Brugha, 2000).

3.5. Ethical Consideration

This research follows five principles, adopted from Kang and Hwang, (2021), to ensure its ethical and responsible implementation. These principles are (1) *maintaining relationships with research participants*, (2) *upholding informed consent*, (3) *upholding confidentiality and privacy*, (4) *upholding beneficence* and (5) *upholding honesty and integrity*.

Further, it is evident that this study was conducted independently and inoffensively by the researcher (Kang & Hwang, 2021) by adopting the following procedure.

The relationships with the research participants, which consist of the interview partners of this study, were maintained and the consent of the interviewees were ensured beforehand. The topic of the research was introduced in the beginning of the interviews. Also, their privacy was ensured through the anonymization of the participants, which was explained to them in the beginning of the interview, which they approved of. It was ensured that the participants were

not harmed and were treated respectfully during the interviews. The criteria of honesty and integrity was also met. All interviews which were recorded, were transcribed and, after approval, direct quotes were used for the analysis of this research. After finishing this thesis, all interview data recorded was deleted to meet the criteria of data privacy.

4. Results - The Case of the German North Sea

In the next chapter the findings resulting from the data collection through interviews, literature, and stakeholder analyses, will be described and set into the context of this study. Firstly, the planning process of the German North Sea is summarized, section 4.2. then presents the involved stakeholders and their role in the conflict, which is introduced in more detail in 4.3., including the perceptions of the stakeholders. Section 4.4. describes the formal and informal institutions which influence the situation. Finally, section 4.5. offers recommendations on how the conflict could be minimized.

4.1. The Planning Process

In Germany, MSP is located on two levels, on the EEZ level and on the state level. On the EEZ level, a plan for both the North and the Baltic Sea was approved in 2009. The state level is responsible for the management of the territorial sea of Germany, here, three of the German states have enforced marine spatial plans for their areas. These are Mecklenburg-Vorpommern (Mecklenburg-West Pomerania), Niedersachsen (Lower Saxony), and Schleswig-Holstein, as they are located on the coast of Germany. The focus of all marine spatial plans in Germany is mainly on shipping and the development of OWFs (European Commission & European MSP Platform, 2022). The responsible authority for the development and approval of MSP, the BSH, published the most recent marine spatial plan for the North and the Baltic Sea on September 1st, 2021, provided in figure 7 (BSH, 2021). The BSH is a federal organization, under the purview of the Bundesministerium des Innern, für Bau und Heimat (German ministry of the interior and the community) (BMI) (European Commission & EU MSP Platform, 2020).

The objectives of MSP in Germany are also connected to the German Raumordnungsgesetz (Spatial Planning Law) (ROG) which states that it should function as a “guiding principle of sustainable spatial development which balances social and economic needs with the ecological functions” (Deutscher Bundestag 2008, §1 Abs. 2 p.3). Further MSP should focus on a long-time and large-scale arrangement and should lead to de-escalation of potential conflicts of interests in the German EEZs (Deutscher Bundestag, 2008).

During the planning process of the marine spatial plan of the German EEZ of the North Sea, several steps had been accomplished before the final plan had been implemented (figure 6).



Figure 6 Planning process of the German EEZ (made by author, modified from the BSH, 2020).

During the process, different organizations and authorities were included in the planning process from an early point on. The BSH updated the marine spatial plan from 2009 in June 2019 with the goal of indicating four priorities on maps. These priorities are security of safety, and efficiency of shipping, the availability of economic use, the availability for research, and the protection and improvements of the marine environment. To gain information about the different actors which have an interest in the North Sea, the BSH invited representatives of these sectors to workshops. Within these workshops, the actors were able to mention their needs and preferences for the new marine spatial plan (BSH, 2022c). For the plan of 2021, the government set fixed goals regarding the space for OWFs. Depending on the goals and targets, set by the government, and influenced by the sectors, the BSH developed first draft plans. For that, three alternative options were developed, which were based on three different priorities and therefore show specific distribution patterns. The first plan A had the focus on traditional uses with large areas reserved for shipping and resource extraction while nature protection was rather limited and had to share the space with several other activities. The second plan B focused

on climate protection. Priority areas for shipping were much smaller and nature protection areas were extended. The third plan C prioritized nature protection, while resource extraction areas were banned within nature protection areas and greater buffers were indicated next to the shipping lines (BSH, 2022c).

In all three planning options, OWE took a major role. Large areas were reserved for building of wind turbines and examination for future OWF areas. In option B, OWE reservation areas were an even greater priority than in plan A and C. Areas reserved for fisheries were not included in any of the three planning options (BSH, 2022c). The planning options were discussed within meetings and a final first draft was published in summer 2020 (BSH, 2022c; ID 5). After the publication, response statements of organizations, authorities, international parties, but also from citizens could be handed in and were collected and evaluated by the BSH. Additionally, technical discussions and scoping meetings were conducted before the plan was updated and published again. After that, the second round of participation was conducted, and statements could be submitted again with further opinions and claims of the different sectors (ID 5). Additionally, from the outset, strategic environmental assessments were conducted, by which environmental impacts, resulting from the activities on sea, were researched and monitored. These results were also considered while developing the draft versions as well as the final plan. In September 2021, the BSH published and implemented the final plan. Additionally, a document was published, providing the explanations about the specific areas which are designated to specific activities as well as justification why it was decided and rules and regulations how these areas are to be handled (BSH, 2021). Figure 7 shows the final plan, which has the status of a legally binding document.

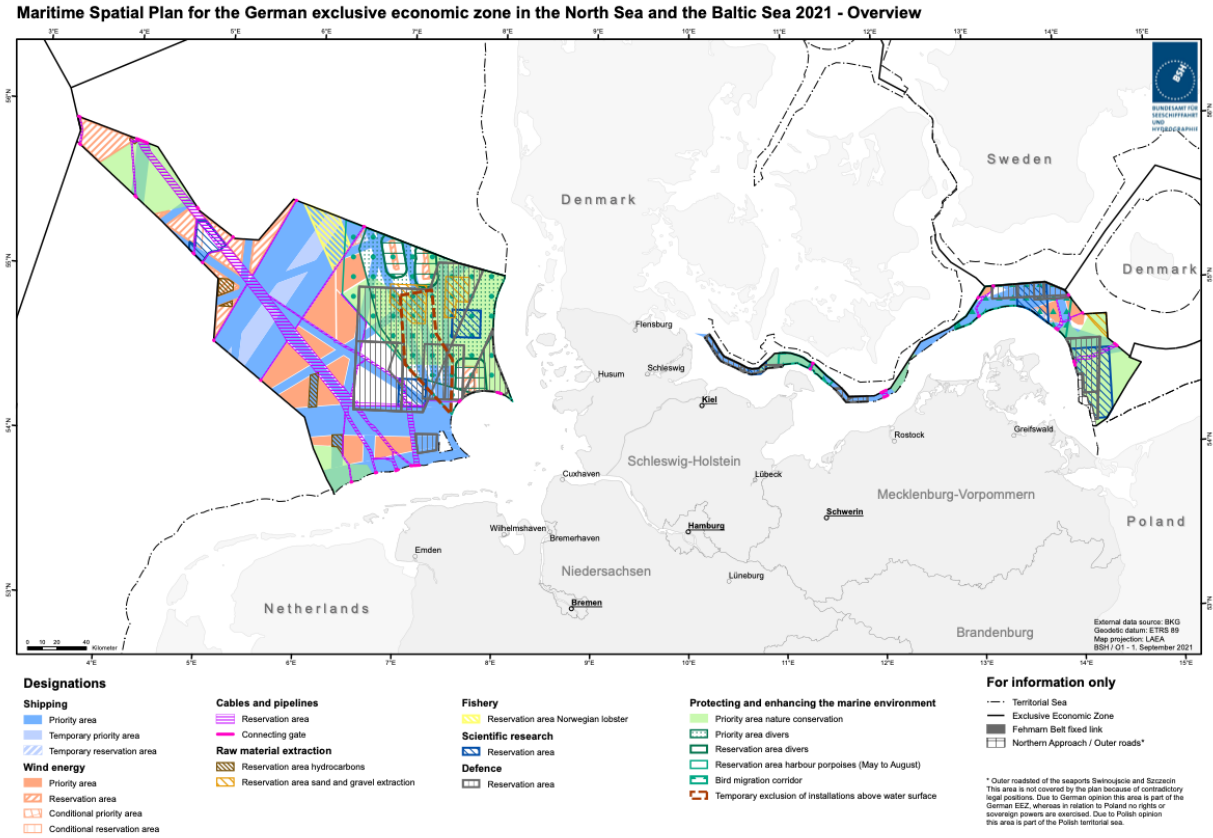


Figure 7 Final marine spatial plan for the German EEZs of 2021 (Source: BSH, 2021).

As fishermen cannot provide data or claims for specific areas as fishing is a fluid activity, depending on seasons and where fish stocks move, it is difficult to exclusively reserve areas for fishing activities (European Commission, 2020). Therefore, areas for fishing activities were not included in the initial drafts. However, after negotiation and workshops took place, in which representatives from the fishery sector and the BSH were present, an area was included which is a reserved area for the fishery of Norway lobster and is located in the northern part of the German EEZ (ID 3), (figure 8, top). A reserved area regulates different activities which are interested in the area. In this case the fishery of Norway lobster is given preferential treatment in this specific area (BSH, 2021).

Areas for OWE have a more prominent and prioritized status in the final marine spatial plan of 2021. Large areas are reserved for either the building of new wind turbines or for further research to examine if these areas are suitable for future development of the same (figure 8, bottom). Additionally, it is specified that research should be conducted if co-use in the OWFs is possible. This research is planned in the area EO2-West in the North Sea (figure 8, bottom). Additionally, it is prescribed that fishing vessels are allowed to pass through OWFs if they are located on the way to their fishing grounds. However, it is not allowed to fish within the OWF itself and neither in the safety area around it (BSH, 2021).

The German marine spatial plan has a strong focus and priority on the construction of OWFs (ID 5). This leads to a disadvantageous position for fishermen who are operating in the German EEZ, as they lose fishing grounds and therefore experience major disadvantages such as loss of income, increasing competition and rising costs (ID 3; ID 4).

Overall, the German planning process focused strongly on participation as suggested in the guideline for MSP, developed by Ehler and Douvère (2009). However, some steps were modified. As the plan of 2021 was the second plan for the German EEZ, after the first plan in 2009, the first step was to establish a report about the status of the current plan and the interests in the sea which have changed in the time being (BSH, 2022c). Also, the proposition of the three options of marine spatial plans with different focuses are different from the initial guideline of Ehler and Douvère (2009). However, in its overall structure, the planning process of the German EEZ resembles the suggested guidelines. Currently, Germany is right behind phase six, step eight (figure 1), as the plan was implemented and enforced in 2021 but the monitoring and evaluation did not start yet (ID 5).

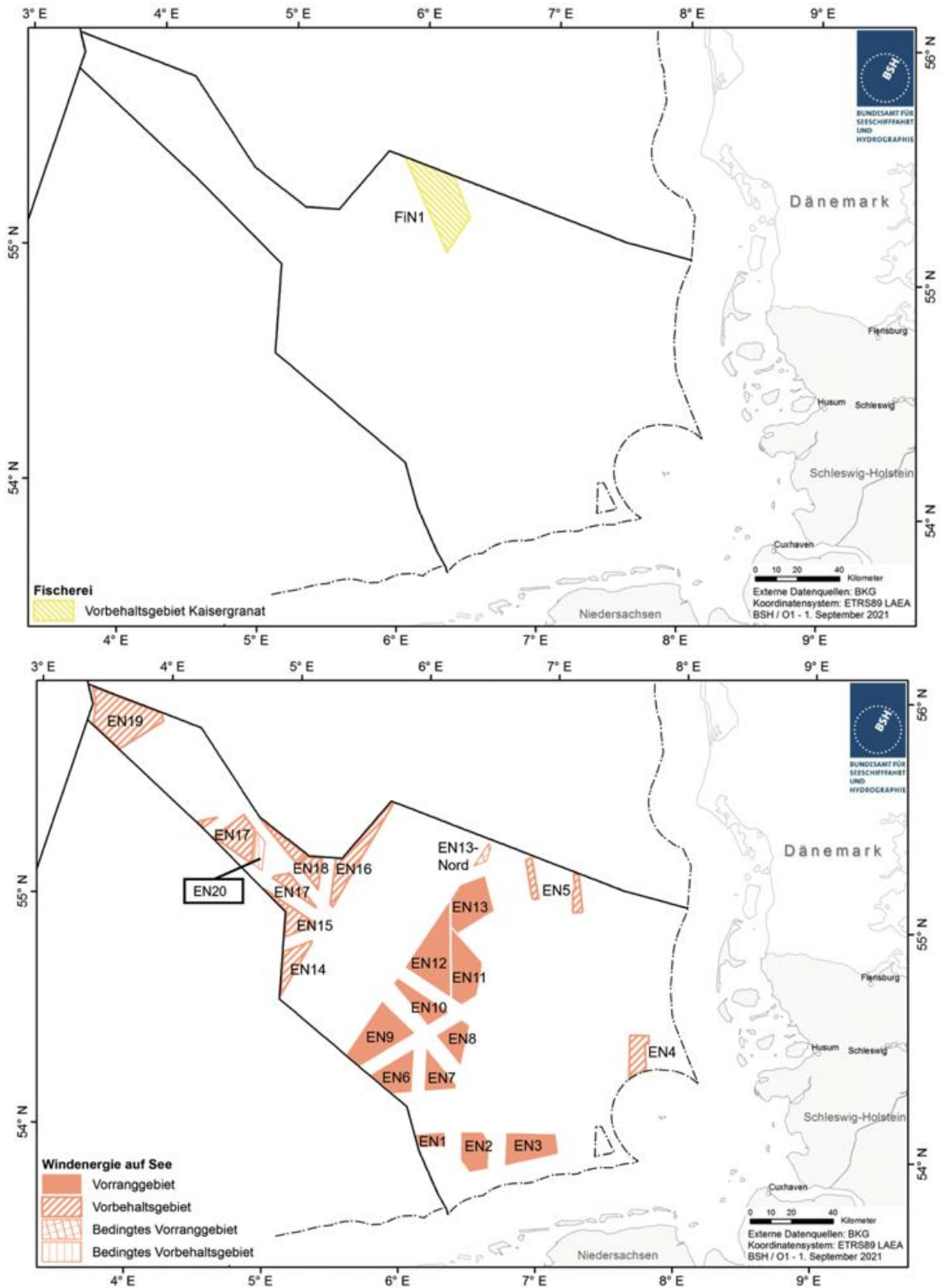


Figure 8 Designated areas for the fishery and OWE sector in the German North Sea. Conditional reserved areas for the fishing of Norway lobster in the German EEZ (top) and designated areas for OWE (bottom). Solid orange areas indicate priority areas, diagonally striped areas are reserved areas, checkered areas indicate conditional priority areas and vertical striped areas indicate conditional reserved areas (Source: BSH, 2021).

4.2. Stakeholder Engagement

4.2.1. The Stakeholders

In the planning process and, more specifically, in the conflict under study, several stakeholders play an important role. These stakeholders are listed in figure 9. As described in chapter 3.4.2., stakeholders can be categorized according to different levels of interests and influence in the conflict.

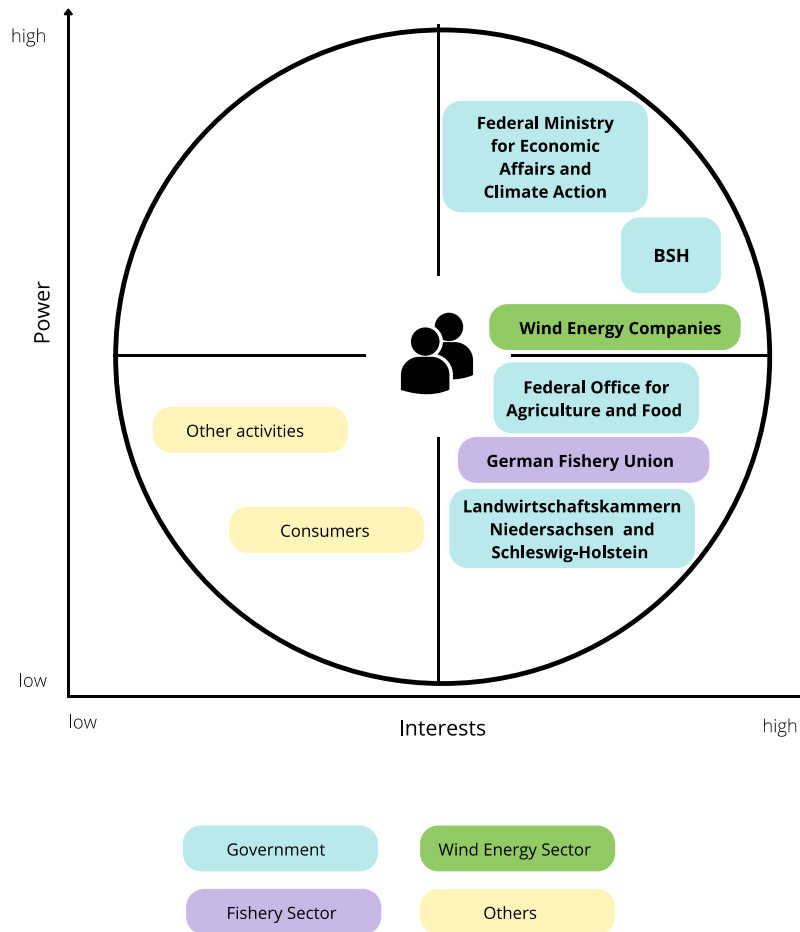


Figure 9 Key stakeholders of the conflict, sorted by interest and power (made by author).

On the governmental level, especially the BSH as well as the Bundesministerium für Wirtschaft und Klimaschutz (BMWK) (Federal Ministry for Economic Affairs and Climate Action) play an important role. As already mentioned, the BSH is responsible for the development of the marine spatial plan and therefore also distributes the space within the German EEZ, following the objectives of the MSP Directive 2014/89/EU (BSH, 2022b). Therefore, its interest and its power are high. However, also the Ministry for Economic Affairs and Climate Action has a high interest and influence as it sets the targets for the OWE production in the German EEZ. This is obligatory to implement in the marine spatial plan (ID 5). This results in the fact that the energy companies which want to build OWFs in the German EEZ as well have a high influence and high interest in the marine spatial plan, as they need large areas to construct the

turbines and generate the energy (ID 5). Since these actors are mainly in favor of OWFs and less interested in solving the conflict, they can be assigned into the category of strategy of collaboration (figure 10). As explained before, the “mixed” stakeholders, which have an overall non-supportive attitude, are important to collaborate with in order to strengthen their supportive opinion or their willingness to act (Varvasovszky & Brugha, 2000). The stakeholders which represent the fishing sector, the Deutsche Fischerei Verband (the German Fishery Union), the Bundesministerium für Ernährung und Landwirtschaft (the Federal Office for Agriculture and Food) and the Landwirtschaftskammern Niedersachsen and Schleswig-Holstein (Chambers of Agriculture of Lower-Saxony and Schleswig-Holstein), were sorted into the category of high interest and low power, as they have a high interest in solving the conflict to sustain their work and livelihood. However, as OWE has a high priority in the German EEZ, due to the climate and sustainable energy targets, the power position of the fishery sector is rather low (ID 5). Therefore, they should be involved and supported during the conflict, as they are willing to cooperate with the other stakeholders and can contribute to solution finding processes. Finally, other stakeholders such as the remaining actors in the German EEZ and the consumers that are supplied with the energy produced by OWFs have a low interest as well as low power. Therefore, they should be monitored, for the case that their influence and power changes and other strategies must be chosen (Varvasovszky & Brugha, 2000). The stakeholder groups as well as the suitable strategies are listed in figure 10.

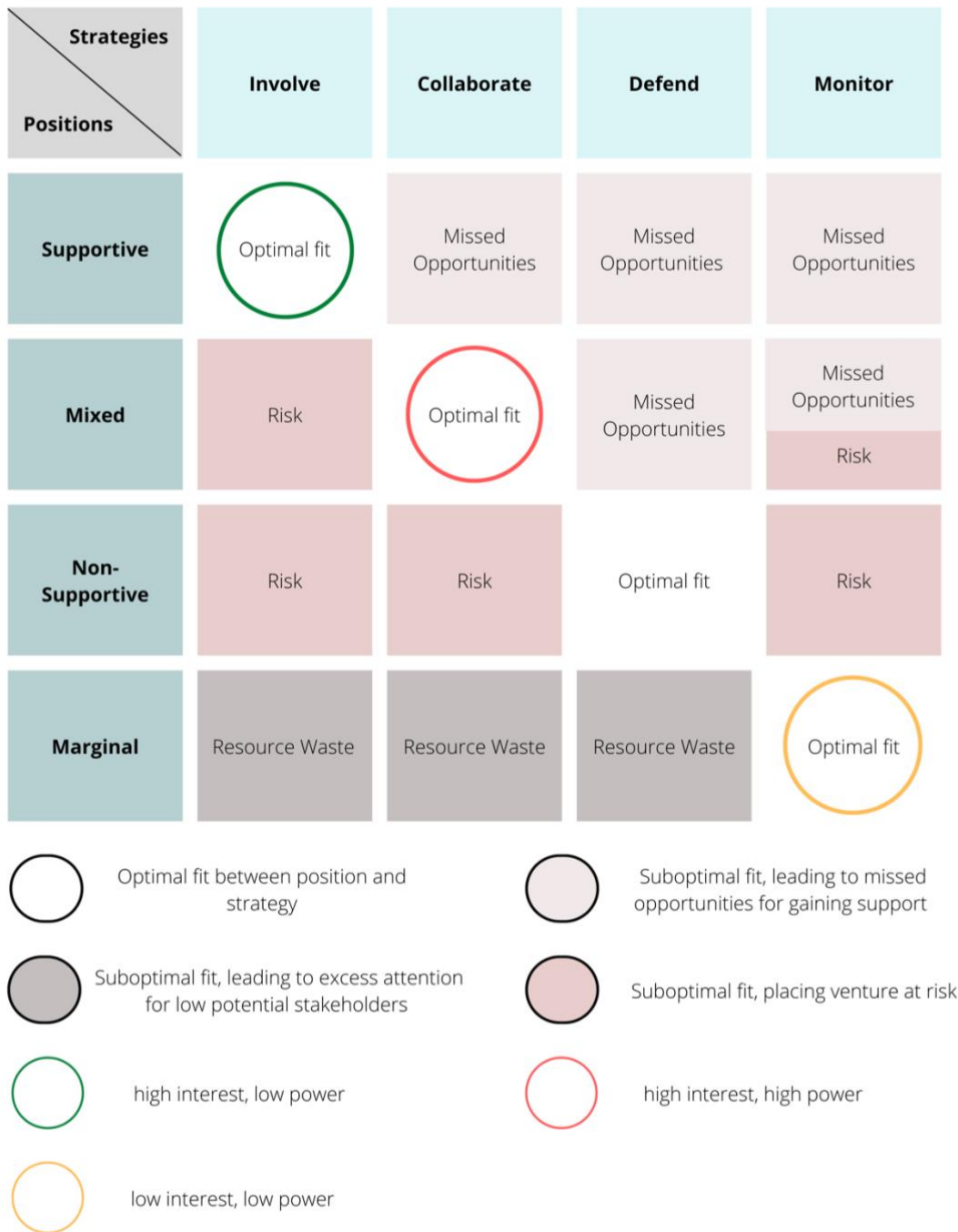


Figure 10 Stakeholder matrix, including the positions of the key stakeholders (made by author, modified from Varvasovszky & Brugha, 2000).

4.2.2. The Involvement of the Stakeholders

Inclusion and participation are crucial parts of MSP and explained in detail in the MSP guide of Ehler and Douvère (2009). As already mentioned in chapter 4.1., stakeholders are heavily included in the German development of the marine spatial plan of 2021. Everyone who has an interest in the planning process and its outcome was able to provide their opinion and feedback. This was done after the first draft plan was published. The BSH then requested feedback and opinions through statements which were forwarded via e-mail and evaluated by the BSH. Also,

before the first draft plan was developed, knowledge and information were gained through workshops and meetings with the different sectors, provided by the BSH. Early stakeholder engagement therefore provided the chance to stay updated and to communicate claims and preferences already in an early stage (ID 5). This is considered important as the interests and needs changed significantly over the ten years in which the marine spatial plan was in force. The need for space for OWFs increased significantly while the required space for other activities stayed the same or increased as well (ID 1).

In the interviews with ID 3, and ID 4, representatives of the fishery sector, it was stated that the communication during the planning process between the fishery sector and the BSH was adequate and understanding. However, according to the interviewees, the fishery sector is still treated in a subordinated way in the planning process and has no or little influence on the distribution of OWFs (ID 3; ID 4). ID 4 explained that the reserved area for the Norway lobster is considered too small among the fishermen and as not sufficient to compensate for the economic loss, which fishermen experience through the building of offshore wind turbines. Jentoft (2017) states that structural power is also recognizable in the planning process of MSP, which means that characteristics such as economic resources, exclusive knowledge or legal mandates can influence the planning process and can make certain sectors or institutions more powerful than others. Jentoft (2017) argues that these assets are not evenly distributed amongst the stakeholders which can lead to unfair conditions in the planning process. The author also states that the space in the German North Sea has different attributes for different stakeholders. For example, for some sectors such as fishery, space relates to their history and identity while for others, this space is a chance for opportunistic exploitation. Further, a sector such as fishery cannot be specified to one location as it is a mobile activity and therefore the chance that it interferes with other activities is much higher. All these factors can lead to unfair conditions for some stakeholders in the planning process (Jentoft, 2017). This can be emphasized through interviewee ID 3, who stated that the stakeholder process of the marine spatial plan of 2021 felt like “Don Quixote who fights against windmills” (ID 3). However, it was also said that the designation of a specific area for the fishing of Norway lobster and the allowing of fishing vessels entering the safety area up to 150 meters to the OWF, provide a great start for future changes. This was possible through a workshop which was specifically held for a discussion with the fishery sector, which was the first time in the process of German MSP (ID 3).

As already mentioned, after the first draft was published, all stakeholders with an interest in the German EEZ were allowed to give feedback on the plan. Eight representatives of the fishery sector in the German North Sea and six representatives of the wind energy sector (table 3) took this offer up to point out issues and sections which should be improved. The BSH considered the retrieved statements and evaluated them before they updated the plan to the second draft version (ID 5). However, interviewee ID 5 explained that to a large extent, statements of one sector contradicted statements of other sectors so that an implementation of both was simply not possible. Therefore, the first and the second draft plan did not indicate major changes (ID 5).

4.3. The Conflict and the Perception of the Sectors

Offshore Wind Energy

The perception between the sectors and the authorities are quite different. In the statements which provided feedback for the first draft of the marine spatial plan in 2020, six representatives of the OWE sector handed in statements with their opinion.

One statement which was mentioned by several organizations and parties of the wind energy sector, was the claim for more space to be designated to OWFs. The Bundesverband der Windparkbetreiber Offshore e.V. (BWO) (German Offshore Wind Farm Operator Association), the Offshore Windenergie-Agentur Bremerhaven/Bremen e.V (WAB) (Offshore Wind Energy Agency Bremerhaven/Bremen), the Wirtschaftsverband Windkraftwerke e.V. (WVW) (Business Association of Wind Energy Plants) and the BMWK emphasized the importance and the role of OWFs in the energy transition and the target to produce 40 GW power through OWFs until 2040. They demanded that significantly more space should be made available for the construction of OWFs (BWO 2020; WAB 2020; WVW, 2020; BMWK, 2020). Additionally, in their perspective, replacement areas should be designated if areas which are under study turn out to be not suitable for future constructions. Furthermore, they criticized that next to the OWFs, no or little attention is given to the required cables and landings which are needed to transport the created power to the shoreline. This infrastructure also needs sufficient space and has to be built and maintained (WVW, 2020). Further, the BWO highlighted the need for more OWFs with the fact that the development of offshore wind turbines is a public interest and is important for public safety. Therefore, more space than planned should be made available for their development and areas which are under nature protection should also be considered as suitable for the construction of further OWFs. Additionally, the BWO suggested classifying OWFs as areas which improve the marine environment, because fish and marine mammals use these areas as retreat areas (BWO, 2020). This was also supported by the WAB. They lobbied for special importance of wind energy to be emphasized more strongly in the plan, as wind energy is “system-serving, because the wind at sea blows strongly and reliably. This makes it indispensable for the energy transition” (WAB, 2020, p.1). Also, ID 1 who is located in the research of MSP, highlighted the importance of OWE if the climate targets of 40 GW OWE are to be achieved. Therefore, the interviewee stated that space is needed, and OWE must be a priority to reach that goal, especially with the ongoing climate crisis and the current war in the Ukraine, which also influences the economy and energy supply of Germany. This finding was also supported by interviewee ID 2, who stated that currently around 70% of Germany’s energy consumption is imported from other countries. This together with the target to phase out fossil energy sources such as coal, let OWE seem to be a suitable and promising approach for energy production (ID 2).

Regarding the topic of fishing activities within OWFs, the representatives of the wind energy sector had similar opinions. The BWO was rather critical about fishing activities (passive and active) within OWFs. They stated that during construction phases, no entry of fishing vessels should be allowed due to safety reasons. Additionally, before it is considered to open the safety area around the OWFs as well as the crossing of OWFs by fishing vessels, several questions

should be answered first. Technologies to track the fishing vessel as well as an uninterrupted information exchange about the fishing gear, location, and duration, has to be ensured before an opening would be possible. Further minimum requirements are, among others, that the vessels must be smaller than 24 meters, which is the case for most of the German fleets, the visibility has to be sufficient, wind speed must be less than 6 Beaufort (39-49 km/h), speed of the vessels cannot exceed eight knots and fishing during nighttime is prohibited (BWO, 2020). Further, the BMWK wanted to clarify that it is not the wind energy sector which is responsible for compensating the fishery sector for lost fishing areas. The BMWK located this responsibility with the EU. Additionally, they wanted the designated area for the fishery of Norway lobster to stay open, so that it can be co-used with OWFs. Lastly, they advocated that the fishery sector should not be “prioritized” in this area but rather “taken into account” (BMWK, 2020). However, ID 5 stated that the perception of co-use differs a lot between the sector of OWE compared to that of the fishery sector. While for the fishery sector co-use is more about different activities operating in one area, for the wind energy sector the definition is reversed, as they rather state: “We go somewhere else, in where others are, we go in with our wind energy in a nature reserve, for example. Or in a research area. But not the other way around. Others are not allowed in our area” (ID 5).

Fishery

Next to the representatives of the wind energy sector, eight representatives from this fishing sector gave feedback in 2020.

A commonly mentioned statement was the unfair treatment in the marine spatial plan and that the consequences of the increasing construction of OWFs are not sufficiently taken into account. The fishery sector felt that the plan was in favor of OWFs, which is highlighted by the Erzeugergemeinschaft der Deutschen Krabbenfischer GmbH (EZDK) (German Crab Fishery Association). They indicated that they were not satisfied with the draft plan as they felt disadvantaged in comparison to the OWE sector: “It should be noted that from a fisheries point of view, a balanced marine spatial planning would certainly be welcome. Unfortunately, we have to note that the current plan, again unilaterally favors offshore wind energy” (EZDK, 2020, p. 1). Therefore, other activities would only be distributed to the remaining areas and especially fisheries were almost not considered at all. The only expectation for this is the designated area for the fishery of Norway lobster which is considered as a good starting point by the EZDK. However, as this is not possible for other, mobile fish species, this is considered insufficient. Additionally, they criticized that consequences through the expansion of OWFs were explicitly mentioned for activities such as research. However, these consequences also apply to the fishery sector, but were not explicitly mentioned in the marine spatial plan. As the EZDK wrote: “The justification [...] states that the general exclusion of research vehicles from wind farms leads to an inappropriate spatial restriction due to the increasing expansion of wind farms. We miss an identical statement with regard to fisheries” (EZDK, 2020). In total the EZDK required more integration of the fishery sector into the plan and the sustainable security for the fishery sector (EZDK, 2020). Also, the Landesfischereiverband Schleswig-Holstein (Fishing Association of the State Schleswig-Holstein), agreed with this perception and considered the marine spatial plan as imbalanced. They wanted to see the explicit and long-term consideration of the demands

of fishermen included in the plan and felt treated unfairly. They also explicitly mentioned the consideration of the negative impacts of OWFs for research vessels while fishing vessels were not mentioned: “the general exclusion of research vessels from wind farms is considered an inappropriate spatial restriction. This also concerns fishing” (Landesfischereiverband Schleswig Holstein, 2020, p. 2). Further, the EZDK claimed that open laying cables should also be considered as an obstacle for fisheries as they can be a safety issue for fishing vessels and gear. The Erzeugergemeinschaft der Nord- und Ostseefischer GmbH (The Fishermen Association of the North and Baltic Sea) agreed with this provided feedback. Also, the Landesfischereiverband Schleswig-Holstein (2020) wished that the danger of cables, especially for bottom trawling, is explicitly mentioned in the marine spatial plan. The Landwirtschaftskammer Niedersachsen supported this opinion as well. They acknowledged that the development of OWE in the North Sea is necessary to reach the climate target of Germany being climate neutral by 2050. However, they also highlighted the fact that through this increasing construction, major areas will be lost for fishing activities. These losses should not only be recognized, but also minimized and compensated as much as possible to prevent an additional burden for the fishermen. Therefore, they suggested that lost areas should be calculated, and the resulting numbers and the resulting limitations should be considered (Landwirtschaftskammer Niedersachsen, 2020). These claims and concerns from the fishing sector were also supported by the interviewees ID 3 and ID 4, both related to the fishery sector in the North Sea. Interviewee ID 4 considered the conflict between OWE and the fishery sector as “unfair and discriminatory” (ID 4). ID 5 also described the current marine spatial plan to be in favor of OWE and that it creates disadvantages for sectors such as fishery but also research and nature conservation. The interviewee mentioned that there are no great efforts from responsible parties to solve the conflict or to work towards cooperation with the fishing sector (ID 5).

Another claim was that consequences resulting from the increasing construction of OWFs should remain as low as possible. For example, the Bundesministerium für Ernährung und Landwirtschaft (BMEL) (Federal Ministry of Food and Agriculture) pointed out that it is very important that the consequences stay minimal. Especially because not only German, but also international fleets use the space of the German EEZ. Therefore, it is a general interest to keep such consequences low. Additionally, they highlighted the importance that passive fishing activities should be allowed within the safety areas around the OWFs and that at least the possibility of co-use should already be indicated in the marine spatial plan (BMEL, 2020). This claim for co-use within OWFs is also highlighted by other actors. The Landwirtschaftskammer Niedersachsen stated that all areas should be open for potential co-use, no activity should have an exclusive right on one specific area. Fishing activities should not be excluded from OWFs on default. It should be possible to provide licenses for fishermen to operate within these areas (Landwirtschaftskammer Niedersachsen) and also the EZDK emphasized the importance of co-use in the marine spatial plan. Also, from a scientific point of view, the Thünen-Institute for fishery and fish ecology supported the efforts to research the possibilities of co-use within OWFs. Additionally, they recommended to consider the negative impacts that OWFs can have on the fish ecology, such as the influence of electromagnetic fields generated by the turbines. These can have the effect that fish avoid these areas, which can also have a negative impact on fishing activities in surrounding areas (Thünen-Institute, 2020).

Another important factor, mentioned by several of the representatives, was the weak legal position of the fishery sector and that they only have limited influence on the marine spatial plan. Berkenhagen et al. (2010b) explain that fishermen have no explicit right on specific areas, even if this area was used for fishing for several decades. If another actor claims this area for their interest, this request is often approved as fishery is not a reason for refusal. This also leads to the situation that this actor is not in charge of compensating the fishermen for their lost fishing areas. Interviewee ID 4 also mentioned that through the loss of space negative impacts occur such as longer journeys to the fishing grounds which leads to higher costs for fuel, and increased competition, as the same number of fishermen have to operate in less space. The interviewee stated that even though the discussions and workshops with the BSH are always nice and understanding, and that a mediation between the organizations is not necessary, the fishing sector remains disadvantaged. The area which is now reserved for the fishing of Norway lobster was often seen as a consolation prize among the fishermen and “is not sufficient to compensate for the disadvantages for fishermen” (ID 4).

Further, ID 3 identified various facets of the conflict between OWE and fishery. Firstly, there are the direct impacts of area loss through the development of OWFs and the exclusion of fishing (ID 3). Hereby, different periods of OWFs also create different scales of problems. Usually, the phases are distinguished between construction, operating and decommissioning (Gusatu et al., 2021). ID 3 mentioned that the major impacts for the fishing industry will be during the construction period until 2030, as in this time fishing vessels are strictly prohibited due to safety reasons (ID 3). Additionally, the fishermen would not want to enter the OWFs during these periods due to safety and insurance reasons. Jentoft and Knol (2014) highlight the danger of OWFs as due to their porosity, the turbines can be difficult to see, especially in bad weather conditions (Jentoft & Knol, 2014). Further there are more indirect impacts, such as the growing competition in the remaining areas (ID 3; ID 4). Consequently, fishing vessels which are constructed to work on high seas and on a larger scale start to fish crabs and fish in the coastal regions as they lose fishing areas on the high sea. Along the coast, traditional, smaller fishing vessels, which are specialized in this area, therefore experience growing competition. This can lead to decreased prices for fish but also additional pressure on the ecology and the fish and crab stocks (ID 4). This is supported by the Thünen-Institute (2020), which stressed the rising pressure on fish stocks due to area losses. Additionally, the rising number of cables, connecting the OWFs with the mainland, creates additional danger and obstacles for the fishing gear and the cables themselves. The cables run vertical to the shoreline while the fishing vessels operate horizontally along the coast. Therefore, the vessels cross the cables, which is especially a problem for bottom trawl fishing as they have to lift their gear if a cable is not buried into the ground properly, which has already happened at the coast of Niedersachsen (ID 3; ID 4).

The EZDK also claimed that future technical improvements and innovations should already be mentioned in the current plan, as these could make smaller safety areas around the OWFs possible as technologies in both sectors, fishing and OWE, are steadily developing.

It can be summarized that the sector of OWE has its interest in more areas, which are designated to OWFs with the argument to attain the climate target by 2040. They acknowledge OWE as a priority and a public service. Fishermen, on the other hand, have the desire to be recognized and that their interests and needs are considered, so that a solution can be found to use the space commonly. The main barriers hereby are the unknown regulations and situation regarding

insurance and safety issues which concerns both sectors while none of them wants to be responsible.

4.4. The Institutions

4.4.1. Formal Institutions

To understand the origin of the conflict and the barriers, institutions such as rules and regulations are important to understand. The following chapter presents the laws, regulations and acts which influence the conflict. First, the institutions regarding the overall process of MSP will be introduced, followed by the rules and regulations regarding OWE and fishing in the German EEZ.

Marine Spatial Planning

In 2014, a legal framework was established by the European Parliament and the Council, namely the Directive 2014/89/EU. The directive states that the increasing demand for space in the marine environment stresses the importance to introduce an integrated planning approach for this area. It is related to the Integrated Maritime Policy (IMP) which was adopted in 2008 by the EU as well. The IMP is an overarching framework, which influences all policies that are related to the marine or coastal areas in the EU. Its objective is to ensure coordination and coherency on the sea and in its policies. Its main principles are blue growth, maritime surveillance, marine data, and knowledge as well as marine spatial planning. The Directive 2014/89/EU is a common framework for all members of the EU and requires that every member state has to develop and also implement a marine spatial plan by 2021. These plans are then in force up to ten years, before they have to be renewed. The marine spatial plan, which is then implemented should include a cycle, consisting of identifying opportunities, the collection of information, planning and decision-making, the implementation itself and updating and monitoring (European Commission, 2014).

The directive gives freedom for interpretation so that every member state can design the plan to their needs and balance their objectives. However, the framework also provides some objectives which should be considered. These objectives contain, among others:

- The support of sustainable development and growth
- Promotion of co-existence of activities and the appropriate allocation of relevant uses
- Supporting the sustainable development of energy sectors, transport, and fishing at sea
- Preserving, protecting, and improving the environment

The member states should also, next to other requirements, adopt an ecosystem approach, include land-sea interactions, take environmental, economic, social and safety aspects into account and ensure stakeholder involvement. The last point of stakeholder involvement aims

for public participation in the development of the plan, at an early stage already (European Commission, 2014).

On the national level of Germany, the ROG forms the legal base, which was made applicable to the German EEZ. One main principle of the ROG is the integrative balance of interests (ID 5). Principles of the ROG regarding MSP are the securing and strengthening of maritime traffic, strengthening economic capacity, optimizing the use of marine space, the promotion of offshore wind development, sustainable use of resources and the securing of natural resources due to disruptions and pollution (Deutscher Bundestag, 2008).

Offshore Wind Energy

In 2015, 195 parties signed the Paris Agreement, with the aim to hinder anthropogenic climate change to cause a global warming of more than 2°C, compared to the temperature of the preindustrial world. One crucial contributor to reach that goal is a transition of energy production. Away from fossil fuels towards a more climate friendly, carbon dioxide free energy source such as renewable energies. The United Nations Environment Programme (UNEP) mentioned explicitly the expansion of wind energy as an important step to achieve that goal (United Nations, 2015).

Also, on the EU-level, renewable energies are important to combat the consequences of climate change. In 2009, Renewable Energy Directive 2009/28/EG, was implemented and was revised in 2018. It is a legal framework for the development of renewable energy in the EU. Its current target is set that 32% of EUs energy consumption should be produced through renewable energy sources by 2030 (European Commission, 2009; European Commission, 2018). Jongbloed et al. (2014) state that wind energy is expected to produce a major part of this goal, including OWFs. Another response to climate change is the EU Green Deal, a strategic plan, with a more ambitious target to make the EU climate neutral by 2050. To reach this goal the emissions of the EU member states should be reduced by 55%, compared to 1990, part of this through clean energy. Until 2030, 40% of the energy consumption should be produced by renewable energy. Additionally, 36-39% of the energy consumption should be saved (Jongbloed et al., 2014).

To reach the targets of the EU on a national level, Germany implemented, among others, the Windenergie-auf-See-Gesetz (Wind Energy on the Sea Law) (WindSeeG) in 2016. This law follows the aim to expand the construction of OWFs, in the interest of climate change and environmental protection. The set target aims for 40 GW of OWE by 2040.

The WindSeeG empowers the BSH for the approval of OWFs in the German EEZ. Before they can plan the areas, which should be designated to OWE, several principals have to be met. For the security and uncomplicated maritime traffic, a risk assessment must be developed and a security area of 500 m around the OWF has to be planned. Also, strict regulations are enforced for the planning of the OWFs. The wind turbines are not allowed to be built too close, so that enough space for shipping remains. Additionally, the turbines should be built “collision-friendly”, to prevent major damages. Also, the cables which are needed for the OWE are regulated by the Richtlinie Offshore-Anlagen (Directive for offshore plants), which states that also, through cables, the maritime traffic should not be limited (Wasserstraßen- und Schifffahrtsverwaltung des Bundes, 2021). If these requirements are met, the BSH can hand in

all needed documents. After approval, the BSH is in charge of the supervision of the project (Deutscher Bundestag, 2016).

Fishery

For fishery activities, various rules and regulations are in force. As fish is a common natural resource and fishing is an activity, which exploits this common good, fisheries have to be regulated. Only this way, a fair and sustainable use is possible. On the EU level, the Common fisheries policy (CFP) was implemented in 1970. The objectives were to increase the productivity, stabilize the markets, the provision of a healthy food source and the insurance of reasonable prices for the consumers of seafood. In 2013, the CFP was renewed as more countries joined the EU and therefore, the management of different fishery problems and challenges, and the conservation of resources became more important. The renewed objectives put more attention on the environmental, social, and economic characteristics of fisheries and, a sustainable yield for all managed stocks, fleet capacity ceilings and multiannual plans were set as main objectives. Also, the fisheries control system was implemented to ensure sustainability and to combat illegal, unregulated, and unreported fishing (European Commission, 2013). The German counterpart to the CFP is the Seefischereiverordnung (SeefiV) (Sea Fisheries Act), which is the legal basis for commercial fishery in the German EEZ. Additionally, it regulates the responsibilities and the authorities which are in charge to control the fishing activities. It was implemented in 1989 and updated in 2019. The SeefiV determines, that the fishermen are not allowed to fish more fish as the set fishing quotas foresee (Deutscher Bundestag, 2019). The fishing quotas are determined thorough information of scientist and the International Council for the Exploration of the Sea, which examines the current fish stocks and set quotas how much fish can be caught without endangering the species. The quotas are then distributed between the fishermen so that everyone is aware how much fish they are allowed to catch (ID 3; Stelzenmüller et al., 2022). Also, certain fishing methods are prohibited in certain areas. These regulations are controlled strictly by inspectors from the country or the federal states, depending on where the examined fishing vessel is located (Deutscher Bundestag, 2019).

As fishing is a fluid activity, because fish stocks move depending on the season and other factors, the designation of areas for fishing is rather difficult (Jentoft & Knol, 2014). That is why the legal position of fishermen is weaker, compared to other activities on the sea which can receive exclusive rights for the usage of certain areas (Gray, 2005). Even if an area is used for fishing activities for decades already, it does not mean that it constitutes a reason for denying claims of other sectors. Additionally, these new actors of this area are not obligated to compensate the fishermen for their losses (ID 4). Further, fishing within OWFs is prohibited. However, the crossing of OWFs is allowed for vessels smaller than 24 m. Also, passive fishing in the security areas around the OWFs is allowed under certain circumstances and up to 150 m near the OWF. In fact, every OWF is considered individually, and the rights or obligations of fishermen might slightly change from case to case (Van Hoey et al., 2018; ID 3; ID 5).

4.4.2. Informal Institutions

Next to the formal institutions, informal institutions constitute an important part to understand the conflict and the barriers and opportunities they can bring. Informal institutions are usually not written down and often created outside the legal system. They often occur out of traditions, moral values or as parts of a (local) culture system (Lauth, 2004; Helmke & Levitsky, 2006). During the interviews as well as the literature review, the following informal institutions, resulting from behavior and perceptions, were mentioned frequently. Therefore, these are explained and presented in more detail in the following paragraphs.

Prioritization

In the case of the German North Sea and the current marine spatial plan, the sector of OWE is prioritized in comparison to other sectors due to their role in the energy transition and Germany's climate targets (ID 5). This leads to situations where areas, which are initially planned for other sectors, such as the area for the fishing of Norway Lobster, will be shifted in a way that more space for OWFs is available. The same also happened with areas, which have been used for (fishery) research for several years already. After the second draft of the marine spatial plan was published, the resort for economy requested these areas for the construction of OWE and the plan had to be changed. Prioritization of specific sectors in (marine) spatial planning is not uncommon, depending on the specific targets or economic needs of a country or region. As Germany aims for high targets towards the energy production through renewables, the prioritization in the German North Sea focuses on the sector of wind energy which can lead to disadvantages for other sectors such as fishery, research but also nature conservation (ID 5).

Perspectives of Stakeholders

One significant aspect of the conflict is the unknown situation regarding insurances. Until today, it is not clear or regulated who is responsible for accidents within an OWF. Interviewee ID 5 stated that the unknown insurance situation could be a barrier to enter OWFs for fishing, even if this would be allowed in the future. Right now, insurances which could potentially be implemented are too expensive as there is no real risk assessment and therefore the costs cannot be calculated realistically. Also, the question, who has to compensate the fishermen for lost areas, energy companies or the authorities, is not solved yet. Also, ID 1, ID 2 and ID 3 mentioned in the interviews that the organization and regulation of insurances are a major problem right now. Especially with the perception that, in future, the regulation might change and passive fishing within OWFs will be allowed (ID 3).

Additionally, ID 3 also stated that fishermen are rather conservative in nature. Changes in their attitude and behavior are not easy to accomplish. Often, they support the attitude: "Why should I change if these people destroy everything out there" (ID 3). Additionally, the prioritization and lack of clarification and responsibility towards the energy companies is perceived unfair

from the side of the fishermen, especially resulting from the differentiated legal position of the fishery sector and the sector of OWE (ID 4). Compensation measures, either in a monetary way or through the designation of the area for the fishing of Norway lobster, is not sufficient to equalize their economic losses (ID 4).

The Missing Communication

During the development of the marine spatial plan of 2021, stakeholders were included from an early stage and workshops were held in the beginning to gain information about the sectors and their perception, by the BSH. However, communication between the fishing sector and the wind energy companies are missing. Due to a lack of time during the planning process but also due to a lack of interest or support from higher authorities, as the fishing situation is not considered important at the moment, no arena could be provided for meetings or discussions between the two sectors (ID 1; ID 5). However, in workshops and meetings between the two sectors and the BSH and by the feedback statements after the publication of the first draft, it becomes evident that a lot of claims of the sectors contradict each other and therefore are not possible to be realized to the satisfaction of all (ID 5). This lack of communication between the two sectors leads to a barrier for possible solution findings such as the implementation of co-use (ID 1).

4.5. Outlook and Recommendations

In the literature and through information of the interviews, several recommendations are mentioned, how to improve the situation in the North Sea, regarding the conflict of the fishery sector and the increasing development of OWE and how to overcome the greatest barriers, forming this conflict. These recommendations will be introduced in the following chapter.

One idea which is mentioned in a wide range of literature and in four of the five interviews is the idea of aquaculture in OWFs. Berkenhagen et al. (2010a) acknowledge aquaculture as an advantage of the construction of wind turbines. The additional hard substrate through the turbine's fundamentals can offer new habitats for sea creatures such as mussels or crabs which can then be harvested (Berkenhagen et al., 2010a; Stelzenmüller et al., 2021). An additional advantage of aquaculture is the permanent installation, which in contrast to the mobile fishing activities can be assigned to a specific area (Jentoft, 2017). However, the perception regarding the practicality and possibility of this approach is still marbled. The implementation, maintenance and harvest of aquaculture brings up similar problems as the fishing activities. The legal basis and the important regulation of insurances and responsibilities are not clarified. Additionally, as for fishing, also for aquaculture, vessels have to enter the OWFs which is a major problem (ID 5). It must be clarified first which requirements are necessary and how and who can operate within the OWFs (ID 1; ID 5). Additionally, the profession of aquaculture is a completely new field of working for fishermen. Therefore, especially in the beginning, the fishermen have to expect to invest a large amount of money for remodeling their vessels and a

lot of time for learning about the new profession, which makes it a recommendation which is not easily manageable for fishermen (ID 3). Interviewee ID 4 also stated that the harvest which can be created through aquaculture, cannot compensate for the economic losses of the lost fishing areas through OWFs. However, a lot of research is already undertaken to examine if aquaculture is a possible alternative for fishermen and which modifications must be applied (Stelzenmüller et al., 2016). In the German Bight, experiments with oysters and mussels were successful and show that the areas could be shared (Gimpel, 2015).

One big issue which is mentioned quite often during this research is the weak legal position of the fishermen (Gray, 2005). They do not have legal rights on specific fishing areas, as the sea is seen as a public domain (European Commission, 2020). The moving nature of fishing activities makes it difficult to determine priority areas for fishing. Therefore, the attitude is often “if this [fishing] is important everywhere, then it is also unimportant everywhere” (ID 5). This is also highlighted by Aschenbrenner and Winder (2019) who state that the biggest disadvantage for fishermen is their weak legal position. This results then in the fact that areas which were formerly used for fishing are designated for OWFs and therefore not accessible for fishing anymore (ID 4). These areas do have a legal security by the BSH through the marine spatial plan which is, in Germany, a legal binding document (Stelzenmüller et al., 2016). Therefore, the suggestion is to clarify and update the legal basis for fishermen and ensure that they can enter sufficient areas to sustain their livelihood (ID 4).

Additionally, the clarification of insurances, regulations and compensations was considered very important by all the interviewees. Without these clarifications, recommendations such as the entering of OWFs are prognosed to be unnecessary as it is not regulated who is responsible in the case of an accident or an emergency. Also, the idea of co-use, which is also mentioned frequently and is currently examined by researchers, is missing insurance models, and is therefore often denied by providers of OWFs as too many risks are involved (Schupp et al., 2021; ID 3). Schupp et al. (2021) state that the commercial fishery sector on the other side is open to the idea of co-use. Kannen (2014) suggests next to co-use also an approach to alternate the use of an area, depending on the seasons.

The lack of communication constitutes another problem. Therefore, closer discussions or meetings between the two sectors under study are considered helpful to discuss concerns and to find suitable ideas and solutions (Schupp et al., 2021). For that, it is important that not only meetings with the individual sectors and the BSH are conducted, but also meetings in which representatives of the sectors themselves meet each other and can communicate on a neutral basis (ID 1). Schupp et al. (2021) state “the most frequently mentioned recommendation is related to the need for further strengthening of dialogue opportunities between relevant stakeholders” (p. 7).

Furthermore, it was recommended that the technology of both, fishing gear and vessels but also the wind turbines should be developed further. Layouts of OWFs have to be planned in such a way, that in the future, vessels can enter them easily and are as secure as possible, even if it is still prohibited to enter the OWFs today (ID 5). Also, fishermen should be subsidized and supported so that they can withstand the rapid development of OWFs and, if needed, change their kind of fishing (ID 3; Stelzenmüller et al., 2016).

Further, ID 4 which is located in the fishery sector, suggested to offer additional tasks which can be operated by fishermen. As fishermen have excellent abilities to securely operate their vessels, they could accomplish tasks such as service or guarding of the OWFs or they could help monitor the sea, for example for environmental protection purposes or to monitor the situation within OWFs (ID 4; ID 5).

5. Discussion

In the following chapter, the results, and their connection to the theoretical framework of chapter 2. are discussed and set into the context of the case study. For this purpose, present literature is used as well as the data collected through interviews. Further, the case under study as well as the research itself is reflected upon and recommendations for future research are given.

5.1. The Situation in the German North Sea

The distribution of space in the marine spatial plan of 2021 is highly influenced by the requirements of the German government. Especially the ambitious goal to become climate neutral by 2050 and the energy transition led to the designation of large areas for the development of OWFs (Bórawski et al., 2020). Opinions about that vary. While the sector of OWE claimed even more space for further construction of turbines (WVW, 2020; BWO, 2020; BMWK, 2020), fishermen were concerned that their fishing grounds, and with that their income, decreases (ID 3; ID 4). That the fishermen only receive explicit rights to fish in one area, dedicated to Norway lobster, seems unfair, especially considering the fact that this is the only tangible outcome of numerous discussions and meetings with the authorities (ID 3). However, it is important to keep in mind that fish stocks are mobile within the sea and are not a fixed resource such as sand or gas. This makes it rather difficult to dedicate specific areas for fishing activities, especially because the occurrence of fish stock does change between seasons and fishermen cannot predict where they will fish in the future (Jentoft & Knol, 2014). Therefore, the attitude of the authorities is often: “if you cannot fish there, you just go somewhere else” (ID 3). It can be assumed that if this attitude remains and the development of OWEs increases further and faster, the space for fishing will be minimized tremendously, and the fishermen will have greater problems to earn their livelihood.

However, considering the current situation and the crises which Germany, and also many other countries, have to deal with, the prioritization of OWE seems logical and justified. Crises, like the war in the Ukraine make it clear why Germany tries to increase its local energy production, since it imports 70% of its power from abroad (ID 2). Additionally, due to the climate crisis, the transition towards renewable energy seems future oriented and indispensable. As wind turbines on land have a high impact, especially because of its high demand of space and the direct contact with inhabitants, OWE is a promising approach to reach the energy targets and can help to make Germany more energy independent (Gusatu et al., 2020). Therefore, it can be argued that the designated space for OWFs is desperately needed to strengthen Germany’s economy and independence.

However, it cannot be done at any costs and especially the fishery sector cannot be forgotten over the current situation. Therefore, it can be argued that the research for alternative approaches must be supported with more resources and approaches, such as aquaculture. This way, OWFs could also be used for different activities and co-use would make it possible to attain the climate targets. This would also benefit Germany’s position, while limiting

restrictions for fishermen and others. It is expected that this could lead to a fairer, more satisfying situation on sea and creates an opportunity.

Countries such as The Netherlands can be seen as a role model for this approach. The Netherlands already has targets in their policies to allow co-use within OWFs and support the research in this field (European MSP Platform, 2015). The UK already opened OWFs for fishing activities. However, fishermen do not want to enter the farms, as insurance and responsibility questions remain still unclear (ID 3; ID 5). Therefore, it can be argued that the definition and clear regulation of these factors is crucial for a functional co-use between OWFs and fishermen.

5.2. The Role of the Actors

While the OWE sector has high influence in the planning process of the German EEZ, its role in the direct conflict seems not to be very present. As the OWE sector is not negatively impacted by the space distribution, it does not seem to be interested in solving the conflict with the fishermen. In the statements, received by the BSH after the first draft plan was published, representatives of the OWE sector claim even more space for the development of OWFs. At the same time, they support the regulation that fishing activities stay banned within wind farms and that co-use should not be an option (WVW, 2020; BWO, 2020). As its legal position is very stable and secure, the OWE sector seems to not feel the urge to minimize the conflict or to invest in solution finding. They are widely supported by the German government, which aims to reach the climate targets and therefore prioritizes the development of renewable energies (BMWK, 2020). The fishermen, on the other hand, already feel the impacts and are very concerned that the situation will be worse in the near future. Therefore, they push more towards research of new approaches and technologies which would make it possible to use the space together (ID 3; ID 4).

ID 3 stated that fishermen are also in need of cheap energy and that they are not against the OWE per se. However, they want to be heard and supported to be able to keep up with the rapid development of OWFs and the fast-changing situation in the German EEZ (ID 3). The BSH as the responsible authority also plays an important role, as they distribute the space in the German EEZ. However, as they are a governmental agency, they are obligated to follow the requests of the government, which again leads to the prioritization of the energy sector (ID 5). Even though, as ID 4 stated, the communication between the BSH and the fishermen are understanding and friendly, this does not substantially influence the outcome of the marine spatial plan. Therefore, it can be argued that besides the communication between the sectors and the BSH, communication between the sectors themselves is very important too. This way, interests, needs, knowledge, and ideas can be shared and discussed. Possible solutions, satisfying for both actors could be found while discussing barriers and opportunities.

Therefore, it can be argued that the theory of boundary spanning could be a helpful tool to bring these actors together. To implement an organization or an individual person who moderates meetings and discussions can lead to respectful and cooperative communication. As the sectors of OWE and fishery follow different interests and are different in their understanding, culture and, to some extent, also language, boundary spanning could help to bridge and connect these

sectors and functions (Van Meerkerk, 2014). The boundaries between fishermen and OWE can be, following Carlile (2002), classified as pragmatic. As introduced in chapter 2.3., pragmatic boundaries originate from competing interests and a non-existing understanding for each other. As the two sectors have a significant difference in interests, while using the same space for different activities, it can be assumed that especially the OWE exhibits a low understanding for the situation of the fishermen. Often, their attitude towards fishing activities is that they can fish wherever they want and that it has not a big impact if areas are not accessible for them anymore (ID 3; ID 5). Therefore, the request of the fishermen to put effort in co-use or to loosen the regulations is not always understood or supported. The role of a boundary spanner, and more specifically, that of a mediator as defined by Carlile (2004), can help to find common ground. A mediator focuses on discussions and on respectful behavior (Carlile, 2004). Van Meerkerk (2014) states that if common ground is found, collaboration can be built upon. For this, the rules between the sectors have to be loosened and bended and trust has to be built. In this, discussions can help to align positions and opinions. For that, the boundary spanner has to translate the information and make it understandable for all involved parties (Tushman & Scanlan, 1981).

Common grounds could be that both sectors want to use the space while not conflicting with other activities. Additionally, both actors have similar interests such as the economic aspect of their activity, sustaining their livelihood and to have a positive impact for the society, one party with the supply of energy and one party with the supply of food (BWO, 2020; ID 5). As both activities require space to fulfill their jobs and nowadays a large amount of this space overlaps with each other, the possibility of co-use as well as the needed requirement can be discussed (ID 5).

It can be assumed that an external organization or the BSH could fill this gap of a boundary spanner. Advantages of the BSH would be that processes and conflicts are already known and that the BSH has good communication with both sectors already. As a trustful relationship already exists between the BSH and the sectors, it would be easier to bring these two sectors together. However, an external organization can also help to make communication possible as it would function as a neutral party. The most important step is to transform the information, knowledge, and opinions to make them accessible and understandable and to build common ground (Carlile, 2004). Commonalities and differences should be discussed together with representatives of the OWE and the fishery sector to understand their needs, preferences, and concerns and to build upon this information to find solutions which are suitable for both, even if both parties have to compromise.

However, communication and discussion will not succeed at solving the conflict alone. As the legal positions of both actors are very different, the OWE sector has currently no real reason to actively participate in the solution finding processes.

5.3. The Influence of Institutions

Various laws and regulations, related to the situation and the conflict under study, are implemented in the German North Sea. Based on the findings of the present case study, it can be argued that these formal institutions have a high impact, resulting in barriers for solving the

problem. While this also holds true for informal institutions, it is especially formal institutions, such as regulations, laws and targets, that lead to the prioritization of OWE and therefore to the disadvantage of the fishery sector. The current climate crisis led to the implementation of targets which have to be implemented at different levels. On the international, EU and national level, legally binding targets are set (United Nations, 2015; European Commission 2021; Deutscher Bundestag, 2016). Therefore, it can be argued that agreements such as the Green Deal, the Paris Agreement and the WindSeeG can lead to an imbalanced situation in the German EEZ. ID 5 also stated that through these agreements the needed space for OWE will increase and is therefore taken away from the spaces designated for other activities. Even when the designated area for the fishing of Norway lobster was set by the BSH, the governmental resorts claimed part of it for OWE. This shows the high impact of the government, even if the principles of the Directive 2014/89/EU as well as the ROG aim at avoiding conflicts, the fair distribution of space as well as the promotion of co-existence and the support of sustainable development of energy, transport, and also of fishing at sea (Deutscher Bundestag, 2008; European Commission, 2014).

At the same time, formal institutions prohibit fishing activities in OWFs (Deutscher Bundestag, 2018). Therefore, they actively strengthen the negative impacts for fishermen while no or not sufficient efforts are made to find alternatives or to provide compensation.

Additionally, the unresolved situation regarding insurance and responsibilities in the case of vessels colliding with a wind farm, lead to the very restricted behavior by fishermen. This can be seen in the situation in the UK where fishing activities within OWFs are allowed. However, due to the question of insurance, very few or no efforts are made to use the areas as fishing grounds (Haggett et al., 2020; ID 3; ID 5). Currently, due to the lack of data and interests, the risk of fishing vessels within OWFs cannot be calculated sufficiently. Therefore, insurances are extremely expensive and cannot be paid by the fishermen (ID 5).

Additionally, informal institutions such as the missing communication but also the attitude of both sectors create a barrier in the conflict. Both sectors acknowledge the responsibility to act to lay with the others. Even on the governmental level, such responsibility is not acknowledged. The BMWK sees the responsibility of compensation for lost fishing areas to lay with the EU (BMWK, 2020) and fishermen, with more conservative mindsets, do not see why they should act if it is others who destroy their areas (ID 3). As no party feels responsible for the situation, it is difficult to come to a solution.

Therefore, it can be argued that these institutions have to be changed to minimize the conflict under study. Regulations must be loosened to provide a possibility for fishermen to use the same space as OWE. Also, both parties have to be willing to communicate and to agree upon rules and regulations which are feasible to implement. Additionally, layouts of OWFs which are developed already have to be planned in such a way that co-use will be possible in the future, even if this is currently not allowed (ID 5). Therefore, if laws and regulations change in the future, the infrastructure is already available to enter the farms. Wind turbines cannot be built too close to each other, and straight passages should be kept free for vessels to prevent accidents (ID 5). Therefore, institutional change can create an opportunity.

Burch et al. (2003) state that institutional change often happens in times of ruptures. As the situation in the German North Sea does change very rapidly and regulations do change due to the current crises such as the war in the Ukraine, it can be argued that in this case a moment of rupture does exist. Therefore, especially formal institutions can be changed more easily, and

regulations can be adopted in favor of co-use or other alternatives for the fishery sector. Path-dependencies must be overcome as the new situation requires new thinking and innovative ideas. Therefore, the current crises, the increasing development of OWE and the ideas from other countries can bring the right incentives to change formal institutions also in Germany (Fuller, 2010). This can provide opportunities to the fishing sector and clarify the legal situation so that co-use and the cooperation of the two sectors under study could soon be possible. Informal institutions, however, are much harder to change as they are more persistent (Williamson, 2000). The norms and beliefs of actors involved create a barrier which is not easily overcome. However, as the conflict is currently relevant and especially the fishery sector needs change, it can be argued that alternatives such as co-use provide incentives to change their paths, even if this change is incremental in the beginning. However, communication is the base for the change as through discussion alternatives can be developed that make it possible to find solutions which are feasible for both sides and are still legally legitimate.

5.4. Limitations

The following limitations apply to the present case study. Firstly, it is important to mention that this study only focuses on the case of the German North Sea. Therefore, the findings cannot be generalized but rather function as assumptions about relevant approaches and innovative ideas about how conflicts in MSP can be minimized especially between the sectors of OWE and fishery. Additionally, the selection of a methodology and theory automatically entails a bias that excludes other approaches and theories, which could have led to different outcomes and findings.

Further limitations relate to the method of semi-structured interviews. The search for interview partners was already more challenging than expected due to the lack of responses. Many potential interview partners which were contacted did not answer or agree to an interview. Reasons were a lack of time or the feeling that their scientific background does not fit with the topic under study, especially for contacted experts of the research field. Further reasons can be the lack of interest in the topic or that they consider a Master thesis as too marginal to participate in.

Additionally, no interview partner of the sector of OWE was willing to participate in the semi-structured interviews. This led to a lack of sufficient data of their perspective. While the lack of interview partners from the OWE sector remains a major limitation of this thesis, the provided statements by the OWE sector for the marine spatial plan draft in 2020 gave insights into its perspectives.

Finally, three of the five interviews were conducted via “Zoom” due to geographic distance. The remaining two interviews were carried out through mails due to a lack of time and difficulties to find a suitable date for a meeting. Because of this, important characteristics such as reactions and gestures could not be observed during the interview which is an important aspect of semi-structured interviews (Helfferich, 2011).

Overall, due to the usage of various methods such as the literature review, interviews and stakeholder analysis, all perceptions could be included in this research and an overview about the situation and possible solutions could be gained.

5.5. Further Research

The findings of this study indicate a good starting point for further research to look beyond the limitations. As this study was based on one single case, the examination of different areas in the North Sea and the comparison of the same would help to establish approaches which can be more generalized and used in different legal or planning settings.

Further, the idea of aquaculture within OWFs should be researched further to examine if this approach is possible practically, ecologically, and legally. For this, in situ experiments within OWFs should be done to see if organisms settle on the hard substrate and if operations to harvest these organisms in the wind farms are feasible. Additionally, the idea of co-use within the German EEZ should be further developed to examine which fishing activities can be done within OWFs and which gear can be used to minimize the risks of damages of the vessels and the turbines.

Finally, this research applied the approach of boundary spanning within MSP. In further research, this can be taken up further to identify opportunities and to develop a framework which can help to minimize conflicts at sea. It should be further examined if the moderation and mediation of discussions and the translation of information between actors can help in finding common grounds and to accept different opinions.

6. Conclusion

The conflict between the sectors of OWE and fishery in the German North Sea is very relevant and with the increasing development of OWE at sea, it will be even more relevant in the future. Therefore, the consideration of possible solutions through boundary spanning and the in-depth examination of institutions in the German EEZ which create barriers and opportunities were used to answer the main research question:

“How can conflicts between the offshore wind industry and the fishing industry in the North Sea be minimized?”

Before this question will be answered at the end of this chapter, the sub-questions will be answered first.

The first sub-question focuses on the current situation of the German EEZ. The current marine spatial plan was implemented in 2021 and indicates a strong focus on OWE. This is a result of the desired energy transition, based on agreements on international, EU and national level such as the Paris Agreement (United Nations, 2015) or the Green Deal (European Commission, 2021). Large areas are therefore designated for the development of OWE, which leads to a decrease of fishing areas. The second sub-question focuses more on the actors involved in the conflict. On the one hand, fishermen are concerned that the situation in the North Sea will result in major losses of income leading to more competition in accessible areas. Also, the rising number of cables which are necessary to transport the generated power to the mainland create an obstacle for the fishermen as they cross them on their fishing routes (ID 3; ID 4). The OWE sector, on the other hand, requires even more space designated to OWFs to reach the target of 40 GW of energy in 2040. This claim is also supported by the German government like the BMWK (2020), which highlights the importance and priority of OWE in the German North Sea. The BSH, responsible for the development and implementation of the marine spatial plan in the German EEZs, must follow the requirements set by the German government. This results in the prioritization of OWE in the marine spatial plan, while sectors such as the fishing sector are only marginally represented and have little influence in the planning process (ID 5). This leads to an unbalanced and unfair situation in the German North Sea. Especially in the current time which is characterized by crises such as climate change and an insecure energy supply for Germany, the increased development of OWFs is crucial. However, formal and informal institutions create additional barriers which make it difficult to minimize the disadvantages for the fishery sector while allowing the development of OWFs (sub-question 3). As fishing activities are prohibited in and around OWFs, the space for fishing decreases rapidly. The idea of co-use is still widely rejected in the sector of OWE and by the government. Main reasons are the unknown risks and the unclear situation regarding insurances and responsibilities (ID 5). These conditions make it difficult to foster supportive attitudes of both sides. The OWE sector, which does not want to take the risks for their wind turbines, but also the fishermen which cannot afford current insurances or the risk of damages on their vessels. Additionally, informal institutions such as the lack of interest from the sector of OWE and the attitude of conservative

fishermen who see the responsibility to act to lay with the energy companies and the government hinder the start of a solution-oriented discussion (ID 3).

The answers to the sub-questions show issues and barriers, creating a conflict between the OWE and the fishery sector. To minimize this conflict, and therefore to answer the main research question, several approaches are introduced next.

Firstly, to enable the use of areas for different activities, formal institutions have to be changed and the idea of co-use within OWFs should be supported. If fishing vessels are allowed to enter OWFs after construction is completed, and fishermen can fish with passive fishing methods, large areas which are currently lost would become accessible again. For this step, it is important to already plan new OWFs in such a way that fishing is possible, e.g., by building turbines with sufficient distances and by leaving passages where vessels can easily pass with minimal risk of damage (ID 5). Further, clarifications regarding insurance are crucial to make fishing activities possible and profitable for fishermen. Another approach which was proposed is that fishermen could be employed for the monitoring of the OWFs. This could also be combined with another approach: if fishermen are allowed to enter the farms, they could support the monitoring of the wind farms when necessary. This way they could also generate income, even in times where the OWF would be closed for fishing, for instance due to maintenance. Another alternative which is widely mentioned in literature is the idea of aquaculture to create another source of income for the fishermen (Berkenhagen et al., 2010a). However, this idea must still be developed, as similar problems occur, such as that the entering of OWFs is still prohibited and the harvest, created through aquaculture would not be sufficient for the losses. Therefore, the possibility as well as the efficiency of aquaculture as an alternative has still to be researched (ID 3; ID 5).

Finally, the results of this research show that communication between the sectors and the authority, but also between the sectors themselves, is a great opportunity to come closer together and find a solution which would be suitable for both. This study examined that up to now, no communication between representatives of the sectors has been arranged (ID 1; ID 5). As both sectors have very different interests while using the same space, the approach of boundary spanning could help to relieve the tensions between them. An external organization can help to moderate the discussion and transfer and translate the information and argumentations of the two parties (Carlile, 2004). Therefore, it would be more likely to find common ground and to agree on ideas such as co-use or the cooperation between fishermen and OWE. Additionally, the sector of fishery is already willing to share the marine space with OWE, even if they have to change fishing methods. However, they wish to be more involved in the planning process and to be supported to withstand the rapid change in the German North Sea, for example through the development of new technologies for fishing (ID 3).

Also, MSP is and remains crucial for the organization and management of the sea. The collection of knowledge and requirements through the BSH helps to include all sectors interested in and dependent on the marine space, especially with the main objective of the ROG, to de-escalate conflict on sea and to balance all interests included (Deutscher Bundestag, 2008).

Concludingly it can be argued that the conflict between OWE and the fishery sector, while highly relevant, is not easily solved. Large areas of the German EEZ in the North Sea are already occupied for the development of OWFs, which will even rise in the future. However,

the fishing industry in Germany is still relevant and many people depend on it. Therefore, both sectors have to be willing to compromise and find solutions to cooperate. Communication with the help of external parties, such as boundary spanners can help to find common grounds and to agree on solutions, even if these also have downsides for both sectors. Additionally, current institutions must be changed in favor of the fishing industry, while maintaining the development of OWE for a climate friendly future and the future independence of Germany's energy supply. Communication alone will not solve the problem, as the current legal system in Germany allows the prioritization of OWE. Therefore, incentives for energy suppliers to cooperate with fishermen are rather low. Fishermen, on the other side, have a weak legal position and therefore less influence on the situation in the German North Sea. Without support, the situation will not change in the next few years, even if it is important that, already today, OWFs are planned in such a way that fishing activities are possible. Therefore, support and commitment from the government is needed to create incentives for the energy companies to allow fishing activities in the OWFs while supporting the fishermen in affording insurances and acquiring fishing gear. Without such help, the fishing industry in the German North Sea will have major problems in the future. However, the fishing industry is an important part of the German North Sea which should be upheld. Therefore, support and the willingness to change the system is needed to save the fishing sector while at the same time supporting the development of renewable energy to combat climate change.

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APPENDIX

Appendix I - Coding Frame

CATEGORY	CODE	DESCRIPTION
THE CASE	Information	Statements about specific information of the German North Sea
MARINE SPATIAL PLANNING	Authorities	Statements about responsible Authorities and Actors of MSP
	Planning Process	Statements of the planning steps and planning processes in the German EEZ
	Perception of MSP	Statements about the usefulness and role of MSP including its evaluation
	Priorities in Space Sistribution	Statements about (un)fairness of the distribution of space in the German EEZ
OFFSHORE WIND ENERGY	Sector Specific View	Statements of perception of OWE in the German EEZ
	Relevance	Statement about the relevance of OWE for the society and Germany
FISHERY	Sector Specific View	Statements of perception of the fishery sector in the German EEZ
	Relevance	Statements about the relevance of the fishery sector for the society and Germany
CONFLICT	Reasons	Statements on the reasons why the conflict occurs
	Direct Impact	Statements on direct impacts due to the conflict

	Indirect Impact	Statements on indirect impacts due to the conflict
STAKEHOLDER ENGAGEMENT	Stakeholders	Statements about stakeholders involved in the issue
	Interests	Statements about the interests of the stakeholders
	Involvement	Statements on the degree and level of stakeholder engagements and collaboration
	Influence	Statement on the degree of influence on the planning process
	Time of Involvement	Statements on the point of time stakeholders are involved
	Restrictions	Statements on restrictions of stakeholder involvement in the planning process
MEDIATION PROCESS	Mediation Process	Statements about mediation processes during the planning process
INSTITUTIONS	Formal	Statements about formal institutions regarding the German EEZ and MSP
	Informal	Statements about informal institutions regarding the German EEZ and MSP
RECOMMENDATIONS	Perspectives	Statements about ideas to minimize the conflict
	Future Outlook	Statement about future perceptions and wishes

Appendix 2 - Interview Guides

Interview Guide ID 1

INTRODUCTION	<ul style="list-style-type: none">- Can you introduce yourself and explain what area you work in and what topics you focus on?
BACKGROUND	<ul style="list-style-type: none">- How would you describe Marine Spatial Planning?- In Germany, the BSH is responsible for Marine Spatial Planning. Could you briefly explain how the planning process works and how the different interests of the stakeholders and sectors are balanced?- Are representatives of the individual sectors (e.g. fisheries) included in the planning process and are their opinions heard?
CONFLICTS AND PROBLEMS	<ul style="list-style-type: none">- What issues may arise during the planning process?<ul style="list-style-type: none">o Are there conflicts that arise from Marine Spatial Planning?<ul style="list-style-type: none">▪ Have you experienced how such conflict can manifest itself through your work? E.g., through your work with the board game/ MSP Challenge?
STAKEHOLDER ENGAGEMENT	<ul style="list-style-type: none">- Are there priorities for the allocation of space in the planning process?<ul style="list-style-type: none">o If yes, why? What are the advantages or disadvantages for other sectors?- How is it ensured that all sectors are given equal footing?<ul style="list-style-type: none">o Are there differences in theory and practice?
OWE AND FISHERY	<ul style="list-style-type: none">- How important is offshore wind energy in the German North Sea?- To what extent are offshore wind energy projects included in the planning process and how has this developed over the last decades?- How important is fishery in the German North Sea?- To what extent is fishery included in the planning process and how has this developed over the last decades?

	<ul style="list-style-type: none"> - Is there a noticeable conflict between offshore wind energy and fisheries? - How did the conflict arise and how has it developed? - Have complaints been filed with the responsible authorities? <ul style="list-style-type: none"> o How are these handled?
IDEAS AND PERSPECTIVES	<ul style="list-style-type: none"> - Are efforts already underway to minimize the conflict between offshore wind energy and fisheries? <ul style="list-style-type: none"> o If so, by whom? - Have there been direct discussions between representatives of the two sectors in the past? <ul style="list-style-type: none"> o If so, in what form did these take place and how successful were they? - Can/should representatives of the sectors be more involved or involved earlier in the planning process? - Are there individuals/organizations that are used as mediators?
IMPROVEMENTS	<ul style="list-style-type: none"> - Do you have any suggestions for improvements to minimize the conflict?
OUTLOOK	<ul style="list-style-type: none"> - In your opinion, should regulations be changed to benefit the fishery? <ul style="list-style-type: none"> o If so, how might these new regulations look like? - What do you think is the likelihood of change? <ul style="list-style-type: none"> o Is the conflict not relevant enough right now? o Who could enforce this change?
ADDITIONS	<ul style="list-style-type: none"> - Anything else you want to add?

INTRODUCTION

- Can you introduce yourself and explain what area you work in and what topics you focus on?

BACKGROUND

- How would you describe Marine Spatial Planning?
- How important is offshore wind energy in the German North Sea?
- To what extent are offshore wind energy projects included in the planning process of Marine Spatial Planning and how has this developed over the past decades?
- How important is fishery in the German North Sea?
- To what extent is fishery included in the planning process of Marine Spatial Planning and how has this developed over the last decades?
- What are, in your opinion, the biggest issues that can arise during the planning process of the German Exclusive Economic Zone?

STAKEHOLDER ENGAGEMENT

- Are representatives of the individual sectors (e.g. fisheries) involved in the planning process and is their opinion taken into account? If yes, how and to what extent?
- Are some sectors prioritized in the planning process (Do they get more space than others)?
 - o If so, why? What are the advantages or disadvantages of doing so?
- How can it be ensured that all sectors are given equal consideration?

OWE AND FISHERY

- Does, and if at all, how does the expansion of offshore wind energy impact the fishing industry in the German North Sea?
- What is the conflict about, which results from this impact and how did this conflict emerge?

IDEAS AND PERCEPTIONS

- Are efforts already underway to minimize the conflict between offshore wind energy and fisheries?
 - o If yes, by whom?

	<ul style="list-style-type: none"> - Can/should representatives of the sectors be more involved or earlier involved in the planning process? - Have there been direct discussions between representatives of the two sectors in the past? <ul style="list-style-type: none"> o If so, what form did these take and how successful were they? - Are there individuals/organizations that serve as mediators?
IMPROVEMENTS	<ul style="list-style-type: none"> - Do you have any suggestions for improvements to minimize the conflict?
OUTLOOK	<ul style="list-style-type: none"> - In your opinion, should regulations be changed to benefit the fishing sector? <ul style="list-style-type: none"> o If so, how might these new regulations look like? - What do you think is the likelihood of change in the future? <ul style="list-style-type: none"> o Who might enforce this change? o Or do you think the disadvantage for fishermen will even grow in the future?
ADDITIONS	<ul style="list-style-type: none"> - Anything else you want to add?

<p>INTRODUCTION</p>	<ul style="list-style-type: none"> - Can you introduce yourself and explain what area you work in and what topics you focus on?
<p>BACKGROUND</p>	<ul style="list-style-type: none"> - How are fishing grounds in the North Sea allocated between fishermen? <ul style="list-style-type: none"> o Licenses, allocation of space, etc.
<p>CONFLICTS AND PROBLEMS</p>	<ul style="list-style-type: none"> - How do you feel about the conflict that fishermen have less space available for their work due to the growing number of offshore wind energy? - How did this conflict come about and how has it developed in recent years?
<p>IMPACTS</p>	<ul style="list-style-type: none"> - To what extent are fishermen restricted in their work? <ul style="list-style-type: none"> o Are there noticeable losses in catch and income? - Who feels the restrictions particularly? <ul style="list-style-type: none"> o Smaller fishermen or also corporations? o Have there already been fishermen who had to change their profession?
<p>POSSIBLE SOLUTIONS</p>	<ul style="list-style-type: none"> - Have there already been discussions between the sectors and also with the authorities? Your authority/BSH
<p>PERCEPTION AND EXPERIENCE</p>	<ul style="list-style-type: none"> - In your opinion, have fishermen and their needs been sufficiently involved in the planning of Marine Spatial Plan? - Is aquaculture in Offshore Wind Farms a real alternative for fishermen in the German North Sea? - What do fishermen wish for the future?
<p>OUTLOOK</p>	<ul style="list-style-type: none"> - How could the conflict be addressed in the future to minimize it?
<p>ADDITIONS</p>	<ul style="list-style-type: none"> - Anything else you want to add?

INTRODUCTION	<ul style="list-style-type: none"> - Can you introduce yourself and explain what area you work in and what topics you focus on?
BACKGROUND	<ul style="list-style-type: none"> - Where in the German North Sea are you present and where do you mainly fish? - How are fishing grounds in the North Sea allocated between fishermen? <ul style="list-style-type: none"> o Licenses, allocation of space, etc.
CONFLICTS AND PROBLEMS	<ul style="list-style-type: none"> - How do you feel about the conflict that fishermen have less space to work with due to the growing number of offshore wind farms? - If the conflict is noticeable, how did it come about and how has it developed in recent years?
IMPACTS	<ul style="list-style-type: none"> - To what extent are fishermen restricted in their work? <ul style="list-style-type: none"> o Are there noticeable losses in catch and income due to offshore wind energy? - Who feels the restrictions particularly? <ul style="list-style-type: none"> o High-sea fishing or coastal fishing? - Is there a noticeable increase in competition between fishermen?
PERCEPTION AND EXPERIENCES	<ul style="list-style-type: none"> - In your opinion, were and are fishermen and their needs sufficiently involved in Marine Spatial Planning? - Is aquaculture in offshore wind farms a real alternative for fishermen in the German North Sea in the future?
POSSIBLE SOLUTIONS	<ul style="list-style-type: none"> - Have there already been discussions between the sectors and also with the authorities? Your authority/BSH - Are there organizations/individuals that act as mediators?
OUTLOOK	<ul style="list-style-type: none"> - In your opinion, should regulations and laws be changed for the benefit of fishermen? If yes, what could they look like? - Furthermore, how might conflicts be addressed in the future to minimize it? - What would you like to see changing in terms of fishing and offshore wind energy?
ADDITIONS	<ul style="list-style-type: none"> - Anything else you want to add?

<p>INTRODUCTION</p>	<ul style="list-style-type: none"> - Can you introduce yourself and explain what area you work in and what topics you focus on?
<p>BACKGROUND</p>	<ul style="list-style-type: none"> - How would you explain or describe Marine Spatial Planning? - In Germany, the BSH is responsible for Marine Spatial Planning. Could you briefly explain how the planning process works and how the different interests of the stakeholders and sectors are balanced? - How is the space allocated? Are fishing areas included in the process? - Who are the key stakeholders in the process?
<p>CONFLICTS AND PROBLEMS</p>	<ul style="list-style-type: none"> - What issues can arise during the planning process? <ul style="list-style-type: none"> o Are there conflicts that arise from Marine Spatial Planning? <ul style="list-style-type: none"> ▪ Have you experienced through your work how such conflict can manifest itself?
<p>STAKEHOLDER ENGAGEMENT</p>	<ul style="list-style-type: none"> - Are there priorities for allocating space in the planning process? <ul style="list-style-type: none"> o If yes, why? What are the advantages or disadvantages for other sectors? - How will it be ensured that all sectors are included? - What does a workshop look like? - Is there a noticeable difference between theory and practice in this regard? - The statements give a good picture on the view of the wind energy companies and the fishermen, would you say most of the wishes or suggestions for improvement were taken into account in the final plan?
<p>OWE AND FISHERY</p>	<ul style="list-style-type: none"> - How important is offshore wind energy in the German North Sea? - To what extent are offshore wind energy projects included in the planning process and how has this developed over the past decades? - Who sets the targets for how much energy should be produced offshore, the Federal Ministry for Economic

	<p>Affairs and Climate Protection?</p> <ul style="list-style-type: none"> - How are the projects distributed to the energy companies? - How important is fishery in the German North Sea? - To what extent is fishery included in the planning process and how has this developed over the past decades? - Is there a noticeable conflict between offshore wind energy and fisheries? - How did the conflict arise and how has it developed? - Have complaints been filed with the responsible authorities? <ul style="list-style-type: none"> o How are these handled? - How do other sectors influence the conflict?
<p>IDEAS AND PERSPECTIVES</p>	<ul style="list-style-type: none"> - Are efforts already underway to minimize the conflict between offshore wind energy and fisheries? <ul style="list-style-type: none"> o If yes, by whom? - Have there been direct discussions between representatives of the two sectors in the past? <ul style="list-style-type: none"> o If so, in what form did these take place and how successful were they? - Can/should sector representatives be involved more or earlier in the planning process? - Are there individuals/organizations that act as mediators?
<p>OUTLOOK</p>	<ul style="list-style-type: none"> - In your opinion, should regulations be changed to benefit the fishery? <ul style="list-style-type: none"> o If yes, how could these new regulations look like? - What do you think is the likelihood that something will change? <ul style="list-style-type: none"> o Who could enforce this change? - Do you have any suggestions for improvements to minimize the conflict?
<p>ADDITIONS</p>	<ul style="list-style-type: none"> - Anything else you want to add?

Appendix 3 - Consent Form



Declaration of consent for the collection and processing of interview data

Research project: Master thesis for the studies DDM Water and Coastal Management/Environmental and Infrastructure Planning

Research question: *How can conflicts between the offshore wind industry and the fishing industry in the North Sea be minimized?*

Institution: Rijksuniversiteit Groningen and Carl von Ossietzky University Oldenburg

Interviewer: Nelly Reckhaus

Interview date: XX.XX.XXX

Statement

By signing this consent form, you agree to participate in an interview that will be conducted as part of my master thesis. Our interview will be recorded in audio and video and transcribed afterwards. All information that could lead to an identification of your person will be anonymized during the analysis and also in the transcript. The recordings will be deleted after the end of the project (probably 17.08.2022). The transcript of the interview will be used exclusively for the analysis and only quoted in excerpts. Your personal contact data will be separated from the interview data, treated confidentially and not passed on to third parties.

Consent

You agree to participate in this interview as part of my master thesis. You have the possibility to cancel the interview at any time. Furthermore, you hereby agree to the above-mentioned form of anonymization and processing and the resulting data. You consent that individual sentences from the transcript are being quoted in the master thesis in order to answer my research question.

Your participation in and consent to the interview is voluntary and you have the option to withdraw this consent at any time. You will not be disadvantaged by refusal or withdrawal. Under these conditions, you agree to participate in the interview and consent to the interview being recorded, transcribed, anonymized, and processed.

Last name, First name

Place, Date, Signature