

Towards Ecosystem-Based Protection of Marine Environments

Investigating the scope for marine reserves in Northern Europe under
the Marine Strategy Framework Directive

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“A protected area is a clearly defined geographical space, recognized, dedicated and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values.”

**– The International Union for Conservation
of Nature and Natural Resources (IUCN)**

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Abstract

European oceans are in a poor state – only 10% of marine habitats and 2% of marine species show favourable conservation status. This is largely attributed to an intense pressure from industrial human activities at sea. The Marine Strategy Framework Directive (MSFD) from 2008 is an attempt to better protect marine environments in the European Union (EU) by enforcing an Ecosystem-Based Management (EBM) approach of marine activities. It has been called a governance challenge unprecedented in the history of EU environmental policy making. The Directive for example obliges coastal member states to adopt spatial protection measures to pursue the ambitious targets. Marine reserves are the strictest type of marine spatial protection and an acknowledged EBM tool. This paper investigates how the on-going implementation of the MSFD is influencing marine spatial protection in Northern Europe, and the scope for marine reserves as a policy instrument for achieving the EBM objectives. By providing case studies from Sweden, the United Kingdom and the Netherlands, the research finds that the Directive is used as a legal imperative for meeting other commitments, such as to the Convention on Biological Diversity, but delivers little advancement toward marine spatial protection. The case studies confirm that the main challenges are regulatory vagueness and overlap, and a lack of scientific knowledge about marine ecosystems. Marine reserves are found to have continued negligible application due to low political acceptability, especially at governmental level, and an uncertainty about their environmental relevance. The research raises concerns about the EBM credentials of existing marine Natura 2000 areas and the need to better incorporate the high values accredited to marine environments into the balancing between exploitation and conservation. The MSFD is a step in the right direction. However, a firm focus on ‘Blue’ economic growth at both national and EU-level makes achieving the ambitious environmental targets of the MSFD unlikely. It seems that this great governance challenge is simply too great.

Keywords: Marine Strategy Framework Directive (MSFD), Marine Protected Areas (MPAs), marine reserves, Ecosystem-Based Management (EBM) approach, Natura 2000

Executive Summary

Despite making up 71% of the Earth's surface, we know little about the diversity of ocean life and the complexity of its ecosystems (National Oceanic and Atmospheric Administration (NOAA), 2014). Estimations show that they contain 50–80% of all life on Earth (UNESCO, 2014) and it is acknowledged by, inter alia, the 2005 Millennium Ecosystem Assessment that they provide a wide range of services significantly contributing to human well-being. However, scientific reports from the last decades have revealed that less than one century of industrialised shipping, fishing and resource extraction has caused detrimental harm to marine life and habitats (see, e.g., Global Marine Species Assessment (GMSA), 2014; Myers & Worm, 2003). The state of marine environments continue to decline as more economic sectors develop ocean space (FAO, 2014). Policy makers around the world are consequently challenged to balance a sustainable use of the oceans with conservation of their largely overlooked environmental values. One approach is the Ecosystem-Based Management (EBM) approach, and an acknowledged tool adopting it is a network of Marine Protected Areas (MPAs) (see, e.g., Katsanevakis et al., 2011). Spatial protection covers 14.6% of Earth's land surface. The equivalent figure for marine environments, although making up 71% of the Earth's surface, is only 3–6% (Convention on Biological Diversity, 2014; Spalding et al., 2013). The total coverage of protection at sea is difficult to determine since the terminology and categorisation of different types of protection is highly fragmented. The highest level of marine spatial protection bans all extractive or otherwise to the environment harmful human activities and are often referred to as “marine reserves” (hereinafter also *no-take marine reserves*). These are estimated to make up less than half of 1% of oceans (The Pew Charitable Trusts, 2014). International organisations currently call for increases of this type of protection in order to realize the EBM approach and try to safeguard marine life and habitats.

The European Union (EU) recently followed suit and enacted in 2008 the Marine Strategy Framework Directive (2008/56/EC; hereinafter the *MSFD* or *the Directive*). It is the first comprehensive piece of legislation in the EU to enforce the EBM approach (Roth & O'Higgins, 2011). It legally binds Member States (MSs) to achieve Good Environmental Status (GES) in their marine waters by 2020, based on eleven qualitative ‘descriptors’. It has been called “a governance challenge unprecedented in the history of EU environmental policy making” (van Leeuwen et al., 2014, p. 2). Article 13.4 requires MSs to adopt spatial measures, which thereby are a central element in operationalising the EBM approach (Qiu & Jones, 2013). The MSFD brings a strong legal imperative for MSs to review and expand marine spatial protection. Given the diverse nature of different uses of the oceans in Europe, however, policy makers constantly have to consider and balance all interests involved. So-called Blue Growth is currently high on the agenda and MSs face several directives and guidelines from the Commission in the marine and maritime domains. Furthermore, inherent characteristics of marine environments such as scientific uncertainty, disconnections in time and space and the invisibility of oceans are obstructing policy processes. In all, the ‘hard’ sustainability objectives of the MSFD are at risk.

This thesis aims to enhance the understanding of how the on-going implementation of the Marine Strategy Framework Directive (MSFD) is influencing marine spatial protection in Northern Europe, and to investigate the scope for marine reserves as a policy instrument for achieving the EBM objective of the Directive. The thesis focuses on three EU member states; Sweden, the United Kingdom and the Netherlands. By contrasting their experiences of the MSFD implementation with academic and theoretical knowledge, the thesis tries to illustrate the impacts of the Directive at a national level, and the operationalization of the EBM approach. The work is conducted in collaboration with the International Council for the Exploration of the Sea (ICES), a key institution in international marine management and

central scientific advisor to the MSFD organisation. In order to achieve the research aim, the following research questions are to be answered:

1. How has implementation of the EU Marine Strategy Framework Directive influenced the establishment of marine spatial protection in the case study countries?
 - › What are current views on the Directive and in particular on its role for the establishment of marine spatial protection?
 - › How do authorities in the case study countries adhere to the need for spatial measures to actively pursue the ecosystem-based approach mandated in the Directive?
2. Why are marine reserves scarce in Northern Europe?
 - › What factors are suggested in current literature to hinder the adoption of marine reserves?
 - › What are barriers experienced in the case study countries regarding establishment of marine spatial protection?

The overall structure of the research is threefold; 1) Conceptual background of the MSFD and of marine reserves based on a literature review and on expert interviews. The two chapters in Part 1 summarise key challenges for implementing the MSFD and key factors hindering the application of marine reserves, respectively; 2) Case studies investigating these factors based on national stakeholder interviews, and; 3) A steering analysis of the MSFD and a policy evaluation of the political acceptability and environmental relevance of marine reserves as a policy tool, each based on the factors derived in Part 1.

In addition to the EBM approach, the Directive is underpinned by normative principles including the precautionary principle (MSFD, Recital 27, 45). In order to achieve the objectives, MSs are required to establish Programmes of Measures (PoMs) by 2015. In May 2014, the Marine Strategy Coordination Group (MSCG) provided recommendations stating that the mandatory spatial measures in Article 13.4 require new spatial areas to be established, and that ‘zoning’ with no-take areas in existing networks is one option (Marine Strategy Coordination Group (MSCG), 2014). The objectives of spatial measures are furthermore underpinned by several international and EU policies, and broadly supported in existing literature and by experts. Key challenges identified for implementation are rather the scientific uncertainty and lack of knowledge, regulatory vagueness and overlap and dependence on political will.

The research finds a considerable fragmentation with regard to the terminology and categorisation of marine spatial protection. There are several MPAs networks in Europe, whereof Natura 2000 under the Birds and Habitats Directives makes up 70%. The total coverage is difficult to determine although marine reserves are estimated to reach less than 1% (Fenberg et al., 2012). Most existing MPAs are located in-shore, omitting species and habitats further out at sea (European Environment Agency, 2012). A brief review of the proven effectiveness of marine reserves shows that they in general have large benefits to biodiversity. Local fisheries may benefit in from spillover of fish, although this is more contested. There is also disagreement regarding the generalizability of the studies. Key factors hindering the applicability of marine reserves include limitations relating to the nature of the instrument, scientific uncertainty and lack of knowledge, socio-economic consequences and political will.

The case studies demonstrate that all three countries use the Directive as an imperative for meeting other commitments including the CBD, the Habitats Directive and the Regional Sea Conventions (RCS). However, it delivers limited progress of spatial protection. The case studies confirm a regulatory vagueness regarding whether additional protected areas actually are required under the Directive or not, resulting partly from inflexibility of national authorities to adopt new guidance. The case studies also confirm regulatory overlap, especially with the new CFP hindering establishment of protection in Exclusive Economic Zones (EEZs),

insecurity whether the new Maritime Spatial Planning (MSP) Directive will create clashes and regarding the distinction between the MSFD objectives and the existing Natura 2000 network. The case studies suggest that political will is influenced by structural characteristics and priorities and confirms that the ability of the countries to act is hampered by lack of empirical studies and standardised methods. *Sweden* does not add new spatial measures in their PoMs due to lack of time and resources, and due to inherent factors in the national environmental management tradition. The Government provides little practical guidance or resources for how to achieve their ambitious targets, and Sweden consequently risks continuing lagging behind internationally and fail to deliver to the MSFD objectives. Existing marine Natura 2000 were established in adjacency to terrestrial Natura 2000 for sake of convenience. *The UK* will not add additional spatial measures since they interpret that it is not required. Instead, the MSFD reinforces the ongoing ambitious establishment of Marine Conservation Zones (MCZs), although the authorities seem reluctant to link it to the MSFD. The case study suggests that one reason may be an inherent reluctance towards the EU. It also reveals failed attempts to involve stakeholder participation and to establish marine reserves. It is suggested that the international call for marine spatial protection may affect the British political will since politicians do not wish to be seen as laggards, although lower management levels may be more reluctant. Furthermore, there is a strong political focus on economic growth, compelling the authorities to deliver solid economic arguments for spatial measures. This is challenging without tools for environmental valuation. *The Netherlands* is at an early stage of marine spatial protection although the only country introducing new spatial measures in their PoMs. However, the rest of the measures are all fishery measures and overall arguably a poor representation of an EBM approach. Dutch authorities seem to satisfy the requirements by adopting the minimal approach mentioned by previous authors. The authorities seem determined to prioritise economic growth and will continue to only adopt the Natura 2000 network.

The case studies confirm that marine reserves are scarce in these Northern European countries mainly due to low political acceptability, especially at governmental level, and uncertainty about their environmental relevance. This is mainly attributed to their high level of coercion not being tolerated by economic actors, especially fishermen, and thereby not by politicians. Stakeholder participation has had limited success. Designation in uncontroversial areas is suggested as a solution, although this approach is questionable. Furthermore, although zoning and reference areas are mentioned, most attempts to introduce these have met strong opposition and been withdrawn. To gain support for marine reserves, authorities need scientific data and empirical examples to demonstrate how local stakeholders will be affected. None of the countries currently assesses their MPAs, however, and regional assessments provided by OSPAR and others have little value since all countries use different classification. Tentative studies of marine reserves in the UK nevertheless show surprisingly positive results. In cases of scientific uncertainty, MSs have the formal possibility to justify marine spatial protection by using the precautionary principle, although it has proven difficult to operationalise at national and regional level. Authorities also need to show how local communities may benefit economically. Alike the rest of the EU, neither of the case study countries use economic valuation of ecosystem goods and services, creating unfair balance between use of natural resources and conservation of their environmental values. The case studies suggest acknowledgement of the ecotourism potential of marine reserves, such as illustrated at Kosterhavet National Park in Sweden. While this is a highly case-specific example, it does provide interesting lessons regarding not jeopardising conservation objectives entirely for the sake of balancing different interests. The EU is working to establish common methodology for economic valuation of ecosystem goods and services, and ICES and other institutions are working to establish a scientific baseline. However, environmental valuation has several shortcomings and whatever is developed at central level takes time and resources to implement among MSs.

Not all marine areas are in need of strict protection to recover. However, the case studies illustrate that many parameters need to coincide for concepts of ‘sustainable use’ to function. Examples of such coexistence where economic growth is not at the expense of marine life are rare. It is meanwhile essential to improve management and enforcement of the existing MPA network, as well as the surrounding environment as a whole through a holistic policy mix where all eleven descriptors of the MSFD are addressed. Furthermore, percentage coverage is not equivalent to protection. Protected areas need well-functioning management and enforcement and scientifically based design. Since the Natura 2000 is already manifested in national management it may be more effective to strengthen its marine part, for instance by introducing zoning, than to try to establish a new paradigm. Furthermore, the author supports that the provisions of environmental protection in the CFP need to be better integrated and enforced to support the MSFD objectives in EEZs, where they are in fact needed the most.

The large difference between the coverage and stakeholder acceptance of terrestrial and marine protected areas may be a result of the invisibility of oceans. To most, the ocean is merely a flat surface and a protected area may have little merit. Terrestrial protected areas are more easily accessible for people to enjoy, on the other hand. Furthermore, terrestrial spatial protection has been in place for a long time and both the public and policy makers are used to the concept.

The adoption of the Marine Strategy Framework Directive (MSFD) in 2008 is an indication that protection of the marine environment in Europe overall is progressing. This research furthermore indicates a strong argument for adopting marine reserves as part of an Ecosystem-Based Management (EBM) approach mandated in the MSFD. The concern is now whether political action will develop soon enough, considering the high pace of marine environmental degradation and the projected increase of economic sectors generating negative externalities on marine ecosystems. Timely and effective implementation of the ambitious goals of the MSFD is of great importance, however, goals and targets have little value without practical tools or sufficient resources. Regarding the inherent scientific uncertainties about marine environments pointed out as a main hurdle in the case studies, a point have been reached where scientists need to acknowledge that full certainty is not possible to attain, and policy makers that some measures ultimately will have to settle for less certain justification. The scope of marine reserves as a means to adopt an EBM approach in Northern Europe seems consequently to be initially reliant on ensuring that the precautionary principle is operational at national and local management levels.

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List of abbreviations

CBA	Cost-Benefit Analysis
CBD	Convention on Biological Diversity
CFP	Common Fisheries Policy
Cefas	Centre for Environment, Fisheries & Aquaculture Science
Defra	Department for Environment, Food and Rural Affairs
EBM	Ecosystem-Based Management
EC	European Commission
EEA	European Environment Agency
EEZ	Exclusive Economic Zone
EPA	Environmental Protection Agency
FAO	Food and Agriculture Organization of the United Nations

GES	Good Environmental Status
HELCOM	Helsinki Convention
ICES	International Council for the Exploration of the Sea
IMARES	Institute for Marine Resources and Ecosystem Studies
IUCN	International Union for Conservation of Nature and Natural Resources
JNCC	Joint Nature Conservation Committee
MCAA	Marine and Coastal Access Act
MCZs	Marine Conservation Zones
MPA	Marine Protected Area
MSCG	Marine Strategy Coordination Group
MSFD	Marine Strategy Framework Directive
MSP	Maritime Spatial Planning
MSs	Member States
NGO	Non-Governmental Organisation
OECD	Organisation for Economic Co-operation and Development
OSPAR	Oslo and Paris Conventions
PoMs	Programmes of Measures
RSC	Regional Sea Convention
SwAM	Swedish Agency for Marine and Water Management
TEEB	The Economics of Ecosystems and Biodiversity
UNCLOS	United Nations Convention on the Law of the Sea
UNESCO	United Nations Educational, Scientific and Cultural Organization

Glossary of terms

Adaptive management: a systematic process for continually improving management policies and practices by learning from the outcomes of previously employed policies and practices (TEEB, 2014).

Biodiversity or biological diversity: the variety of life at three different levels – genetic diversity, species diversity and ecosystem diversity (Swingland, 2001).

Connectivity: the movement of organisms between sites, e.g. marine reserves, through dispersal or migration (Roberts & Hawkins, 2000).

Ecosystem: a system in which the interaction between different organisms and their environment generates a cyclic interchange of materials and energy (*Glossary of Environment Statistics*, 1997).

Ecosystem goods and services: the direct and indirect contributions of ecosystems to human wellbeing. The concept “ecosystem goods and services” is synonymous with ecosystem services (TEEB, 2014).

Eutrophication: the effects of excess nutrient input to water bodies, such as excessive algal growth, reduced light penetration, reduced oxygen levels and ultimately hypoxia.

Good Environmental Status: the environmental status of marine waters where these provide ecologically diverse and dynamic oceans and seas which are clean, healthy and productive (MSFD, Art. 3).

Marine Protected Area (MPA): a clearly defined geographical space, recognised, dedicated and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values (Dudley, 2008). (For a discussion about definitions, see Section 4.1).

Maritime Spatial Planning (MSP): a public process of analysing and allocating the spatial and temporal distribution of human activities in marine areas to achieve ecological, economic, and social objectives that usually have been specified through a political process (UNESCO & IOC, 2014).

No-take Marine Reserve or Marine Reserve: defined areas of ocean space fully protected from extractive uses, except for non-harmful levels of recreational activities (for a discussion about definitions, see Section 4.1).

Resilience: the ability of an ecosystem to recover from disturbance without human intervention (TEEB, 2014).

Spillover: movement of adult and larval organisms from a protected area into nearby areas.

1 Introduction

1.1 Background

The oceans are home to an estimated 50–80% of all life on Earth (UNESCO, 2014). Yet, it is commonly said that we know less about the oceans than we do about space. As the ultimate last frontier, the sea is still a mystical and foreign place which most of us rarely encounter. Constituting 71% of the Earth's surface, understanding the oceans is not easy. Nevertheless, an increasing body of science reveals that less than one century of industrialized shipping, fishing and resource extraction has caused significant harm to marine life.

Our use of the oceans has been guided by a premise that they are inexhaustible (Roberts, Hawkins, & Gell, 2005; The World Bank, 2006). Harvesting of commercial species has kept an unsustainable pace, often using destructive methods. This has resulted in loss of 90% of large marine predators (Myers & Worm, 2003) and a predicted worldwide collapse of commercial fisheries by 2048 (Worm et al., 2006). Untargeted species including sea birds and mammals have been caught as bycatch and discarded – as much as 90% of the catch in some European fisheries (Kelleher, 2005). Meanwhile, secondary impacts from for example climate change and eutrophication have intensified the stress on marine environments. A well-known example is the deterioration of the most diverse and valuable ecosystems on the planet, coral reefs, from acidification. Corals now risk extinction by mid-21st century (Burke, Spalding, Perry, & Reyter, 2011). By meanwhile using the oceans for waste disposal; pollution and waste has spread to the deepest oceans sinks and disrupted marine life (Pham et al., 2014). Consequently, an increasing number of marine species are gradually added to the International Union for Conservation of Nature and Natural Resources (IUCN) lists of vulnerable or threatened species (Global Marine Species Assessment (GMSA), 2014).

Despite gaining global public attention, the state of marine environments is still generally downward-sloping (FAO, 2014). As the effects of our impacts continue to unravel, we are yet to realise the full ecological and biological impacts since 95% of the oceans remain unexplored (National Oceanic and Atmospheric Administration (NOAA), 2014).

The value of marine natural capital

Deterioration of fisheries, coral reefs, and other marine life jeopardise the valuable and important goods and services that these ecosystems provide. These values are acknowledged by, inter alia, the Convention on Biological Diversity (CBD), UNEP Regional Seas Programme (UNEP, 2014) and the 2005 Millennium Ecosystem Assessment (Millennium Ecosystem Assessment, 2005). They highlight that ecosystems offer a wide range of services significantly contributing to human well-being. The oceans hold infinite biodiversity values on ecosystem, species and genetic levels. This has importance for medicine as well as to build resilience against systemic impacts caused by for example climate change. Species below the surface are furthermore of importance to species above the surface, creating an interlinked web of values essential to maintain. The oceans also provide intangible benefits in the form of recreational, cultural and bequest values for future generations. Decisions concerning the use of ecosystem goods and services should acknowledge these values and be consistent with their conservation. However, conventional macroeconomic tools fail to capture these values and consequently incorporate them into conventional economic assessments (Wawrzynski, personal communication, September 8, 2014).

Overall, the total value of marine ecosystems is largely overlooked (Maes et al., 2012). A review commissioned by the European Commission in 2008 generated a list of 291 valuation studies, of which four were related to marine ecosystems (Markandya et al., 2008). Available

estimates suggest that marine environments provide immense monetary value (Costanza et al., 2014).¹ Meanwhile, new uses of marine space are gaining importance. Wave- and offshore wind energy generation are important when phasing out fossil energy sources. Seafloor mining of minerals is skyrocketing as land-based deposits dwindle and demand increases. As a result, pressures on marine environments become increasingly complex. The balance between using the oceans sustainably and safeguarding their values and resources has become increasingly challenging for policy makers and national and regional authorities are accelerating ocean governance across all continents to address this challenge.

Policy needs and development

With the exception of commercial fisheries, protection of marine life and habitats is a rather new conservation focus, receiving little attention until the last few decades (Blasiak et al., 2014). Fishery managers have traditionally included habitat protection in management models mainly as a factor for production support (Hilborn, 2014; Roberts et al., 2005). There is now significant call for action among international institutions and several global commitments have been made to halt the loss of marine biodiversity and support a sustainable future of marine environments, including the 2010 Biodiversity Targets agreed by the Parties to the Convention on Biological Diversity (CBD) (see Section 3.5).

Dealing with human impacts and environmental responses separately and in isolation is not possible since oceans are by nature interconnected. Anthropogenic impacts often develop in unforeseen patterns via various threshold effects. This requires management and policy efforts to adopt a systematic and holistic approach, addressing the state of the marine environment through a mix of interventions including environmental regulations, emissions standards for industry, use of market-based instruments such as environmental taxes and grants, as well as posing protection status for threatened species and habitats (The World Bank, 2006). With this understanding, new management approaches are emerging in the intersection between commercial use of marine resources and concerns for marine ecosystems (Backer, 2011). One such approach is the Ecosystem-Based Management (EBM) approach, which receives significant attention and has been widely adopted in recent years, although still, has limited practical impact (Katsanevakis et al., 2011). For a definition of the concept, see Section 3.2.

Marine spatial protection

Protecting clearly defined geographic areas by regulating human activities is an acknowledged EBM tool (Cárcamo, Garay-Flühmann, Squeo, & Gaymer, n.d.; Katsanevakis et al., 2011; Moksnes et al., 2014; Nike Bianchi, Parravicini, Montefalcone, Rovere, & Morri, 2012; Pita et al., 2011). It has long been a popular instrument for conservation and recreational objectives on land.² Today, 14.6% of Earth's land surface is protected. The equivalent figure for oceans, although making up 71% of the Earth's surface, is estimated to be 3–6% (see Section 4.2).

Spatial nature protection imposes varying levels of restrictions on human activities. At sea, restrictions range from limiting the magnitude of fishing, to prohibiting all resource extraction. There is no generally adopted categorisation of marine protected areas (MPAs); however the IUCN provides one that is frequently applied by governments and regional management authorities (Dudley, 2008) (see Section 4.1). The highest level of protection, banning all

¹ In an oft-cited study from 1997, Robert Costanza and his colleagues made a tentative estimate of global ecosystem services of US\$33 trillion per year (in 1997 dollars). Out of this estimate, marine ecosystems had a value almost twice that of terrestrial ecosystems (Costanza et al., 1997). In a recent update of their study, the global value of ecosystem services was re-estimated to \$125 trillion/year (in 2007 \$US) (Costanza et al., 2014).

² One of the world's first national park was established in Yellowstone, US, 1872.

extractive or otherwise to the environment harmful human activities, is often referred to in the literature as “no-take marine reserves” (hereinafter also *marine reserves*). It is also the definition applied to this research. For a more detailed description of MPA categorisation, see Section 4.1. The NGO the Pew Charitable Trusts (2014) emphasises that marine reserves make up less than half of 1% of world oceans – 15 times less than its terrestrial equivalents.

Since MPAs and marine reserves are spatial by nature, they mainly intend to protect sedentary flora and fauna within its boundaries. However, empirical studies have shown that protected areas can be important also for mobile creatures such as fish (see Section 4.3). The UNEP-hosted initiative the Economics of Ecosystems and Biodiversity (TEEB) states that MPAs also may benefit and support marine ecosystem services such as climate change mitigation and adaptation, eco-tourism, clean water, natural hazard mitigation and cultural and recreational values (TEEB, 2009). Given current trends of marine degradation and the risks of increasing extinction rates of marine species, there is support for an extension and improvement of the global network of spatial protection (see, e.g., Edgar et al., 2014; Mora & Sale, 2011). The United Nations Educational, Scientific and Cultural Organization (UNESCO) call MPAs “essential to conserve biodiversity of the oceans” (UNESCO, 2014). Spalding (2013) emphasises that “the considerable benefits from stricter levels of protection (including no-take areas or marine reserves) must be acknowledged” (p.242), and Lester et al. (2009) argue that marine reserves offer the greatest protection for marine resources and ecosystems. The IUCN World Parks Congress in 2003 goes as far as to recommend that at least 20–30% of marine habitats globally should be protected as a network of marine reserves. International NGO Greenpeace calls for 40%. The Mission Blue initiative calls for 20%. US President Barack Obama proposed in June 2014 the world’s hitherto largest no-take marine reserve, about the size of Mexico, in the central Pacific Ocean (Eilperin, 2014). Roberts et al. (2005) claims that “effective nature conservation in the sea cannot be delivered without marine reserves” (p.128).

Policy development in the EU

The European Union (EU) recently followed suit in the paradigm shift towards integrated ocean management, recognising the balance between the environment and human activities (Roth & O’Higgins, 2011). With its several inland seas and heavily populated and exploited shores, the European continent exerts particularly high pressure on its marine environments. According to the European Environment Agency (EEA) (2010), only 10% of the marine habitats in Europe and 2% of marine species show favourable conservation status, although much is still unknown. There are several networks of MPAs, of which the Natura 2000 network makes up 70%. However, most are located close to shore, omitting important species and habitats further out at sea (European Environment Agency, 2012). For details about Natura 2000 and other spatial protection networks in the EU, see Chapter 3.

In 2008, the European Parliament and European Council enacted the Marine Strategy Framework Directive (2008/56/EC; hereinafter the *MSFD* or *the Directive*). It is the first EU framework specifically directed at protecting and preserving the marine environment as a whole (European Environment Agency, 2012). The Directive legally binds coastal EU Member States (MSs) to achieve or maintain Good Environmental Status (GES) in their marine waters by 2020, based on eleven qualitative ‘descriptors’ (see Appendix III). These include, inter alia, maintaining biological diversity, controlling invasive species, and ensuring sustainable commercial fisheries (MSFD, Annex 1). Each member state is currently translating the eleven descriptors into practical policy measures for how to manage human activities at sea and achieve the goals. These measures will make up the Programmes of Measures (PoMs). Management of marine activities has to apply an Ecosystem-Based (EBM) approach (MSFD, Art. 1.3). The Directive is thereby the first comprehensive piece of legislation in the EU to enforce the EBM approach (Roth & O’Higgins, 2011). The PoMs must include “spatial

protection measures, contributing to coherent and representative networks of marine protected areas” (MSFD, Art. 13.4). These spatial protection measures are meant to protect marine biodiversity (Marine Strategy Coordination Group (MSCG), 2014). This makes marine spatial protection a central element in operationalising the EBM approach (Qiu & Jones, 2013). A more detailed description of the EBM and the Directive is provided in Chapter 3.

The MSFD currently receives significant attention and is likely to remain a central part in the process of ensuring long-term protection and sustainable use of marine resources in Europe (Wawrzynski, personal communication, April 15, 2014). Van Leeuwen et al. (2014) call it “a governance challenge unprecedented in the history of EU environmental policy making” (p.2).

1.2 Research Problem

Given the diverse nature of different uses of the oceans in Europe, there is a constant political balance at EU level to ensure that all interests are considered. Different sectors have different priority. Ocean management is currently high on the EU agenda, including the establishment of the MSFD, the recent reform of the Common Fisheries Policy (CFP) (in December 2013), introduction of the Maritime Spatial Planning (MSP) Directive (in July 2014) and the still ongoing design of an Integrated Maritime Policy (IMP). As a result, EU coastal states face several directives and guidelines from the European Commission (EC), with the risk for regulatory overlap and confusion regarding how to operationalise different strategies. The MSFD brings a legal imperative for MSs to review, improve and expand marine spatial protection. Nevertheless, this confusion may influence how the respective MSs are interpreting the requirement for spatial protection measures and potentially influence achieving its objectives. Consequently, and given the short timeframe of the Directive, continuous evaluation is crucial to ensure timely and effective implementation.

In order to understand national implementation of the MSFD, it is important to consider the general context of marine environmental policy in the EU. Koivurova (2012) calls the European governance context ‘unique’ in the sense that the EU holds a supra-national authority over oceans governance, compelling MSs to comply with and implement regulations and directives. The institutional capacity and political willingness for action differs largely between the respective MSs, however, and there is no central enforcement body to act upon non-compliance. The EU is a good example of a generally inherent challenge in policy making, namely the effects of a top-down policy approach where implementation lies at lower governance levels. Consequently, the knowledge about how specific policies are performing is often poor with little feedback to the top level policy makers. Mundaca (2013) suggests that these challenges derive from the high level of complexity of policy evaluation, the costs associated with conducting follow-up, and that there often is a lack of relevant data to analyse (lecture, December 3, 2013). The MSFD is no exception, and the knowledge gap is especially evident on a regional and pan-European level (Wawrzynski, personal communication, April 15, 2014).

The efforts of MSs to pursue the MSFD objectives and identify effective and feasible policy instruments are hindered by inherent characteristics of environmental issues in general, and marine issues in particular (Jessup & Power, 2011; Mickwitz, 2003). To be able to analyse the application of marine spatial protection under the MSFD, these inherent characteristics are important to consider. Firstly, marine environmental issues are complex, and there is considerable *scientific uncertainty*. External impacts may resonate throughout ecosystems in unforeseen patterns. The physical nature of water means that separate areas are functionally connected (De Santo, 2013). Jessup and Power (2011) suggest that this uncertainty and shortage of data may lead to opposition towards marine spatial protection and to practical and policy dilemmas in selecting suitable locations to protect. Policy makers may acknowledge the existence of uncertainties and the lack of empirical data (Toonen, 2013), however, science-

policy interactions might still prove too problematic (Degnbol, 2012). Secondly, the transboundary nature of oceans and *spatial disconnection* of impact and effect obstruct interaction between science and policy. Many marine species are mobile and migratory and harm caused in one area may affect the resilience of the species elsewhere. Furthermore, pollution dissipates and travels with currents to affect ecosystems far from the emission source. There may also be a *time lag* between the impact and the environmental response. It takes time for a high level of fishing pressure to ultimately cause a population to collapse (depending on target species and the level of pressure). There is also time lag between a policy measure and the ecosystem response (Mickwitz, 2003). The original system state may furthermore have changed irreversibly; meaning that predicting its response based on historical data is no longer possible. Thirdly, suggested as the most significant challenge to the utility and merit of marine spatial protection is the “*invisibility*” of oceans (Jessup & Power, 2011). Oceans are not only invisible, but may also seem unfamiliar and less charismatic to the public than terrestrial environments (De Santo, 2013). Furthermore, in terrestrial environments it is easier to see and understand how spatial restrictions effect species and habitats.

1.3 Objective and Research Questions

The aim of this thesis is to enhance the understanding of how the on-going implementation of the Marine Strategy Framework Directive (MSFD) is influencing marine spatial protection in Northern Europe, and to investigate the scope for marine reserves as a policy instrument for achieving the EBM objectives of the Directive. The thesis focuses on three EU member states; Sweden, the United Kingdom and the Netherlands. By contrasting their experiences of the MSFD implementation with academic and theoretical knowledge, the thesis tries to illustrate the impacts of the Directive at a national level, and of the operationalization of the EBM approach in terms of marine spatial protection. The work is conducted in collaboration with the International Council for the Exploration of the Sea (ICES), a global organisation developing scientific advice to support decisions makers making informed choices on the sustainable use of the marine environment and ecosystems. With 20 member countries and a network of over 4,000 scientists, ICES is a key institution in international marine management and a central scientific advisor to the MSFD organisation and establishment.

In order to achieve the research aim, the following research questions are to be answered:

1. How has implementation of the EU Marine Strategy Framework Directive influenced the establishment of marine spatial protection in the case study countries?
 - › What are current views on the Directive and in particular on its role for the establishment of marine spatial protection?
 - › How do authorities in the case study countries adhere to the need for spatial measures to actively pursue the ecosystem-based approach mandated in the Directive?
2. Why are marine reserves scarce in Northern Europe?
 - › What factors are suggested in current literature to hinder the adoption of marine reserves?
 - › What are barriers experienced in the case study countries regarding establishment of marine spatial protection?

This thesis may be of interest to the MSFD organisation and other EU institutions working to support marine environmental protection, to national and regional policy makers for the sake of learning from others and finding new perspectives on the topic and to the case study countries as perspective to their approaches to marine biodiversity protection. The case studies may also provide interesting examples for an academic audience in the same or in relevant research fields, and for non-European marine planners and policy makers.

1.4 Scope and Limitations

In this section, the author presents and justifies the scope of the thesis and addresses limitations of the scoping. This helps set the boundaries of the research and identify avenues for future research.

The geographical focus of the research is on Northern European sea basins, namely the North Sea, North-East Atlantic Ocean and the Baltic Sea. The North Sea is an “ecologically rich sea” (Toonen, 2013, p. 21) which once included sharks and rays, edible oysters, mussel beds and considerably larger and older fish (Lindeboom, personal communication, July 29, 2014). Main environmental impacts are effects of fishing and eutrophication, although recreational use and habitat loss also exert intense pressure (Walday & Kroglund, 2002b). Commercial fisheries in the North Sea do not meet the sustainability criteria of ICES (see Figure 1). Demersal fish species in Northern Europe have declined 80–90% since year 1900 (Christensen et al., 2003). Van Veen et al. (2008) also mention that collateral damage from fishing gear is high, and that about 75% of catch is discarded.³ Furthermore, large individuals have disappeared and marine waters are dominated by smaller sizes. The North-East Atlantic is under similar stress from overfishing, trawling and discards, as well as pollution from maritime transport. Several of its species are endangered (Johnsen, Nygaard, & Olsgard, 2002).

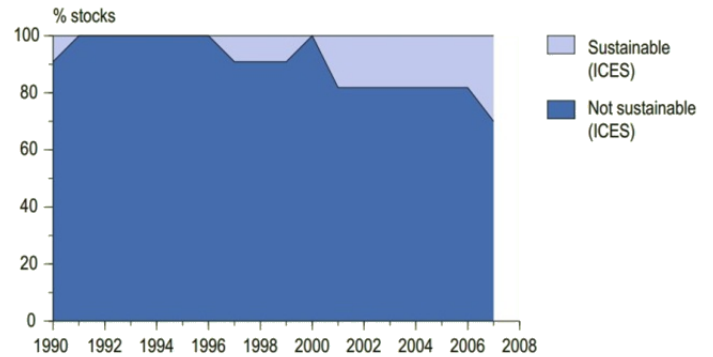


Figure 1 Commercial fish stocks unsustainably fished in the Greater North Sea (van Veen et al. 2008, p.9)

The Baltic Sea is almost entirely enclosed with slow water renewal circulation through the Danish straight. It is the largest brackish water system in the world and the high variation in salinity makes the marine environment highly vulnerable (BalticSea2020, 2013; Walday & Kroglund, 2002a). The Baltic Sea has experienced dramatic changes during the late 20th century (Olsson, 2013). The main environmental stressor is eutrophication. Fisheries are also largely impacting due to over-exploitation, by-catch and impacts from trawling, but also pollution of hazardous substances and introduction of non-indigenous species (Korpinen, Meski, Andersen, & Laamanen, 2012; Walday & Kroglund, 2002a). Furthermore, it is predicted that climate change effects in the Baltic Sea may gradually drive protected species out of protected areas, calling for ongoing monitoring and flexibility regarding their boundaries (HELCOM, 2013). An explanation of the case study selection – Sweden, the United Kingdom and the Netherlands – is provided in Section 2.2.

Marine spatial protection is studied in more detail because it is explicitly required under the MSFD in Article 13.4. The particular focus on no-take marine reserves (the most strict version of MPAs) has three main motives. Firstly, both global multinational environmental agreements such as the Convention on Biological Diversity (CBD) and regional regulations such as the MSFD demand better protection of marine environments. Marine reserves are suggested to offer the greatest protection for marine resources and ecosystems, and could therefore be interesting in this context. Secondly, despite being an acknowledged conservation tool, marine reserves make up 15 times less space than their terrestrial equivalents, which illustrates a need to review this imbalance (The Pew Charitable Trusts, 2014). Thirdly, several

³ Discarding of commercial fish species is banned since the 1 January 2014 according to the new Common Fisheries Policy (CFP). It will however come into force on a fishery-by-fishery basis (CFP, Art. 15), and not cover non-commercial species.

international institutions and actors currently give the instrument much attention and demand considerable increase of their coverage. The MFSD offers the formal foundation to consider adopting this type of protection in a coherent network throughout the EU. Nevertheless, the author acknowledges that an ultimate marine policy mix must include a range of different instruments to successfully safeguard marine ecosystems. Relevant policies need to incorporate not only conservation interests, but also economic and social interests.

The methodological choice of conducting interviews may have limitations. Interviewees, regardless of affiliation, have different personal and organisational interests affecting their responses. It is difficult for the researcher to identify peoples' ultimate objectives. Expert interviews ultimately provide a one-sided view of the respective expert's opinions. The author acknowledges this potential bias and has therefore interviewed different experts in different countries in an attempt to broaden the perspective. Furthermore, the author acknowledges that the selected interviewees may or may not have been the best sources for the purpose of this study. There is a potentially high level of bias related to 'both sides' of this topic. Moreover, due to time and resource constraints, several stakeholder groups have not been interviewed and their views therefore not represented. As emphasised by Mickwitz (2003), not all relevant stakeholders have the capacity to participate in a study like this, as many recreational users are not sufficiently organised and therefore not easily identifiable. The timing of the interviews (summer holidays) has furthermore limited the magnitude of information gathered and potentially compromise the robustness of the conclusions.

In conducting qualitative research, the author inevitably uses herself as a tool for analysis which creates potential bias based on the author's background and ideological beliefs. The author of this thesis has a science background and kept this in mind to avoid jeopardising the quality of the analysis. Qualitative research is by default subjective and subjectivity is seen as an 'essential element of understanding' for the qualitative researcher. However, this subjectivity may give rise to misunderstandings, both from the author herself and from her readers, due to lack of clarity or due to own intellectual shortcomings (Stake, 1995, p. 45). It is therefore of great importance that qualitative research is validated through 'triangulation' (see Chapter 2). Another limitation of qualitative research is a lack of transparency and that it may be difficult to describe what has actually been done during the research (Bryman, 2012). The author attempts to minimise this ambiguity by for example providing a detailed accord in Section 2.3.2. A limitation of using a case study design is that they pose certain difficulties when it comes to generalisation. Instead, the ultimate aim is to study and learn about the uniqueness of the individual cases. However, this uniqueness may still provide important knowledge to other cases (countries in this case) whose situations are different (Stake, 1995, p. 8).

The policy evaluation criteria chosen to analyse marine reserves as a policy tool are political acceptability and environmental relevance (see Section 2.4.2). The author acknowledges that limiting the analysis to two criteria inevitably excludes other factors that may determine the success of a policy in meeting its goals. Current literature of MPAs focus on political and legal challenges and management issues (Dotinga & Trouwborst, 2011; Higgins, Vandeperre, Pérez-Ruzafa, & Santos, 2008; Jennings, 2009; Leenhardt, Cazalet, Salvat, Claudet, & Feral, 2013; Rochette et al., n.d.; Silva, Ribeiro, de Carvalho Cameira Mocinho Viras, & Grilo, 2012). Studies of marine reserves focus mainly on environmental effectiveness (Babcock et al., 2010; Dalton, 2010; Gell & Roberts, 2003; Lester et al., 2009; Russ, Alcalá, Maypa, Calumpang, & White, 2004; Stelzenmüller et al., 2008; Vandeperre et al., 2011), reserve design (Botsford, Micheli, & Hastings, 2003; Claudet et al., 2008; Gaines, Gaylord, & Largier, 2003; Halpern, 2003; Roberts, Bohnsack, Gell, Hawkins, & Goodridge, 2001), social justice issues (Jones, 2006), and lack of scientific understanding (Sale et al., 2005). Despite being an essential part of any environmental policy instrument, environmental effectiveness is not within the scope of

this research since such an assessment has not been feasible within the given time and resources. Studying environmental effectiveness is, moreover, inherently hampered by scientific uncertainties and time-gaps mentioned in Section 1.2. The author acknowledges that there are different opinions about how effective marine reserves are and under which preconditions (see Section 4.3), and emphasises that this research does not try to portray marine reserves as the ultimate solution. Whether a marine reserve is a suitable measure depends, *inter alia*, on the species and habitats in need of protection. The judgement of ultimate policy mix to operationalise an ecosystem-based management approach under the MSFD would require considering a multitude of factors beyond the scope of this thesis.

1.5 Thesis Outline

Following a description of the research methodology in Chapter 2, the main body of the thesis is divided into three parts. The first part begins by providing a background of the EU Marine Strategy Framework Directive (MSFD) in Chapter 3. It includes its goals and objectives and describes how the Directive relates to marine spatial protection and what existing academic literature says about this. Chapter 3 also reviews how the MSFD relates to other international and EU policy, respectively. The section concludes by presenting identified key challenges for implementing the MSFD. Chapter 4 describes marine reserves as an environmental policy tool including a discussion about terminology and the existing confusion regarding nomenclature. It describes the current coverage in the EU, concluding with identified aspects of political acceptability and environmental relevance of marine reserves. Chapter 3 and 4 are largely based on a literature review, supported by information collected through expert interviews.

Chapter 5 begins the thesis' second part, presenting the main empirical results of the semi-structured interviews with stakeholders in the three case study countries. The national motivations for establishing or not establishing marine spatial protection measures are presented, including examples of how the Directive has influenced and will continue to influence marine spatial protection through the design and adoption of Programmes of Measures. The section further includes, *inter alia*, barriers encountered and to what extent marine reserves have been considered as an alternative to safeguard biodiversity in national marine waters.

The third and final part of the thesis analyses the research in three stages in Chapter 6, bringing together the first two parts of the thesis (conceptual background and case studies). First, the MSFD is analysed in terms of implementation steering. Secondly, marine spatial protection is analysed as a potential policy tool under the MSFD, using the criteria of political acceptability and environmental relevance. Thirdly, an overall analysis discusses the scope for marine reserves in Northern Europe under the MSFD. Finally, in Chapter 7 the author concludes the main findings and reflections about the research, makes concluding remarks and suggestions for future research.

2 Research Methodology

This chapter describes the methodology used to guide the research. It describes the overall research structure and the use of case studies, and explains the methods for data collection and analysis, including Implementation Steering and a policy evaluation.

2.1 Research Approach and Overall Structure

The thesis adopts a qualitative research approach since it mainly investigates socio-economic and political aspects of policy implementation. Qualitative research aims to understand and observe, avoiding interfering in pursuit of an hypothesis (Stake, 1995, p. 44). Limitations of the approach are mentioned in Section 1.4. One attempt of triangulation is use of different methods (Stake, 1995, p. 114), why this thesis combines a literature review with interviews. The research structure described below merges theoretical and empirical research in an attempt to bring together the normative notion that marine reserves are an effective EBM policy tool, with positivist (factual) experiences in order to determine their practical applicability in the MSFD PoMs. The combination of written and verbal materials has provided empirical experiences with which the author has been able to illustrate theory and complement peer-reviewed publications. It has also given interesting subjective views illustrating the current discourse of marine spatial protection in the EU. As mentioned in the introduction, the overall structure of the thesis is threefold; 1) Conceptual background, 2) Case studies, and 3) Policy analysis (see Figure 2).

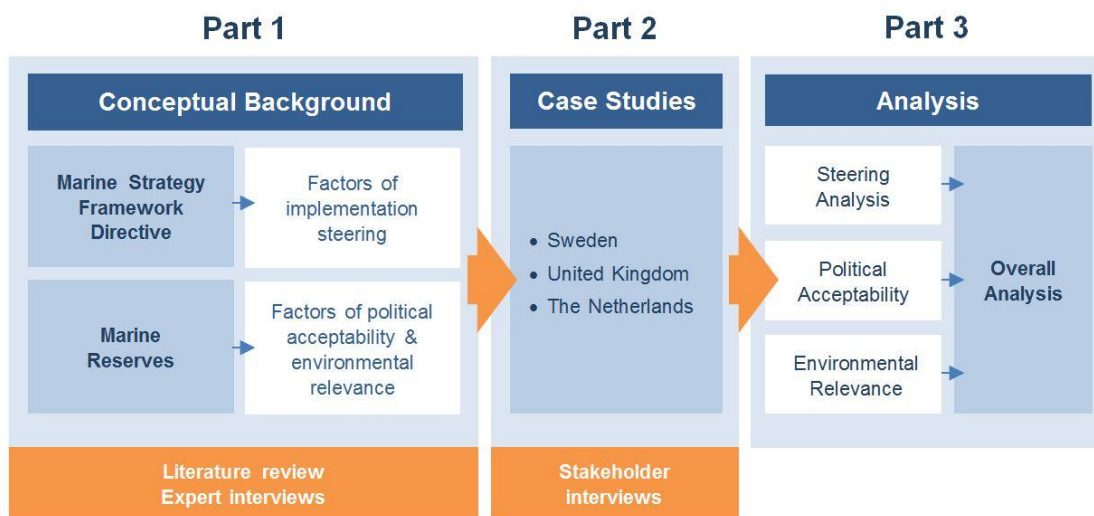


Figure 2 Research structure

Part 1 – the conceptual background of the MSFD helped the author develop an understanding of the Directive and how it influences marine spatial protection. A summary of factors suggested to influence the MSFD steering process is derived. In parallel, the author investigates marine spatial protection and the theoretical and empirical potential of marine reserves as policy tools. Again, a summary of factors potentially affecting the political acceptability and environmental relevance of marine reserves is derived. Data supporting Part 1 is based on a literature review and on interviews with experts (see Section 2.4).

Part 2 – in order to answer the research questions it was necessary to compile empirical data from authorities and stakeholders in coastal states in Northern Europe. This was done by conducting interviews and presenting case studies. The author investigated how the case study countries are working with marine spatial protection under the MSFD and, to the extent possible, which spatial measures they will include in the Programmes of Measures (PoMs).

Part 3 – Based on the case studies in Part 2, the author analyses the steering of the MSFD and the environmental relevance and political acceptability of marine reserves. The intention was to either confirm or contradict factors derived in Part 1, and if possible identify new aspects based on the case studies.

2.2 Case Study Research Design

Based on the research questions, a multi-case design appeared suitable. Case studies are used to explore and describe individual or smaller groups in detail. The unit of study in this thesis are nation states, emphasising the experiences in their particular contexts. Each case study is instrumental to learning about the effects of the MSFD on marine spatial protection. According to Stake (1995), “two principal uses of case study are to obtain the descriptions and interpretations of others” (p. 64). Consequently, interviews are a suitable means of data collection (see Section 2.4.2). Another goal of case studies is to identify avenues for further research. It was initially difficult to determine which kind of case studies the three represent. Instead, as Bryman (2012) suggests, it was only at a late stage in the process that the distinction became clear. The case studies involve a combination of elements: a) *critical case type* – the theory is that implementation of the MSFD requires spatial protection measures, and the cases are chosen to better understand the circumstances around whether or not this will be achieved. b) *Unique case type* – given the political and institutional stability in Sweden especially, and a generally strong confidence in the state, marine spatial protection in Sweden demonstrate close to unique factors. Finally, the case studies are also to a certain extent c) *revelatory case types* – in that they investigate a new and still ongoing process (Bryman, 2012).

Selection of case study countries

When selecting cases, Stake (1995) suggests that the first criterion should be to maximise the learning outcome. Therefore, the three countries were selected to illustrate different approaches to marine spatial protection to the extent that this was suggested in existing academic research, presented on national authorities’ websites, or previously known to the author. The preliminary literature review identified that the Netherlands traditionally follows closely what the EU requires, Sweden has an internationally renowned focus on marine spatial protection, thanks to Kosterhavet National Park, and that the United Kingdom (UK) recently launched a significant expansion of their marine spatial protection. All three countries are Northern European, matching the geographical scope of this research explained in Section 1.4. The three countries have different levels of coastal and marine exploitation. The lengthy Swedish coastline is relatively unexploited. The UK has both heavily and less exploited areas, whereas the Netherlands is highly exploited. Furthermore, there are contextual similarities between the selected countries, including that all three are historical maritime nations where marine sectors are still of great national importance (see Chapter 5 for specific national contexts). However, the selection is not meant to represent any specific group, since representation of a small sample groups is difficult to defend (Stake, 1995).

2.3 Methods for Data Collection

The following section describes how data was collected for this research. The complex nature of the Directive and the fact that the thesis reviews three different countries called for a broad variety of sources in order to reduce bias and uncertainty. Techniques for collecting data were determined based on the expected accuracy and quality of the data, the age of the information, and the limited time available for data collection. Especially the first factor has been important, since the concept of marine reserves risks to attract uncritical advocacy. Except for the two main data collection methods, the author’s understandings are based on observations from participation in an international expert workshop at ICES headquarters, June 2014.

2.3.1 Literature review

As mentioned above, a literature review supported Parts 1 and 2 of the thesis. Literature included academic peer-reviewed articles, official reports of relevant organisations and authorities, legal text and databases. Statements and opinions of non-governmental organisations and conservationists have been reviewed to illustrate the spectrum of opinions. Contextual information about the case study countries was retrieved mainly from national and EU authorities' official reports and legislative documents. The general aim was to gain information from a wide range of different sources as a way of triangulating the data.

2.3.2 Interviews

Data was also collected by conducting interviews with representatives from relevant authorities in the case study countries and with academic experts on the topic, including marine biologists, ecologists, and legal experts. Other stakeholders included tourism officials and fishermen's organisations. A total of 17 interviews were conducted with an additional three written answers to the questions and five written responses with partial answers or other relevant information. A comprehensive list of the people interviewed, including those providing written replies, can be found in Appendix I. The interviews had a semi-structured and informal format, intended for the author to gain understanding about the MSFD policy process in each country and experiences with marine spatial protection. The questions asked were open-ended, allowing the author to capture information and nuances that were not explicitly asked for (for a sample of questions asked, see Appendix II). Personal interviews allowed the author to ask follow-up questions and clarify details. Interviews took place in June, July and August 2014. Notes were taken during all interviews and transposed directly following each interview, in order not to lose any important information or ideas generated during the discussion. Interviewees were selected by targeting respondents with the highest authority and relevance for the questions, e.g. by browsing authorities' and organisations' websites. After identifying suitable contacts, the author sent an introductory email including an explanation of the thesis and affiliations of the author. The email included a request for an interview, an attached set of questions edited for the respective stakeholders, and a suggestion for interview time. As the research proceeded and the author gained more knowledge, additional key stakeholders were identified and contacted. Potential limitations of using interviews are presented in Section 1.4.

2.4 Methods for Data Analysis

This section outlines the two analytical methods used in this thesis. Firstly, the MSFD is analysed based on Implementation Steering, comparing the factors derived in Section 3.7 with the case studies. Secondly, the analysis of marine reserves as a policy tool is analysed using policy analysis, based on the factors derived in Section 4.4 compared to the case studies.

2.4.1 Implementation Steering Analysis

The MSFD is a policy steering occurring at multiple levels, e.g. between the state and bureaucrats and between bureaucrats, private actors and citizens of the society. In the latter, the state can be said to be represented by the bureaucrats (Lundquist, 1987, p. 71). Applied to this thesis, bureaucrats are represented by responsible authorities and steering by the EU on national states is added (see Figure 3). The individual relationship in the steering process is between the one steering (A) and the steered (B). Lundquist (1987) explains how the implementation steering process is driven by three main actor properties:

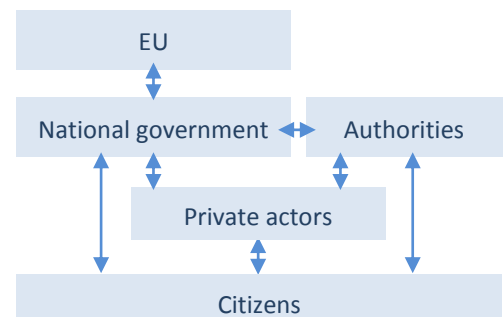


Figure 3 Policy network with steering chain (figure adapted from Lundquist (1987) p.71)

Understand – to what degree B understands A’s steering and A in turn understands B and B’s environment. Reasons for misunderstandings in both directions include that the policy may be unclear or incomplete, or that the two operate in incompatible frames of reference.

Will – to what degree B is willing to act on the steering. Guided by B’s more or less conscious preferences towards the policy and towards A. B’s lack of will may therefore be a result of B disliking the policy or distrust the system which A represents. For A, *will* refers to objectives and goals that gives a purpose to steer.

Can – B’s ability to act on the policy and shape its environment accordingly, and A’s ability to make B follow the steering, e.g. by providing resources. *Can* may hamper the steering whether or not B understands it or has the will to act, implying that a change of *can* may generate changes in *will* and *understanding*.

These actor properties can help determine the success of a policy. Lundquist (1987) stresses the distinction between individual and collective, since the two ultimately are and behave differently. For the purpose of this thesis, the steering chain is mainly one of collective–collective relations. Based on factors found in existing literature in Section 3.7 and the case studies (see Figure 2) the MSFD is analysed by the actor properties explained above.

2.4.2 Policy Evaluation

Dye (1976) defines policy analysis as, “What governments do, why they do it, and what difference does it make”. The second analytical part of this thesis is a policy analysis of marine reserves as a potential measure under the MSFD. It compares factors derived in Section 4.4 with the case studies. Finally, in order to conclude the scope for marine reserves under the MSFD, the Directive and marine reserves are analysed together at the end of Chapter 6.

Evaluation criteria

According to Mickwitz (2003), “Evaluation is by nature normative and thus some criteria on which to base the normative judgements must be utilized” (p.425). There are various criteria relevant for evaluating marine reserves. The most evident aspect of any environmental policy intervention is its effectiveness to address the issue at hand (Mickwitz, 2003). For the purpose of this research, however, the criteria environmental relevance and political acceptability have been used (see Section 1.4). The establishment of spatial protection under the Directive depends on how well the steering is received by national authorities. For marine reserves to be relevant options in Programmes of Measures (PoMs), they need to be environmentally relevant in the given region and feasible given management and political context. The choice of criteria was based on the findings in the preliminary literature review, where the author sought to develop enough understanding on the topic to be able to formulate suitable criteria. The choice also depended on the availability of data to conduct a valuable analysis.

Environmental relevance – To what extent does the policy instrument adequately address key environmental problems in the specific geographical area? (Mickwitz, 2003).

Political acceptability – Looks at enabling and obstructing factors for political support for a policy. Are there key elements in the instrument’s design that affects its political acceptability? (Mundaca, lecture, December 3, 2013). What ability does the instrument have to reconcile ecological and economic policy objectives? What is the level of coercion of the instrument? The most coercive policies restrict individual liberty, and policy makers therefore tend to avoid these (Salamon, 2002). In the eyes of the policy maker, stakeholder attitudes are often most important. If a policy does not gain sufficient stakeholder support, it is unlikely to be adopted and therefore to generate intended effects (Sabatier & Mazmanian, 1980).

3 Marine Strategy Framework Directive (MSFD)

This chapter presents the EU Marine Strategy Framework Directive (MSFD) adopted in 2008. It briefly describes why it was established and covers the theoretical background of spatial nature protection. It presents the aims and objectives of the Directive and its different normative legal principles. The ecosystem based management approach is considered of certain importance for the establishment of marine spatial protection and is therefore elaborated in more detail. The chapter also describes the implementation timeline of the Directive, discusses its relation to other EU and international law and policy and concludes by listing a number of key challenges for implementation of the MSFD.

3.1 Background and Development of the Directive

Degradation of European marine environments is to a large extent due to market failures, such as poorly defined property rights and negative externalities, inter alia, pollution, resource depletion and habitat destruction. According to theory, negative environmental externalities generated by different sectors incur costs that are not borne by the sectors themselves to a sufficient extent, but become costs for society. One way to avoid these costs and the degradation of common pool resources is for governments to manage and ‘provide’ the good. Spatial protection measures are one example. In nationally sovereign waters, property rights have been allocated in the UN Convention of the Law of the Sea (hereinafter *UNCLOS*) (see Annex IV), partly as an attempt to promote “the conservation of [the oceans] living resources, and the study, protection and preservation of the marine environment” (*UNCLOS*, 1982, preamble). However, it has not put an end to overfishing and environmental degradation in the Exclusive Economic Zones (EEZs). Instead, short-term social and political concerns often prevail and the geographical dimension of the sea makes monitoring and enforcement a challenge (Birnie, Boyle, & Redgwell, 2009).

As emphasised in Chapter 1, our use of the oceans has grown increasingly complex over time, today providing several important goods and services. The economic sectors represented in European sea basins provide, inter alia, more than 1.6 million jobs in coastal and maritime tourism, 730,000 jobs in fisheries, and 2.6 million EUR worth of renewable energy operations (EC, 2014a). Consequently, negative externalities imposed on the environment are not easily attributable to respective sectors. Acknowledging the complexity of human-ocean interaction, ocean governance programmes around the world are establishing “integrated ocean policies” which adopt a coordinated and holistic approach to marine management. Some examples are the National Maritime Policies of Brazil, Australia and Canada respectively, the Basic Act on Ocean Policy in Japan, the Norwegian Maritime Strategy and the up-coming Ocean Policy in New Zealand (Markus, Schlacke, & Maier, 2011). In the EU, the on-going design of the Integrated Maritime Policy (IMP) represents the equivalent policy development. The IMP covers, inter alia, the areas of so-called Blue Growth and Maritime Spatial Planning (MSP) (see Section 3.5.1) (EC, 2014d). Given this focus, academic scholars and NGOs have addressed it as having a predominantly economic agenda, and taking a “soft” approach to sustainability⁴ (Qiu & Jones, 2013; Seas At Risk, 2014). Qiu and Jones (2013) refer to the EU regulation no. 1255/2011 establishing a programme to support the further development of the IMP: “[of] a total of EUR 40 million committed for the implementation of the IMP for the period 2011–2013, at least 60% will be allocated for the development of cross-sectoral management tools, including MSP [maritime spatial planning], compared to 8% for the protection of the marine environment and sustainable use of marine resources” (p.186).

⁴ “Soft” sustainability assumes substitutability of human activity for natural capital, whereas “hard” sustainability does not (Becker, 1997, p.23).

While the IMP focuses on human use of the oceans and their resources, the MSFD focuses on the environmental implications of this utilisation. The MSFD is the “environmental pillar” of the IMP (MSFD, Recital 3) and contrary to the IMP adopts a “hard” approach to sustainability (Qiu & Jones, 2013). The diverging aims of the two policies is illustrated by under which responsibility in the Commission they fall – the IMP is overseen by the Directorate-General Maritime Affairs and Fisheries (DG MARE), whereas the MSFD is overseen by the Directorate-General Environment (DG Environment). The MSFD is the most recent policy driver for the protection of the European marine environment, and a clear step in the ongoing “mainstreaming of environmental concerns into wider planning and development programmes in European legislation” (Qiu & Jones, 2013, p.185). Unlike the IMP, it is legally binding to all EU Member States (MSs).

3.2 Aims, Principles, and Objectives

The Directive aims to “ensure the integration of environmental concerns into the different policies, agreements and legislative measures which have an impact on the marine environment” (Art. 1.4). It establishes a framework within which “Member States shall take the necessary measures to achieve or maintain good environmental status in the marine environment by the year 2020 at the latest” (MSFD, Art. 1). “Good Environmental Status” (GES) is a core concept of the Directive, meaning that marine ecosystems are fully functioning and resilient to human-induced environmental change, anthropogenic decline of biodiversity is prevented and biodiversity protected, marine resources are used sustainably and anthropogenic impacts to the oceans do not cause pollution effects (European Commission, 2014).

To comply with the Directive, MSs need to ensure that their marine environments adhere to eleven qualitative descriptors of GES laid out in Annex 1 of the Directive (see Appendix III). The Directive and its requirements on MSs are furthermore underpinned by normative principles: the principle of preventative action, the principle of rectifying environmental damage at source, the polluter pays principle, the principle of sustainable development, and the precautionary principle⁵ (Recital 27, 45). MSs marine strategies are to “apply an ecosystem-based approach to the management of human activities, ensuring that the collective pressure of such activities is kept within levels compatible with the achievement of good environmental status” (MSFD, Art. 1.3). The Knowledge-based Sustainable Management for Europe’s Seas (KnowSeas) and the European Community’s Seventh Framework Programme has adopted the following definition, “A resource planning and management approach that integrates the connections between land, air and water and all living things, including people, their activities and institutions” (Roth & O’Higgins, 2011, p. 2).

3.3 Implementation and Operationalization

The MSFD is a framework Directive and therefore leaves room for MS to operationalise the policy to fit their national context (van Leeuwen et al., 2014). As mentioned in Chapter 1, however, “spatial protection measures, contributing to coherent and representative networks of marine protected areas” are mandated (MSFD, Art. 13.4). The Directive furthermore requires MSs sharing a regional sea to cooperate and coordinate their activities (Art. 5.2), for instance through existing regional cooperation structures, including those under the RSCs (Art. 6.1). Europe’s oceans are divided into four regional sea basins, each of which is covered by a Regional Sea Convention (RSC) (see Figure 4 and Table 1).

⁵ The precautionary principle is also enshrined in Article 191 of the Treaty on the Functioning of the European Union, C83/47, which establishes rules for all EU laws and policies, including the MSFD.

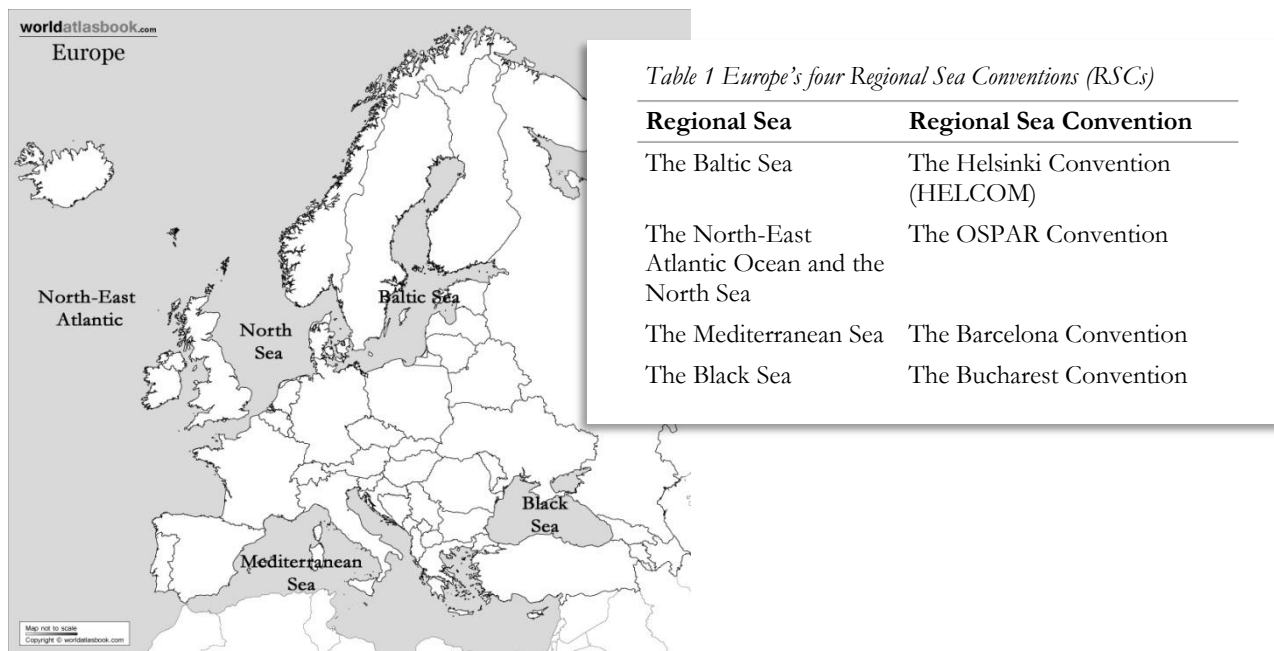


Figure 4 Map of Europe with main sea basins (illustration adapted from worldatlasbook.com)

After transposing the Directive into national law in 2010, MSs defined the concept of GES for their respective EEZs based on the eleven qualitative descriptors laid out in Annex I (Art. 9.1 and 5.2(a), see Appendix III). In parallel, MSs conducted initial environmental assessments of the current state of their marine environments (Art. 8.1), and set environmental targets and indicators to guide the progress towards achieving GES (Art. 10.1) (see timeline in Figure 5).

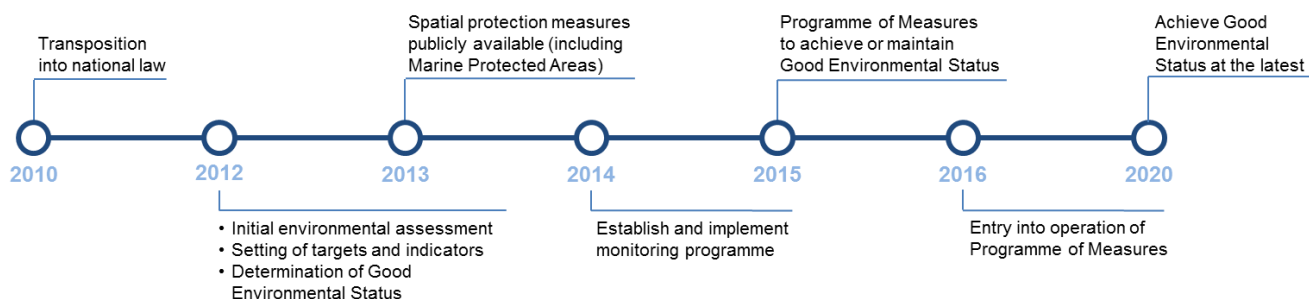


Figure 5 Implementation timeline of the MSFD (illustration developed by the author)

In order to achieve or maintain GES in their marine waters by 2020 at the latest, Article 13.1 requires MSs to establish Programmes of Measures (PoMs) based on the initial assessment and targets. PoMs are required, as previously mentioned, to include spatial measures under Article 13.4. Article 13.3 adds that measures included need to be cost-effective, technically feasible and based on impact assessments, including cost-benefit analyses. They also need to take into account, inter alia, communication, stakeholder involvement and raising public awareness (MSFD, Annex VI). MSs are currently finalising their PoMs to be in operation by 2016. The MSFD implementation schedule is ambitious, especially considering that the work requires regional cooperation and cross-border coherence (EC, 2013). In order to assist individual MSs and RCSs with the implementation, the Common Implementation Strategy has therefore supported MSFD implementation from the start (EC, 2013). In the Common Implementation Strategy, the Marine Expert Group under the Habitats Directive is meant to support a common understanding of Article 13.4 among MSs. In May 2014, the Marine Strategy Coordination Group (MSCG) provided draft recommendations for how MSs are to design PoMs.

3.4 Article 13 – Spatial Protection Measures

By 2013, each member state was to map their networks of spatial protection and assess coherence and representativeness in order to identify possible gaps (Marine Strategy Coordination Group (MSCG), 2014). The MSCG (2014) draft recommendations outline what is required of MSs and define the following, “A spatial protection measure is any spatial restriction or management of all or certain human activities in order to: 1) Protect biodiversity, e.g. marine reserves. Such areas could support MPA networks in terms of coherence and representativity (Art. 13.4) and the overall achievement of MSFD GES; 2) Support certain industrial or leisure activities, e.g. banning of fisheries or gravel extraction within a shipping lane or offshore wind-farm, which may have synergistic effects on biodiversity protection/conservation” (p.23). PoMs “shall include new spatial protection measures, contributing to coherent and representative networks of marine protected areas, adequately covering the diversity of the constituent ecosystems” (para. 2.1). Existing measures may be included in the PoMs (Box 1). Categories 1a and 1b allow MSs to update or revise existing MPAs (see Section 4.2) to streamline them with the MSFD target, or adopt stricter levels of protection (“reserves” or “no-take”) in parts of the area (p.25). Under categories 2a and 2b, the MSCG (2014) is “stressing that this is a separate process from the completion of the marine Natura 2000 network under the Birds and Habitats directives” (p.25). The EEA (2012) states: “the Directive thus implies something more comprehensive than the existing marine MPA network (in its current form of implementation) is needed, in order to deliver representative and ecological coherent networks of MPAs” (p.115).

Policy instruments rarely address all aspects of an issue. In this case, the stressors are mainly described by the eleven descriptors in Annex I of the MSFD (see Appendix III).⁶ Marine reserves may address at least four of these (1, 3, 4 and 6). It is important to point out that PoMs also need to include other measures. Spatial measures alone are not enough to halt loss of biodiversity in European oceans (European Environment Agency, 2012).

3.5 Related Legislation

Several policies underpin the objective of spatial measures under the Marine Strategy Framework Directive (MSFD), internationally and within the EU. Those with direct relevance for this study are included below. Other relevant examples are presented in Appendix IV.

3.5.1 Related international law and policy

The Convention on Biological Diversity (CBD) is “the most comprehensive and significant international instrument addressing the threats to biodiversity, as well as protecting, understanding and using natural resources sustainably” (Katsanevakis et al., 2011, p.810). The CBD Parties shall establish a “system of protected areas” (CBD, Art. 8.a), and develop guidelines for the selection, establishment and management of these areas.

Box 1 Measures to include in PoMs

Existing measures (Art 13.1 & 13.2):

Category 1.a: Measures relevant for the maintenance and achievement of GES under the MSFD, that have been *adopted and implemented*;

Category 1.b: Measures relevant for the maintenance and achievement of GES under the MSFD that have been adopted under other policies but that have *not yet been implemented or fully implemented*;

New measures (Art 13.3):

Category 2.a: Additional measures to maintain and reach GES which build on existing implementation processes regarding other EU legislation and international agreements but go beyond what is already required under these;

Category 2.b: Additional measures to maintain and reach GES which do not build on existing EU legislation or international agreements.

Source: (MSCG, 2014)

⁶ Pharmaceuticals flushed out untreated are not explicitly mentioned in the descriptors, but may fall under D.8 and/or D.9.

Within the CBD framework, *the Jakarta Mandate* (Programme of Work Arising from Decision II/10 (Jakarta Mandate on Marine and Coastal Biological Diversity)) from the second conference of the parties has particular relevance for marine protected areas and marine reserves. Programme Element 3 covers Marine and Coastal Protected Areas. As does Decision VII/5 of the CBD COP7, since it acknowledged the call from the World Summit on Sustainable Development in Johannesburg 2002. This enshrined the concept of an ecologically coherent framework of MPAs at the international level (Pieraccini, 2013). In 2003, the Subsidiary Body on Scientific, Technical and Technological Advice, scientific advisory board of the CBD, recommended that the core of national MPA networks should be based on areas where no extractive uses are allowed (Roberts et al., 2005). At the tenth meeting of the Conference of the Parties in 2010 in Nagoya, CBD Parties agreed on the Aichi Biodiversity Targets for 2020. Target 11 includes establishing at least 10% of well-connected coastal and marine protected areas by 2020 (Strategic Goal C).

3.5.2 Related EU law and policy

*The Birds and Habitats Directives*⁷ are the main instruments for implementing the Convention on the Conservation of European Wildlife and Natural Habitats (‘the Bern Convention’) (Dotinga & Trouwborst, 2011). The two Directives are major drivers for establishment of protected areas in Europe, and are the legal basis for the Natura 2000 network (Katsanevakis et al., 2011). Natura 2000, as introduced in Article 3 of the Habitats Directive, is a “coherent European ecological network of special areas of conservation”. The aim is to “contribute towards ensuring bio-diversity through the conservation of natural habitats and of wild fauna and flora” (Habitats Directive, Art. 2.1). The network includes Special Areas of Conservation (SAC’s) assigned under the Habitats Directive (habitats in Annex I and habitats of species listed in Annex II). These habitats are to be “maintained or, where appropriate, restored at a favourable conservation status in their natural range” (Art. 3.1). The Natura 2000 network also includes Special Protection Areas (SPA’s) assigned under Annex I in the Birds Directive. For these areas, MSs must establish the necessary conservation measures to avoid deterioration of the habitats and significant disturbance to the species for which the areas are designated (Art. 6.1 and 6.2). Any plan or project needs to conduct the ‘appropriate assessments’ and seek a license to develop in the area (Art. 6.3). Should projects with negative assessments nevertheless be considered a public interest (including social or economic), the State needs to compensate to “ensure that the overall coherence of Natura 2000 is protected” (Art. 6.4).

Although the Birds Directive covers many marine species, the Habitats Directive foremost concerns terrestrial areas with limited coverage of marine habitats and species, especially in the offshore marine environment (EC, 2007). Considering that the eleven descriptors in the MSFD covers a broad variety of species, habitats and ecological process, MSs will probably be required to establish MPAs beyond what the Habitats Directive obliges (Dotinga & Trouwborst, 2011; Qiu & Jones, 2013). A guiding document from the European Commission on the links between the MSFD and the Habitats and Birds Directives (2012) states that “achieving GES is likely to require additional substantive measures outside and inside the Natura 2000 network” (para. 38). In terms of the objectives of the MSFD and the Habitats and Birds Directives, the two “are not necessarily equivalent but can be mutually supportive” (EC, 2012b, para. 30).

The issue of MPA coverage in offshore waters was put to its edge in 1999 when Greenpeace took the Government of the United Kingdom to the UK High Court for its implementation

⁷ Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora (hereinafter the *Habitats Directive*) and Council Directive 79/409/EEC of 2 April 1979 on the conservation of wild birds (hereinafter the *Birds Directive*)

of the Habitats Directive offshore (*The Queen v. Secretary of State for Trade and Industry ex parte Greenpeace Ltd.* [1999] Case CO/1336/1999, hereinafter *UK v Greenpeace*). Greenpeace opposed that the UK excluded establishment of Natura 2000 in offshore waters, arguing that the Habitats Directive also includes the continental shelf and superjacent waters.⁸ The High Court found in favour of Greenpeace. The ruling was later accepted by the European Court of Justice, thereby implying that the Habitats Directive apply to all European EEZs (*Commission of the European Communities v United Kingdom of Great Britain and Northern Ireland* [2005] Case C-6/04, hereinafter *Commission v UK*).

With regard to Section 4.4 of this thesis, it is important to note that the Habitats and Birds Directives apply a technocratic approach to establishing protected areas, basing site selection on scientific expertise (see, e.g., Art. 4 of the Habitats Directive). They therefore do not allow for socio-economic consideration and a participatory designation approach, as is encouraged in e.g. the OSPAR Convention (Pieraccini, 2013).

The Regional Sea Conventions are operationalised by the Regional Sea Commissions (RSCs). The two Northern European ones are OSPAR⁹ and the Helsinki Convention (HELCOM). Contractual parties have committed to the work of the RSCs; however they are not legally obliged. The RSC MPAs do not provide any legal protection as such (HELCOM, 2013).

*The EU Common Fisheries Policy (CFP)*¹⁰ has recently undergone considerable reform (new CFP adopted on 1 December 2013), which will have significant effects on the implementation of the MSFD (Qiu & Jones, 2013). The new CFP acknowledges the spatial protection measures required in the MSFD, the Habitats and the Birds Directives, however states that “where such measures might affect fisheries interests of other Member States, the power to adopt such measures should be granted to the Commission” (recital 25). The state that wishes to introduce a spatial protection measure that involves fisheries restrictions therefore have to “provide the Commission and the other Member States having a direct management interest with relevant information on the measures required, including their rationale, scientific evidence in support and details on their practical implementation and enforcement” (Art. 11.3). A ‘Member State having a direct management interest’ refers to fisheries located in the Exclusive Economic Zone (EEZ) of the State in question (recital 22). Consequently, if a member state wishes to adopt spatial protection in their EEZ, as part the MSFD, they will have to seek permission through the Commission to the extent that this will affect fisheries in the area. This gives the Commission, unlike other EU law, exclusive authority to manage fisheries beyond the 12 nm territorial waters.

Interestingly for this thesis, the European Parliament Committee on Fisheries had a proposal in the CFP reform process stating that, “In order to secure the reversal of the collapse of the fishing sector, and to conserve living aquatic resources and marine ecosystems, and as part of a precautionary approach, Member States shall establish a coherent network of fish stock recovery areas in which all fishing activities are prohibited” (Amendment 68, Part 3, Art. 7a). It was proposed that MSs should establish such recovery areas in between 10 and 20% of their territorial waters. In a study presented before the European Parliament by Roberts and Hawkins (2012), it was for example concluded that:

⁸ UNCLOS Articles 77 and 78 declare the rights of the coastal State over the continental shelf and the superjacent waters.

⁹ The name refers to the original Oslo and Paris Conventions (OSPAR Commission, 2014)

¹⁰ Regulation (EU) No 1380/2013 of the European Parliament and of the Council of 11 December 2013 on the Common Fisheries Policy (hereinafter the *CFP*)

- Fish Stock Recovery Areas, at the scale proposed, could deliver major benefits for fish stock improvements and habitat protection
- The conservation role of [marine] reserves is also indispensable for achieving targets of good environmental status under the Marine Strategy Framework Directive.
- It is recommended Fish Stock Recovery Areas cover 20% of fishing grounds as this would deliver greater benefits than 10%

In the final text of the reformed CFP, the proposal from the Parliament was not included.

Directive for Maritime Spatial Planning (MSP), (Directive 2014/89/EU of the European Parliament and of the Council of 23 July 2014 establishing a framework for maritime spatial planning) obliges all MSs to implement a MSP system by 2021. In a press release from the European Commission, it is stated that this Directive: “should help Member States develop plans to better coordinate the various activities that take place at sea, ensuring they are as efficient and sustainable as possible. In coastal and maritime areas, many activities compete for the same space and resources: fishing grounds, aquaculture farms, marine protected areas exist alongside maritime infrastructures such as cables, pipelines, shipping lanes and oil, gas and wind installations. The new Directive will help avoid potential conflicts between such diverse uses and create a stable environment attractive to investors, thereby contributing to sustainable growth.” It also states that the new Directive will “help Member States reach good environmental status of their waters by 2020. It should help establish coherent networks of Marine Protected Areas” (EC, 2014e). Art. 5 of the Directive for MSP promotes an ecosystem-based approach (EC, 2014f).

Blue Growth is the EU’s long-term strategy to support sustainable growth of marine and maritime sectors, in which the Commission sees great potential for innovation and growth. For instance, the combined capacity of fully grid-connected offshore wind energy in Europe is now 6.6 GW (in 2013) and increasing (Corbetta & Miloradovic, 2014). The focus is also turning to tidal and wave energy development (EC, 2014b). Other sectors of interest for Blue Growth include aquaculture, which accounts for 20% of fish production in Europe, and which the Commission intends to boost (EC, 2014g). The potential for increasing mineral resource extraction in European ocean floors is considerable (EC, 2012a). Blue biotechnology with exploration and exploitation of new pharmaceuticals or industrial enzymes, and coastal and maritime tourism development are the two other focuses of the strategy (EC, 2012a). These various interests ultimately create competition with conservation interests for both space and resources. There is also substantial political lobbying from all sectors involved. Some being more resourceful than others, there is a risk that conservation-related regulations are undermined (Roberts et al., 2005). In an analysis conducted by Freire-Gibb, Koss, Margonski, and Papadopoulou (2014) of regional governance structures in the EU and their ability to implement the MSFD, one identified threat is “increasing prevalence of economic policy rather than GES (e.g. EU Commission is now promoting “Blue Growth”)” (p.175).

3.6 Significance of the MSFD

The MSFD has been widely studied, including its added value for marine conservation and ecosystem-based management in Europe. Dottinga and Trouwborst (2011) argue that it brings substance and legal teeth to the existing policy framework for establishment of MPAs in the EU. Jan Ekeboom at the Metsähallitus in Finland and previously policy advisor at the European Commission agrees, and points out that especially Article 13 is important. He has worked closely on the development of the MSFD and participated in the Finnish implementation (personal communication, July 28, 2014). Also Markus et al. (2011) point to the strengths of the MSFD in that it, as part of the IMP, “initiates a dynamic process in the development of an

integrated marine management programme” (p.90). The authors believe that the Directive gives an indication of the willingness of MSs to adopt a far-reaching integrated ocean policy, although it remains to be seen what actual measures will be included in the PoMs. Fenberg et al. (2012) support this belief. Sebastian Valanko at ICES emphasises that the MSFD adds political leverage, although stresses the longer perspective. The constant dialogue between science and politics is the nature of getting things forward. There is always room for criticism, but one needs to consider where the EU would be without the MSFD (personal communication, July 4, 2014). Punt, Weikard, Groeneveld, Van Ierland, and Stel (2010) comment that in order to manage our seas sustainably, “we need to develop tools and policy instruments that are capable of achieving goals that have been set at EU level and mitigate fragmentation at lower levels. MPAs may be such a tool” (p.612).

3.7 Key Challenges for Implementation

Several authors and experts describe shortcomings and implementation challenges with the Directive. Based on the reviewed literature, the following section summarises key challenges and which therefore, to the extent that they materialise, will affect the establishment of marine spatial protection measures under the Directive and ultimately achieving its objectives.

3.7.1 Scientific uncertainty and lack of knowledge

The first frequently mentioned challenge is that the process of establishing Programmes of Measures (PoMs) is hampered by the lack of scientific understanding about marine environments (see, e.g., Bertram & Rehdanz, 2013; van Leeuwen et al., 2014). The eleven descriptors of the Directive cover a wide range of complex issues (see Appendix III). National policy makers are to, as mentioned, design PoMs based on these and economically justify their decisions. Since little is known about the nature and extent of ecosystem goods and services and what socio-economic values they provide (Bertram & Rehdanz, 2013; Levrel et al., 2014; van Leeuwen et al., 2014), it is a challenge both to identify suitable measures and to justify them. Bertram and Rehdanz (2013) argue that the lack of knowledge about the complex ecosystems’ link to socio-economic impacts and human wellbeing is obstructing valuation of their services and thereby their representation in a cost-benefit analysis as the ones required under Article 13. Börger et al. (2014) point out that valuation of ecosystem goods and services is recognised as an important tool in marine planning, but its application is still rare. One reason is said to be lack of scientific knowledge. To back up the requirement in Article 13.3, Levrel et al. (2013) call for a standardised assessment of costs to society for environmental degradation. In order to be more than a ‘fuzzy’ concept, also the Ecosystem-Based Management (EBM) approach needs to be underpinned by solid understanding about marine social-ecological systems and the benefits that these provide to society (Farmer et al., 2012). The implementation recommendations provided by the Marine Strategy Coordination Group (MSCG) (2014) addresses this issue by acknowledging that positive and negative impacts of the policy measures do not necessarily have to be presented in quantitative or monetary terms. They also emphasise that other criteria are of importance when justifying the PoMs – such as stakeholder support and the precautionary approach (p.30).

3.7.2 Regulatory vagueness and overlap

The second key challenge for the MSFD relates to regulatory vagueness. For instance, the Directive does not specify how regional collaboration for pursuing GES will be accomplished, how MSs are to achieve GES, nor provides sufficient guidance for what ‘GES’ actually means (Borja et al., 2013; van Hoof, Hendriksen, & Bloomfield, 2014; van Tatenhove, Raakjaer, van Leeuwen, & van Hoof, 2014). Consequently, each member state has been able to define GES irrespective of neighbouring countries. In the Commission’s assessments of the first implementation stage for the Baltic Sea, Dupont, Belin, Moreira, & Vermonden (2014a)

describe how "all seven Member States of the marine region have defined GES for Descriptor 1 but none have defined it in the same way (or even similarly)" (p.7). Together with further ambiguity about concrete targets, standards and assessment criteria, Markus et al. (2011) fear that the vagueness will lead to largely varying protection requirements across different European marine regions. Furthermore, despite being at the heart of the Directive, no definition of the EBM approach is provided in the MSFD, leaving room for diverging national interpretations and implementations (Farmer et al., 2012), and confusion about what policy instruments to put in place to operationalise it (Katsanevakis et al., 2011).

Implementation of the MSFD has already experienced considerable delays, with a majority of MSs being late with the first phase (EC, 2013). Relevant parties are preparing for an extended horizon of the Directive beyond 2020 (Wawrzynski, personal communication, April 15, 2014). The support from the Common Implementation Strategy has been considered successful for the first phase, although it is acknowledged that the current phase of designing PoMs will face additional challenges, such as confusion regarding interpretation of MSFD provisions and the interaction between different policies concerning the marine environment (EC, 2013). Ounanian, Delaney, Raakjær, and Ramirez-Monsalve (2012) argue that, overall, the MSFD is "not so well-thought through", considering: 1) the unequal capacity in different sectors to deal with the MSFD, 2) its legal vagueness, and 3) the unclear boundaries between relevant policies. This regulatory overlap is referred to in Section 1.2. Several authors call for integration between MSFD-relevant national, regional and international policies (Raakjaer, Leeuwen, Tatenhove, & Hadjimichael, 2014; Salomon, 2009; van Hoof et al., 2014; van Leeuwen et al., 2014; van Leeuwen, van Hoof, & van Tatenhove, 2012). With regard to establishing spatial protection in EEZs, Qiu and Jones (2013) argue that there is a need to better integrate environmental protection into the Common Fisheries Policy (CFP) "if the objectives of the MSFD, Habitats Directive and other EU environmental policies are to be achieved" (p.186). The authors state that despite provisions in the CFP supporting environmental conservation through fisheries restrictions, such provisions are very rarely used, and that "the lack of restrictions under the CFP to protect marine Natura 2000 sites is a stark illustration of the legal and political difficulties of improving the link between EU fisheries regulations and environmental legislation" (p.187).

Regulatory overlap also includes the institutional ambiguity of European governance, i.e. the multiple levels and relevant authorities creating confusion as to who is responsible for what (Freire-Gibb et al., 2014; Qiu & Jones, 2013). The level of institutional ambiguity differs, however, between the different RSCs, with the lowest level in the Baltic Sea and highest in the Mediterranean Sea. This appears to depend, e.g., on whether or not the respective countries consider MSFD implementation to be urgent (van Leeuwen et al., 2012).

3.7.3 Dependence on political will

Freire-Gibb et al. (2014) suggest that recent economic recession and strong lobbying from various interest groups may affect a timely and effective implementation of the MSFD. Thiel (2013) has identified significant political challenges for the MSFD in Germany, Portugal and Spain. In Germany especially, the political issues created by the multifaceted uses of the seas have made it difficult to develop integrated policies. At the Regional Sea Convention-level, van Leeuwen et al. (2014) point out that requirement for consensus means that coordination and integration of policies necessitates political will from all parties involved.

4 Marine Reserves

This chapter discusses spatial protection as a policy instrument for marine biodiversity conservation. It explains what constitutes a Marine Protected Area (MPA) and a “marine reserve” in particular, and presents the nature and current extent of such protection in the EU. It also provides a brief overview of the environmental effectiveness of marine reserves. This thesis does not, as indicated in Section 1.4, intend to evaluate environmental effectiveness per se; instead the overview merely intends to illustrate the scientific rationale behind establishing marine spatial protection for nature conservation – factors that may affect their environmental relevance in Northern Europe. The chapter concludes by discussing factors affecting the applicability of marine reserves, including socio-economic aspects.

4.1 Definition

An MPA generally implies a spatial management measure at sea restricting human activities to various degrees in order to relieve the pressure on the natural environment. There is no internationally standardised definition, although the International Union for Conservation of Nature’s (IUCN) definition for protected areas is widely used:

A clearly defined geographical space, recognised, dedicated and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values. (Dudley, 2008)

The IUCN also provides categories of different protection levels (see Table 4, Appendix V) (Day et al., 2012). These do not specify what activities are restricted, but a list of suggested restrictions in the respective area is provided (see Table 3, Appendix V).

The marine spatial protection discourse is highly fragmented. The terminology includes, inter alia, “marine park, marine reserve, fisheries reserve, closed area, marine sanctuary, MAC-PAs/MCPAs (marine and coastal protected areas), nature reserve, ecological reserve, replenishment reserve, marine management area, coastal preserve, area of conservation concern, sensitive sea area, biosphere reserve, ‘no-take area’, coastal park, national marine park, marine conservation area and marine wilderness area” (Agardy et al., 2003, p. 356). Some consider fishery closures, gear restriction zones and other fishery measures to be MPAs (Claudet, 2011). In the US, ‘marine sanctuaries’ allow almost any human activity except for oil drilling. In Australia, ‘sanctuary zones’ are small areas within larger ‘marine parks’ that do not allow any type of extraction (Ballantine, 2014). Areas excluded from public entrance for other reasons may furthermore have similar effects as MPAs, e.g. areas around historical ship wrecks or areas fenced off for military purposes (Ekeboom, personal communication, July 28, 2014).

In the literature review conducted for this research, the term ‘no-take marine reserves’, or ‘marine reserves’ is a common denomination for areas where extractive human activities or activities that may otherwise harm the natural environment are banned permanently (Leenhardt et al., 2013; Lester et al., 2009; Lubchenco, Palumbi, Gaines, & Andelman, 2003; Roberts & Hawkins, 2000; Russ et al., 2004; Spalding, Meliane, Milam, Fitzgerald, & Hale, 2013). Sometimes an exemption is enunciated for monitoring and research purposes (see e.g., Lubchenco et al. 2003, and Lester et al. 2009). This thesis has adopted this definition.

It should be noted that the World Bank suggests a growing resistance to the concept of no-take reserves (The World Bank, 2006), and WWF has adopted the term “fully-protected areas” since people may interpret no-take reserves with “no-people” reserves (Roberts & Hawkins, 2000).

4.2 Current Coverage and Management in the EU

Establishment of marine spatial protection have increased considerably around the world in the past decades, although the total figure of their coverage is difficult to determine. Estimates range from 2.93% of global oceans (Spalding et al., 2013) to 6.3% (Convention on Biological Diversity, 2014). It is nevertheless clear that their coverage is steadily increasing (see Figure 4). Marine reserves are estimated to cover less than half of 1% (The Pew Charitable Trusts, 2014).

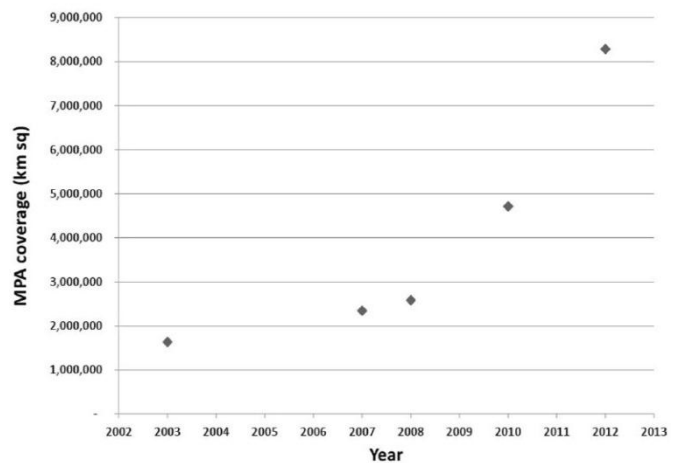


Figure 4 Summary of international MPA coverage (Spalding et al. 2013)

Presenting an aggregated coverage figure for Europe is equally difficult, due to above-mentioned issues of definitions and categorisation. Despite the lack of a precise figure,

it is clear that the coverage of MPAs in the EU is dwarfed compared to terrestrial equivalents. The EEA (2012) emphasises that: “Given that the EU has committed to designating 10% of marine and coastal areas as protected areas, it appears obvious that significant additional efforts have to be made on this type of ecosystem” (p.60). To specify, the target has been met for territorial waters (1–12 nm from the coast), with considerable regional variations, but is far from being met for offshore waters (beyond 12 nm). A large majority of these areas allow different degrees of human activity. No-take marine reserves make up less than 1% and are usually embedded only as small fragments within multiple-use MPAs (“zoning”) (European Environment Agency, 2012; Fenberg et al., 2012). National states usually own protected areas and provide monitoring, management and enforcement either directly or delegated via communities, NGOs or others (European Environment Agency, 2012).

Marine spatial protection in the EU is established in three main ways:

- 1) *The Natura 2000 network*: Marine areas may be designated for conservation purposes under the Habitats or the Birds Directives as part of the European Natura 2000 network (for a more detailed description, see Section 3.5.1). The European Environment Agency (EEA) states that 4% of marine waters under EU member state jurisdiction is protected as Natura 2000 (compared to 18% of land) (European Environment Agency, 2012).
- 2) *Regional Sea Convention networks*: MPAs can also be established under one of the four RSC networks in Europe. For the focus of this thesis (Northern Europe), “HELCOM MPAs” (earlier Baltic Sea Protected Areas, BSPAs) and OSPAR MPAs are the relevant designations. There is considerable overlap between these networks and the Natura 2000 network. In 2009, only Portugal had OSPAR MPAs outside Natura 2000 sites (Dotinga & Trouwborst, 2009). In the Baltic Sea, the HELCOM MPA coverage is today estimated to 10%, with 85% of these also designated under Natura 2000. OSPAR MPAs in the North-East Atlantic cover just over 3%. For both, there are differences in protection between coastal and offshore waters (European Environment Agency, 2012). International agreements such as the RSCs offer means for information exchange, consultation, discussion regarding level of protection, size of sites etc. and other issues falling under the mandate of the conventions. It is important to clarify, however, that marine spatial protection is always established nationally, and despite being legally binding to contracting parties, RSC’s have no means to enforce compliance (Van Bets, 2010).

- 3) *National networks*: States may also establish protected areas according to their own definitions and protection levels. Such designations are only possible in territorial waters, (out to 12 nm). There is no coherent overview for these networks, although out of the total coverage of nationally protected areas in the EU, only 8% covers marine ecosystems (European Environment Agency, 2012).

4.3 Environmental Effects of Marine Reserves

A large number of publications from around the world demonstrate empirical outcomes of marine protected areas (MPAs) and marine reserves. This section provides a summary of these to the extent that their results may affect the environmental relevance or political acceptability of marine reserves in the case study countries.

4.3.1 Effects on biodiversity

Marine spatial protection is primarily intended to protect benthic ecosystems, but also marine birds, mammals, and plants (Ekebom, personal communication, July 28, 2014; Svedäng, personal communication, July 22, 2014; Vandeperre et al., 2011). Marine reserves in particular may improve system resilience (Lester et al., 2009), which Ekebom argues is a commonly overlooked aspect of marine spatial protection (personal communication, July 28, 2014).

In a marine reserve, non-commercial species are protected to the extent that they would otherwise be killed as by-catch (Claudet et al., 2008), or from having their habitats destroyed by detrimental fishing methods or other activities. Halpern (2003) finds, based on 89 empirical international studies, “Marine reserves, regardless of their size, and with few exceptions, lead to increases in density, biomass, individual size, and diversity in all functional groups. The diversity of communities and the mean size of the organisms within a reserve are between 20% and 30% higher relative to unprotected areas. The density of organisms is roughly double in reserves, while the biomass of organisms is nearly triple” (p.129). Lester et al. (2009) similarly reviewed 124 empirical studies of marine reserves, finding dramatic increases in biomass and density (446 and 166% respectively), and more moderate but still significant increases in individual size and species richness (28 and 21% respectively). Edgar et al. (2014) present a third meta-analysis of 87 MPAs worldwide, also finding significant increases of conservation benefits. However, their results indicate that being no-take is not the only feature determining the effectiveness of MPAs, but also the age of the protection, its size and level of enforcement.

From a European perspective, Fenberg et al. (2012) present a meta-analysis of 46 peer-reviewed studies of marine reserves mostly located in the Mediterranean Sea. The authors also find significant increases in biomass, density, species richness and organism size. Recently, Guidetti et al. (2014) empirically studied 30 MPAs in the Mediterranean Sea, illustrating significantly higher fish biomass in no-take MPAs than in partially-protected MPAs and in areas without protection. However, no impact was found on invasive species. Fenberg et al. (2012) illustrate that marine reserves of all sizes and ages are effective, although old and large reserves contained higher fish densities and species richness. The authors suggest that despite not explicitly required in the MSFD, these evidence illustrate that marine reserves may be an important component for the MSFD ecosystem-based management approach.

It seems generally agreed that restricting human activities at sea will benefit ecosystems to the extent that they were previously under pressure. Effects are likely to be more lasting the longer a reserve is kept in place. However, spatial protection may not be effective against external stressors, including climate change factors such as warmer temperature and changes in ocean circulation; terrestrial factors such as residential and agricultural wastewater; and oceanic factors, including nutrient loading and salt- and freshwater mixing (Jameson et al., 2002).

4.3.2 Effects on commercial fisheries

Marine reserves may also benefit coastal and pelagic commercial fisheries (see, e.g., Burke et al., 2011; Halpern, 2003; Ekebom, personal communication, July 28, 2014). The fishing sector arguably share the same goal as conservation – the persistence of the target species (Botsford et al., 2003). The application of marine reserves as a fisheries measure is however contested (Ekebom, personal communication, July 28, 2014). Since fishing is prohibited in marine reserves, the benefits that fishermen stand to reap relate to reversing trends of severe population decline of important species (Sale et al., 2005; Ekebom, personal communication July 28, 2014), and export of target species from the reserve to surrounding unprotected fishing grounds (“spillover”) (Vandeperre et al., 2011). Long-term sustainability of fisheries is, among other things, dependent on the density of large fish, since these individuals have greater reproductive potential and produce larvae with better survival rates than younger fish (Birkeland & Dayton, 2005). Marine reserves have been shown to increase the individual size of target species, but also their abundance and biomass (Claudet et al., 2008; Guidetti et al., 2014; Lowe, Topping, Cartamil, & Papastamatiou, 2003; Mateos-Molina, Schärer-Umpierre, Appeldoorn, & García-Charton, 2014). Claudet et al.’s (2008) empirical study of 12 marine reserves in southern Europe shows that older reserves are more effective in producing larger fish, and that any sized reserve increased fish density and diversity, although larger ones were the most effective. Interestingly, their results indicate that reserve efficacy does not depend on the distance to neighbouring reserves, contrary to previous empirical studies. As with terrestrial protected areas, the connectivity between individual MPAs is said to be crucial for the overall conservation results, at least for mobile species. A longitudinal and latitudinal gradient is required to help certain species use the areas as stepping stones (Valanko, personal communication, July 4, 2014). Ensuring well-connected ecologically coherent networks is therefore, as mentioned in Chapter 3, part of the required considerations in the Marine Strategy Framework Directive (MSFD).

Reserves may constitute important feeding and survival opportunities for vulnerable mobile species, especially at spawning grounds (Ekebom, personal communication, July 28, 2014). Here, stocks are easier to catch and banning fishing is effective to reduce fish mortality. Henrik Svedäng, Associate Professor in Marine Ecology at the Swedish University of Agricultural Sciences explains that this is part of the rationale behind relatively large area closures in Kattegat, Sweden. Conversely, if the fish decides to spawn in a different area it is no longer protected (personal communication, July 22, 2014). Marine reserves have a benefit in that it is not as easy to circumvent their legal basis as it is with gear restrictions, quota setting and time-based restrictions. Reserve protection is all-encompassing and without time boundaries (Roberts et al., 2005). However, if surrounding fisheries are mismanaged, spillover effects from protected areas will achieve limited benefits (Jessup & Power, 2011).

Marine reserves have, as mentioned, been shown to generate spillover of fish to surrounding fishing grounds (Gaines et al., 2003; Gell & Roberts, 2003; Roberts et al., 2001; Russ et al., 2004; Ekebom, personal communication July 28, 2014). Spillover increases with time, since it takes many years for fish species – decades for some – to become successful breeders (Vandeperre et al., 2011; Ekebom, personal communication, July 28, 2014). “Fishing-the-line” is a potential dilemma where fishermen build up higher-than-normal pressure around the edges of a reserve (Roberts et al., 2005). Stelzenmüller et al. (2008) confirm this behaviour from five European MPAs. Fishing pressure may also increase elsewhere due to lost catch opportunities within the reserve (Hilborn et al., 2004). Spillover is also important for larval dispersal, although more difficult to assess (Gaines et al., 2003; Sale et al., 2005; Vandeperre et al., 2011). Larvae avoid capture by adjacent fishing and may benefit surrounding fishing grounds regardless of fishing-the-line activities (Roberts et al., 2005). According to Gaines et al. (2003) larval dispersal is an oft-overlooked benefit of marine reserves.

4.4 Key Factors Hindering the Applicability of Marine Reserves

There are a number of factors affecting the applicability of marine reserves as part of public policy to protect marine biodiversity. This section focuses on factors concerning the political acceptability and environmental relevance of marine reserves, due to the focus of the thesis.

4.4.1 Limitations relating to the nature of the instrument

Like any environmental policy instrument, marine reserves have functional limitations and drawbacks. Firstly, their sedentary nature raises concerns about flexibility. On the one hand, marine reserves provide inclusive protection for sedentary species, as well as reefs and other formations. On the other hand, for finfish and migratory species, reserves only provide protection at certain life stages. The degree of protection declines with increasing mobility of the species (Roberts et al., 2005). Ballantine (2014) argues that if the aim is to protect marine ecosystems, including habitats and non-commercial species, reserves play a central role. Also Punt et al. (2010) point out that reviewing marine spatial protection only as a fisheries management tool ultimately ignores other benefits to species conservation. Marine spatial protection is one of several alternative tools for implementing an ecosystem-based management (EBM) approach, aimed to protect a specific ecosystem that merit special measures (Katsanevakis et al., 2011). Lester et al. (2009) argue that this is especially true of marine reserves, since they protect all species and habitats within their boundaries. Secondly, marine reserves are as mentioned not a suitable tool to address large-scale external stressors. According to Margherita Pieraccini, lecturer in law at Bristol University, regulatory flexibility, meaning that the boundaries of the protected area may be amended in light of new evidence, may be one way of helping the instrument cope with changing these external conditions (personal communication, July 16, 2014).

Thirdly, the most suitable size of marine reserves is contested. It is suggested that a protected area need to be vast in order to be sufficiently effective and encompass enough of species' habitats (Babcock et al., 2010; Gell & Roberts, 2003; Roberts et al., 2005). Some argue that especially temperate waters require large reserves (Roberts et al., 2005), e.g. since species in these regions tend to be more mobile (Lester et al., 2009). Roberts et al.'s (2005) meta-analysis indicates that marine reserves can play an important role in managing also temperate industrial fisheries, however, and Lester et al. (2009) find that reserves have positive results at all latitudes and regions. Svedäng states similarly that there are theoretical suggestions that spatial protection must be extensive in order to reduce fish mortality (personal communication, July 22, 2014), although Claudet et al. (2008) suggest that empirical studies have not supported the theoretical hypotheses. In Sale et al.'s (2005) meta-analysis, also small reserves are shown to provide biodiversity protection and spillover effects. The findings of Edgar et al. (2014) (see Section 4.3) indicate that several factors, including size, are important. Valanko mentions that there is a big debate about whether a few large or several small areas is optimal. He personally believes that the crucial aspect is that the areas incorporate different habitats to act as sources of recruitment for other areas (personal communication, July 4, 2014). Sale et al. (2005) argue that establishing a few large marine reserves might be more practical from a management point of view; although it might lead to greater displacement of fishermen and greater disadvantages to local communities (see Section 4.4.2). Too large reserves may on the other hand diminish the positive effects of spillover and fish dispersal (Roberts et al., 2005), and may not be practically possible to monitor or enforce (De Santo, 2013). It may therefore be politically problematic to implement reserves of sufficient size to provide the level of protection required (Sale et al., 2005). On the other hand, mosaics of coastal MPAs with a mix of reserves, multiple-use and fished areas may also difficult to police (Edgar et al., 2014).

4.4.2 Scientific uncertainty and lack of knowledge

Studying empirical effects of marine spatial protection, as exemplified in Section 4.3, is obstructed by uncertainty. Firstly, the original, ‘untouched’ state of the environment is often unknown, meaning there is no clear baseline for comparison. Secondly, assessing biodiversity responses requires taking a wide range of species into consideration (Botsford et al., 2003). Different species respond differently and in different time – some fish species may take decades to recover while some plants may recolonize quickly (Edgar et al., 2014; Valanko, personal communication, July 4, 2014). Thirdly, unforeseen and indirect ecological effects may occur once a reserve is established and the system left to recover (Claudet et al., 2008), e.g. from the sudden lack of fishing pressure. Fourthly, it is difficult to determine which response is attributable to the protection and which is due to something else (Mateos-Molina et al., 2014). An ecosystem may change entirely without indicating what the ultimate impact that tipped it over was. Finally, because of these uncertainties, the results of empirical studies have a high degree of case-specificity. There is a discord in the current literature regarding the generalizability and level of certainty of existing studies. Valanko argues that spill-over effects, for instance, have not been “proven” since you cannot replicate in the marine environment and empirical studies are inherently case-specific (personal communication, July 4, 2014). Additional studies are needed from a variety of different waters and external conditions to further support this effect of marine reserves (Sale et al., 2005). Ekebom argues, nevertheless, that there is usually some degree of generalizability and important lessons to be learnt. The complexities mentioned in Section 1.2 contribute to this polarisation regarding the role of marine reserves. More empirical studies are necessary to fill in knowledge gaps, fortify tentative assessments and reinforce the understanding of what effects can be expected of marine spatial protection (personal communication, July 28, 2014).

The knowledge gap further includes a lack of inventory of potential direct and indirect ecosystem goods and services in European oceans. This data could enable valuation and economic justification of future restoration, conservation, and strengthening of marine ecosystem resilience (Wawrzynski, personal communication, May 5, 2014). Despite the controversy of putting a price-tag on natural systems, such estimates is an attempt to better incorporate these values into economic decisions and public policy. It is a means to illustrate the importance of conservation in economic terms. There are an increasing number of attempts to value ecosystem goods and services in order to more fairly balance benefits and costs to society of marine spatial protection in cost-benefit analyses. This is especially noticeable since the aspect of ‘ecosystem services’ was included in the IUCN definition of a protected area in 2008 (see Section 4.1). However, there is little progress in the marine area, as mentioned in Section 1.1. The Commission’s working group on Economic and Social Assessment (WG ESA) is developing common standards for these valuations (Wawrzynski, personal communication, May 5, 2014).

4.4.3 Socio-economic consequences

Marine reserves may have both positive and negative socio-economic effects. Benefits of marine reserves are difficult to predict and much-debated (Gell & Roberts, 2003). In addition to potential benefits of spillover to local fishermen, marine reserves may be important for cultural services and existence values (TEEB, 2009). They may also serve as reference areas or baselines when addressing the ‘impact problem’ of other environmental policy instruments, i.e. the issue of not being able to observe the development that would occur without a particular instrument (Mickwitz, 2003). This may also be of importance for the educational purpose of understanding species interaction if left unaffected, to allow future generations to understand what an area used to look like, to be able to study population fluctuations and the differences between fished areas and no-take areas (Ekebom, personal communication, July

28, 2014). Valanko at ICES does not see that marine reserves would have a role solely as reference areas, however. He argues that ‘reference area’ is a troublesome term since all marine waters are ultimately connected and cannot be kept in isolation. He agrees that marine reserves are an important tool, but that conservation issues ultimately must be balanced with social and economic interests to consider all three aspects of sustainability. He therefore argues that no-take marine reserves ultimately will have limited importance and considers network connectivity and maritime spatial planning more important than to aim explicitly for marine reserves. A step towards an integrated network is to establish areas of different levels of protection through zoning. Some areas could be more strictly protected and act as buffers (personal communication, July 4, 2014). The EU presents several difficulties for connectivity of MPAs, such as multi-national coastlines, lack of ecological information about the deep seas as well as powerful fisheries interests (Fenberg et al., 2012). Well-functioning management and enforcement is emphasised for the success of any marine spatial protection (Chape, Harrison, Spalding, & Lysenko, 2005; Edgar et al., 2014; Fenberg et al., 2012; Halpern, 2003; Jameson et al., 2002; TEEB, 2009). If existing institutions cannot control and penalise illegal harvesting, for instance, a reserve is only a regulation on paper.

Designating an area for biodiversity conservation may signal visit-value and generate tourism, referred to as the ‘designation effect’ of MPAs (Lemelin & Dawson, 2014). Marine reserves in New Zealand have for example had significant ecotourism value, and values for education and science purposes as reference areas (Taylor & Buckenham, 2003). In a Southern European context, tourism and recreational uses are often important economic drivers for establishing marine reserves, e.g. due to the warm waters and well-developed marine tourism. In Northern Europe, existence value and overarching policy obligations are the more common economic drivers (Fenberg et al., 2012). Tourism can this way be a means of financing management of the protected area. Peters and Hawkins (2009) present an international meta-analysis of 18 existing studies of visitors’ willingness to pay for marine parks. The results conclude an “overwhelming public approval to pay for entry to marine parks, with all studies indicating a general acceptance for the introduction of fees or an increase in those where charges already exist” (p.221). Ecotourism raises questions regarding tourists’ impact on conservation objectives. While large groups of tourists and related infrastructure may have a negative impact, there are examples where well-managed and controlled ecotourism have negligible effect on marine life (Heyman, Carr, & Lobel, 2010; Luna, Pérez, & Sánchez-Lizaso, 2009).

Restricting activities in certain areas may infringe recreational, cultural and tourism to the extent that they include extractive activities such as harvesting, picking or collecting certain items or species. This creates a discussion about social justice.¹¹ De Santo (2013) argues that establishing spatial protection may lead to, inter alia, stakeholder distrust, infringements on the protected area and future opposition to designation of new areas. Terrestrial protection has similarly a history of “park versus people”-debates (De Santo, 2013), although they are often established in areas where the public already have limited rights to access (Jessup & Power, 2011). Marine reserves instead challenge the strong notion of the public’s free right to use the sea. However, while marine spatial protection is frequently said to be a controversial policy instrument, a survey conducted on 7,000 respondents in seven EU countries in 2011 showed that a large majority of respondents in all countries supported the establishment of marine protected areas (Figure 5) (Potts, O’Higgins, Mee, & Pita, 2011). Any successful MPA will need to incorporate the social dimension (The World Bank, 2006), but there is clearly a need to review the discussion about social justice implications of marine spatial protection measures (Caveen, 2013; De Santo, 2013).

¹¹ De Santo (2013) defines social justice in this context as “the fair allocation of adequate access to fishing or other activities that people depended on for their economic sustainability prior to the MPA’s designation” (p.143).

Industries that are incompatible with marine reserves include, inter alia, industrial fisheries, oil and mineral extraction and, marine renewable energy installations (Qiu & Jones, 2013). These sectors “almost inevitably create spatial externalities” (Katsanevakis et al., 2011, p.815). It is often implied that especially fishermen are adverse to marine reserves, since it ultimately may lead to dislocation of their activities (Sterner, 2003). This aversion has been demonstrated e.g. in California, US, where attempts to establish marine reserves has led to fist fights between marine biologists and fishermen. Public hearings about the Marine Life Protection Act have at times required presence of armed game wardens (Dalton, 2010). One should be careful to assume that the aversion is unanimous, however. The two can also be found arguing together when it comes to impacts of construction plans etc. (Katsanevakis et al., 2011). Pita et al. (2011) comment that much of the existing literature is based on anticipated values of the fishing sector – not empirical opinions. Roberts et al. (2005) suggest that the idea that marine reserves will put fishermen out of business is a myth. They argue that only extremely large reserves would create considerable difficulties, and instead suggest “smaller, more numerous reserves will spread fishery benefits more widely, and enable continued access to fishing grounds for all” (p.126). In well-functioning marine reserves, initially negative fishermen attitudes may furthermore change over time (Agardy et al., 2003), and turn into a support for the continued protection of marine reserves (Russ et al., 2004). New Zealand was a pioneering nation in establishment of marine reserves, with the first established in 1975. The first reserves met strong opposition from fishermen, which 10 years later had turned into 75% of fishermen favouring establishment of additional reserves. Today, there are over 30 marine reserves in New Zealand, prohibiting harvesting or any human intervention (except for recreational visits) (Department of Conservation, 2014). The key aspects for stakeholder support in New Zealand have been identified as community involvement, information dissemination, communication and compromise (Wolfenden, Cram, & Kirkwood, 1994).

Some people have suggested that governments should designate parts of the ocean as protected areas, in the same way that they do with national parks on land, while others have said this is not a good idea. To what extent do you agree or disagree with this suggestion?

Please use a scale of 1 to 5 where 1 means strongly disagree and 5 is strongly agree.

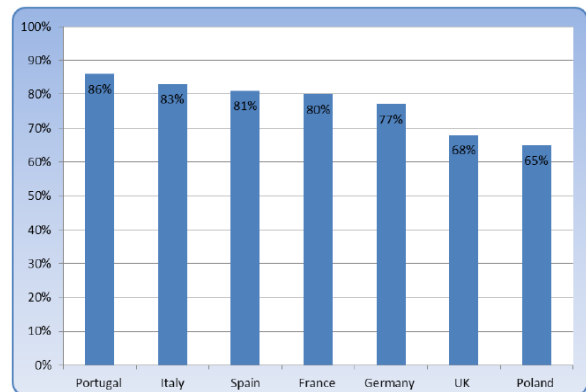


Figure 5 Rankings of national responses to designation of marine protected areas. Shown as percentage (Potts et al. 2011, p.16)

4.4.4 Political will

Fenberg et al. (2012) stress that regardless of the level of scientific understanding and evidence for marine reserves, science will not translate into design and implementation of policy without sufficient political will. The authors emphasise, however, that it is not certain that this motivation cascades down to a national or local level. Any political motivation has to be strong enough to overcome resistance from opposing sectoral interests and from politicians and regulators with stakes in such sectors. The authors point out that regardless of their ambitions for MPA establishment, neither the MSFD, the Habitats and Birds Directives, nor the CFP explicitly require establishment of marine reserves. They therefore conclude that political will for marine reserves may have to come from national and local levels.

In cases of scientific uncertainty, the precautionary principle theoretically has a role to play to justify action. Ekebom argues that it is a key concept often ignored by policy makers, and that its influence is limited without widespread political leadership taking the principle seriously. According to Ekebom and Svedäng, the main challenge would be to inform the public that reserves are needed. Public support and understanding is essential for compliance and management. The formal protection must be clear and specific (personal communication, July

28, 2014; personal communication, July 22, 2014). Valanko agrees that a participatory planning and design process where local interests are invited is required (personal communication, July 4, 2014). The lack of common nomenclature of what constitutes an MPA has been said to lead to confusion and mistrust among stakeholders (De Santo, 2013; Fabinyi, 2008). Enforcing with guards and legal punishment may backfire in terms of lost popularity, making the authorities the 'bad guy' and jeopardise support for marine protection at large. Therefore, according to Ekeboom, economic arguments in terms of local benefits may be easier to lean on when arguing for spatial protection (personal communication, July 28, 2014).

Ekeboom comments that historical experiences of marine protection in Europe indicate that things have been more positive than negative. The MSFD is an indication of this. The issue is rather the high pace of environmental degradation and that even the positive steps now taken are not fast enough. He argues that factors to influence the political acceptability for marine reserves are foremost scientific proof, both in terms of showing potential results of different measures but also for media use and a means to illustrate positive examples and gain public support for marine conservation (personal communication, July 28, 2014). Also Svedäng agrees that scientific assessments illustrating the effects of marine reserves may affect political acceptability (personal communication, July 22, 2014).

Lastly, some authors are concerned that assigning MPAs is a policy trend which risks to result in ill-informed designations of a large number of MPAs, including reserves, based on a 'one size fits all'-approach (Agardy et al., 2003; Svedäng, personal communication, July 22, 2014). De Santo (2013) suggests that alarms about global environmental issues, such as 'apocalyptic' scientific studies of the deterioration of fisheries and marine environments have created a 'protect as much as you can'-approach with politicians around the world, especially with regard to coral reefs. Caveen (2013) adds that this type of advocacy has created cynicism in the fishing industry and blurred the distinction between environmentalism and environmental science. The same two authors raise criticism against the use of percentage targets for marine spatial protection, as used by national, regional and international institutions (Caveen, 2013; De Santo, 2013). Also Spalding et al. (2013) emphasise that despite the total coverage of marine spatial protection is increasing, coverage may not be equivalent to protection without adequate management, design and enforcement. Agardy et al. (2003) are concerned that the significant polarisation of views could, if not addressed, lead to decision makers rejecting marine spatial protection altogether, or use it in the wrong way. This policy backlash has become a threat at the time when marine spatial protection is needed the most.

5 Case Studies

The following section presents case studies of Sweden, the United Kingdom and the Netherlands. Each case study includes a brief introduction of national contextual factors related to marine management, a background of marine spatial protection in the respective country, how the Marine Strategy Framework Directive (MSFD) is currently being implemented, and the nature and extent of spatial protection of marine environments, including marine reserves. Each section contains a fact-based description complemented with personal views derived from the interviews conducted with stakeholders in the respective countries. The latter makes up the bulk of the chapter. The chapter concludes by discussing factors that are relevant in the entire region or throughout the EU regarding the scope for marine reserves under the MSFD.

5.1 Sweden

Sweden is the third largest country in the EU with its almost 530 000 km² (including water areas), although sparsely populated. The population of almost 9.7 million is increasing, as is the depopulation of rural areas (European Environment Agency (EEA), 2011a; Statistics Sweden, 2009). The Swedish coast is over 13,500 km long, stretching the Baltic Sea and parts of the North Sea with Kattegat and Skagerrak (see Figure 6) (Statistics Sweden, 2001). The marine environment is therefore important for Sweden, and several significant economic sectors depend directly on marine environments for economic benefits, such as shipping, fishing, mineral extraction, energy production, tourism industries and recreation (OECD Environment, 2014). The largest marine sectors in Sweden both in terms of number of jobs and monetary value are, in order, tourism, transport, and fisheries (EC, 2014c). A trend analysis presented by the World Wildlife Fund (WWF) in 2010 predicted that many of these sectors will increase significantly in the Baltic Sea in the coming 20 years (WWF, 2010). The EEA further states that, for Sweden, increase of international and national shipping, and in most types of energy supply and use are some of the main developments expected to contribute the most to environmental pressures in coming decades (European Environment Agency (EEA), 2011a). This progress creates more competition for marine space and a more difficult balance between nature protection and other interests. The Swedish EPA clarifies that this collision is especially evident in coastal and archipelagic areas near major cities and shallow offshore banks. There is a great risk for future conflict (Swedish Environmental Protection Agency (EPA), 2008). Competition for the space and resources of the Baltic Sea is further hindered by the fact that it is shared by 85 million people in nine different countries.



Figure 6 Map of Sweden and location of Kosterhavet National Park (illustration adapted from europeetravel.com)

UNESCO and the Intergovernmental Oceanographic Commission (2014) state that the environmental status of Swedish seas is far from acceptable, with annual warnings about algal blooms, hypoxia and a fish stock status “worse than ever” (para. 2). Most marine ecosystems suffer from eutrophication due to large national and regional emissions of nitrogen to the Baltic Sea (OECD Environment, 2014). Since any rapid reversal of eutrophication during the timeframe of the MSFD is unrealistic, management targets will need to take into account eutrophication processes, but also climate change (Roth & O’Higgins, 2011).

In terms of regional cooperation, Sweden is a member of both HELCOM and OSPAR. Sweden otherwise has a long tradition of decentralised planning with strong regional power through the municipalities and county administrative boards. The county administrative boards are responsible for nature conservation, among other things (Ministry of the Environment, 2009). National environmental policy is guided by the 16 ‘Swedish Environmental Objectives’, describing the quality of the environment that Sweden wishes to achieve by 2020 (Swedish EPA, 2013). Sweden has often prided itself as a forerunner when it comes to environmental awareness and policy. Yet, the recent Environmental Performance Index, conducted by Yale University, places Sweden on a 89th place out of 177 countries when it comes to protection of habitat and biodiversity (20th for marine protected areas). When the EEA (2011a) assessed nature protection and biodiversity in Sweden in 2011, their message was that “designating protected areas does have positive effects on biodiversity but this action still lacks sufficient planning on a larger scale”.

5.1.1 Development of marine spatial protection

Sweden has worked with marine spatial protection in periods and is currently increasing its efforts to protect and manage its marine environment (OECD Environment, 2014). Jorid Hammersland at the Swedish Ministry of the Environment explains how regulatory criteria for marine spatial protection were first developed in the 1980s, but that things did not take off until 2005 and onwards. Since then, authorities have tried to adopt the spatial protection criteria developed in HELCOM and OSPAR, which in turn are based on recommendations from the IUCN. Swedish nature conservation tradition has been a central part of this development, and is enshrined in the Swedish Environmental Code. This tradition aims to achieve the best possible protection based on clear aims and legal basis, without ‘unnecessary’ or unjust limitations of human activities. This view is crucial and has been a way to build stakeholder acceptance (personal communication, July 4, 2014).

An example of the current progressive efforts highlighted by the OECD is the establishment of the Swedish Agency for Marine and Water Management (SwAM) in 2011 (OECD Environment, 2014). The agency replaced the Swedish Board of Fisheries and took over responsibility for marine and water management issues from the Swedish EPA. One of the agency’s responsibilities is marine spatial protection and to delegate related objectives to the county administrative boards who are responsible for designation and management. The need for protection is assessed for each site and followed up to make sure that the intended outcome is achieved or to consider if revision is needed (Hammersland, personal communication, July 4, 2014).

Sweden currently has three types of MPA networks (Natura 2000, HELCOM and OSPAR MPAs) and one marine national park (Kosterhavet, see below). Along the West Coast, there are ten OSPAR Marine Protected Areas (MPAs) established to date, whereof all but one overlaps with Natura 2000 sites. The Swedish Baltic Sea contains 28 HELCOM MPAs. Currently, 6.3% of Swedish marine waters (territorial waters and EEZ) are under some form of nature protection. It is the lowest coverage of MPAs out of the Baltic Sea states, e.g. compared to 40% in Germany (WWF, 2014b). A recent opinion poll conducted by the WWF on 1,000 Swedes illustrated that 90% want the government to increase the amount of nature protection (WWF, 2014a). In 2013, the Swedish Environmental Objectives were complemented with ten new targets on biodiversity and ecosystem services, including creating an additional 570,000 ha of marine spatial protection and to reach at least 10% of MPA coverage by 2020 (Swedish EPA, 2014). Swedish WWF welcomes the initiative, but are critical of the lack of mandate and resources given to responsible authorities (WWF, 2014b). The Government provides little practical guidance and no legal changes to increase protection of marine areas. Lena Tingström at SwAM argues that the targets are ambitious considering

current protection covers 6.3%. For sake of comparison, Sweden is to reach almost the same level of protection for marine areas as for terrestrial (currently 12%) within six years. Establishing the terrestrial protection took over 100 years (personal communication, June 12, 2014). The Swedish assessment of existing marine spatial protection concluded that if Sweden is to achieve its commitments under the Convention on Biological Diversity (CBD) of 10% protection by 2020, an area equivalent to an additional 14 Kosterhavet National Parks is necessary (Swedish Agency for Marine and Water Management, 2013).

A combination of factors have justified establishing existing spatial protection. The far strongest driver has been the Habitats Directive and the Natura 2000 network (see Section 3.5.1). The establishment of Natura 2000 in Sweden occurred over a short period. Areas were selected largely based on existing coastal protection of terrestrial and tourism values for sake of simplicity. Consequently, there is need for revising the representativeness of the marine Natura 2000 areas to make sure that they are relevant and coherent. The areas were appointed on inadequate scientific basis. Authorities have since then gained a broader understanding and the current expansion of spatial protection to 10% includes a review of existing designations and an assessment of what needs to be complemented. County administrative boards are in charge of this work (Hammersland, personal communication, July 4, 2014).

The OECD Environment (2014) comments that, like many countries, “Sweden is at a very early stage in implementing the ecosystem approach in its marine policy” (p.16). A key challenge is “insufficient consideration of the economic benefits of marine ecosystems in policy making”. This is mostly accredited scientific data gaps. The assessment furthermore identifies contradictory objectives of Swedish national environmental policies. For instance, fisheries are exempt from the Swedish fuel tax, potentially encouraging large-scale fishing. Meanwhile, fishermen are provided a range of financial grants in order to protect marine stocks and to harvest sustainably (OECD Environment, 2014). Fredrik Lindberg, Ombudsman at the Swedish Fishermen’s Federation (SRF), mentions contradiction also with regard to cod protection in Kattegat. Despite closed from fishing, the Swedish EPA granted Falkenberg municipality’s request to dump 80,000 m³ dredged materials in the area, potentially contaminating surrounding waters. The Swedish Environmental Court later revoked this decision, based on the precautionary principle (Miljödomstolen [2009] Case M 4022-09).

Kosterhavet National Park

Kosterhavet National Park was established in 2009 as Sweden’s first and only marine national park located on the west coast (see Figure 6). It is, according to Ylva Engwall at SwAM, renowned internationally for its efforts to ensure sustainable use of natural resources (personal communication, July 4, 2014). General national park rules apply (see Box 2). Fishing is regulated according to national fishing regulations, although trawling is subject to special rules (Swedish EPA, 2009).

The manager of Kosterhavet National Park, Anders Tysklind, says that with their fifth birthday coming up, it is still too early to determine the ecological effects of the park (personal communication, July 24, 2014). Since no particular activities are restricted, the park has a formal possibility for ‘adaptive management’, meaning that if the environment changes so that its values are no longer safeguarded, whatever was originally agreed with local stakeholders may be revised. This agreement has been important to communicate from the start in order to build local acceptance, ensure flexibility and avoid false promises. It is also a central concept in order not to lose the park’s conservation objectives simply to seek agreement between involved parties. Tysklind argues that it is necessary to be willing to continuously argue for natural and ecological values and that this has been done successfully at Kosterhavet. Collaboration is part of the everyday park management, including mutual respect and trust

between different actors. It is important to compromise, listen and realise that all objectives cannot be achieved. There is high value in getting acceptance and understanding that the area is worth protecting. Especially in long-term, this might be more essential than the actual speed of implementation. Local acceptance depends largely on involvement of the local community, to base the work on local preconditions and interests, and to try to get them involved as much as possible. In short, contact and dialogue outweighs rules (personal communication, July 24, 2014).

Since the park does not have the authority to restrict fishing, there have been long discussions with local fishermen. Part of the condition for the national park was that the fishing would stay unregulated (except for national fishing laws), but also because there was an existing good collaboration between local fishermen and authorities. According to Tysklind, fishermen in the region realise that in order to fish in the protected area and get access to its resources, they need a high level of credibility. This has made the fishermen one of the initiators for stricter rules. It is likely that park establishment might have been more difficult without this existing good collaboration (personal communication, July 24, 2014). Lindberg at Swedish Fishermen's Federation (SFR), comments that the public's image of the professional fisherman is probably quite far from the truth. He argues that fishermen generally care the most for the wellbeing of the stocks to ensure next generation's livelihoods (personal communication, August 12, 2014).

Tysklind mentions that the park has boosted local tourism, especially in off-peak seasons. No official assessment has yet been published, although he argues that local entrepreneurs would confirm the trend. Some refer to it as the "Kosterhavet effect". Tysklind has noticed several new business concepts establishing in recent years in direct connection to the national park, such as eco-tours and guided diving and kayaking. A close dialogue is kept with local businesses to make sure that development proceeds in line with the park's statutes of 'sustainable use'. Tysklind believes that marine spatial protection could generate tourism in a previously non-tourist area. He also strongly believes that the word 'national park' has appeal, although it is not essential. He has noticed how visitors from around the world have a certain respect towards a national park, although different countries mean different things with the term. Tysklind thinks that one of the most important aspects of Kosterhavet is to show and educate the values of biodiversity and spread the knowledge beyond the visit. He has seen visitors experiencing a, for them, new world, previously not realising "the beauty and colours of cold-water reefs and marine life" (personal communication, July 24, 2014).

Although some locals oppose tourism in the area, the large majority seems positive. Tysklind describes a sense of pride among local residents over the park, to the extent that some even assist the park management with enforcement. Overall, visitors understand and respect the restrictions and enforcement works well. Seven person man the park and coast guard and coastal police assist if necessary. The park could have had twice the enforcement as is common in some countries, but Tysklind emphasises that it is a matter of balancing control and trust (personal communication, July 24, 2014).

Being a state authority, the park is run on a state budget. Marine monitoring has proven costly, e.g. beach cleaning costing 1–1.5 million SEK annually, but no tourism revenues go to

Box 2 General rules in Swedish National Parks

- The Right of Public Access is limited, e.g. tenting
 - Dogs must be kept on leash
 - Digging up plants is prohibited
 - Picking or moving stones is prohibited
 - Hunting is prohibited
 - Introducing alien species is prohibited
 - Biking, horseback riding and driving a scooter is usually limited
 - Mooring, anchoring and speed is restricted
 - Putting up a fire only allowed in designated areas
 - Drawing cables is prohibited
 - Spreading harmful chemicals prohibited
-

Source: EPA (2009)

management of the park. Although entrance fees to national parks are common in other countries, it is generally not allowed in Sweden. Tysklind suggests that such a set-up may work elsewhere as long as local entrepreneurs are interested in helping to finance. He argues that there sometimes is an over-trust in what state involvement offers. Authorities cannot do everything with limited budgets. According to Tysklind, cooperation is the best alternative, rather than different actors pointing responsibility at each other. He mentions a generally strong political support for the national park. Initially, the expensive visitor centre generated debate, but today the local Kosterhavet Delegation, including municipal representatives, is highly engaged and wants ‘more of everything’ (personal communication, July 24, 2014).

5.1.2 Marine spatial protection under the MSFD

Sweden has implemented the MSFD mainly through the establishment of the Marine Environmental Regulation (SFS 2010:1341). SwAM is responsible for implementation, including establishing Programme of Measures (PoMs). This process is highly limited by the fact that all suggested measures require financial support. It is therefore favourable if measures can address several MSFD descriptors simultaneously (see Appendix III). Linda Rydell at SwAM explains that they try to present links between descriptors and measures to help justify their decisions (personal communication, July 7, 2014). Spatial protection measures may address several of the MSFD descriptors; however, it will not address eutrophication – one of the key environmental issues in Swedish waters. In order to justify establishing spatial protection, there is a need to assess how they may help the marine environment at large (Tingström, personal communication, June 12, 2014). Ida Reuterswärd at the Swedish Ministry of the Environment stresses that at a national policy level, there is a recurring issue about how to assess the descriptors of the MSFD and how to link them to respective actions (personal communication, May 19, 2014).

Tingström explains that the choice of policy measures to include in the PoMs is largely steered by economic justification, based on cost benefit analyses and cost effectiveness. Economic impact assessment is a requirement for all new regulations under the Swedish Environmental Code. The MSFD requires that costs for suggested measures are presented. The choice of measures is also largely guided by need for protection of biodiversity, although Sweden currently lacks comprehensive mapping of marine habitats. Tingström comments, “We know which areas are protected, but not locations of the habitats most worthy of protection or how much of these that is already being protected” (personal communication, June 12, 2014). Once areas are identified, it is decided on a case-by-case basis which weighs heavier, ecological or economic values (Engwall, personal communication, July 4, 2014). Tingström argues that it is problematic to determine all costs involved since there are so many, including staff, investigations, assessments, and monitoring (personal communication, June 12, 2014). Engwall hopes that valuation of ecosystem goods and services, which is a Government priority, soon can become operational and assist in this work, in order to avoid comparing apples and pears (personal communication, July 4, 2014). Tingström mentions that it is still in its infancy in Sweden (personal communication, June 12, 2014).

Preliminary, Sweden will not establish any new protected areas under the PoMs due to time constraints (implementation needs to go through the county administrative boards). Instead, SwAM has adopted the Swedish Government’s commission from 2013 of 10% protection and decided to lift that into the PoMs. No other options are discussed (see Box 1 in Section 3.4) (Hammersland, personal communication, July 4, 2014). The goal is based on the CBD (Tingström, personal communication, June 12, 2014). Besides, the PoMs needs to be coordinated with the new Maritime Spatial Planning (MSP) Directive and biodiversity aspects from other directives. This may lead to clashes at a later stage. SwAM has therefore chosen to view the PoMs as a means of synchronising and coordinating existing measures. Sweden aims

to coordinate this measure also with other member states of the Regional Sea Conventions in order to achieve synergy effects. Sweden often discusses and considers OSPAR and HELCOM's recommendations, although do not automatically translate them into national measures (Rydell, personal communication, July 7, 2014). Tingström stresses that because protection measures are so different in the different countries, international connectivity and resilience of existing areas is difficult to measure. The terminology is important here, and terms such as "marine reserve" may be translated differently with countries making their own interpretations, hindering comparisons between different national networks of protected areas. Assessments of ecological coherence therefore do not say much, e.g. the ones conducted by OSPAR (personal communication, June 12, 2014).

Rydell emphasises that some of the mixed interpretations of the MSFD may result from the work being built on assessments made in 2012, when MSs were still unclear on what the Commission wanted and expected of them. This is a limitation for Sweden, e.g. since environmental quality standards (EQS) for Swedish marine waters were only established in mid-2012. For instance, Swedish authorities did not have enough information in 2012 to be able to set specific targets or EQS for marine biodiversity. Consequently, Sweden did not include a baseline or short-term functional goals for this in the first stage of the MSFD implementation (personal communication, July 7, 2014). Since the MSFD states that PoMs should aim to achieve the stated goals, and the Swedish targets have been criticised by the Commission for: "Only focused on fish, no targets for other species groups [and] No pressure targets" (Dupont, Belin, Moreira, & Vermonden, 2014b, p. 8). Rydell comments that, ultimately, it would have been more correct of Sweden to set a random target for biodiversity, which she thinks is what many other countries did (personal communication, July 7, 2014).

5.1.3 Marine reserves

Sweden has no marine reserves. There are, however, areas protected against most economic development, for example, bans on dredging, mineral extraction etc. (but not fishing since this is regulated separately). There are fragments of areas closed from fishing, e.g. within Kosterhavet National Park and in Kattegat to safeguard the commercially important cod. Studies of some of these areas have indicated positive effects on commercial fish stocks in terms of density and size (Bergström et al., 2007). Another example is the Öresund straight between Sweden and Denmark, where certain fishing methods, such as trawling, have been prohibited for marine safety reasons since 1932. This has had secondary effects on marine life, for example strongly benefited the cod population (Bergström et al., 2007). The population does not, however, seem to spill over into neighbouring Kattegat (Svedäng, personal communication, July 22, 2014). Terrestrial protection stretching into coastal areas may furthermore function as marine reserves (Hammersland, personal communication, July 4, 2014).

Hammersland comments that if a direct comparison is made of what is defined as 'marine reserves' for biodiversity protection in Sweden and in Southern Europe, one might find that the same level of protection effectively applies in some Swedish areas. Looking only at the terminology may be misleading (personal communication, July 4, 2014). In this regard, she appreciates how the MSFD combines Natura 2000, RSC MPAs and national networks relevant for respective countries, although stresses that Natura 2000 only formally applies to species and habitats listed in the annexes of the Habitats and Birds Directives (see Section 3.5.1). Marine Natura 2000 in Sweden is furthermore in considerable need of revision (see Section 5.1.2). She believes that marine reserves may ensure a broader protection that could be combined with existing Natura 2000. This does not mean, however, that a strict protection level has to be applied to all parts of the respective areas. According to Swedish nature conservation tradition, if full protection is considered necessary, it should be established. Hammersland welcomes the discussion about no-take areas, but argues that other levels of

protection must also be considered. It may be more relevant to discuss stricter enforcement of existing regulations to enable a sustainable use, such as Kosterhavet National Park (personal communication, July 4, 2014).

Marine reserves have not been discussed as a measure for biodiversity conservation in the Swedish PoMs (Engwall, personal communication, July 4, 2014; Rydell, personal communication, July 7, 2014). In the current discussion about Blue Growth (see Section 3.5.1), aquaculture is of particular importance for Sweden. A marine reserve would close an area from many types of economic development, standing against blue growth goals (Hammersland, personal communication, July 4, 2014).

Regarding multi-use MPAs, Engwall predicts that Maritime Spatial Planning (MSP) is going to be increasingly important in Sweden, with authorities trying to find mutual goals among interest groups. New industrial sectors such as energy producers and dumping of dredging material are emerging as the main interest groups, and according to Engwall, Swedish fishermen do not have nearly as much lobbying power anymore. There are also aims to increase marine infrastructure (personal communication, July 4, 2014). Hammersland does not entirely agree that fishermen have less influence, and argues that they are still the strongest interest opposing spatial protection measures, together with offshore wind energy. She sees that the fishing industry is starting to realise the importance of protection, and hopes that current policy development in the EU can lead to a higher acceptance for spatial protection e.g. for spawning areas, not only in coastal but also offshore waters (personal communication, July 4, 2014). The Baltic Sea cod is a good example where the stocks are in such poor condition that fishery management can no longer act in separation of environmental conservation (Engwall, personal communication, July 4, 2014). Lindberg at the Swedish Fishermen's Federation comments that marine spatial protection may well be an alternative, as long as there is an objective need for it. He believes that this is the general attitude towards spatial protection among Swedish fishermen, depending on to what extent they themselves are affected and the reasons why. He argues, as mentioned, that fishermen often care the most for the stocks, although the opposite is frequently assumed (personal communication, August 12, 2014).

Interviewees suggest that the political acceptance for marine reserves in Sweden is difficult to determine. However, the Government asking for 10% MPAs indicates a certain level of short term acceptance, although for multi-use sites and not marine reserves. Locally, the acceptance is likely dependent on location of the sites (Rydell, personal communication, July 7, 2014; Engwall, personal communication, July 4, 2014). According to Hammersland, the political acceptability of marine reserves is growing, but decision makers always have to consider opposing interests. Restrictions must be clearly justified in order to be accepted. She contemplates whether there is enough acceptability to base conservation objectives on the precautionary principle, especially at the local level where decision makers are in direct proximity to local interests. The Natura 2000 network's strength is that it clearly specifies what to protect. Keeping areas untouched as scientific reference areas might be easier to justify, she argues (personal communication, July 4, 2014). Regarding what factors may affect the political acceptability for marine reserves; Engwall names the current political majority as an obvious determinant. Different political parties give varying attention to environmental issues (personal communication, July 4, 2014). Hammersland also mentions that the political acceptability is affected by the interconnectedness of the marine environment. The difference between terrestrial and marine spatial conservation is that the prospects of achieving targets in the sea depends to a much larger extent on how the rest of the sea is treated. Eutrophication is a good example, used for many years as an argument against designating protected areas at sea, since there is 'no point'. The environmental authorities have argued that it is more a matter of strictly enforcing existing regulations in order to reach conservation objectives. Furthermore,

in the Maritime Spatial Planning (MSP) commencing in fall 2014 as a response to the new MSP Directive, marine reserves may be important to reach conservation objectives. It is essential to argue for marine reserves to become part of the policy mix, in order to address the notion that eutrophication is a reason not to act (personal communication, July 4, 2014).

According to Hammersland, critics argue that there is not enough scientific knowledge to determine where to place protected areas and that we should wait for better information. When assigning new areas for protection, closing areas entirely for precautionary reasons may be correct from a natural science perspective. From the authorities' point of view, however, there has not been political or social acceptance for such an approach. It is difficult to predict how this discussion will unravel, since decisions can be increasingly well-founded scientifically. Hammersland hopes that establishing valuation of ecosystem goods and services, as previously mentioned, can help illustrate and justify protection of larger and more areas to secure the supply of these services (personal communication, July 4, 2014). Previously, there has been an issue that county administrative boards sometimes have a purely regional planning focus when deciding where to locate new protected areas and how. Tingström argues that SwAM needs to emphasise a different focus to local administration (personal communication, June 12, 2014).

Experiences of regional implementation

The county administrative boards of Blekinge, Västra Götaland and Kalmar are represented here to illustrate regional experiences of marine spatial protection. In Västra Götaland, conservation drivers in the last century were recreation, birds and seals. For instance, many of the large Natura 2000 areas from the 1970s were established for recreational purposes or for bird protection, and management plans for their marine components are still lacking due to poor mapping of marine environments. Maria Kilnäs at the county administrative board comments that in this century, conservation instead has a stronger focus on nature values and the threats against these.¹² Knowledge has improved thanks to increased economic resources for conducting assessments, leading to Natura 2000 protection in the EEZ in Skagerrak and an impending strengthening of protection in some OSPAR MPAs. However, the authorities expect continued challenges posed by lack of resources for mapping, monitoring and enforcement in the future. Kilnäs also mentions that most local stakeholders have been positive to marine protection, apart from opposition from small marinas and wave- and wind energy plants, representatives of these (including local politicians and business organisations), recreational and professional fishermen and the Swedish Armed Forces. Kilnäs adds that also nature protection organisations have sometimes not accepted that the authorities need to compromise with conflicting interests to secure local acceptance (personal communication, August 11, 2014). Ulf Lindahl at the county administrative board of Blekinge states that marine spatial protection there has foremost been driven by existence of high nature values, especially of plants, and of finding areas that are “easy to work in”, i.e. state-owned land, or in, or close to, an existing terrestrial reserve (personal communication, August 5, 2014). So far, designations in Blekinge have been uncontroversial. When planning future protected areas, recreational fishermen have expressed concerns that areas may be closed for all extraction. Lindahl therefore predicts that it will be a challenge to get acceptance among fishermen for future necessary restrictions for protection of fish stocks (personal communication, August 5, 2014). In Kalmar, only one of current MPAs was actually established for marine purposes. Rita Jönsson at Kalmar county administrative board mentions that reimbursing local fishing was a challenge, as well as balancing conservation and leisure interests. Decisions as to whether or not to establish marine spatial protection are based on if restrictions are able to support biodiversity values from the present threats (personal communication, August 19, 2014).

¹² If the threats are high in one area, this can be prioritised over an area with higher nature values but lower threats.

The environmental effects of existing protected areas have not been assessed in any of the regions (Lindahl, personal communication, August 5, 2014; Kilnäs, personal communication, August 11, 2014; Jönsson, personal communication, August 19, 2014). Recolonization of the critically endangered cold-water coral *Lophelia* has however been identified on previously dead reefs in Kosterhavet (Kilnäs, personal communication, August 11, 2014). In Kalmar, annual assessments of the harbour seal population are showing an annual population increase of about 9%. Otherwise, marine environments are considered to be too heavily affected by large-scale factors such as eutrophication and overfishing to be possible to monitor or manage at a local level (personal communication, August 19, 2014). According to Kilnäs, there are not enough resources for follow-up (personal communication, August 11, 2014).

Lindahl considers marine reserves to have some relevance under the MSFD, depending on location and design. Generally, the most important factor is to demonstrate high enough values to justify a reserve. He mirrors the comments of SwAM representatives saying that several main environmental problems, such as, eutrophication, toxic pollution, and overfishing of cod, are too large to address with spatial protection. In many other areas, however, physical exploitation could effectively be remedied by marine reserves. The authorities' ability to demonstrate the values worth protecting is hampered by a lack of resources for comprehensive inventory (personal communication, August 5, 2014). Kilnäs agrees that marine reserves should not be an end in itself, referring to the Swedish conservation tradition (personal communication, August 11, 2014). Jönsson and her colleagues in Kalmar also think that marine reserves may be an important tool under the MSFD, especially for descriptors 1, 3, 4, and 6 (see Annex III). If fishing regulations, spatial planning or international cooperation cannot resolve existing impacts on the sea, they consider marine reserves to have large relevance. They also call for adaptive management, including marine reserves, in order to safeguard biological values. The main challenge for establishing marine spatial protection is, however, lack of staff (personal communication, August 19, 2014).

According to Lindahl, growth in tourism is politically important in Blekinge, and fishery interests have high political impact. Marine reserves may be seen as a 'dead hand' in terms of growth. Potential factors to affect the political acceptability are analyses of ecosystem goods and services and better data on impacts of fishing on coastal stocks. More pilot areas and positive examples with solid scientific base could facilitate this process. It is not so much the terminology or type of protection that determines its acceptance, but rather, which concrete restrictions it imposes (personal communication, August 5, 2014). Kilnäs' perspective in Västra Götaland is that political acceptability for marine reserves is steered by not establishing larger or more areas than necessary and that benefits of increased ecosystem services can be illustrated (personal communication, August 11, 2014). Jönsson in Kalmar comments that restrictions to access automatically create scepticism. Areas with 'weaker' protection may therefore be more accepted, or because they may be set for a limited amount of time and are regulated via the Fisheries regulations (personal communication, August 19, 2014).

5.2 The United Kingdom

The United Kingdom (UK) consists of Wales, Scotland, England and Northern Ireland, each with their separate regional jurisdiction, including marine management. This thesis focuses on the UK as a whole, and will discuss differences between the regional jurisdictions only to the extent that they are deemed relevant.¹³

¹³ Northern Ireland is in an early stage of marine policy development and will therefore not be addressed further in this thesis.

The UK is a member of OSPAR, with waters in the North Sea and the North-East Atlantic Ocean. Marine species include sea horses, sharks and dolphins, and British seas have the most underwater chalk reefs in Europe (Natural England, 2014a). The coastline includes areas of intense development and human activity, as well as less-developed areas. According to Philip Evans, Head of Policy and Analysis at VisitEngland, all coasts have some level of tourism (personal communication, August 1, 2014). The UK is an historically and contemporary maritime nation, with “a long heritage of sea based activities” (Association of Inshore Fisheries and Conservation Authorities (IFCA), 2014, para. 1). The largest marine sectors are tourism, transport and shipbuilding (EC, 2014c). Aquaculture, extraction of oil and gas and renewable sources of marine energy are increasing considerably. Main environmental pressures in the UK include habitat loss, infrastructure development (including coastal development), and climate change. Part of the UK’s efforts to protect biodiversity is to ‘do more for the marine environment, including offshore waters’ (European Environment Agency (EEA), 2010).

Lead Advisor Simon Jennings at Centre for Environment, Fisheries & Aquaculture Science (Cefas) explains that the British Government takes recommendations for marine management from the Joint Nature Conservation Committee (JNCC) and Natural England (NE). Scientific aspects are advised from Cefas (personal communication, July 11, 2014). Cefas is the executive agency of the UK Department for Environment, Food and Rural Affairs (Defra), and provide advice on MPAs and marine reserves (Cefas use the term ‘no-take zones’) (Cefas, 2014).

5.2.1 Development of marine spatial protection

British spatial nature conservation began in the 1930–40s. Although the perspective was primarily terrestrial, some areas covered ‘marine’ aspects. A new piece of legislation was brought in 1981,¹⁴ allowing designation of Marine Nature Reserves (MNR), including areas away from the coast. Jon Davies, Programme Leader of Marine Protected Sites at the JNCC explains that due to its design and implementation process, the Act was unsuccessful and only managed to bring about a couple of MNRs over the course of 20–30 years. Instead, marine spatial conservation took off in the 1990s with the Habitats and Birds Directives. Due to the rulings in *UK v Greenpeace* (1999) and *Commission v UK* (2005) (see Section 3.5.1); the UK has since worked to identify sites for protection away from the coast. Today, the total coverage of Natura 2000 designations is 108 Special Areas of Conservation (SAC’s) assigned under the Habitats Directive and 108 Special Protection Areas (SPA’s) with marine components assigned under Annex I in the Birds Directive (personal communication, July 16, 2014). This constitutes the largest national designation of marine Natura 2000 in the EU (European Environment Agency, 2012).

The Marine and Coastal Access Act 2009

The Habitats and Birds Directives are still the main instruments for marine spatial protection in the UK (Davies, personal communication, July 16, 2014). However, Natura 2000 has shortcomings (see Section 3.5.2) and in order to fulfil obligations under the OSPAR Convention¹⁵ and the CBD, additional designation alternatives were needed. This was provided in the Marine and Coastal Access Act in 2009 (hereinafter the *MCAA*). MCAA Part V allows for the designation of Marine Conservation Zones (MCZs) for protection of nationally important species, habitats or geological areas where such are rare or threatened, or to protect the

¹⁴ The Wildlife and Countryside Act 1981

¹⁵ The OSPAR objective is to achieve an MPA network that is ecologically coherent and well-managed by 2016 (OSPAR Commission, 2010).

diversity of such, regardless if they are rare or threatened (MCAA, Part V, Art. 117).¹⁶ MCZs are multiple-use and restrictions are to be established through consultation with all relevant stakeholders (Art. 119). According to Margherita Pieraccini at Bristol University, this approach entails that authorities are accompanied in the management boards of MPAs by local community representatives (personal communication, July 16, 2014). This obligation coincided with, and was reinforced by, the requirements in the Marine Strategy Framework Directive (MSFD) (see Section 5.2.2) (Davies, personal communication, July 16, 2014). Potts et al. (2014) summarise how establishment of MPAs differ between the different jurisdictions, “In England, the focus has been on biodiversity conservation with the proposed establishment of a new suite of MCZs which will complement the existing network of English MPAs. The Welsh government has proposed an increase in the level of protection of a number of existing MPAs in order to protect biodiversity, and ecosystem functioning and resilience. In Scotland a new suite of MPAs is proposed which has the dual focus of nature conservation and delivery of ecosystem service functions within the principal theme of sustainable development” (p.142). Davies adds that fisheries benefits have been an acknowledged potential side-effect, although not an explicit justification for MPAs (personal communication, July 16, 2014).

Since the last 4–5 years, the UK is running a comprehensive programme to identify MCZs (Davies, personal communication, July 16, 2014). According to Defra, 27 MCZs covering an area of 9,700 km² were designated in 2013, with an additional 37 candidate sites for the second round in 2015 and a third round planned for 2016 (Department for Environment, Food and Rural Affairs (Defra), 2014). Anne-Michelle Slater, Head of School of Law at University of Aberdeen explains that the establishment of MCZs has thus drastically helped to expand the British marine spatial protection network (personal communication, July 23, 2014; Rees et al., 2013), to an extent ‘unprecedented’ in the history of marine conservation in the UK (Natural England, 2013). Taken together, British MPAs¹⁷ now cover 9.5% of the territorial sea (Joint Nature Conservation Committee (JNCC), 2014a). In terms of the MCZ network, it is still too early to assess any environmental effects (Pieraccini, personal communication, July 16, 2014). Davies comments, furthermore, that the UK tries to use the IUCN MPA categorisation, although they do not all work that well. Especially for offshore waters where the CFP has to be taken into account and whether or not measures are discriminatory to other EU member states etc. Once established, though, fisheries protection measures in offshore waters apply across borders and are de facto strict no-take areas and therefore a greater level of protection than inshore (personal communication, July 16, 2014).

According to Slater, establishing MCZs was a result of a bottom-up realisation of dysfunctional management, e.g. based on considerable public support and interest in recent years in TV and pushes from various charities and NGOs about what is happening in the oceans (personal communication, July 23, 2014). It had previously been difficult to get political will to implement MPAs despite legislation being in place for many years. The MCAA was therefore very much welcome (Davies, personal communication, July 16, 2014). Still, the UK faces many questions regarding the management and structure of the MCZs, e.g. if the MCZs will go by a voluntary approach (Pieraccini, personal communication, July 16, 2014).

¹⁶ The MCAA adheres to inshore waters of England and Wales and all UK offshore waters. Subsequent Marine Scotland Act (2010) and emerging legislation in Northern Ireland cover their respective inshore waters. The Scottish equivalent of MCZs is Nature Conservation MPAs.

¹⁷ In addition to the MCZs, Natura 2000, and the Scottish Nature Conservation MPAs, the UK has three other spatial protection designation categories: Sites of Special Scientific Interest (SSSIs), Ramsar Sites and Marine Conservation Zones (MCZ) in Northern Irish territorial waters (Joint Nature Conservation Committee (JNCC), 2014b).

Participatory designation process

Local communities and economic interests have had varying attitudes towards existing MPAs. According to Davies, some industries in the UK are opposed by principle, although there is a broad agreement that most of the MCZ work is needed. Davies emphasises that actors generally support policies until they are directly affected (personal communication, July 16, 2014). In the Scilly Islands for example, the attitude was positive since the community felt they had more control of the decision-making process, designation and management which reduced the perception of risk. Overall, there is a move in the UK towards a more flexible, partnership approach to management of MPAs. This has originated from a feeling among certain communities that MPA designation is like an external inquisition from Europe and that they had no power in the process (Pieraccini, personal communication, July 16, 2014). The first round of establishing MCZ sites was the first time that nature conservation was led by a participatory process. Pieraccini calls it “ground-breaking”. Regional stakeholder groups identified possible sites, instead of the governmental conservation authorities. These groups consisted of nature conservation bodies, fishermen, industries (such as oil and gas, renewable energy etc.) and regulators. The programme stretched over two years with iterative scientific review, and resulted in 127 suggested MCZ sites (personal communication, July 16, 2014).¹⁸ However, only 31 of these were identified by Defra for possible designation (Defra, 2013), to the disappointment of many stakeholders. A majority of the selected 31 sites were furthermore located in-shore, which is problematic when seeking to ensure an ecologically representative network of protection (Pieraccini, personal communication, July 16, 2014). The official explanation for this was that there was not enough scientific evidence to designate all of the 127 suggested sites. Unlike other MPA designations, establishment of MCZs requires socio-economic considerations, and several economic impact assessments were conducted in the suggested areas. The idea was that when the socio-economic interests outweighed the ecological interests, the decision would be not to designate. The House of Commons Environmental Audit Committee (2014) criticises Defra’s decision and calls for more commitment to protecting marine environments: “To be credible and attract support from all quarters, the Government needs to be able to demonstrate that the choice of sites strikes an appropriate balance between environmental, business and leisure interests. The selections so far, however, have been criticised from all sides. From an environmental protection perspective, they betray a lack of ambition and there are gaps in the level and types of biodiversity covered. But there are also concerns about potential harm to business and leisure activities” (p.16). The Committee points out that the next round of designations should follow a precautionary approach.

According to Davies, one reason for these events was that bureaucracy intervened; reverting stakeholders to their traditional positions where environmental interests supported MCZs and economic interests opposed them (personal communication, July 16, 2014). Pieraccini thinks that another reason for the Government making this decision, considering the selected sites were mostly in-shore, may have been the EU Common Fisheries Policy (CFP) and wanting to avoid foreign fishing interest issues later on (personal communication, July 16, 2014).

The JNCC consequently tried a different approach when identifying marine sites for protection in Scotland. Marine activities were mapped in detail in order to locate areas with little activity. This was done for two reasons. Firstly, there was a better chance that these marine areas were less impacted. Secondly, the less activities, the less compromise when designating MPAs. Of course, this approach has obvious limitations, for instance when special areas of interests need protection and restoration from high-impact activities (Davies, personal communication, July 16, 2014).

¹⁸ Covering 15 per cent of the waters under Defra’s jurisdiction (JNCC and Natural England, 2012, p. Executive Summary)

Mapping and valuating ecosystem goods and services

The socio-economic impact assessments mentioned above have been hampered by the lack of valuation of ecosystem goods and services. Valuation of ecosystem goods and services is generally not taken into account in marine planning and management in the UK, and there is a lack of mapping of these values (Davies, personal communication, July 16, 2014; Slater, personal communication, July 23, 2014; Börger et al., 2014; Potts et al., 2014). This is especially true for the environmental values in offshore waters. They are more difficult to evaluate since there is little tourism and leisure activities to use in prevailing methods for environmental valuation (such as opportunity cost evaluation and travel cost method). Instead, qualitative descriptors are used to illustrate environmental values, which are difficult to compare with economic costs. For example, an energy company can without much effort demonstrate how much marine restrictions will cost them. The monetary value of protecting the marine environment in the same area is not quantifiable, which creates a considerable barrier in discussions and impact assessments. This is a day-to-day impediment for the JNCC (Davies, personal communication, July 16, 2014). The MCAA could have incorporated values of ecosystem goods and services more explicitly instead of focusing primarily on socio-economic costs, Pieraccini argues. She suggests that it has created an even greater divide between ecologists, fishermen and other stakeholders. Pieraccini's own research strongly indicates that fishermen see the new MCZs as an obstacle bringing only costs and no benefits. Pieraccini believes that if ecosystem values would have been included in the MCAA designating areas would have been easier (personal communication, July 16, 2014). Slater points out that a 'proper' EBM approach would consider environmental valuation (personal communication, July 23, 2014). There have been a few attempts, e.g. by Plymouth University commissioned by the Wildlife Trust, to assess and value the ecosystem services that the MCZ network provides (Plymouth University, 2014). Slater argues that Maritime Spatial Planning (MSP) may help. However, since MSP legislation is still only on paper, Slater comments that the potential to balance it with conservation requirements and operationalization of the EBM approach is quite contested, mainly due to lack of scientific data and the complicated science-policy interface. However, Slater does not think that MSP will obstruct establishment of marine protection (personal communication, July 23, 2014).

Davies states that the general lack of scientific understanding of the scale and impact of human activities in the marine environment has been a barrier when establishing marine spatial protection. There is generally less data available about the environment away from the coast, impeding decision making, although less of a problem than the lack of socio-economic information mentioned above. Also, this uncertainty has significant negative effect on stakeholder support. Davies explains that there have been issues trying to justify restrictions to local stakeholders, without the authorities being sure about to what extent and what types of impacts this will have on the different stakeholders. Instead, many stakeholders assume that "restrictions" imply that they will be entirely excluded and thereby oppose any protection measures. An unconvincing line of argument consequently affects stakeholders' support (personal communication, July 16, 2014).

5.2.2 Marine spatial protection under the MSFD

The MSFD was transposed into UK law through the 2010 No. 1627 Environmental Protection, Marine Management, The Marine Strategy Regulations 2010 (hereinafter *the Marine Strategy Regulations*) (Natural England, 2014b). The regulations "stick closely to the wording of the Directive and do not go beyond the requirements it sets out" (Explanatory Memorandum to the Marine Strategy Regulations 2010, 4.2). The Marine and Coastal Access Act (MCAA) is linked to the MSFD through MCAA Section 123.5: "When complying with the duty imposed by subsection (1), the appropriate authority must have regard to any obligations under EU or

international law that relate to the conservation or improvement of the marine environment”. MCAA regulation 14.3 paraphrases MSFD Article 13.4, “Programme of measures must include spatial protection measures, to contribute to coherent and representative networks of marine protected areas”. Defra is leading the ongoing design of the PoMs. What will actually be included is still under consideration. According to Abigayil Blandon at the JNCC, they cannot provide that information to external individuals since it is not yet finalised. So much can be said, however, that the UK will link the MSFD requirement for spatial protection to the Natura 2000, with consideration given to other mechanisms such as the Common Fisheries Policy (CFP) (personal communication, July 25, 2014). Davies clarifies that the UK is not bringing in any specific legislation for MPAs under the MSFD, since it is not considered necessary. Instead, the interpretation of Article 13.4 is that it brings a stronger legal imperative for member states to meet existing non-legally binding obligations under the RSCs, rather than itself requiring a separate network (personal communication, July 16, 2014). Finally, British authorities also reserve the opportunity to put forward incidental protection such as fishery- and military closures (Davies, personal communication, July 16, 2014).

Regarding the link between MSFD spatial measures and fishery measures under the CFP, Davies points to a specific difficulty that the JNCC envisages may increase. CFP measures are solely for fish protection (i.e. a stock-perspective and not an ecosystem perspective). Because fishing is the main pressure away from the coast, any restriction on fishing will also provide incidental protection of the sea bed, stationary marine life etc. The difficulty comes when looking at these areas from a network perspective, since most CFP measures are temporary. The measure might be removed if it is working as planned for the fish stocks, removing also the seabed biodiversity protection.¹⁹ Davies concludes that CFP spatial measures definitely are important, although since focused on stocks-only, their protection of biodiversity at large is uncertain (personal communication, July 16, 2014).

In this regard, Davies comments on the clarity of the MSFD and its provisions. There is ongoing work within the Commission to address the vagueness of Article 13.4. Does it actually impose an obligation on MSs to establish a network in addition to existing RSC and Natura 2000? The reviewers’ interpretation is that it does, but Davies does not agree. The UK has questioned the way the text is being interpreted, and Davies believes there will be legal issues about this (personal communication, July 16, 2014).

5.2.3 Marine reserves

Three areas in the UK effectively work as marine reserves (referred to as ‘no-take zones’) – Lundy Island in the Bristol Channel, Arran in Scotland, and Flamborough Headland in Yorkshire (see Figure 7).

Lundy Marine Conservation Zone, Bristol Channel – the waters around Lundy Island contains rocky reefs and marine wildlife of special importance, including grey seals, lobsters and different corals. Originally a voluntary nature reserves, it was established as the first Marine Nature Reserve in the UK in 1986. The area is divided into different zones permitting different activities, including a 3.3 km² strict no-take zone designated in 2003. The small no-take zone was supported by local fishermen who “hoped to see an increased catch outside the area, demonstrating how commercial and conservation interests can work together for mutual benefit” (Natural England, 2014c). According to Davies, the no-take was established primarily to study the effects on lobster populations (personal communication, July 16, 2014). In 2011,

¹⁹ Davies mentions an example from the west coast of Scotland. Areas set aside to protect the orange roughy were removed since they had been successful, although keeping the restriction to fish orange roughy. Other fishing is however welcome, which could affect marine life.

Hoskin, Coleman, von Carlshausen, and Davis showed that the abundance of large lobster inside the no-take zone at Lundy had increased by 127% between 2004 and 2007, and that it was five times more abundant there than in other locations. Medium sized lobster had increased 97% within the zone and by 140% in locations nearby, indicating spillover. This rapid and large positive effect on valuable species came as a surprise (Natural England, 2014c), and helped to illustrate the potential benefits of no-take reserves to local fishermen. There are yet few other studies on the environmental effects of spatial protection in the UK, mainly since areas are still relatively new. The Lundy monitoring programme is a start and the next stage is to evaluate the entire network (Davies, personal communication, July 16, 2014). In 2010, Lundy became the first MCZ under the MCAA (Pieraccini, personal communication, July 16, 2014).

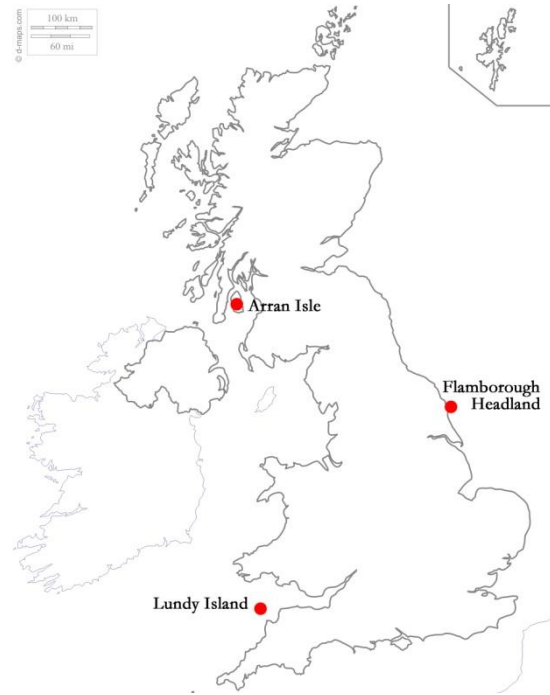


Figure 7 Map of the UK and locations of no-take marine reserves (map adapted from d-maps.com)

Arran’s Community Marine Reserve No Take Zone, Scotland – the Arran Bay was recently made a marine protected area. The 2.6 km² no-take zone was voluntarily designated through a community initiative, as the first community-led MPA in Scotland. The designation was therefore non-controversial (Pieraccini, personal communication, July 16, 2014). E.g. the Scottish Fishermen’s Federation and the Scottish Creel Fisherman’s Federation support the establishment (The Scottish Government, 2014).

Flamborough Headland, Yorkshire – the Flamborough Headland is an area of “regionally rare intertidal and subtidal chalk reefs, sea caves and sea cliff vegetation”. It was designated Natura 2000 in 2005. The no-take zone is 1 km² in size, and does after two years seem to be having a good impact (Marine Reserves Coalition, 2013). The area is at present put forward to become a MCZ no-take reference area, although this has not yet been decided (Pieraccini, personal communication, July 16, 2014).

In addition to these marine reserves, in the participatory designation process of the first set of MCZs (see previous section), the stakeholder groups suggested a similar zoning policy establishing Highly Protected Marine Reserves under the Marine Act, at 65 of the suggested 127 sites (personal communication, July 16, 2014; personal communication July 23; 2014). These small marine reserves were meant as reference areas for scientific comparisons and reference points for other types of management efforts. However, the Government decided that no reference areas will be put in place at this stage. The House of Commons Environmental Audit Committee (2014) points out that the Countryside Alliance²⁰ welcomed the decision. The Countryside Alliance states that such no-take reference areas were “a grave source of concern to wildfowlers and anglers, as well as others in coastal areas” (Countryside Alliance, 2014, para. 9). Furthermore, the Welsh Government initially opted to use the MCZ mechanism only to establish “highly protected MCZs” protected from all extractive, damaging and disturbing activity. The purpose was to contribute to ecosystem recovery and resilience and improve the scientific understanding of habitats and species’ responses (Welsh Government,

²⁰ The Countryside Alliance, established in 1997, is “the lead voice against the threats to hunting and shooting” in rural Britain (Countryside Alliance, 2014).

2012). Ten potential sites were suggested whereof four were to be established. The consultation process resulted in a large number of responses with “divergent and strongly held views” (Davies, 2013, para. 3). Consequently, in July 2013, the Welsh Minister for Natural Resources and Food announced that, “Many people in Wales rely upon and use our seas to support their livelihoods and recreational activities. We want this to continue and develop as part of our blue growth agenda” (para. 2). All suggested Highly Protected MCZs were withdrawn (Davies, 2013). Slater adds that marine reserves are still discussed as an alternative in Scotland, although this process is also highly controversial, inter alia among Scottish fishermen (personal communication, July 23, 2014).

Comments on stakeholder support

Slater comments that even though the Scottish fishermen are well-organised and a strong lobby group, their impact is a fragment of what it once was. Slater stresses that since there is hardly any fishing left in England, the UK fleet is today basically equal to the Scottish fleet. Instead, aquaculture far exceeds in terms of export. Slater’s personal understanding is that British fishermen are not unitedly opposed to spatial protection, but that there is, after 10–15 years of dialogue, a realisation that some areas need protection – some in the form of no-take marine reserves (personal communication, July 23, 2014).

According to Davies, the debate regarding marine reserves is obstructed by strong polarisation and conceptual difficulty, for instance how to determine what ‘extractive or otherwise harmful activities’ are. Some may claim that too many anglers may disturb bird life, and it becomes a question of scale – are ten anglers acceptable? ‘No extraction’ means not allowing any angling. It would be incredibly difficult to gain support such protection (personal communication, July 16, 2014). Davies and Pieraccini both refer to the attempts to establish Highly Protected Marine Reserves mentioned above as a practical example. Pieraccini calls it a “sad” development, and the Marine Biological Association (2014) calls it “a serious oversight” (para. 4).

Davies emphasise that leisure values are strong arguments to encourage communities to support marine reserve, although management funding comes from the government. Tourism revenues generally go to the local communities (boat services etc.), who therefore usually see the benefits of these reserves (personal communication, July 16, 2014). Slater agrees that there may be a link between tourism and marine spatial protection in the UK in the future, as long as it is done properly. Currently, she does not think the system is integrated enough between different sectors to enable tourism (personal communication, July 23, 2014). Philip Evans at VisitEngland²¹ argues that the economic value of Lundy Island is rather small, and that only a fraction of 1% visits the areas for the sake of the marine reserve. However, although individual sites may make little difference for people’s travel decisions, taken together he believes that the sum of protected areas is greater than its parts. He does not see that entrance fees are applicable for marine reserves in the short term. There are narrow margins in this sector already and local entrepreneurs may not accept an extra charge to visitors. Evans supports the idea that a new marine reserve may generate tourism in a previously unvisited area, and that terminology is important. The labelling of the tourism product builds up an expectation among visitors and local businesses, helping to boost the standard of their respective products (personal communication, August 1, 2014).

Local support for marine reserves may therefore be encouraged mainly through clearly demonstrating their benefits to local communities and specify who is affected. In offshore areas, people generally do not see how protected areas will affect them, making this a particu-

²¹ VisitEngland is a national body that focuses, among other things, on tourism implications of various uses.

lar challenge for gaining public support. The discussion about ecosystem goods and services is starting to come in, although the lack of knowledge about offshore areas makes it a difficult concept to get across. Davies believes that people generally understand the necessity of long-term protection, but politicians normally work on short-term. If enough local support is generated, he believes the political attention will come. The same is true about the opposite scenario. Davies stresses that this is a case-to-case issue, although it is less common in the UK for politicians to make environmental arguments in the face of economic interests (personal communication, July 16, 2014). Evans at VisitEngland, on the other hand, states that local acceptance might be easier to attain in the UK than elsewhere. Most commercial fishing has disappeared and marine reserves have potential to attract and boost different sectors, e.g. tourism-related. The issue may rather be to gain acceptance from other large-scale industrial actors, such as wind energy developments (personal communication, August 1, 2014). Davies highlights the issue of the authorities not knowing the scale of damage of activities, and that disproportionate restrictions may be placed on activities that actually have little or negligible impact on the environment. He believes that marine reserves generally, from a science and management point of view, are useful as reference sites, since they provide an understanding for how to better manage multiple-use areas (personal communication, July 16, 2014).

Comments on political support

According to Slater, marine reserves may have future relevance for the most valuable areas, and that they may be politically accepted as long as their application is limited. Authorities recognise environmental, social and economic aspects of the use of marine environments, and that many species are migratory and thereby would not benefit much from a marine reserve (personal communication, July 23, 2014). Davies at the JNCC argues similarly that the UK authorities strongly emphasise that spatial protection is only one tool to achieve good environmental status (GES). The UK may not have eutrophication to the same extent as the Baltic Sea, but they have other non-spatial issues such as nitrate pollution. Achieving GES will consequently require a series of policies. He says that the government has focused strongly on MPAs lately, but taken their eyes off what is occurring in the wider environment. This is dangerous. Davies mentions here that the UK MPA programmes include a provision that if a pressure from a different location adversely affects the area, e.g. pollution from an oil field, restrictions may be imposed also outside the MPA (personal communication, July 16, 2014).

Overall, Pieraccini sees little political acceptability so far in the UK for marine reserves. Because a key challenge to establish marine reserves in the North Sea are socio-economic pressures, she argues that the main factor that could influence acceptability would be to designate no-take areas in uncontroversial areas, e.g. as was done in Scotland (personal communication, July 16, 2014). Davies suggests that the most important factors influencing political acceptability are the prospect of generating economic benefits and the level of local support. He mentions that currently, it is unfortunately difficult for the JNCC to develop a strong economic argument, considering the general economic situation. The current British government is strongly pro-economic growth, and unless you can clearly argue that the suggested marine restrictions will have economic benefits, political acceptability is likely to be low. He emphasises that this is all about timing, and that much of the MPA work in the UK was conducted before the global economic crises at a time when it was essential to be seen to act and pursue international environmental obligations. Consequently, he believes that as economic problems increase, political will may decrease somewhat (personal communication, July 16, 2014). Davies nevertheless mentions that international influence and reputation is important in the UK. Ministers generally do not like to have to justify why the UK is a laggard. Being a leader is an important part of the national character, and partly explains why the UK is actively involved in OSPAR. This has been and still is a strong driver for the work of the JNCC, together with similar obligations made under the CBD. Therefore, Davies thinks

that international calls for marine reserves voiced by various NGOs and large organisations do have national importance. Davies personally believes that the next set of reporting for OSPAR and the rest of the MSFD process will shed uncomfortable light on the UK's MPAs and cause political discomfort. This may spur improved national action for marine biodiversity protection, and is also a reason why the regional sea conventions' work to establish international standards is essential, in order to encourage national governments to reflect on what they are doing to meet international best practice (personal communication, July 16, 2014). Evans adds that while international reputation may be an important driver for politicians, civil servants may be more reluctant to act. New proposals are often met with "rolling of eyes" and a scare for creating additional conflict. He furthermore believes that Brits tend to see themselves as different from mainland Europe, and that the government often do not see how many EU policies would apply to or benefit the UK, including marine policies. He argues that this helps explain the inertia in adopting the MSFD. He also emphasises that most political parties in the UK are unified behind a strong climate change commitment, which may be causing conflict with marine conservation objectives. Offshore wind farms and the development of a green energy mix are huge priorities (personal communication, August 1, 2014).

5.3 The Netherlands

The Netherlands has the highest population density in the EU with 488 inhabitants per km² (Holland.com, 2014), and the Dutch part of the North Sea is one of the most intensively used seas in the world (Ministry of Infrastructure and the Environment, 2012). The Port of Rotterdam is the busiest in Europe, and the country is historically an important maritime nation. The main marine sectors in terms of jobs are tourism, transport and fisheries, and in terms of value offshore oil and gas, tourism and transport (EC, 2014c). Its waters extend out into the North Sea and the Netherlands are a member of OSPAR. Marine management is incorporated into several governmental bodies due to its multi-faceted importance, including the Ministry of Infrastructure and the Environment.

According to the European Environment Agency (EEA) (2011b), biodiversity in the Netherlands have been steadily decreasing in the past century. Forty per cent of national species are red-listed (van Veen, ten Brink, Braat, & Melman, 2008), mainly due to intensification of large-scale agriculture and of various infrastructures. The incomes from Dutch fisheries have decreased by 38% from 1990 to 2003, due to the poor status of North Sea fisheries as explained in Section 1.4. Meanwhile, the gain in new protected areas is not fast enough to reach the Dutch CBD targets (European Environment Agency (EEA), 2011b).

5.3.1 Development of marine spatial protection

The National Ecological Network established in 1990 to improve, connect and extend natural areas has helped slowing down terrestrial biodiversity loss in the Netherlands (van Veen et al., 2008). However, marine spatial protection did not begin until 2008, with preparations for a Natura 2000 network. There are three Natura 2000 in Dutch territorial waters (12 nm) at time of writing – all multiple-use areas. Only one of them however, the Voordelta, has a management plan in place.²² Leo de Vrees, senior advisor at the Dutch Ministry of Infrastructure and the Environment and previously with the Marine unit of the Directorate-General Environment of the European Commission states that management plans for two other two areas will be finalised in the autumn of 2014 (personal communication, August 6, 2014). In all, the Natura 2000 network is the only Dutch spatial protection of marine areas, and current measures only slightly limit the options for the Dutch fishermen (Noordzeeloket, 2014a).

²² The management plans provide information about which activities are allowed in the respective areas, and which activities that needs to conduct an environmental impact assessment and receive a permit in order to operate.

Since the work to establish Natura 2000 is still on-going, no overall figure of MPA coverage has been found for this research. It should be noted that an expansion of the Port of Rotterdam, finalised in 2013, has covered about 2,500 hectares of the Voordelta. This area will be compensated in accordance with the National Conservation Act (Noordzeeloket, 2014b).

Previously, Dutch law only allowed Natura 2000 sites within territorial waters. In January 2014, following amendments of the Nature Conservation Act, the Dutch government formally allowed Natura 2000 establishment also in the Exclusive Economic Zone (EEZ). Consequently, three additional Natura 2000 areas are being established in the Dutch EEZ. The new legislation, including designation of the three sites, was proposed already in 2009, although the process was delayed by the fact that the Netherlands since then had two changes of government. de Vrees emphasises, however, that even without the relevant legislation, as soon as the site is designated it has to de facto be treated as if the law was already in place. The difference is that without a management plan, any activity that might negatively affect the habitats or species protected in this area will have to go through the Natura 2000 licensing procedure. Once the management plan is established, this procedure only applies to the activities not addressed or restricted in the plan. de Vrees mentions an example from 2009, when environmental impact assessments of proposed offshore wind farms in the EEZ resulted in several developments being declined a license, despite the lack of the natural protection legislation in the EEZ (personal communication, August 6, 2014).

One of the Natura 2000 areas in the EEZ – Cleaver Bank – has been criticised by fishermen, NGOs and marine biology experts. The site is regionally unique for its gravel and cobble formations from the last Ice Age and accompanying reefs and high biodiversity. The area was suggested as a Natura 2000 site in 2009, and the Dutch government set out to establish restrictions, involving fisheries organisations and NGOs in the decision process. The final plan adopted by the authorities was a compromise. Fishermen considered the area too large, and the NGOs too small. Interestingly, however, the management plan included protection for certain shellfish and worms, but only two moving animals, and no fish. According to Han Lindeboom at Institute for Marine Resources and Ecosystem Studies (IMARES) at Wageningen University, the ultimate result is a strangely shaped area protecting the stones with attached species (personal communication, July 29, 2014). The three new protected areas in the EEZ will be multiple-use, and discussions are ongoing with stakeholders regarding restrictions and size of the areas. Stakeholders include relevant governmental ministries, NGOs, and the fisheries sector (personal communication, August 6, 2014). According to de Vrees, the Dutch policy is to involve stakeholders from the beginning. This work is largely based on a Joint Fact-Finding process, meaning that the monopoly of knowledge is not with the government but also other stakeholders provide the facts. The approach originates from the understanding that, until the involved parties agree on the basic facts, the process will not move forward. It is therefore essential to adopt this approach from the very beginning of the planning process. de Vrees mentions that the approach has helped to build stakeholder trust and appreciation (personal communication, August 6, 2014).

David Goldsborough, senior researcher at Wageningen University, confirms that the main interest groups both in coastal and offshore waters have hitherto been fishermen and NGOs. Both sides have for the most part run the same debate – do we know enough to propose spatial protection measures? The main fishermen argument is that measures may not make sense due to lack of scientific knowledge. NGOs, in turn, invoke the precautionary principle (personal communication, July 22, 2014). Robbert Jak at IMARES at Wageningen University argues that the result of this stakeholder involvement has been a type of fishery management plan within Natura 2000 sites in territorial waters (personal communication, July 17, 2014).

Jak suggests that the Dutch government traditionally applies a minimal approach, keeping to what is strictly required from the EU, e.g. in terms of sticking to the Natura 2000 designations (personal communication, July 17, 2014). This tendency has also been noted in academic literature (Dotinga & Trouwborst, 2009). Jak states that the minimal approach is probably due to nationally important economic sectors, such as oil and gas, shipping and fisheries, making the Natura 2000 designation the most suitable in order not to restrict too much activity. He thinks that such sectors too easily are allowed to operate within Natura 2000 sites (personal communication, July 17, 2014). According to Jak, Dutch Natura 2000 establishment is based on the general belief that fisheries adversely affect benthic habitats, due to trawling especially, and that fishery restrictions therefore will add sufficient protection (personal communication, July 17, 2014). It is too early to say anything about the environmental effects of existing areas, however. Furthermore, as mentioned, most areas still lack management plans and there are no measures in place to assess (Goldsborough, personal communication, July 22, 2014).

Dogger Bank

Jak emphasises that there have been considerable difficulties with diverging national objectives in terms of regional cooperation. One example is the cooperation on conservation measures in Dogger Bank, a large sandbank area in the North Sea located within the EEZs of the Netherlands, United Kingdom, Denmark and Germany (see Figure 8). Jak was involved in trying to establish conservation measures in Dogger Bank in 2009, trying to get the national governments to agree. He says that it was close to impossible since each country wanted to develop the area differently. Finding agreement around common objectives was not possible at the time, neither regarding which activities to allow nor which species to include. The Netherlands are discussing to establish a Natura 2000 site in their part, mainly to protect the seafloor. This will affect especially trawling in the area, but international fisheries measures are complicated by the CFP requirements for regional collaboration and agreement (see Section 3.5.2). In addition to the countries with formal claim to Dogger Bank, other nations fish the area, including Spain and Sweden (personal communication, July 17, 2014).



Figure 8 Map of the Netherlands and location of Dogger Bank (illustrations adapted from ifaw.org and commons.wikimedia.org)

Natura 2000 management measures are still not in place for Dogger Bank. Goldsborough says that the idea was to wait for the new CFP, although when it was eventually put in place it required a different approach including full stakeholder consultation which further complicated the situation. Goldsborough calls it a political game (personal communication, July 22, 2014).

5.3.2 Marine spatial protection under the MSFD

The Dutch Ministry of Infrastructure and the Environment is responsible for implementing the MSFD. The Deltares and IMARES institutes provide scientific advice for the MSFD implementation. The MSFD has been transposed into national law through the Water Act (Boyes, Cutts, & Elliott, 2013). The National Water Plan determines the Dutch strategy for implementing the MSFD until 2020. “Making the North Sea more sustainable” is one focus in the National Water Plan, keeping sustainable use in line with e.g. the MSFD (summary, p.7). Box 3 is an extract from the official summary of the National Water Plan, under the section of a sustainable North Sea.

The initial assessment completed in 2012 indicated that the Dutch seafloor does not meet the criteria of ‘good environmental status’, mainly due to bottom trawling. Dutch authorities are therefore focusing on seafloor integrity (MSFD, quality descriptor 6, see Appendix III) when establishing Programmes of Measures (PoMs) (de Vrees, personal communication, August 6, 2014). In accordance with the Commission’s recommendations presented in Section 3.3, the Netherlands will include the following in their PoMs: reducing fisheries, zoning and restrictions of activities within the 12 miles, especially within coastal Natura 2000 areas (these are existing measures, category 1a, Box 1), and opening a barrier to enable upstream fish migration (category 1b). Implementation of elements of the CFP, such as banning discards and sustainability certificate fisheries (these are new measures, category 2a), and reducing fisheries activities in Natura 2000 areas in the EEZ, protecting the harbour porpoise, and adding two new protected areas (category 2b) (de Vrees, personal communication, August 8, 2014). The two new suggested areas are in addition to existing Natura 2000 designations as part of the MSFD implementation, in order to increase protection of the seafloor and benthic habitats, and improve the network. The two areas, Frisian Front and Central Oyster Grounds, do not comply with the requirements for Natura 2000, but there may be possibilities to reduce the pressure on the seafloor in these areas by protection with regard to, e.g., Article 13.4 of the MSFD. de Vrees explains that during the last 3–4 years, authorities have encouraged economic sectors to not wait for instructions but actively make their operations more sustainable. Drafting the PoMs has therefore been a relatively straightforward process, except for deciding the exact area to be protected from bottom trawling. Because the proposed areas are international waters, adopting fishery restrictions requires engagement with neighbouring countries and countries with fishing activity in these waters, and ultimately approval from the European Commission (see Section 3.5.1) (personal communication, August 6, 2014).

Box 3 Extract from the English summary of the Dutch 2009-2015 National Water Plan (p.7)

Within international frameworks, the Cabinet is giving priority to the following activities as being of national importance for the Netherlands:

- Sand extraction and replenishment: sufficient space for protecting the coast, counteracting flood risks and for fill sand on land;
- Sustainable (wind) energy: space for 6,000 Megawatt of wind energy on the North Sea in 2020 (at least 1,000 km², creating conditions for further (international) growth after 2020;
- Oil and gas field development: extracting as much natural gas and oil from the Dutch fields in the North Sea as possible;
- CO₂ storage: sufficient room for storing CO₂ in empty oil and gas fields or aquifers;
- Sea shipping: building a system of traffic separation schemes, clearways and anchoring areas allowing safe and prompt handling of shipping;
- Defence areas at sea.

As mentioned in Chapter 3, the MSFD includes an obligation to conduct cost-benefit analyses (CBA) on measures included in PoMs. Economic valuation of ecosystem goods and services is not included in the Dutch methodology. Instead the Netherlands looks at the values of economic sectors making use of marine goods and services and the costs that the suggested measure would impose on these sectors, which is an accepted approach in the MSFD implementation (de Vrees, personal communication, August 6, 2014).

As for all of EU, the lack of available data has led to interpretation issues also in Dutch waters regarding the value of specific areas. This is an issue when implementing the MSFD. Goldsborough argues that there is no good overview of ecological values in the North Sea, and information is poorly balanced across the different MSs, with a general tendency to favour coming up with a solution rather than attaining best scientific data. According to Goldsborough, the Dutch government has assumed that current efforts under Natura 2000 are enough to protect the seafloor and that only a relatively small extra effort is required to meet the MSFD objectives. He argues that this is a recurring approach of the Dutch government (personal communication, July 22, 2014).

5.3.3 Marine reserves

According to de Vrees, the Dutch principle is to not have any areas entirely closed from economic activities, since they are not considered necessary and too difficult to maintain and enforce. Instead, the aim is to have multiple-use sites. Naturally, sand mining will not be allowed in an MPA aiming to protect the seafloor, but shipping, certain fishing, and drawing of cables and pipelines may still be allowed, depending on the outcomes of environmental impact assessments of each project (personal communication, August 6, 2014).

Zoning is discussed in the current drafting of management plans for Natura 2000, including areas open for fishing, areas with a certain frequency of certain activities, areas closed to fishing, and experimental areas for new sustainable fishing technologies. An agreement has been reached with fisheries organisations to close certain areas of Natura 2000 e.g. for certain types of trawling. The objective is to restrict but also create opportunities for fishing using less environmentally detrimental techniques and testing new trawling methods (Jak, personal communication, July 17, 2014). According to Goldsborough, complete no-take reserves have in fact been part of this discussion. He says with certainty, however, that if ever introduced such areas would merely be for scientific reference (personal communication, July 22, 2014). Jak does not see complete exclusion of all fishing and extractive activities as an alternative in the ongoing establishment of management plans for the existing Natura 2000 sites or MSFD implementation. Economic and sectoral interests are too important, and nature protection is only one of many uses of the Dutch North Sea. Jak emphasises, however, that this may change in the future (personal communication, July 17, 2014). de Vrees stresses that the level of protection depends on what one wants to protect, that scale is central, and one has to manage the marine system as a whole. Some environmental impacts are point sources and easy to locate, though many of the most significant stressors are of a wide-spread nature, such as eutrophication. Different species furthermore require different forms of protection. de Vrees argues that designating a number of protected areas will not automatically assure good environmental status. Furthermore, he thinks it is important to notice that good environmental status cannot be achieved for each meter of the sea, since it would restrict activities too much. de Vrees stresses that it is more important to consider the functioning of the entire ecosystem, as required by the MSFD (personal communication, August 6, 2014).

Goldsborough mentions that there has generally been little support for nature conservation in the past 10 years. Some governments have almost been anti nature conservation. Relatively ambitious plans that were in place previously have been reduced, also driven by economic motivations. During difficult economic times, economic interests reach further with their lobbying and gain political support. Goldsborough says that showing results is essential to get around this. It is positive that the MSFD have a clear path and clear deadlines, and he thinks it will be interesting to see how the Dutch authorities will show results, given that the Directive requires that MSs have made the effort (personal communication, July 22, 2014). According to de Vrees, delays with management plans etc. is due to the previously mentioned fluctuating political situation (personal communication, August 6, 2014).

5.4 Pan-European Perspective

Marine management in the EU is changing. The fishing industry's significance seems to drop with the decline of wild capture fisheries (Wawrzynski, personal communication, April 15, 2014). Although still important, fisheries is not a focus area of the Commission's Blue Growth initiative (EC, 2014a) (see Section 3.5.1). Instead, other sectors are on the rise, including marine energy production and shipping. As indicated in Section 3.5.1, Maritime Spatial Planning (MSP) is currently a strong focus. While the MSFD has a 'green' agenda, the MSP drives economic growth. The linkages between the MSFD and the MSP may become

complex, and many are trying to understand what the law actually requires. Implementation may prove problematic (Slater, personal communication, July 23, 2014).

Although interview respondents in this research stress the importance of the MPA network (Ekebom, personal communication, July 28, 2014; Valanko, personal communication, July 4, 2014), it is noted that proper management of existing sites must first be ensured. Ekebom thinks that there is room for considerable improvement in this regard. He argues that the level of legal protection of natural environments is currently too weak, and that it seems that the stronger the level of protection, the weaker the enforcement (personal communication, July 28). Tingström argues that ensuring an integrated network is problematic due to the differences in definitions and levels of protection (personal communication, June 12, 2014). Furthermore, Pieraccini emphasises that the concept of ‘network-thinking’ varies considerably throughout the EU, with more in the North than in the South. For instance in Italy, she explains that the Natura 2000 network is hardly recognised. Nevertheless, Italy and many other Southern European countries have a large number of MPAs in place, with a higher percentage of no-take marine reserves than Northern Europe (personal communication, July 16, 2014; Fenberg et al., 2012). However, Pieraccini explains that the latter is a consequence of Southern MPAs generally including a three-layered zoning structure. Consequently, there are several no-take reserves, although in a patchwork of small dots (personal communication, July 16, 2014).

According to Ekebom, insufficient monitoring and enforcement is a common issue, e.g. since it would drastically increase costs.²³ Ekebom points out that in Finland, there are over 14,000 complaints to the Supreme Court regarding marine and terrestrial Natura 2000, giving a clear signal that authorities need to first manage existing areas properly before establishing new (personal communication, July 28, 2014). Valanko argues that stakeholder involvement in a bottom-up approach, and to inform the local community about why the area is important, are important factors to get the local community involved (personal communication, July 4, 2014).

The economic trend in Europe affects marine conservation, potentially making policy makers inclined to focus on growth. Decision makers still see safeguarding of economic interests as inherently contradictory to ecologic interests. Pieraccini adds that economy and environment are still strongly conflicting interests, but that the one should not be more important than the other and that it is possible to integrate the two. She suggests that concepts such as ecosystem goods and services may come to overcome this divide (personal communication, July 16, 2014). The outcomes of these structural changes on the environmental objectives of the MSFD are unknown. The first comprehensive evaluation will be possible when the PoMs are in place (Wawrzynski, personal communication, July 10, 2014). The case studies presented in this research nevertheless provide a tentative indication of the validity of marine spatial nature conservation in face of these managerial changes.

²³ Management costs include, for instance, mapping and assessing the area, consultations, employment, monitoring, administration and enforcement (Tingström, personal communication, June 12, 2014). The costs of maintaining the existing global network of MPAs has been estimated at US\$870 million per year (Cullis-Suzuki & Pauly, 2010).

6 Analysis

Based on the method presented in Chapter 2, this chapter analyses the implementation of the Marine Strategy Framework Directive (MSFD) and its requirement for spatial measures, and the political acceptability and environmental relevance of marine reserves in Sweden, the UK and the Netherlands. The analysis builds on the factors derived from literature and interviews with experts in Sections 3.7 and 4.4, and additional elements identified in the case studies.

6.1 Analysis of the MSFD Policy Steering

The MSFD and Article 13.4 is analysed based on implementation steering theory described in Section 2.4.1. Several aspects of the factors *understand*, *can* and *will* have been identified in the case studies and will here be compared with listed factors in Section 3.7.

6.1.1 Understand – the Directive is taking different roles

For the MSFD to be successful in achieving its targets, its provisions have to be understood by the different member states (MSs) and relevant authorities – preferably in the same way in order to enable comparison. This research illustrates that this is not the case. *Regulatory vagueness* is confirmed, especially whether or not the Directive requires establishment of additional spatial measures. Chapter 3 makes it clear that it is required, however when talking to authorities in the respective countries, there is still uncertainty about this. The role of the MSFD in the three countries is generally as a legal imperative for meeting existing commitments for spatial protection under for example the Convention on Biological Diversity (CBD), the Habitats Directive and the RSC, although there are some differences. The Swedish authorities state that they will not have time to establish any new protected areas under the MSFD, but have used the Directive as an ‘umbrella’ for coordinating existing policies. Furthermore, Swedish authorities did not have sufficient knowledge in 2012 to set biodiversity targets, which has been criticised by the Commission. This illustrates a deviation of understanding between national and EU level. The UK adopts a similar approach and will not introduce new areas. An authority representative states that it is their understanding that the MSFD does not require new spatial measures, and that this disagreement is likely to cause legal issues. The UK has a separate streamlining framework in place under the Marine and Coastal Access Act (MCAA) and the Marine Conservation Zones (MCZs) which is said to have been further reinforced by the MSFD. They also have the highest number of marine Natura 2000 in the EU, but the MCZs are somewhat more flexible than Natura 2000 in terms of application. Part of the explanation of the MCZ expansion might be, as an interviewee suggests, a result of massive media coverage of the poor state of marine environments and a push for spatial protection. The Netherlands are at an early stage of adopting any spatial protection measures at sea. They are nevertheless introducing spatial measures under the MSFD. However, the authorities seem to again satisfy the requirements by adopting a minimal approach, confirming some of the views presented in Section 5.3. Dutch authorities have suggested two new areas for seafloor protection although restrictions of human activities have to be approved by the Commission (see Section 3.5.1). The rest of the Dutch measures are fisheries measures (see Section 6.1.2). Overall it is arguably a poor representation of an Ecosystem-Based Management (EBM) approach. It remains to be seen how the EU receives the minimal approach. Academic experts interviewed for this research believe that it will be a challenge for the Dutch authorities.

The role of the MSFD in the three countries may have several explanations, including the short implementation timeframe and the fact that the current Marine Strategy Coordination Group (MSCG) recommendations so new (from 2014). The recommendations introduced a more generous interpretation of ‘spatial measures’, which may have caused confusion, for

example the ability to use incidental protection of marine biodiversity as spatial measures in the PoMs (see Section 3.4 and examples in 5.1.3). While these areas, such as fishing restrictions in certain areas, may provide incidental protection of other marine life from trawling etc., they are generally temporary. The Joint Nature Conservation Committee (JNCC) in the UK envisages that this will be an increasing challenge for offshore marine conservation (see below). The author of this thesis interprets this as a relaxing of the EBM approach.

Regulatory vagueness extends to terminology. The OECD Environment (2014) stresses that Sweden and many other countries are at a very early stage to adopt the EBM approach to marine management. The fact that the MSFD – the first comprehensive EU legislation to enforce the EBM approach – does not provide a clear definition may explain why. The use of different terminology in different countries has also been suggested to undermine the value of regional assessments of ecological coherence (see Section 6.2.1). This research suggests that the lack of guidance has led to inertia of the MSs. The case studies can furthermore confirm a need to better coordinate and integrate existing EU policies to avoid *regulatory overlap*. Different steering at the same time is causing confusion and is a threat to achieving the intended outcomes of the MSFD. This appears to take three main expressions in the case studies. The first is that the new Common Fisheries Policy (CFP) is obstructing establishing spatial protection in the EEZ where it is needed the most (see Section 1.1) and therefore the pursuit of operationalising the EBM approach under the MSFD. Since such designation requires MSs to go via the CFP and the Commission (see Section 3.5), this is a lengthy and difficult process. One reason for the British Government avoiding MCZs in their EEZ might have been that they wanted to avoid issues with foreign fishing interest (see Section 5.2.1). The debated process of establishing protection in the Dogger Bank is another example (see Section 5.3.1). Furthermore, the effectiveness of spatial measures for protection of fish stocks is contested, which would then make it even harder to establish protected areas in EEZs (see Chapter 4). On the one hand, once established, CFP measures apply across borders giving a formally strong protection. On the other hand, spatial measures adopted under the CFP are only temporary and solely for protection of certain commercial fish stocks and do not adopt an ecosystem perspective. The author of this thesis largely agrees with Qiu and Jones (2013) that the provisions of environmental protection in the CFP needs to be better integrated and enforced if the MSFD objectives are to be achieved.

The second expression is uncertainty about how the MSFD relates to the new Maritime Spatial Planning (MSP) Directive. Interviewees are concerned that clashes will occur between conservation objectives and other development (see Section 6.1.3). Priorities between objectives may not always be obvious. For example, offshore renewable energy and aquaculture have ‘green’ objectives to some degree. Shallow marine areas which often are important in an ecological sense, such as the Dogger Bank, are suitable areas for offshore wind energy. The question remains whether MSP will further marginalise marine nature conservation and the pursuit of the MSFD objectives, or support it. One determining factor may be the adoption of valuation methods for ecosystem goods and services referred to in Sections 6.2.2 and 6.3.3. Interviewees indicate that spatial protection is kept on hold until the MSP Directive work will start. The MSP Directive also requires an EBM approach, but its applicability necessitates that the EBM approach first is operational at national level. The third expression of regulatory overlap is between the Natura 2000 and the MSFD, mainly in terms of an inability to see how the two relate. The potential implications of this are discussed further in Section 6.3.1.

The literature suggests that *institutional ambiguity* may be an issue for implementing the MSFD, although less so in Northern Europe. The case studies confirm this. One example of institutional ambiguity may nevertheless derive from marine management in the UK and the Netherlands being incorporated into several governmental bodies. In Sweden, SwAM is an

overarching department for marine and water issues, although implementation is at regional administration and Section 5.1 illustrates several clashes. These divisions may explain some of the difficulties of understanding the MSFD steering, and may affect how private actors and the public in turn will understand the steering from national authorities once policies are introduced (see Figure 3 in Section 2.4.1).

Seen from the top of the policy network in Figure 3, the EU has limited understanding of the policy environments in the respective Member States (MSs). Furthermore, marine governance at EU and MSs level operate in incompatible frames of reference. For example, regarding the difficulty of valuing ecosystem goods and services, the MSCG (2014) states that impacts included in the required Cost-Benefit Analyses (CBA) (MSFD, Art. 13.3) not necessarily need to be in monetary terms, but that stakeholder support and the precautionary approach are important arguments. However, national law and political structures in the case countries require economic impact assessments, leaving national policy makers with little option. Furthermore, British and Swedish authorities suggest that stakeholder support in fact is largely determined by being able to show monetary costs and benefits to the local community and actors (see Section 6.2.2). The precautionary principle is in turn enshrined in several international and EU policies (see Section 3.5 and Appendix IV), encouraged by the European Parliament during the CFP reform process and emphasised by the House of Commons Environmental Audit Committee. However, interviewees have illustrated that policy makers often ignore the precautionary principle, and that it is difficult to operationalise in the national policy context, especially at local level. The precautionary principle appears to still belong to a high-level policy discourse and be difficult to argue to regional and local actors.

6.1.2 Will – determined by structural characteristics and priorities

Some authors stress that the implementation process is *dependent on political will*, influenced by, inter alia, lobbying and the general economic situation. The fact that the Directive was adopted in the first place is seen as an evident will among MSs to act upon degradation of marine environments. However, whether this translates into will at the national level will only be evident when PoMs are ready. The case studies nevertheless suggest that this is partly guided by varying conscious and underlying preferences towards the EU. Sweden has often prided its environmental policies and in many fields had higher standards than the EU level. Sweden is however lagging behind both internationally and among the Baltic Sea states with regard to marine spatial protection. There seems to be a relatively high will from national and regional authorities, and the weak directions from the government are criticised. The target for spatial protection mirrors the 10% commitments made under the CBD, although the limited resources and budget provided will make achieving the targets a serious challenge. Furthermore, no new legislation is put in to protect vulnerable areas against large scale industrial activities and little concrete action suggested. The OECD and the Swedish Fishermen's Federation instead suggest that Swedish stakeholder acceptance is at risk due to contradictory policy objectives, as illustrated in Section 5.1.1. It consequently resembles little more than empty goals, despite a seemingly strong support among the Swedish public for nature protection. However, Swedish authorities indicate that this may change in the future, arguably depending on governmental power (Section 5.1.1).

The UK on the other hand seems to distrust the EU system and question how the MSFD benefits them. Authorities suggest that local communities have seen marine spatial measures as a form of external acquisition from the EU. Since the current political power focuses on economic growth, the authorities struggle to attain political acceptability for spatial measures without strong economic arguments. This is obstructed by the lack of valuation of ecosystem goods and services as discussed in Section 6.3.3. It is nevertheless suggested that concerns about international reputation engrained in the British national character may be affected by

the current call for marine spatial protection referred to in Section 1.1, and thereby influence politicians to act. Development of international standards may also encourage. However, while politicians may not want to be laggards, it is suggested that civil servants are more reluctant to create conflict and may not be equally excited about restricting marine activities.

The Dutch example is an interesting case (see Section 6.1.1). It appears as if the Netherlands have little will to pursue the environmental objectives of the MSFD. The focus is currently exclusively on Natura 2000 since it imposes minimum restrictions on economic activities. The suggested PoMs appear to be a new representation of the Dutch government adopting a minimal approach (see Section 5.3.1). The Dutch National Water Plan displays political priorities for a sustainable Dutch North Sea that are largely at odds with conservation objectives and the EBM approach (see Box 3, Section 5.3.2). Instead, the focus seems to be economic growth and that the ongoing establishment of a Natura 2000 network is sufficient.

6.1.3 Can – empiricism and standardised methods required

Factors of ‘can’ illustrated in the literature mainly concern *lack of scientific knowledge* about marine ecosystems, and therefore a lack of capacity among national authorities to act upon the MSFD and its ambitious requirements. This is also confirmed in the case studies to hinder the authorities’ ability to justify protection measures both to central governments and to local stakeholders. Poorly justified messages from the authorities have, for instance in the UK, resulted in loss of stakeholder trust. In Sweden, adopting the nature conservation tradition (to not restrict human activities more than can be scientifically justified) is a legal requirement. The Swedish ability to act is also hampered by the time-consuming process of all work going through the county administrative boards as well as a lack of resources. Spatial measures will need to address several descriptors simultaneously in order to justify financing them. With increased resources, the authorities might be able to compensate fishermen, adopt adaptive management, and spread information to local stakeholders. However, regional authorities envisage an increasing issue of resource constraints. Since MPAs are generally owned by the state (see Section 3.4) and dependent on state budgets, this may be a limitation for marine reserves also elsewhere. Lack of mapping of vulnerable areas in the North Sea has also hindered the Dutch implementation of the MSFD.

The ability for authorities to communicate the need for protection to stakeholders is also affected by a lack of economic valuation of ecosystem goods and services, which could enable comparisons between environmental and economic interests (see Section 6.3.3). Despite growing interest, the lack of knowledge is hampering also this process. Tentative studies have been conducted in the UK and the EU is working on establishing a common approach, but nothing is yet operational. This hinders the MSs’ ability to economically justify MSFD PoMs (see Section 3.3). With lack of resources or strong opposition from local stakeholders, it has little relevance whether or not authorities understand the MSFD correctly or has the will to act. Lundquist’s (1987) theory presented in Section 2.4.1 suggests that if MSs cannot act according to the steering, the steerer (the EU) may assist by providing additional resources. The case studies suggest that standardised tools, concepts and methods are necessary. Furthermore, with improved scientific understanding, will and understanding may change.

In cases of scientific uncertainty, MSs can formally justify spatial protection with the precautionary principle since it is a normative principle of the Directive. This has however proven difficult at national and regional level, as discussed in Section 6.1.1. The case in the Swedish Environmental Court invoking the precautionary principle (Section 5.1.1) was brought by the Fishermen’s Federation. The question is if the Court would have ruled the same if the case was brought by conservation representatives.

6.2 Analysis of Marine Reserves as a Policy Instrument

This section analyses marine reserves as a policy instrument in the case study countries by evaluating the instrument against the criteria political acceptability and environmental relevance described in Section 2.4.2. It addresses the factors derived in Section 4.4 as well as additional elements found in the case studies.

6.2.1 Environmental relevance

To what extent does the instrument adequately address key environmental issues in the case study countries?

Key environmental issues in the region are generally overfishing and destructive fishing methods, habitat loss due to infrastructure development and seafloor resource extraction, eutrophication, pollution of hazardous substances, climate change effects and introduction of invasive species (see Section 1.4). Due to the nature of the instrument, marine reserves mainly address the first three, but have little effect on the latter three. This is a concern among interviewees. Swedish authorities have had problems with people arguing against spatial protection since there “is no point” due to the high level of eutrophication (see Section 5.1.3). Authorities in all three countries acknowledge that spatial protection measures have to be combined in a policy mix where also external issues are addressed. Nevertheless, it is mentioned that marine reserves may be relevant for especially vulnerable areas, although there is a request for empirical examples of their success. Literature identified in this research indicates that existing marine reserves around the world generally have been effective, sometimes surprisingly so. They have also proven more effective than less strictly protected areas (see Section 4.3). Effectiveness is however a matter of, *inter alia*, careful design and well-functioning management and enforcement, and there is a discord among experts regarding the generalizability of empirical studies (see Section 4.4.1). As emphasised in Section 1.4, the intention here is not to determine the environmental effectiveness of marine reserves, but these results evidently influences their relevance as a policy instrument in the case study countries. Other *limitations relating to the nature of the instrument* affecting their environmental relevance include their utility for mobile and migratory species and their required size. However, this is barely mentioned in the case studies since marine reserves have not been discussed as an alternative.

This research confirms that determining the environmental relevance of marine reserves is hindered by *scientific uncertainty and lack of knowledge*. Swedish and British authorities stress that they are not entirely sure where valuable marine areas are located and what pressures they are exposed to. All three countries point to the need for empirical studies showing beneficial effects of marine reserves in order to understand if they may be relevant in their waters and justify their establishment to local stakeholders as mentioned in Section 6.1.3. This is especially true for offshore areas since people in general have less connection to these waters and might not see the value of protection. However, the literature review conducted for this research have found several studies, which some of the national representatives wanted to take part of. Nevertheless, the difficulties of studying marine spatial protection are all illustrated in the case studies (see Section 4.4.2). There is currently almost no follow-up or assessment of existing protected areas in these countries. Regional authorities in Sweden lack the resources and some state again that there “is no point” to monitor local effects since marine environments are too severely affected by eutrophication and overfishing. Meanwhile, decisions for whether or not to establish marine spatial protection in Sweden are based on facts illustrating that the proposed restriction is effective in protecting biodiversity from present threats. This creates a difficult contradiction. In the Netherlands and the UK, it is still too early to assess any results of protected areas. Tentative studies have begun in the UK in two of three marine reserves, showing surprisingly positive results.

6.2.2 Political acceptability

There is arguably some level of political acceptability for marine reserves at EU level, considering, inter alia, the Marine Strategy Coordination Group's (MSCG) recommendations mentioned in Section 3.4, and the Parliament's proposal for compulsory marine reserves under the Common Fisheries Policy (CFP), as described in Section 3.5.1. Literature in Section 4.4.4 points out, however, that regardless of their ambitions for MPA establishment, neither the MSFD, the Habitats and Birds Directives, nor the CFP explicitly require establishment of marine reserves. *Political will* for marine reserves therefore have to come from national and local levels. The case studies suggest that this is poorly reflected in the case study countries, at least at governmental level. It is only the UK that has marine reserves (at least explicitly) although they are only three and very small areas. There is regional acceptability, e.g. in Wales and Scotland, but the national Government is a hinder. In Sweden, there are protected areas that may live up to the same definition of "no extractive or otherwise harmful activities" allowed, although it was generally not possible to make a clear comparison within the scope of this research since there is a large number of areas with different levels of protection. The Netherlands explicitly do not want any marine areas closed for economic activities. Marine reserves are not discussed as an alternative in the case countries to any major extent due to their unaccepted *socio-economic consequences*. Restricting economic activity is simply not accepted, which confirms existing literature.

Are there key elements in the instrument's design that affects its political acceptability?

Judging from experiences with multiple-use MPAs, stakeholder participation in the designing of spatial protection is central. This is also encouraged under both the MSFD and the OSPAR Convention (see Section 3.5), and suggested in the literature as a way to establish public support. Attempts in the case studies to involve a stakeholder participation process for multiple-use MPAs have not been hugely successful, however. In the Netherlands, stakeholder engagement for Natura 2000 management plans has involved fishermen, NGOs and authorities, and negotiations resulted in types of fisheries management plans with a poor representation of an EBM approach. The Cleaver Bank is one example illustrating a watering-down of conservation objectives and favouring of economic activities. In the UK, the first-ever attempts with a stakeholder consultation process for nature conservation started off as a 'ground-breaking' success, but ended in disappointment for all sides (see Section 5.2.1).

Two aspects stand out in the case studies as potentially valuable to nevertheless support a participatory designation process. The joint fact-finding approach in the Netherlands and the adaptive management approach applied in Kosterhavet National Park in Sweden. The latter also illustrates the importance of not abandoning conservation objectives for the sake of balancing different interests (see Section 5.1.1). Kosterhavet appears to correspond to the IUCN category IV (see Appendix IV). Its 'sustainable use' concept has achieved multiple values, including conservation (studies at Kosterhavet have shown positive effects for a threatened coral species), ecotourism and stakeholder values in terms of local and national pride for the park. Reasons for the success may be, inter alia, the close collaboration with economic actors in the region, the existing collaboration between fishermen and authorities, and generally high support from local residents. The experiences from Kosterhavet suggests that multiple-use areas of IUCN type IV or equivalent can be successful for all involved, but that it depends on a range of different factors. Although case- and site-specific, it presents interesting aspects of what a multiple-use MPA may require to function effectively.

What is the level of coercion of the instrument?

Marine reserves exert a high level of coercion on economic sectors and are consequently poorly tolerated by many stakeholders (and thereby by politicians as indicated above). There

have been attempts to introduce small reserves in various formats in the UK, although all have met strong opposition (see Section 5.2.3). The British Government furthermore upheaved marine reserves in the form of reference areas during the ongoing designation of MCZs; even though they were suggested by stakeholder groups (see Section 5.2.1). Lobbying from opposing sectoral interests is confirmed to some extent. In Sweden, fishery interests are said to have a high political impact. In the Netherlands, sectors such as oil and gas, shipping and fisheries are of national importance and partly explains why the Government goes entirely for Natura 2000 designations which impose little restrictions on economic activities. The ongoing decline of the fisheries sector has not seemed to influence this attitude. The British Government's decisions have been criticised for letting down all stakeholders involved, and the lobbying power from the fisheries industry has largely declined. Instead, recreational interests seem to play a central role. To minimise conflict, Scottish authorities are trying to locate protection where least possible human activity takes place. This approach has also been suggested in Sweden. Furthermore, interviewees imply that spatial protection may clash with the ongoing expansion of renewable energy production at sea and with aquaculture, which confirms that spatial protection may be more suited in remote areas. Expert interviewees suggest that designation in uncontroversial areas could be a main factor to influence political acceptability of marine reserves. However, the author of this thesis points out that these areas may not remain uncontroversial in the future, meaning that any protection applied must be formally strong in order to safeguard the site long-term.

Since stakeholder attitudes are crucial for policy makers they tend to avoid coercive alternatives (see Section 2.4.2). Then again, this research suggests a certain confusion regarding fishermen's actual attitudes towards marine spatial protection measures. This confirms the literature which suggests that there is a lack of empirical data about fishermen's attitudes.

Experts interviewed for this research point to difficulties in determining what 'extractive or otherwise harmful activities' entail and where to draw the line, making marine reserves difficult to implement. There is need for clear, well-founded and commonly adopted classification. The author would like to emphasise, however, that it is also important to consider that people generally do not want to break rules. Recreational users such as anglers and divers are arguably usually concerned about the well-being of the area. As tentatively suggested by the case studies, the official establishment of spatial protection of an area alone may create a level of compliance and additional visit value. If the alternative is to not establish any protection, then degradation is allowed to continue. If the alternative is adopting a multiple-use MPA, conservation objectives will have to be held strong in negotiations with economic interests in order not to create a 'paper park' where most industrial activity is still allowed. This may need to be addressed differently depending on level of development and human activity in the area. Sweden is for example scarcely populated and recreational extractive activities may rarely reach levels of concern for conservation. In the UK and Netherlands on the other hand, areas may need to be more clearly communicated to locals.

What ability does the instrument have to reconcile ecological and economic policy objectives?

The literature in Section 4.3 points to the potential economic benefits for fishermen from healthier stocks and spillover to areas surrounding the reserve. However, since marine reserves are not considered in the case study countries, this has not been mentioned more than as a secondary effect by British authorities. Meanwhile, some economic actors will naturally suffer if they are displaced from an area. The answer therefore depends on where the site is located and how much and what types of economic activity operates in that area. From a long-term perspective, establishing a marine reserve will prevent any future development of extractive or harmful activity. Local authorities in Sweden comment that some consequently see reserves as a 'dead hand'. Representatives at the Swedish Agency for Marine and Water Management

(SwAM) emphasise that reserves may go against the Swedish objectives to, inter alia, expand aquaculture as part of the European strategy for Blue Growth (see Section 3.5.1). Attempts to introduce no-take marine areas in England, Wales and Scotland have all been foiled by opposition from stronger economic interests. British national authorities struggle as mentioned to establish an economic argument due to the current economic situation and that the current government is strongly pro-economic growth.

This research confirms that a protected marine area may attract visitors – a possible way of reconciling ecological and economic objectives. Representatives from both national authorities and from tourism agree that marine reserves may be compatible with ecotourism. Kosterhavet National Park in Sweden illustrates an existing public, but also entrepreneurial, interest. This interest appears to increase with the level of environmental credential of the protected site. Terminology is indicated as important for attracting visitors, e.g. a national park signalling a high visit value and a level of respect for the restrictions. It has furthermore been suggested in some literature that the term “no-take” may instead spur resistance, compared to “fully-protected” (see Section 4.1). An expert interviewed has confirmed this. Political support may furthermore be encouraged if tourism revenue is linked to management costs. However, although this research finds a relatively robust argument for entrance fees, experiences in the case study countries indicate that this may not be applicable due to already narrow margins in the relevant sectors and issues related to conservation traditions. In order not to lose track of conservation objectives, it is important to manage tourism to avoid excessive impact. It also seems important not to make ecotourism the sole purpose of marine spatial protection, since this may create a notion of, once they are in place, policy makers need not care about the rest.

It should be noted that comparing ecological and economic policy objectives is imbalanced, since existing macroeconomic tools fail to include the values of marine natural capital (see Sections 1.1 and 6.3.3). Finally, the case studies tentatively suggest that marine reserves may be accepted as reference areas for science and education. There are clear issue here, as pointed out by experts, whether a ‘reference area’ is even possible in oceans and regarding the ecological coherence of the EU network. Reference areas would be small and scattered among less protected areas. This could create the same mosaic as in Southern Europe where network thinking is not recognised. Furthermore, as mentioned, attempts in the UK to establish reference areas at a ‘larger’ scale have been withdrawn by the Government.

6.3 Analysis of the Role of Marine Reserves

The following section concludes the scope for marine reserves as a means for pursuing an Ecosystem-Based Management (EBM) approach under the MSFD specifically. It also addresses additional elements encountered in the case studies which lay outside the original analysis framework, although of importance for answering the research questions.

6.3.1 The scope for marine reserves under the MSFD

Marine reserves appear to have no scope as a policy tool in the PoMs in any of the case countries at this stage. This is a result of their environmental relevance in these waters being relatively unknown to policy makers and a low political acceptance due to their high coercion. The case studies make it clear that measures included in the PoMs preferably should address several descriptors at the same time. Although marine reserves may be effective to address four of the MSFD descriptors, they, as well as other spatial measures, have limited impact on important external large-scale issues such as eutrophication. The literature suggests that marine reserves nevertheless play a central role in adopting the EBM approach which the countries are obliged to adopt under the MSFD (see Section 4.4.1). Nonetheless, in the UK and in Sweden, national and regional authorities seem to have a higher acceptance for marine

reserves, but are hindered by national governments being laggards. Political favouring of economic growth before nature conservation, both at national and EU level, is ultimately excluding any potential for reserves.

6.3.2 Concerns about marine Natura 2000

All three countries adopt multiple-use spatial protection, especially Natura 2000. It is an accepted terrestrial conservation tool gradually translated into the marine area with varying precision. Natura 2000 is more accepted than stricter protection mainly since it does not restrict economic activities to the same degree. Furthermore, authorities confirm what previous authors and experts interviewed in Chapter 3 emphasise – that multiple-use areas better acknowledge the social, economic and environmental objectives of sustainability. However, considering that MPA coverage is still small, this balance is skewed in the disfavour of conservation. Furthermore, Section 3.5 emphasises that the MSFD likely will require MSs to establish MPAs beyond Natura 2000 due to the complexities of the eleven descriptors of good environmental status.

This research suggests shortcomings with the existing marine Natura 2000 network and clashes with the MSFD. Firstly, it only legally protects the species and habitats listed in the annexes of the Birds and Habitats Directives, which is problematic from an EBM point of view. Secondly, Natura 2000 has weak provisions for marine environments (see Section 3.5.1). The Dutch Vordelta is an example of economic interests circumventing its formal protection (see Section 5.3.1). Thirdly, Natura 2000 is suggested to apply a technocratic approach which leaves little room for participatory designation. Fourthly, the considerable overlap between RSC MPAs and Natura 2000 creates double-counting. Fifthly, the bulk of the existing Swedish MPA network is marine Natura 2000 that were established in adjacency to terrestrial Natura 2000 for sake of convenience. Swedish regional authorities suggest that designation of spatial protection is preferred in areas close to existing terrestrial protected areas since they are ‘easier to work in’. While this approach may be quick and require limited resources, it is arguably repeating previous mistakes and not ensuring protection where it is needed the most. Finally, most Natura 2000 areas are located close to shore, omitting areas out at sea. Reasons may be that such designations clash with the Common Fisheries Policy (CFP) (see Section 3.5.2). Designating spatial protection in the EEZ becomes a question of negotiations between relevant states with limited scientific influence. For protected areas to have ecological relevance, their boundaries should be set based on scientific criteria rather than politics.

These examples suggest that there is room to strengthen conservation credentials beyond Natura 2000 without jeopardising the balance of sustainability. Another interpretation is that it might be more effective to strengthen the marine part of Natura 2000 than to try to establish a new paradigm. Especially since Natura 2000 is a well-known concept at regional level. It is also a matter of ensuring that the entire marine environment is managed sustainably. If surrounding fisheries continue to be mismanaged, spillover has limited benefits. If eutrophication is not addressed in the Baltic Sea or nitrate emissions in the North Sea, marine life is at risk regardless of spatial protection. If extractive activities such as seafloor mining and oil and gas extraction are allowed in protected areas, their merit is jeopardised.

The case studies finally suggest a certain interest for the concept of zoning and reference areas. However, most attempts to introduce zoning and reference areas have so far met strong opposition and been withdrawn.

6.3.3 Incorporating the value of natural capital

Marine ecosystem values are largely underestimated and ultimately unrepresented in current assessment models and policy making processes. Without a framework for valuation of marine ecosystem goods and services yet in place, the fair balance between use of natural resources and conservation of their environmental values remains a serious challenge for policy makers.

Generally, when assessing the need to protect marine environments, environmental values of protection are compared to economic costs of restrictions. Expert interviewees argue that one should not be more important than the other, especially not under an EBM approach, but that it is possible to integrate the two. However, unlike the rest of the EU, neither of the case countries use economic valuation of ecosystem goods and services in this comparison, due to lack of scientific understanding and standardised methodology. Meanwhile, economic costs of restrictions imposed on different sectors are relatively easy to determine, and it ultimately becomes an uneven comparison. Furthermore, policy decisions and the political agenda are largely steered by budgets and economic factors. In terms of Article 13.4 and weighing different options for how to use ocean space, conservation measures will continue to have a disadvantage without a standardised valuation methodology of marketed and non-marketed values of marine ecosystems. Also in multiple-use MPA's, nature protection components risk misrepresentation without environmental valuation. Furthermore, as discussed in Section 6.1, local stakeholders demand economic justifications of political interventions. Not being able to economically justify marine spatial protection seems to be an obstructing factor for political support for marine reserves in all three countries. The ongoing designation of MCZs in the UK requires socio-economic assessments, although values of conservation are not represented in economic terms due to lack of scientific information. In Sweden, economic and ecological values are weighed against each other when new MPAs are designated, but only with economic interests measured in monetary terms. The Government has the goal to include environmental valuation in all policy decision, although no details are provided e.g. regarding which valuation methods will be used. In the Netherlands, values of protection are equated to the costs that restrictions impose on sectors using the marine environment.

It should be noted that economic valuation of the environment involves several challenges. Establishing one valuation method with universal applicability is very difficult. There is no 'best' method and they are all suitable for different situations and purposes. It may be more appropriate to combine different methods. Also, these methods and ways of operating will have to be conveyed to all management levels involved. Furthermore, large quantities of ecological data are required in order to make valuation methods operational. This in turn requires resources for continuous mapping. Since valuation results are generally not replicable or generalizable, this data may have to be collected for each case. There is also an inherent risk when putting a 'price-tag' on nature that it fails to capture other values of the oceans such as bequest and intrinsic. Existing methods to evaluate environmental values adopt an anthropocentric view, assuming that people have a willingness to pay or accept monetary compensation for loss of these values. If they do not, it would imply that the area has no value. Protecting marine areas merely for the sake of reference areas or within national parks is another example which neglects intrinsic values. Ultimately, economic valuation of marine ecosystems and natural resources should not be seen as a panacea, although it would arguably provide more accurate representation of environmental values in general decision making processes. Furthermore, awaiting other ways of incorporating these values into marine spatial planning may further postpone protection of marine environments.

7 Conclusions

This final chapter presents the main messages of the research, primarily by answering the stated research questions in Section 1.3. It also includes the author's reflections on the research methods, suggestions for future research and concluding remarks and observations.

7.1 Main Findings and Conclusions

The aim of this research has been to enhance the understanding of how the on-going implementation of the Marine Strategy Framework Directive (MSFD) is influencing marine spatial protection in Northern Europe, and to investigate the scope for marine reserves as a policy instrument for achieving the objectives of the Directive. The MSFD provides EU Member States (MSs) with a strong legal imperative to develop marine spatial protection under Article 13.4, as the first comprehensive EU legislation enforcing an Ecosystem-Based Management (EBM) approach of human activities at sea. Spatial protection measures are a requirement for MSs to include in their Programmes of Measures (PoMs) under the Directive and emphasised as a central for operationalising the EBM approach (see Chapter 3). The literature presented in Chapter 4 suggests that marine reserves, where all extractive and otherwise to the environment harmful activities are banned, are the most effective and comprehensive EBM tool.

7.1.1 The MSFD is delivering limited progress

The case studies demonstrate that the MSFD is assisting Sweden, the UK and the Netherlands to scrutinise their existing marine environmental management, identify management gaps and create a baseline. It is used as an imperative for meeting other commitments under for example the Convention on Biological Diversity (CBD), the Habitats Directive and the Regional Sea Conventions. However, it delivers limited progress of spatial protection (see Section 6.1.1), which answers the first research question of this thesis. Reasons include the Directive's short implementation timeframe and issues with understanding the steering from the EU. The case studies confirm a regulatory vagueness especially regarding whether additional protected areas actually are required under the Directive or not. The confusion appears to partly be a result of the dynamic MSFD implementation process and national authorities not being as flexible to adopt continuous guidance. Furthermore, there is a deviation of understanding between national and EU level, illustrated by the EU prescribing principles and guidance that are not yet operational at national level, such as the precautionary principle. The case studies also confirm that regulatory overlap is a threat to achieving the intended outcomes of the MSFD (see Section 6.1.1), including the Common Fisheries Policy (CFP) hindering establishment of protection in Exclusive Economic Zones (EEZs), insecurity whether the new Maritime Spatial Planning (MSP) Directive will create a clash between conservation objectives and other objectives, and a confusion regarding distinction between the MSFD objectives and the existing Natura 2000 network. Adopting the Directive is seen in the literature as an illustration of will among MSs to act upon marine environmental degradation. The case studies suggest that structural characteristics and priorities are influencing whether this will is going to translate into practical action (see Section 6.1.2).

The case studies illustrate that *Sweden* does not add new spatial measures in their PoMs due to lack of time and resources, and since authorities are restricted by inherent factors in the national environmental management tradition and process. The Government has adopted the CBD commitments of 10% marine spatial protection by 2020, but provides little practical guidance or resources for how to achieve this ambitious target. Sweden consequently risks continuing lagging behind internationally and fail to deliver to the MSFD objectives. *The UK* has not yet decided what their PoMs will include, but will not add additional spatial measures since they interpret that it is not the intention of the MSFD. Instead, the MSFD reinforces the

ongoing ambitious establishment of Marine Conservation Zones (MCZs), driven partly by massive media coverage of the poor state of the oceans. The authorities seem reluctant to link the MCZs to the MSFD, and the case study suggests that one reason may be an inherent reluctance towards the EU. The Government furthermore seems to avoid designating spatial protection in the EEZ where they are needed the most, potentially since this requires approval from other states and ultimately by the Commission (see Section 3.5.1). The case study furthermore reveals failed attempts to involve stakeholder participation when designating Marine Protected Areas (MPAs) and to introduce marine reserves. It is suggested that international standards and the current international call for marine spatial protection referred to in Section 1.1 may affect the British political will since politicians do not wish to be seen as laggards. Lower management levels, on the other hand, may be more reluctant to create conflict by imposing restrictions on marine activities. Furthermore, the current political leadership focuses on economic growth, compelling the authorities to deliver strong economic arguments for spatial measures. This is a significant challenge without valuation tools for environmental values (see Section 6.3.3). *The Netherlands* is the only country of the three that has clear PoMs present at this stage, and that is introducing spatial measures under Article 13.4. However, these areas are only intended to protect the seafloor, and will first need approval from the Commission since they are in the EEZ. The rest of the suggested measures are all fishery measures, and overall this is arguably a poor representation of an EBM approach. Dutch authorities seem to satisfy the PoM requirements by again adopting the minimal approach mentioned by previous authors in Section 5.3. It remains to be seen how the EU receives this approach. Academic experts interviewed for this research predict that it will be a challenge for the Dutch authorities. The authorities nevertheless seem determined to prioritise economic growth in their marine waters and will continue to only adopt the Natura 2000 network which only moderately limits economic activities.

Regarding the sub-question to research question one, the countries consequently adhere poorly to the need for spatial measures to actively pursue the EBM approach mandated in the Directive. The case studies confirm and identify knowledge gaps where additional research is required in order to justify spatial measures to stakeholders (see Section 6.1.3), mainly concerning establishing a scientific baseline about marine environments, which is arguably ongoing through the work of ICES and others. ICES is for instance working on bridging the science-policy gap under the MSFD by trying to determine essential attributes of the eleven MSFD descriptors and the impacts of human interactions on marine environments. In cases of scientific uncertainty, MSs formally have the possibility to justify marine spatial protection by using the precautionary principle, although it has proven difficult to operationalise at national and regional level. The gap also includes a need for empirical studies of marine spatial protection, standardised terminology and refined management tools, including common methodology for economic valuation of ecosystem goods and services. The EU is working to establish the latter. Overall, Article 13.4 of the MSFD appears to be difficult to implement.

The Natura 2000 network has been the ultimate driver for marine spatial protection in all three countries since it only moderately limits economic activities, it states clearly what is protected and it is said to adhere to the social, economic and environmental sides of sustainability. However, current management in all three countries is arguably already skewed in the disfavour of conservation objectives. This research suggests that the public opinion generally appears to favour nature conservation and protected areas (see Sections 4.4.3 and 5.1.1). Furthermore, both the literature and the EU request measures beyond Natura 2000 to achieve the MSFD objectives, and this research suggests that Natura 2000 arguably has limited merit from an EBM perspective (see Section 6.3.1).

At EU level, strategies for economic growth with ‘soft’ sustainability objectives are provided more resources than the ‘hard’ sustainability objectives of the MSFD (see Section 3.1). The case studies show that favouring of economic interests is evident also at state level and has repeatedly stalled national spatial protection measures. Nonetheless, the MSFD formally compels Member States (MSs) to deliver results. Meanwhile, all three case study countries are signatories to the Convention on Biological Diversity (CBD) and its commitment to achieve at least 10% protection of the oceans by 2020. Section 3.5 and Appendix IV emphasise that also other international and EU regulations and policies formally support establishment of marine spatial protection. All three countries consequently face challenges in delivering results to these commitments. Interviewees expect that assessing and reporting to the MSFD will shed uncomfortable light on all three governments.

7.1.2 Marine reserves will continue to be scarce

It is generally agreed in the literature and among experts that marine reserves are effective in protecting marine species and habitats, and likely benefit neighbouring fisheries through healthier stocks and spillover effects (see Section 4.3). Marine reserves are potentially relevant for limiting impacts from overfishing, habitat destruction and seafloor resource extraction. The case studies suggest that marine reserves are scarce in these Northern European countries mainly due to a low political acceptability and uncertainty about their environmental relevance (answering the second research question in Section 1.3). Since none of the case study countries has adopted marine reserves to any significant degree, interviewees’ comments in this regard are mainly speculative. The case studies illustrate, however, a concern that spatial measures including marine reserves do not address external stressors such as eutrophication. Interviewees confirm a need for scientific data about marine environments and empirical examples of marine reserves to be able to consider marine reserves. This is interesting since the literature review conducted for this thesis has found a large number of empirical studies (see Section 4.3). None of the case study countries currently conduct any own organised assessment of the effects of the MPAs they have in place. Either assessments are too early to conduct, or are not possible due to a lack of resources. Furthermore, since all MSs seem to adopt different terminology and types of marine spatial protection, regional assessments made by for example OSPAR have limited value. There have been small studies conducted in two of three marine reserves in the UK, which both showed surprisingly positive results. Also assessments from the ‘sustainable use’ area in Kosterhavet National Park in Sweden have shown examples of positive conservation results.

The case studies find that the political acceptability for marine reserves at EU level is poorly reflected in the case countries. The main reasons are unacceptable socio-economic consequences from restricting economic activities since the high level of coercion of the instrument makes it poorly tolerated by many economic actors. This has hampered almost all attempts to introduce marine reserves (see Chapter 5). The main opposing stakeholder group is fishermen, although the case studies confirm that there is a need to assess empirically these actors’ attitudes (see Section 4.4.3). Based on experiences at e.g. Kosterhavet and Lundy in the UK (Section 5.1.1 and 5.2.3), a stakeholder participation process is central when designing spatial measures and is also encouraged under the MSFD and by OSPAR. However, examples from the case studies indicate a limited success with stakeholder participation. While Kosterhavet is highly case-specific, it does provide interesting lessons regarding not jeopardising conservation objectives for the sake of balancing interests. Another suggested solution to the high coercion is to place marine reserves in uncontroversial areas. This is being tested in Scotland and mentioned as a solution at regional level in Sweden. It could be a potentially generalizable approach elsewhere. However, this method has clear limitations and the author of this thesis points out that these areas may not remain uncontroversial in the future. One aspects supporting establishing marine reserves in low-activity areas is that some

interviewees raise concern regarding where to draw the line for “extractive” activities, e.g. for recreational users. However, the author argues that recreational users generally care for the environment and there are examples of cooperation and well-functioning management. Furthermore, designating protection based on level of potential conflict risk to backfire, learning from the experiences with Swedish establishment of marine Natura 2000 (Section 5.1.1). The case studies furthermore indicate certain interest for marine reserves as reference areas for science and education, and as zoning in existing MPAs. The latter is a recommended alternative by the Marine Strategy Coordination Group (MSCG) (see Section 3.4). However, most attempts to introduce zoning and reference areas have so far met strong opposition and been withdrawn. Protecting marine areas merely for the sake of reference areas for science or as national parks furthermore neglects the intrinsic values that most of us arguably would ascribe both animals and natural habitats. At the same time, marine reserves are no guarantee for environmental protection. They require careful design, well-functioning management, stakeholder engagement, and strong enforcement. They have to be part of a larger policy mix addressing a multitude of stressors. It is important to avoid uncritical advocacy of any policy instrument, and acknowledge the high level of uncertainties involved.

Regarding the instrument’s ability to reconcile economic and ecological policy objectives, case studies indicate that some consider marine reserves to be a ‘dead hand’ over an area whereas others see ecotourism potential, such as in Kosterhavet. Since access to ocean space is generally a right for everyone to enjoy, adopting any restrictions requires support from the local public and economic interests. To gain support, authorities need to justify why protection is necessary, how it will affect these stakeholders and often how they will benefit economically. This in turn is largely dependent on available tools for estimating and illustrating the value of marine life and its ecosystems, in order to enable fair comparisons with alternative uses of that marine area. Economic justification of policy measures is furthermore required both by the MSFD and by national legislation in the three countries. Existing macroeconomic tools for assessing economic value fail to include the high values of marine natural capital, however (see Sections 1.1 and 6.2.2). Alike the rest of the EU, neither of the case study countries use economic valuation of ecosystem goods and services, since there is not enough scientific understanding and yet no standardised methodology to adopt. The balance between use of natural resources and conservation of their environmental values consequently remains a serious challenge for policy makers. Economic development and growth is ultimately still valued higher than conservation purposes, both practically and structurally. However, the author emphasises several shortcomings of this type of valuation in Section 6.3.3.

To understand the scope for strict marine spatial protection in the three countries, one finally needs to consider inherent characteristics of the marine environment (see Section 1.2). The large difference between the coverage and acceptance of terrestrial and marine protected areas may especially be a result of the invisibility of oceans. To most of us, the ocean is merely a flat surface and its life and diversity unknown. A protected area may not mean much to the general public. Terrestrial protected areas are more easily accessible for people to enjoy, on the other hand. Furthermore, terrestrial spatial protection has been in place for a long time and both the public and policy makers are used to the concept.

7.2 Reflections of the Research

This research adds to the body of literature illustrating the progress of marine spatial protection and of marine reserves. It contributes to the ongoing analysis of the progress of the MSFD and adopting an Ecosystem-Based Management (EBM) approach. Case studies per definition explore case-specific details, but given that the MSFD applies equally to all EU MSs, some common tendencies and ideas may be possible to derive from these results. Furthermore, several of the factors influencing the scope for marine reserves in the case studies are

represented also in other coastal EU states, such as high degrees of development and economic activity in ocean space and similar stressors of marine environments. Marine reserves may be met with similar considerations in these countries.

The overall research structure was developed by the author in an attempt to capture the complexity of the topic. However, it is acknowledged that this methodology may have limitations. In the literature review underpinning parts one and two, the author may have overlooked important literature or studied a misrepresented range of publications. This is especially a risk with the publications discussing the efficacy of marine reserves, since the discussion is highly polarised and it may be difficult for the uninitiated to separate objective science from uncritical advocacy. Furthermore, all empirical studies have limitations and preconditions that would have to be addressed in order to make a comprehensive representation of the literature. Additionally, when conducting telephone interviews with different stakeholders representing a variety of ideological backgrounds, the author may have misinterpreted or misunderstood the answers. By adopting a qualitative research method, the author ultimately uses herself as a tool for analysis which forces her to challenge her own preconceptions and theoretical background. Since only a few representatives from the respective national authorities were interviewed, relevant facts and interpretations may have been omitted. This is especially a risk with the Dutch case study, since only one authority representative agreed to an interview. Four national experts were on the other hand able to explain the Dutch case. The author also acknowledges that the selection of case study countries could have been adjusted along the way, in order to maximise the learning outcome and provide enough variety in terms of focus on marine spatial protection. Stake (1995) points out that it is important to assess the progress of the case study and if necessary drop dysfunctional cases and re-select. For example, the Swedish case could have been replaced by Germany or Denmark, both northern European countries who has a considerable focus on marine spatial protection and that therefore may add interesting variety to the trio.

Concerning the chosen methods for data analysis, Implementation Steering theory is suitable yet has limitations for analysing the MSFD at this stage, given that implementation is still ongoing. In addition, to provide a thorough steering analysis including underlying structural, contextual and normative factors would have required more time and resources than available for this thesis. The author's interpretation may consequently be limited and potentially oversee critical aspects. The policy evaluation of marine reserves furthermore turned out to have some limitations. Firstly, since there are so few marine reserves adopted in the case studies or to the knowledge of interviewees, the discussion was often purely speculative. Secondly, omitting environmental effectiveness as an evaluation criterion leaves out an important aspect of the merit of marine reserves. However, given that the case studies indicate both a structural opposition towards reserves and a consistent favouring of economic interests, the practical scope for marine reserves in the three countries may not have been affected by their level of effectiveness. Finally, fully understanding their political acceptability would require a similar contextual understanding as emphasised above.

The legitimacy of the research questions is fair, although in order to answer the first question with more certainty, the author would have needed to interview a broader range of stakeholders. Answering the second research question is hampered by the fact that the PoMs are not yet completed. Still, the ex-ante nature of the question adds interesting analytical aspects as well as raises the potential of the results to influence the implementation process. Although the case countries are relatively clear about what to include, the final strategies are not adopted. Because the implementation of the MSFD is a dynamic process, the main challenge for this research is that statements and findings may quickly become obsolete. The EU is continuously drafting additional initiatives underpinning the implementation process and clarifying the

Directive. However, national authorities and regional implementation bodies may not be as flexible to adopt new guidelines. The case studies illustrate that there are factors of *can*, such as availability of resources, and of *will*, such as political priorities, that largely determine the national process.

7.3 Suggestions for Future Research

At the national level, the MSFD has been a good start for mapping marine waters and their status, although the case studies suggest that there is still considerable need to thoroughly map marine ecosystems to know where biodiversity hotspots are located and where vulnerable ecosystems may be in need of protection. Given the complexities and uncertainties about the nature of marine environmental issues, there is a need to assess the demonstrated success of different conservation policy interventions, including additional empirical studies of marine reserves. Interviewees suggest a need for ‘good examples’ of marine reserves, in order to encourage policy makers to take action and assist justifying spatial measures in communication with various stakeholders. One way of doing this could be to conduct a wider study of the potential ecotourism values of marine spatial protection in Northern Europe. Such values are often important arguments for protected areas in Southern Europe and in tropic regions around the world. Future research could for instance investigate whether it would be feasible to develop a marine ecotourism management model for marine reserves, and how this would affect stakeholder and political support. Similarly, an interesting avenue for future study would be to investigate the differences between public acceptance for marine spatial protection versus more established terrestrial equivalents. As has been suggested by the OECD Environment (2014) in the case of Sweden, it may also be interesting to explore market-based policy instruments as a means to finance marine protected areas, such as compensation mechanisms for biodiversity protection. It could furthermore be relevant to attempt a study of economic efficiency of marine reserves compared to other conservation tools, including a cost-benefit analysis where values of ecosystem goods and services as well as bequest values of marine environments are represented. Finally, the case studies confirm the lack of empirical data about fishermen’s attitudes towards spatial measures expressed in the literature. Future research could investigate this and meanwhile include attitudes of other sectoral interests such as offshore renewable energy generation and seafloor mining.

7.4 Concluding Remarks and Observations

Based on the findings of this research, the author makes a number of observations which may be of interest to the audience mentioned in Section 1.3. Firstly, the case studies suggest that building local support is dependent on clearly justifying the need for protection and its implications for local communities. Although this is a sizeable challenge, mapping of national marine environments should still be prioritised to help create a baseline on which to build future conservation decisions. This could also assist valuation of ecosystem goods and services when such approaches are operational. If stricter protection levels should be deemed relevant, e.g. in the form of zoning, developing a body of empirical studies requires marine reserves to first be adopted, e.g. as pilot areas. Placing protection in uncontroversial areas may be one option, although it is a limited approach. Secondly, when developing tools and terminology for marine spatial protection, national authorities’ limited flexibility needs to be better acknowledged. Furthermore, the development of methods for valuation of ecosystem goods and services need to recognise the inherent limitations with this approach. Thirdly, the case studies illustrate the significance of not sacrificing conservation objectives entirely for the sake of balancing different interests. The fundamental objective is to adopt the Ecosystem-Based Management (EBM) approach, and the EU member states now have the opportunity and the obligation to establish marine spatial protection under the MSFD and under commitments to the RSC and CBD.

All marine areas are not in need of strict protection to recover. However, the concept of 'sustainable use' ultimately allows, to different extent, the same activities which are part of the reason why protection is necessary. The case studies suggest that many parameters need to coincide in order for a 'sustainable use' to function. Empirical examples of such coexistence where economic growth is not at the expense of marine life are arguably rare. Although marine reserves are not the ultimate solution, the case studies illustrate that there is room to expand their coverage in this region. Nevertheless, percentage coverage is not equivalent to protection. Protected areas need well-functioning management and enforcement and scientifically based design. It is first of all essential to improve management of existing MPA networks, as well as the surrounding environment as a whole through a holistic policy mix where all eleven descriptors of the MSFD are addressed. Since the Natura 2000 is already manifested in national management it may be more effective to strengthen the marine part of existing Natura 2000, for instance by introducing zoning, than to try to establish a new paradigm. Finally, the author supports that the provisions of environmental protection in the CFP need to be better integrated and enforced to support the MSFD objectives in EEZs.

The adoption of the Marine Strategy Framework Directive (MSFD) in 2008 is an indication that protection of the marine environment in Europe overall is progressing. It provides the Member States (MSs) with a legal imperative for pursuing spatial protection also at sea, in addition to the existing protection on land. This research indicates a strong argument for adopting marine reserves as part of an Ecosystem-Based Management (EBM) approach mandated in the MSFD. The concern is now whether political action will develop soon enough, considering the high pace of marine environmental degradation and the projected increase of economic sectors generating negative externalities on marine ecosystems. Timely and effective implementation of the ambitious goals of the MSFD is of great importance, however, goals and targets have little value without practical tools, sufficient resources or political leadership. A fundamental limiting factor for progressive marine spatial protection confirmed in the case studies is scientific certainty. Nevertheless, full certainty will never be achieved. What is known is that many marine species and habitats are under severe stress jeopardising their resilience and long-term existence and thereby the high values that they provide. Impacts are largely due to industrial human activities that do not take due consideration of, or bears the costs of, their impacts on the natural environment. A point has been reached where scientists need to acknowledge that full certainty is not possible to attain, and policy makers that certain measures ultimately will have to settle for less certain justifications and make use of the precautionary principle. This requires a better practical adoption of the precautionary approach at national and local level. This research suggests that there is both public support and institutional enthusiasm at national level for marine spatial protection. At this stage, however, the scope of marine reserves and the ultimate merit of the ambitious MSFD targets are shadowed by top-level policy makers' blind stare towards economic growth.

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Case law

The Queen v. Secretary of State for Trade and Industry ex parte Greenpeace Ltd. Decision of the High Court of Justice (Queen's Bench Division) of 5 November 1999 (Case No. CO/1336/1999), UK v Greenpeace.

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Failure of a Member State to fulfil obligations - Directive 92/43/EEC - Conservation of natural habitats - Wild fauna and flora. Case C-6/04. I-09017, Commission v UK

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Lectures

Dalhammar, C., (2013) Lecture at the International Institute for Industrial Environmental Economics, November 25, 2013.

Mundaca, L., (2013) Lecture at the International Institute for Industrial Environmental Economics, December 3, 2013.

Appendix I: Interviews

Sweden

Lena Tingström, Swedish Agency for Marine and Water Management, Sweden

Linda Rydell, Swedish Agency for Marine and Water Management, Sweden

Ylva Engwall, Swedish Agency for Marine and Water Management, Sweden

Jorid Hammersland, Senior desk officer, Ministry of the Environment, Sweden

Ida Reuterswärd, Desk Officer, Ministry of the Environment, Sweden

Ulf Lindahl, [written answer], marine biologist, County Administrative Board, Blekinge, Sweden

Maria Kilnäs, [written answer], Environmental Protection unit, County Administrative Board, Västra Götaland, Sweden

Rita Jönsson, [written answer], Brackish water ecologist, County Administrative Board, Kalmar Län, Sweden

The United Kingdom

Jon Davies, Programme Leader, Marine Protected Sites, Joint Nature Conservation Committee (JNCC), UK

Philip Evans, Head of Policy and Analysis, VisitEngland, UK

Simon Jennings, [written answer], Lead Advisor, Cefas, UK

Abigayil Blandon, [written answer], Marine Support Officer, Joint Nature Conservation Committee (JNCC), UK

The Netherlands

Leo de Vrees, Dutch Rijkswaterstaat, part of the Ministry of Infrastructure and Environment, the Netherlands

Academic experts

Henrik Svedäng, Associate Professor in Marine Ecology, Swedish University of Agricultural Sciences, Department of Aquatic Resources, Institute of Marine Research, Sweden

Jan Ekeboom, Senior Adviser (Marine Biology), Metsähallitus, Finland

Sebastian Valanko, marine ecologist, ICES, Denmark

Margherita Pieraccini, Lecturer in Law, Bristol University, UK

Anne-Michelle Slater, Head of School of Law, University of Aberdeen, UK

Christopher Rodgers, [written answer], Professor of Law, Newcastle Law School, Newcastle University, UK

David Goldsborough, senior researcher, Wageningen University, the Netherlands

Robbert Jak, IMARES, Wageningen University, the Netherlands

Han Lindeboom, [written answer], IMARES, Wageningen University, the Netherlands

Linde van Bets, [written answer], PhD candidate, Wageningen University, the Netherlands

Other stakeholders

Anders Tysklind, National Park Director, Kosterhavet National Park, Sweden

Fredrik Lindberg, Ombudsman, Swedish Fishermen's Federation (SFR)

Research workshop attended

10th–11th June 2014 **WK STAGES workshop at ICES Headquarters, Copenhagen**
STAGES (Science and Technology Advancing Governance on Good Environmental Status) is a coordination and Support Action, which has received funding from the European Union under the Seventh Framework Programme of Cooperation (FP7; Food, Agriculture and Fisheries). The aims of STAGES are to connect science to policy to help achieve a Good Environmental Status (GES) in marine waters. More information can be found at <http://www.stagesproject.eu>.

Appendix II: Template interview questions

Questions to national authorities about the Marine Strategy Framework Directive (MSFD):

1. Establishment of MPAs to ensure a coherent and representative network of protected areas in Europe is an explicit requirement for Member States to include in their Programmes of Measures (PoMs) under the EU Marine Strategy Framework Directive (MSFD, Article 13.4). Could you please explain, briefly, how establishment of Marine Protected Areas (MPAs) has developed over time in [country]?
2. What have been the main barriers when establishing existing MPAs in [country]?
3. How was the establishment of existing MPAs generally received by local communities and economic interests?
4. Based on these experiences, what local factors (political and socioeconomic) are most relevant to consider and to address when seeking to establish MPAs?
5. How does [country] interpret Art.13(4) of the Directive?
6. Could you elaborate on the link between the Dutch MPA networks and the upcoming Marine Spatial Planning Directive?

Questions to national authorities about marine reserves:

1. There is a range of different categorisations and definitions of what constitutes an MPA, offering different levels of protection and regulation. The highest level of protection (so-called 'no-take marine reserves', or 'marine reserves') often implies that no extractive or otherwise to the natural environment harmful human activity is allowed. Do you have any no-take areas? If so, what was the incentive/justification?
2. To what extent have marine reserves been discussed as an alternative in pursuing 'good environmental status' of marine environments under the MSFD in [country]?
3. What relevance do you consider marine reserves to have in your national waters?
4. What are key challenges for establishing marine reserves in [country]?
5. What is the political acceptability of establishing marine reserves from your experience?
6. What could be factors influencing the political acceptability of marine reserves?
7. What aspects may facilitate local acceptance when establishing marine reserves?

Questions to experts about the marine reserves:

1. When deciding on whether or not to establish a marine reserve – there are key considerations from a natural science point of view; What are generally the main natural science/marine biology determinants for whether a no-take reserve is a relevant choice in a particular area? Could you mention a few that you have come across/studied in your research?
2. Generally, what are the most relevant anticipated outcomes for biodiversity from establishing marine reserves? Could you estimate how likely they are to occur?
3. Generally, what are the most relevant anticipated outcomes on biodiversity outside of the target area from establishing marine reserves? Could you estimate how likely they are to occur?
4. What are potential unanticipated environmental effects? (e.g. certain 'unwanted' species flourish, trophic cascades etc.?)
5. There are international case studies (e.g. from the Mediterranean by Guidetti et al., 2014) showing beneficial results for biodiversity indicators in marine reserves. What is your opinion on the generalizability of such studies and their applicability to the North Sea/the Baltic Sea?

Appendix III: Qualitative descriptors of the Marine Strategy Framework Directive

Table 2 Qualitative descriptors of Good Environmental Status from Annex I of the MSFD (Roth & O'Higgins, 2011, p.5)

No.	Descriptors of Good Environmental Status from Annex I of the MSFD
1	Biological diversity is maintained. The quality and occurrence of habitats and the distribution and abundance of species are in line with prevailing physiographic, geographic and climatic conditions.
2	Non-indigenous species introduced by human activities are at levels that do not adversely alter the ecosystems.
3	Populations of all commercially exploited fish and shellfish are within safe biological limits, exhibiting a population age and size distribution that is indicative of a healthy stock.
4	All elements of the marine food webs, to the extent that they are known, occur at normal abundance and diversity and levels capable of ensuring the long-term abundance of the species and the retention of their full reproductive capacity.
5	Human-induced eutrophication is minimised, especially adverse effects thereof, such as losses in biodiversity, ecosystem degradation, harmful algae blooms and oxygen deficiency in bottom waters.
6	Sea-floor integrity is at a level that ensures that the structure and functions of the ecosystems are safeguarded and benthic ecosystems, in particular, are not adversely affected.
7	Permanent alteration of hydrographical conditions does not adversely affect marine ecosystems.
8	Concentrations of contaminants are at levels not giving rise to pollution effects.
9	Contaminants in fish and other seafood for human consumption do not exceed levels established by Community legislation or other relevant standards.
10	Properties and quantities of marine litter do not cause harm to the coastal and marine environment.
11	Introduction of energy, including underwater noise, is at levels that do not adversely affect the marine environment.

Appendix IV: Related law and policy

Related international law and policy

- *The United Nations Convention on the Law of the Sea (UNCLOS)* defines and establishes the geographical sovereign claims of all countries, and is therefore fundamental to the MSFD and to the establishment of MPAs and marine reserves. Countries have full sovereignty out to 12 nautical miles (nm) from the shoreline (the territorial sea). EU member states are free to establish marine protection measures of their choice within these waters. However, further out in the adjacent 200 nm Exclusive Economic Zone (EEZ), the EU has single management authority as stated in the Common Fisheries Policy (CFP) (see below). In these waters, only Natura 2000 areas or Regional Sea Convention designations of MPAs are possible (European Environment Agency, 2012). UNCLOS does not mention establishment of marine spatial protection per se, but its Part XII does obliges states to “protect and preserve the marine environment” (Art. 192), and to take measures “necessary to protect and preserve rare or fragile ecosystems as well as the habitat of depleted, threatened or endangered species and other forms of marine life” (Art. 194.5). Establishment of MPAs can clearly contribute to this (Dotinga & Trouwborst, 2009; Pieraccini, 2013). The obligation referred to in Article 194.5 is provided that such measures do not affect the rights of other states (Art. 194.4).
- *Agenda 21*, the international plan of action for sustainable development established following the 1992 United Nations Conference on Environment and Development in Rio de Janeiro, urges coastal states to “undertake measures to maintain biological diversity and productivity of marine species and habitats under national jurisdiction” (para. 17.7). One such measure suggested is the “establishment and management of protected areas” (para. 15.7(g)). At the subsequent World Summit on Sustainable Development in 2002 in Johannesburg, countries committed themselves to establish a global network of well-connected MPAs. The agreed text calls for establishing “marine protected areas consistent with international law and based on scientific information, including representative networks, by 2012” (para. 32(c)). It also emphasises the use of an ecosystem approach.
- *The FAO Technical Guidelines on fisheries management* (1997) explicitly states that “marine protected areas can have a critical role to play in sustainable fishing” and that they can “also play an important role in preserving critical habitats or sensitive life stages of species” (FAO, 1997, para. 3.1.1 (iv)). The United Nations General Assembly Sustainable Fisheries Resolution of 2006 furthermore called upon States to “take action immediately, individually and through regional fisheries management organisations and arrangements, and consistent with the precautionary approach and ecosystem approaches, to sustainably manage fish stocks and protect vulnerable marine ecosystems, including seamounts, hydrothermal vents and cold water corals, from destructive fishing practices, recognising the immense importance and value of deep sea ecosystems and the biodiversity they contain” (para. 80).

Related EU law and policy

- *The EU Biodiversity Strategy to 2020* (‘Our life insurance, our natural capital: an EU biodiversity strategy to 2020’; revising the ‘Biodiversity Action Plan’) is the EU response to the Aichi Targets under the CBD. It was updated and adopted by the Parliament in 2012 and acknowledges that the 2010 targets were not met, and that this new strategy must not fail as well (General remarks, para. 7). Two out of six targets set under the Biodiversity Strategy are of relevance to spatial protection measures. One states, “at least

40 per cent of all habitats and species must have a favourable conservation status by 2020 ... [and] by 2050, 100 per cent (or almost 100 per cent) of habitats and species must have a favourable conservation status” (General remarks, para.24). The other target wishes to restore 15% of degraded ecosystems by 2020 as a minimum (General remarks, para.49).

- *The Water Framework Directive*²⁴ – MSFD measures should only be taken in coastal waters including seabed and subsoil, to the extent that they are not already covered by the Water Framework Directive. This is to ensure complementarity and avoid unnecessary overlap (MSFD, recital 12).

²⁴ Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy (hereinafter the *Water Framework Directive*)

Appendix V: IUCN categories and appropriate human activities

Table 3 Matrix of marine activities that may be appropriate for each IUCN management category (Day et al., 2012, p. 27)

Activities	Ia	Ib	II	III	IV	V	VI
Research: non-extractive	Y*	Y	Y	Y	Y	Y	Y
Non-extractive traditional use	Y*	Y	Y	Y	Y	Y	Y
Restoration/enhancement for conservation (e.g. invasive species control, coral reintroduction)	Y*	*	Y	Y	Y	Y	Y
Traditional fishing/collecton in accordance with cultural tradition and use	N	Y*	Y	Y	Y	Y	Y
Non-extractive recreation (e.g. diving)	N	*	Y	Y	Y	Y	Y
Large scale low intensity tourism	N	N	Y	Y	Y	Y	Y
Shipping (except as may be unavoidable under international maritime law)	N	N	Y*	Y*	Y	Y	Y
Problem wildlife management (e.g. shark control programmes)	N	N	Y*	Y*	Y*	Y	Y
Research: extractive	N*	N*	N*	N*	Y	Y	Y
Renewable energy generation	N	N	N	N	Y	Y	Y
Restoration/enhancement for other reasons (e.g. beach replenishment, fish aggregation, artificial reefs)	N	N	N*	N*	Y	Y	Y
Fishing/collecton: recreational	N	N	N	N	*	Y	Y
Fishing/collecton: long term and sustainable local fishing practices	N	N	N	N	*	Y	Y
Aquaculture	N	N	N	N	*	Y	Y
Works (e.g. harbours, ports, dredging)	N	N	N	N	*	Y	Y
Untreated waste discharge	N	N	N	N	N	Y	Y
Mining (seafloor as well as sub-seafloor)	N	N	N	N	N	Y*	Y*
Habitation	N	N*	N*	N*	N*	Y	N*

Key:

No	N
Generally no, unless special circumstances apply	N*
Yes	Y
Yes because no alternative exists, but special approval is essential	Y*
* Variable; depends on whether this activity can be managed in such a way that it is compatible with the MPA's objectives	*

Table 4 IUCN Protected area categorization (table adapted from (Day et al., 2012))

Category	Description
Ia	<i>Strict Nature Reserve</i> : Protected area managed mainly for science
Ib	<i>Wilderness Area</i> : Protected area managed mainly for wilderness protection
II	<i>National Park</i> : Protected area managed mainly for ecosystem protection and recreation
III	<i>Natural Monument</i> : Protected area managed mainly for conservation of specific natural features
IV	<i>Habitat/Species Management Area</i> : Protected area managed mainly for conservation through management intervention
V	<i>Protected Landscape/Seascape</i> : Protected area managed mainly for landscape/seascape conservation and recreation
VI	<i>Managed Resource Protected Area</i> : Protected area managed mainly for the sustainable use of natural ecosystems