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Title:
*Environmental risk governance in the Baltic Sea – A comparison among five key areas*

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Abstract
This report focuses on challenges for adaptive, reflective and legitimate regional environmental governance related to environmental risks in the regional context of the Baltic Sea. The point of departure is the assumed challenges for establishing mutually fruitful regional collaboration among a diverse group of neighbouring countries. The Baltic Sea countries differ considerably in terms of socioeconomic development, institutional structures and procedures, power relations, policy styles, political cultures and history. How can regional governance arrangements cope with such differences and establish robust and sustainable modes of risk management? The report places its focus on regulatory frameworks for identified environmental risks as well as decision-making forms and processes. It builds on a discursive comparative case-study design where five key risks for the long-term ecological integrity of the Baltic Sea previously have been studied in detail: oil discharges from marine transportations, chemical pollution, over-fishing, eutrophication and invasive alien species. The analysis is based on case studies undertaken for the international research project ‘Risk governance of the Baltic Sea’ (RISKGOV). The analytical framework is primarily based on mappings of problem structures (i.e. bio-geophysical features affecting collaborative patterns), existing international conventions, regulatory institutions and to what extent civil society actors take part in governance arrangements. Although our primary focus is on the regional scale, the analysis takes into consideration the interplay (in terms of synergistic or conflicting effects) of such regional arrangements with national, EU, and international risk management. Our findings suggest that whereas comprehensive regulatory frameworks in most cases are in place, enforcement and implementation often lags behind. Moreover, regional institutional mechanisms for systematic reflection among relevant stakeholders on long term improvement of environmental safety within the individual issue-areas as well as between different sectors are largely lacking. This tends to lead to – via mechanisms such as path dependency, sectoral management, too narrow conceptions of uncertainty, static rather than dynamic approaches, neglect of self-monitoring activities and inadequate appreciation of governance plurality – reactive rather than forward-looking policy responses, legitimacy deficits and sub-optimal social and institutional learning.
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1. Introduction

Marine affairs have always been a matter of crossing boundaries, borders and jurisdictions. Norms and conventions have evolved allowing free passage not only at the high seas, but typically also in territorial waters at least in peaceful times and for non-hostile purposes. Marine areas have moreover often been described as the last commons. The reasons to this are not difficult to understand. The collective nature of the potential benefits such as ecosystem services derived from marine ecosystems and values stemming from marine transportation as well as other forms of interaction routes make cooperation imperative and negotiations indispensable. The need for joint management to avoid open access dilemmas and tragedies of the commons has become apparent to most observers. In few other issue-areas where joint action is needed is this more apparent than in the realm of the environment and the protection of marine ecosystem integrity.

In this report we analyse and compare governance structures of five prominent environmental problem areas in the Baltic Sea; marine transportation risks, loss of biodiversity, eutrophication, over fishing and hazardous chemicals. In contrast to many other studies in this area where the focus is placed on individual cases, emphasis is here given to differences and similarities in governance structures among the five areas. However, to make this possible, assessments of achievements and challenges of present governance in the respective areas first have to be made. Starting off from this assessment, the primary objectives of this report is to (a) increase the understanding of how these risk governance structures have evolved and operate, (b) identify and assess important differences and similarities among governance areas and (c) suggest preliminary recommendations on how governance could be improved, primarily based on the analytical framework of reflective governance and responsive potential that is elaborated in this report.

For several reasons, it is interesting to study the Baltic Sea region. First, the Baltic Sea is due to its steep salinity gradient, brackish nature and semi-enclosed character a particularly vulnerable sea. Several kinds of severe disturbances and hazards such as large areas of sea bottoms affected by hypoxia (low levels of dissolved oxygen), chemical pollution, over

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1 These case studies have been undertaken within the research project "Environmental risk governance of the Baltic Sea (RISKGOV)", 2009-2011, funded by BONUS EEIG. The reports on these case studies are freely available for downloading at the RISKGOV homepage at http://www.sh.se/RISKGOV.
fishing, alien species and dense shipping make it imperative to reduce environmental risks (HELCOM 2010). Second, due to the semi-enclosed nature of the Baltic Sea most ecosystem delimitations are comparably clear and the number of directly involved stakeholders is relatively limited. Both factors tend to reduce regulatory complexity and facilitate analysis. Third, the combination of a group of countries with established reputations as forerunners when it comes to environmental policy (i.e. the Nordic countries and Germany) with the countries in transformation at the southeast part of the Baltic Sea makes the search for innovative solutions and collaboration both interesting and sometimes cumbersome (Hassler 2003a; 2003b). Fourth, and finally, the two well established international bodies of EU and the Helsinki Commission are both important in relation to the regional governance of the Baltic Sea environment, but the many differences between them when it comes to issues such as regulatory mandates, resources and members makes the over-all regulatory and institutional structures of environmental governance in the Baltic Sea especially interesting. An intriguing question that we will return to in the analysis is to what extent there are synergistic or antagonistic aspects between regional EU and HELCOM management.
2. Theoretical context

2.1 Background – Regional marine governance

From having been almost an exclusive responsibility for governments, marine environmental management has become more complex during the last decades, involving not only governments and other public bodies, but increasingly so actors such as international government organisations (IGOs), trans-national networks of public authorities at sub-state levels, sector organisations, industry, and non-governmental organisations (NGOs). The inclusion of non-public actors has to considerable extents co-evolved with increased use of economic mechanisms such as differentiated levies, taxes and subsidies aimed at changing actors’ behaviour through altered economic incentives.

Moreover, while interactions traditionally have been predominantly horizontal and primarily involving governments, interactions among the many involved entities now are horizontal as well as vertical. Horizontal interactions are typically not structured in distinct patterns or cover clearly delineated geographical areas, they may occur between similar or dissimilar bodies or conventions, they may be synergetic or in conflict with each other and they may be the result of intentional/functional or accidental interplay (Oberthür and Gehring 2006; Young 2002; Stokke 2001). For example, regional regulations on fishing, chemicals and eutrophication interact in complex ways, sometimes synergistically and sometimes in conflict with each other. In contrast, vertical interaction takes place between organisations with different geographical scope (e.g. a global organisation interacts with a regional one). Vertical interaction may create strong incentives for actors to rescale particular issues in order to increase impact (Griffin 2009). The functional domain may vary considerably between organisations or institutions at different levels. For example, whereas the global maritime organisation IMO cover safety and environmental issues related to shipping, the regional environmental organisation HELCOM covers, in principle, all forms of environmental threats to the Baltic Sea. However, within the functional area delineated by the overarching organisation (e.g. IMO), the lower level entity (HELCOM) typically has to adapt in order to avoid inconsistencies in the governance of global commons.

In other words, traditional governing of the seas has evolved into complex interrelated modes of multi-level governance involving new groups of stakeholders, intensified interactions among stakeholders, and new forms of steering mechanisms including economic
instruments to reduce incentives to pollute (e.g. environmental differentiated fairway dues depending on sulphur content in bunker oils, no-special-fee systems in ports aimed to reduce temptations to clean tanks at sea).

Governance patterns in various areas are not just intentionally designed; it is usually more relevant to describe them as outcomes of interaction processes where diverse sets of actors pursue strategies to promote diverse sets of interests. Intentions matters, but as long as these intentions are not identical among all actors, outcomes reflect distributions of interests and capabilities. For example, actors may look for ways to improve influence and impact by rescaling regulatory authority to levels with higher or lower degrees of enforceability depending on what is perceived to be in their best interest (Griffin 2009).

Thus, governance patterns and politics need to be analysed in tandem, where different actors’ interests are delineated in order to tap potentials to influence. As top-down command and control management is increasingly seen as insufficient for complex environmental governance (Young et al. 2008), detailed incentive structures of key actors may need to be mapped out in order to successfully design mechanisms that induce governments, operators, sector organisations and others to voluntarily choose less environmentally hazardous practices, fuels and chemicals.

Adding to the complexity of environmental governance, there is an increasing understanding among scholars that risk, uncertainty and ambiguity are key factors of the problems at hand (Gilek et al. 2011; Lidskog et al. 2009; Renn 2008; Voss et al. 2006). Because of the systemic nature and different kinds of values of marine ecosystems a holistic approach needs to complement, and probably sometimes replace, the traditional emphasis on single species and tightly circumscribed risk assessments that exclude all others than formal experts from decision-making and management. In many cases it is more reasonable to talk about uncertainty than risk (as conventionally understood within risk assessment), as limited knowledge in combination with stochastic processes makes estimation of probabilities for different outcomes difficult, and often not even possible. Moreover, ambiguity among stakeholder groups often emerges where normative standpoints not directly related to the magnitude of the risk or uncertainty influence decision-making processes (Voss et al. 2006).

Departing from this brief account of regional marine governance from a theoretical perspective, we will now elaborate deeper into how reflection, reflexivity and responsiveness
among stakeholders may or ought to influence risk management. Reflection and reflexivity is important as these concepts point to the need for strategic thinking on how to build institutions and governance modes that are forward-looking and able to cope with uncertainty, whereas responsiveness address how stakeholders act and react to changing environments and circumstances. This elaboration will lead to a list of nine groups of governance items that are directly related to contemporary marine governance and will be used in the analysis to discuss governance robustness, long term sustainability and ability to accommodate unexpected outcomes in the five studied environmental risk areas.

2.2 Reflexivity, reflective governance and responsiveness

Reflexive governance involves the self-critical scrutinising of the current mode of governance, including its achievements and possible unintended negative effects.

Reflexive governance puts itself up to probing. It acknowledges that governing activities are entangled in wider societal feedback loops and are partly shaped by the (side) effects of its own working. It incorporates such feedback by opening problem-handling processes for diverse knowledge, values and resources of influence in order to learn about appropriate problem definitions, targets and strategies of governance for sustainable development (Voss et al. 2006a:xv-xvi).

Applied to studies of environmental governance, we ask if actors involved in governing are involved in reflecting upon themselves, the way they take part in governance, and the conditions for their governance. Reflexive governance thus includes a continuous self-oriented examination of positive and negative outcomes (substantive dimension) as well as on how the governance itself is related to these outcomes (structural/procedural dimension).

The concept is related to Ulrich Beck's theory of the world risk society and reflexive modernisation (1992; 1994). Beck connects late modern risks to how societal spheres and institutions (technology, science, politics, the state, the economy) in the 'simple' or 'first' modernity operated according to the Enlightenment project. The instrumental, rational problem-solving during the 'simple' modernity relied on a cognitive and institutional approach in which uncertainty, complexity and ambivalence were eliminated. The approach relied on two dogmas (Grin 2006: 59): firstly, the view that it is possible to know the "Truth" on the basis on universal knowledge, and secondly that it is possible to control reality based on that assumption. Problem solving was specific and straightforward, and the goal was maximising the control of social and economic development. However, this approach inevitably leads to
many unintended, negative consequences, at first called 'externalities' or 'side-effects'. As these where multiplied and increasingly seen as unresolved within traditional instrumental approaches, a reflexive turn emerges; or in Beck's word: reflexive modernisation (or 'world risk society').

It is important to notice that reflexivity has two different but related meanings (Voss & Kemp 2006; see also various work of Beck). The first meaning of reflexivity refers to how “…modernity deals with its own implications and side effects, the mechanism by which modern societies grow in cycles of producing problems and solutions to these problems that produce new problems” (Voss & Kemp 2006: 6). This is what Beck calls self-confrontation. According to Beck, our current society are confronted by many unintended consequences that the 'first modern' instrumental approach produced. These risks shake the foundations of our existing societies (such as the 'national-state'), which in turn, our society to some extent are forced to handle. However, it is an open matter whether this societal handling of side-effects is done with much or little reflection. Beck thus reminds that "reflexivity" should not be confused with "reflection", because our current crises can very well lead to various types of fundamentalisms (e.g. neo-nationalism, terrorism).

The second meaning does refer to reflection, however; namely "the cognitive reconstruction of this cycle in which problem solving through instrumental rationality generates new problems" (Voss & Kemp 2006: 6). It is accordingly this second meaning that many would refer to by the term "reflection". But it is important to stress that such reflection entails reflection on the very governance process itself including its condition: i.e. the extent to which existing boundaries, constitutions, discourses, policies, regulations, science-policy interactions, organisational arrangement reproduce the generation of risks. A key question for the researcher is whether there are structures and processes that could facilitate such second-order reflexivity.

Reflexive governance includes both meanings. Reflexive governance accordingly involves recognition that global and local sustainability problems are extremely complex, uncertain and ambivalent; and need to be handled as such. Problem-handling requires transgressing existing cognitive and institutional boundaries (Voss and Kemp 2006). Reflexive governance thus stresses that problems cannot be "solved" in the strict meaning of the word, only handled, because second-order reflexivity acknowledge that new problems or trade-offs always tend to
appear after decisions being made. Decisions always involve compromises. Surprises will appear over and over again. The question is if the governance has potential to continuously respond to such surprises.

Based on the existing work on reflexive governance, we list nine key features that we think a reflective and responsive approach would entail. After each heading, a label is given related to this specific governance feature that later on will be used as referents to the respective feature areas.

1. **Economic incentives and political pressures for improvements** *(incentive structures)*. Economic incentives and political pressures can be assumed to influence stakeholder action, and therefore also political decision-making. However, subjective perceptions of these drivers may differ between actors. To assess potentials for improvements, in-depth investigations into key stakeholders’ subjective views on institutional settings, economic needs and political strategies may be indispensable.

2. **An acknowledgement of uncertainty and ambivalence including a willingness to actively explore such and preparedness for unintended consequences** *(acknowledging uncertainty)*

Unintended consequences are impossible to eliminate completely and therefore have to be prepared for. This preparedness has to be both discursive and institutional.

3. **Preparedness for multi-scale approaches to problem-handling** *(multi-scale approach)*

This includes the possible need of shifting scales - re-scale - and deal with problems that go beyond existing geographical boundaries. Functional spaces may differ between the five risk areas which can lead to considerable problems for the governance system. "In short, the interaction space needs to be congruent with the problem space" (Voss et al. 2006: 427). Different actors’ incentives to attempt, or to stop, re-scaling needs to be reasonably well understood, in order to be able to adopt forward-looking perspectives on shifting governance level dynamics.
4. **A multi-sector approach to problem-handling** *(multi-sector approach)*
   This point acknowledges interdependencies across various sectors and arenas of governance (which, e.g. the ecosystem approach to management stress), which necessarily requires co-operation among stakeholders, and a potential to go beyond existing institutional boundaries.

5. **A multi-actor approach in goal-formulation, knowledge production and decision-making** *(interest, knowledge and value conciliation)*
   Here, the plurality of values and variety of conflicting interests needs to be acknowledged and handled within social discourses and democratic procedures. Reflective governance helps to articulate conflicts and cleavages, and can therefore also further social learning (Voss et al. 2006b). Moreover, the need for trans-disciplinary knowledge production, as well as co-production of knowledge among various types of knowledge-holders needs to be acknowledged (Kemp and Loorbach 2006).

6. **Acknowledgement of path dependency and needs for incremental policy-making** *(path dependency)*
   There is a number of exogenous and endogenous factors that serve to reproduce existing institutional structures (economic incentives, existing institutional boundaries, discourses, vested interests, habits, cognitive limitations, bounded rationality...): "the existing structure fight back" (Grin 2006:74). Thus, social-ecological transformation is typically path dependent, and existing physical and institutional structures frame ambitions to work towards sustainable development. However, path dependency also means that continuing along existing paths sometimes is preferable to keeping too many doors open as prior investments, learning and experiences then can be made use of, making capacity growth cumulative.

   The reflexive governance perspective underscores the importance of taking path dependency seriously. Arguably, considerable reflection is required to determine when incrementalist, step-by-step transformation is appropriate rather than searching for
optimal/utopian/unrealistic policies (Grin 2006; Kemp and Loorbach 2006), and when it is wiser to continue along with prior investments and selected paths.

7. **An active adoption of a dynamic perspective (dynamic perspective)**

   This dimension should be open, experimental and learning oriented. Reflexive governance is geared towards continued learning, "in the course of modulating ongoing developments, rather than towards complete knowledge and maximisation of control" (Voss & Kemp 2006: 7). Institutional and technological structures need to be forward-looking, adaptive, allow for trial-and-error learning, and experimenting with new innovations (Grin 2006; Kemp and Loorbach 2006). "The process necessitates the capacity to respond to unexpected effects and developments" (Voss & Kemp 2006: 12).

8. **Plurality of governance approaches and instruments (governance plurality)**

   The insufficiency of handling trans-boundary environmental problems with traditional nation-state centred command and control approaches is stressed in much of the literature on governance. Although traditional nation-state oriented approaches still play an essential role there is a strong argument for a plurality of approaches (e.g. Young 2007): Hard and soft; vertical and horizontal, formal and informal, economic and informational (Mol 2008). More can sometimes be achieved by "smart connections" (Grin 2006) between several approaches rather than to attempt to design theoretically optimal ones.

9. **Monitoring and self-monitoring mechanisms (Self-monitoring)**

   Monitoring of ecological parameters is a key component of modern environmental governance. This is needed in order to track changes in ecosystems and is often undertaken or supervised by governmental authorities. However, this is not sufficient as neither reflection, nor reflexivity, necessarily is part of these programs. Therefore, active participation of stakeholders is a necessary component of a robust governance system. Civil society organizations, media and other “external” actors need to be part of the over-all monitoring of environmental conditions and also to contribute with
other, autonomous forms of monitoring.

The self-monitoring envisioned here moreover includes a discursive level: second-order reflection on various effects of current governance.

These nine items are suggested to be building blocks of a robust and reflexive marine governance system. Before looking into to what extent the five risk areas studied in this report reflect such a framework and to what extent improvements could be made, some points will be made below in relation to method and the individual risk areas.
3. Method

The empirical data presented in this paper is based upon five case studies conducted in the RISKGOV project Environmental Risk Governance of the Baltic Sea (2009-2011). All case studies were guided by a common analytical framework that had been elaborated within the RISKGOV project. The cases comprise descriptions and analyses of governance structures and processes of marine environmental risks in the Baltic Sea concerning eutrophication (Haahti et al. 2010), biodiversity/alien species (Lemke et al. 2010), over-fishing (Sellke et al. 2010), chemical pollution (Udovyk et al. 2010) and marine oil transportation (Hassler et al. 2010). These case studies were undertaken during 2009 and 2010 and were all primarily based on the following empirical sources:

1. Existing available literature, especially research reports and articles on the risks being covered in the respective areas and literature on theoretical matters of relevance.
2. Text analyses of policy documents and reports from governments and other domestic public authorities, international (global and regional) governmental organisations, the EU, environmental NGOs, sector organisations and web-sites of the key actors in the respective field.
3. Semi-structured qualitative interviews with key-actors in the respective risk areas. The respondents selected for interviews included actors representing politicians and policy actors within risk management (primarily from national, HELCOM, and EU authorities), sector organisations and business interests, various NGOs (especially but not exclusively environmental NGOs), scientists, and journalists. In total, about 100 interviews were undertaken with informants from different countries around the Baltic Sea region (Finland, Sweden, Russia, Poland, Germany, and Denmark). Most of them were done during 2010.
4. Participatory observations have been made during relevant conferences, workshops, and various consultations. The three roundtable stakeholder conferences that were conducted under RISKGOV auspices were especially important to our mapping of interests, capabilities and perspectives adopted by different actors.

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2 For additional information on RISKGOV, see http://www.sh.se/riskgov.
4 For more detailed information on what empirical material that was used, we refer to the individual case studies.
4. Background – Origin and development of environmental risk governance of the Baltic Sea

Contemporary marine environmental risk governance in the Baltic Sea has been described as being increasingly characterised by various multilevel interactions among a larger set of actors (Joas et. al. 2008). Before the collapse of the Soviet Union regional collaboration was more or less restricted to governmental discussions within the framework of the Helsinki Commission and scientific collaboration at expert levels (Hjorth 1992). The cold war placed strict limits on what was politically possible to achieve. Several major changes affecting marine governance have occurred during the last two decades. First, the liberation of the Baltic States and Poland sparked off extensive bilateral support programs from primarily Sweden, Finland and Denmark (Hassler 2003a). These programs often involved governmental and non-governmental actors such as municipalities and county boards, as well as private organisations.

In order to establish collaboration schemes, twinning agreements were made between donor and recipient countries. In these agreements a public authority or private company in the donor country was supposed to collaborate with a counterpart in the recipient country in order to stimulate transfer of knowledge and know-how. Financing was typically secured through government funds or international financial institutions such as NEFCO (Nordic Environment Finance Corporation, EBRD (the European Bank for Reconstruction and Development) and IBRD (the World Bank). In addition to these collaborative schemes, transnational initiatives were taken, such as collaboration among political parties, labour unions, NGOs and sector organisations. For example, political parties in Sweden and Finland collaborated with sister organisations in the Baltic States, and labour unions similarly had projects targeting areas such as gender equality and workplace democracy. Typically, these undertakings were partly financed by public sources (Hassler 2003a). Taken together, these new forms of interactions all contributed to the strengthening of the Baltic Sea governance and to development of some reflective and responsive potential. Second, the enlargement of the EU with Sweden and Finland becoming members in 1995 and the Baltic States and Poland in 2004 profoundly affected governance patterns. National legislation had to be adapted to the common EU regulatory framework and enforceable directives were added to the arsenal of
steering mechanism as were the sizeable funds from EU's regional programs. New opportunities for strategically scaling up national and regional initiatives to the EU level in order to increase impact and for scaling down global conventions to add these regulations to the EU arsenal of enforceable directives emerged. Additionally, new opportunities for business organisations, NGOs, municipalities and other non-state actors to by-pass national governments and approach EU authorities directly became increasingly important.

Third, the scope of what constitutes an environmental concern has been broadened during the last decades (Kern 2011). From having been comparably narrowly perceived management problems that in most cases could be dealt with by experts and various technical solutions, multi-dimensional analyses, stakeholder involvement and system-wide management approaches is now what is asked for. For example, the Baltic 21 organisation under the CBSS (Council of Baltic Sea States) – a regional adaptation of Agenda 21 – was established as a complement to the more traditional environmental organisation HELCOM after the UNCED summit in Rio de Janeiro, 1992. Whereas HELCOM primarily had been established to combat well defined and functionally/geographically restricted problems, the ambition of Baltic 21 was to take a broader grip, inviting not only governments but NGOs and other interested actors as well, and to integrate sectors that previously had been managed more or less separately (Hassler 2004). However, HELCOM has been affected by the trend towards sustainability, holistic perspectives and the ecosystem approach during the last couple of decades. The most apparent signs of these changes can be found in the 2007 Baltic Sea Action Plan; “This plan provides a framework for managing the Baltic Sea environment using an integrated and holistic approach to address all major environmental problems affecting the Baltic Sea” (HELCOM 2011:2). To what extents these declarations of intents become effectuated into significantly changed day-to-day research practice is, however, yet too early to tell.

Sustainable development requires consideration not only of ecological dimensions, but of social and economic ones as well. These are referred to in most modern international conventions, EU directives, national strategies and other instruments within the environmental domain. Stakeholder participation is typically emphasised not only as important in relation to public legitimacy from a normative standpoint, but also as a means to make implementation more effective (Dreyer et al. 2011). It has finally become apparent in most management
contexts that system approaches such as the *ecosystem approach* is needed to be able to address complex areas such as fish stock depletion, hazards emanating from mixtures of different chemicals appearing in marine environment and the long term effects from eutrophication. A concrete example of this alleged broadening of the scope could be given by a comparison between the Helsinki Commission Joint Action Plan (JCP) from 1992 with the recent 2007 Baltic Sea Action Plan (BSAP) elaborated by the same organisation. Arguably, the key part of the first plan was the list of Hot Spots, key areas where urgent action was needed to, for example, decrease pollution. These Hot Spots typically consisted of point sources and the bearing idea was that these Hot Spots would be possible to eradicate from the list one by one, given that financial resources were forthcoming. For this purpose, a large donor conference was held in 1993, and a number of Hot Spots were later possible to remove from the list (Hassler 2000). The BSAP on the other hand, mentioned no Hot Spots. Instead, the focus was squarely set on sustainability, the adoption of the ecosystem approach to management and the inclusion of stakeholders rather than on command and control schemes. Although it is still too early to know whether and how the ecosystem approach will affect risk governance in the Baltic Sea, it is clear that this policy development adapt to broad trends in western participatory democratic thinking, decentralisation of decision-making authority and increased reliance on industry and market-like structures and incentives. The policy development does indeed cover some elements that could stimulate a reflective and responsive potential. However, such assessment must be connected also to more concrete analyses of developments within particular sectors.
5. Comparing the five issue areas: Points of departure

Contemporary marine governance in the Baltic Sea region comprises a complex mix of different tendencies. On the one hand the increased leverage exerted by the EU adds to the centralisation tendencies. Important decisions are taken in Brussels rather than in national capital cities, and directives are designed to work in various contexts throughout Europe. Moreover, the global commons and boundaries features of major environmental issues such as global warming, biodiversity loss and chemical pollution give additional credence to the arguments for large-scale and centralised initiatives. On the other hand, recent development in the EU comprises the giving of increased attention to so-called macro regions such as the Baltic Sea region, the importance of stakeholder involvement, participatory decision-making and improved availability of scientifically based information on the present status of the environment. For approaching these complexities of contemporary marine governance, we think three dimensions are of crucial importance to consider.

First, the identified primary socio-ecological risks, the direct causes behind these risks and the resulting effects are shortly described. By direct causes, we do not only mean drivers and incentive structures, but also concrete physical causes (e.g. leakage from agriculture causing eutrophication or too high fish quotas causing depletion of stocks). Second, the scope of the problem is discussed, primarily based on the geographical impact of the particular problem and how this may turn varying sets of actors at different governance scales into active stakeholders. Third, and finally, the governance structure is assessed and its key components identified. Here, aspects related to formal regulation, monitoring and enforcement are of central importance, as well as soft law, norm-building capacity, legitimacy and capability in terms of monetary resources, learning and expertise.

After having summarised key governance components and characteristics in the five respective cases, we will turn to the discursive comparison between them. The primary aim will then be to elaborate on to what extents risk governance in the respective sectors allows for reflection, reflexivity and responsiveness, similarities and differences between the studied sectors and potentials for cross-fertilisations and social learning aimed at reducing threats to the ecological integrity of the Baltic Sea.
5.1 Case 1: Eutrophication

Identified risk

Eutrophication has been identified as one of the most significant threats to the ecological integrity of the Baltic Sea (AMBIO 1990; 2001; 2007; UNEP 2005; Rockström et al. 2009). The risk associated with eutrophication is increased primary production (Nixon 2005; 2009) which in turn often causes hypoxic or anoxic bottom areas (“dead zones”) (Diaz & Rosenberg 2008; Conley et al. 2009). These zones are key stressors in marine ecosystem and may cause toxic algae blooms, reduce fish stocks and have negative effects upon tourism, recreation values and real estate (Lundberg 2005). Other stressors such as over-fishing, introduction of alien species and chemical pollution may exacerbate the impact caused by too large nutrient inflows. The most significant sources of eutrophication are run-off from agriculture and forests, industry, riverine inflows, nitrogen fixation, waste water treatment plants and atmospheric deposition (HELCOM 2009). Despite considerable efforts to reduce these nutrient run offs from various sources, few positive signs can be observed in terms of e.g. reduced levels of hypoxic or anoxic bottom areas.

Scope

Because of its semi-enclosed nature the eutrophication of the Baltic Sea is primarily a regional seas problem. However, as the distribution of negative effects from too much nutrients are difficult to predict, eutrophication of the Baltic Sea is to significant extent a collective bad. Whereas the costs for reducing input are direct and have to be born by individual governments and domestic actors, primary beneficiaries cannot be known beforehand. But depending on factors such as the length of the coastlines, sensitive archipelagos and other causes to vulnerability, countries may be unequally affected and the risk of being affected can to some extent be estimated beforehand, if not predicted (Hassler 2003b).

Governance pattern

Considering the regional scope of most problems related to eutrophication, regional regulations play a key role, although global governmental organisations such as IMO

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5 This section summarises findings in Haahti et al. (2010).
(especially concerning pollution from by sewage from ships) and ICES (projects on measures to reduce eutrophication) form an overarching framework in certain areas. The riparian Baltic Sea nation states and the EU constitute the main regulatory bodies. The 6th Environmental Action Program (2002-2012) defines the major objectives of the European Union, a number of Directorate-Generals (DGs) and EU directives are of relevance for the mitigation of eutrophication. Yet, the most important EU directives are the WFD (Water Framework Directive), the MSFD (Marine Strategy Framework Directive), the Nitrates Directive and the UWWTD (Urban Waste Water treatment Directive).

The EU regulatory framework can, from an eutrophication mitigation standpoint, be characterized as very complex. First, different regulatory frameworks are to certain extents in conflict with each other. The DG for Agriculture and Rural Development and in particular the CAP (Common Agriculture Policy) contradicts certain aspects of the WFD and the MSFD. Whereas the WFD attempts to prevent further deterioration of European Waters and the MSFD aims to protect more effectively the marine environment, the CAP basically promotes about intensive farming. In order to produce cheap food there is a need of an intensive use of fertilisers, which ultimately contributes to the deterioration of the marine environment. This tension between conflicting goals makes efficient implementation of the regulations that could mitigate eutrophication difficult and may make fruitful reflection among stakeholders on possible ways forward cumbersome.

Second, the EU regulatory framework is rather top-down regulated and thus makes sustainable regional solutions, e.g. reforming CAP, for the Baltic Sea Region a difficult task. A too strong reliance on top-down regulation can also exclude wider sub national stakeholder participation. EU directives have a rather broad consultation process for affiliated stakeholders, however rather few stakeholders are aware of this, because of lack of information or difficulties accessing and locating the right information. Although vast networks of international sub-state, city networks or lobby organisations exist within the BSR (see Figure 3.1. in Haahtı et al. 2010: 23), their influence is to a rather large extent predetermined by the character of the regulatory framework, making their role more indirect:

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6 The Environment DG, the DG for Agriculture and Rural Development, DG for Maritime affairs and Fisheries, DG for Regional Policies and DG for Health and Consumer Protection.
attending meetings and participating within for example HELCOM according to their observer status (see also WP3 report). But, due to the vastness of the NGO networks, there is considerable competition among the networks, both for funding and on the policy agenda, which in some cases has resulted in overlaps and ineffectiveness among and within the networks.

Third, although this does not solely apply to the EU regulatory framework, it extends also to national regulations and to HELCOM produced action plans; there is a rather narrow focus on sector governance, which often excludes cross sector cooperation. For example, BSAP and EU directives rely almost exclusively on scientific knowledge as a basis for their management objectives. The risk assessment relies on a narrow scientific-technical framing, and the governance framework appears to exclude the public and lay people’s knowledge, which may essentially undervalue their potential input and could potentially undermine the reflective potential and legitimacy of the governance framework (compare WP3 report). However, when it comes to effective governance in mitigating eutrophication, reforming CAP is a priority. The conflicting regulatory framework is the main culprit for the implementation deficit of the current directives and plans. Another important aspect also to consider is the inclusion of Russia in the governance process, as Russia is a considerable emitter of nutrients to the Baltic Sea. Accordingly, HELCOM’s importance in the governance structure, including its current and potential role as a link between EU and Russia, must be emphasised.

5.2 Case 2: Biodiversity

Identified risk

Marine biodiversity as a concept is rather elusive and many affiliated stakeholders disagree of its content. It was originally defined in terms of the richness of species, although currently it is perceived on different levels of biological organisation: genes, species and ecosystem, and/or it can be viewed and considered from an anthropogenic point of view, i.e. in terms of goods and services provided by the marine ecosystem. In this case study we have limited the studied area to alien species. Although introduction of new species temporarily may increase the

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8 This section summarises findings in Lemke et al. (2010).
number of species in a certain geographical area, the long term effect could be that other species are out-competed and biodiversity diminishes.

The most imminent threat, and simultaneously perhaps the most complex, is the introduction of invasive alien species (IAS) either deliberately or inadvertently to the Baltic Sea marine environment. IAS are most likely introduced into the Baltic Sea by the ballast water tanks in oil tankers, container ships, cruise ships and RO-RO ferries (Carlton & Geller 1993; Carlton 1996; Shine et al 2010). IAS are sometimes responsible for declines in native populations, as they win competition for food and often enjoy prolific reproduction, growth and survival due to lack of natural predators controlling the population size in their native range. Therefore IAS have the potential to radically change the function of the ecosystem of the Baltic Sea, which may have, besides the negative environmental aspects such as undermining the local environments tolerance to other stressors, negative economic and social effects on fisheries, industry and other human activities that are dependent of the Baltic Sea.

Scope
The absence of a unified monitoring system for IAS in the Baltic Sea limits the knowledge and the capabilities to receive a comprehensive evaluation of the scope of the risk IAS poses, and for reflective governance in general. The knowledge and the evaluations that do exist are usually characterised as incomplete and non reliable. The debate on IAS is only slowly emerging and where it does exist, it is often limited due to the low degrees of public dialogue and stakeholder involvement. The most common vector of transportation and at the same time one of the very few that is currently addressed (by IMO BWMC mostly) are the ballast waters and ship hulls. Given the fact that marine transportations are growing, both in terms of transported volumes and number of vessels, it is likely that ecological threats related to IAS will increase in the foreseeable future.

Governance pattern
The predicaments of IAS is not only restricted to the Baltic Sea, it constitutes a global problem, although the Baltic Sea Region is particularly at risk due the sensitive nature of its ecosystem. Considering the global nature of the problem the regulatory framework on IAS is highly dependent on international agreements and cooperation. The first international
agreement and legal convention on preventing the introduction and spread is the Convention on Biological Diversity (CBD). All riparian Baltic Sea states, including the EU, have signed the convention and are thus contracting states. The other international agreement of key importance of preventing and controlling IAS is the International Convention for the Control and Management of Ships Ballast Water and Sediments (BWMC), which is a result of collaboration between IMO and the shipping industry. Although these global conventions constitute valuable and useful set or rules, there is no global document regulating the ships’ ballast water tanks, as BWMC is a voluntary agreement and very few countries have ratified the convention. Sweden, as an example, is the only signatory of the Baltic Sea countries. Moreover, due to the Baltic Sea shallow nature and small size BWMC guidelines cannot be fulfilled here, hence creating a need for Baltic Sea specific rules (HELCOM BSAP as an example).

The regulatory framework on invasive alien species in the Baltic Sea is rather fragmented and is mostly based on global agreements, partly because the problem framing of potential threats to the ecological integrity of marine areas has a comparably recent history. EU has no consistent legal act or other comprehensive instrument to address the problems related to IAS, e.g. there is no common ballast water policy. The existing EU regulations that are in place, NATURA 2000, MSFD, WFD and the Bird and Habitat Directive may provide part of the problem-handling. However there are no mechanisms to support the harmonisation of these directives, as agreements on how to achieve this has yet to evolve, and furthermore there are no consistent approaches among neighbouring countries or countries in the same sub-region. Moreover, EU has no systematic formal requirements for risk analysis in connection with intentional introduction of non native species that may affect biodiversity, albeit EU is in midst of developing a general strategy on IAS.

The HELCOM and OSPAR commission have set voluntary guidelines for shipping vessels entering the Baltic Sea. These guidelines, General Guidelines on the Voluntary Interim Application of the D1 Ballast Water Exchange Standard have been approved by the HELCOM member countries. However, in order to facilitate the creation of mandatory regulations for the Baltic Sea, HELCOM has adopted a Ballast Water Road Map as a part of BSAP.
The Baltic Sea states are not only obligated as signatories of the CBD, but also by EU law, to prepare national policies concerning IAS. But only a few Baltic Sea states have national policies in the form of plans or strategies in place, although countries appear to be in the process of developing regulations.

Some NGOs take an interest in IAS regulatory framework via providing knowledge and advice to policy makers on an international and a national level, although the general impression is that this is not an issue that has been prioritised among the dominating NGOs in the region. Among international NGOs the International Union for Conservation of Nature (IUCN) and the European Research Network on Aquatic Invasive Species (ERNAIS) are the most prominent, whereas from a Baltic Sea perspective the Baltic Marine Biologist (BMB) organisations is of importance as it maintains a database on alien species in the Baltic Sea. Private businesses, in particular shipping representatives, are also of key importance for creating a regulatory framework, as they have the technical and managerial expertise as well as the financial resources to combat IAS.

### 5.3 Case 3: Over-fishing

**Identified risk**

The term over-fishing as such is a basis for extensive debate and various perceptions. According to the European Commission (EC), maximum sustainable yield (MSY) refers to "…catching the maximum proportion of a fish stock, that can safely be removed from the stock while, at the same time, maintaining its capacity to produce maximum sustainable returns, in the long term" (Europa – Gateway to the European Union 2006). Over-fishing can then, according to the EC, be defined as fishing larger amounts of fish than what MSY stipulates.

The concept of MSY is controversial, as it is dependent on accurate data that takes into account real world operational complexities. Moreover the concept has been criticised for being reliant on an economic (not biological) thinking as well as highly sensitive to political pressure. The risks associated with over-fishing can broadly be categorised into two different aspects, depending on the view of various affiliated stakeholders. The ecological risk of over-

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9 This section summarises findings in Sellke et al. (2010).
fishing denotes to a possible extinction of fish populations in the Baltic Sea, which would diminish the biological diversity and could ultimately have unforeseen biological consequences for the entire Baltic Sea Region. The socio-economic risk refers to potential job losses within the fishing sector around the Baltic Sea, a sector that already has suffered from low profits. This negative development is mainly a result of fleet overcapacity in combination with recreational fishing and secondary effect from tourism and marine pollution. The chronic overcapacity is viewed by many not only as a source for over-fishing but also as a source for the economic misery within the fishing sector.

Scope
The exact magnitude of the problems related to over-fishing is uncertain due to the multidimensional complexity of assessing fish stocks in the Baltic Sea, although it is clear that the scope is primarily regional. Although few species in the Baltic Sea are endemic, recent research shows that individual populations of the same species often depend on local habitat, which means that over-fishing in one area cannot easily be compensated by protection of other populations of the same species. The data that is collected and analysed by national fisheries institutes (NFI) must not only take into account various intervening variables, such as stochastic relationships and changed human behaviour, but the aggregated data for the entire Baltic Sea must also include national variations in monitoring procedures and techniques into consideration. Subsequently the data is often regarded as unreliable and perhaps even biased, therefore the scope of the problem cannot be limited to a certain part of the Baltic Sea nor can it be ruled out that the scope of over-fishing would not affect the entire Baltic Sea Region. Lately, research has shown that local populations of the same species may differ genetically, which could make sub-regional or even local perspectives needed in order to protect long term diversity at the genetic level.

Governance pattern
The regulatory governance of fisheries management is one of the few exclusive areas of competence of the EU. The governance framework for fisheries management in the Baltic Sea is provided by the Common Fisheries Policy (CFP). The main goal of CFP is to achieve a long-term sustainable exploitation of fish stocks. The institutionalisation of CFP as the
exclusive regulatory policy is a result of the multinational and complex character of exploiting an open resource, where conflicts are more the rule than exception.

Despite the exclusive competence of the EU, the governance and stakeholder structure management is rather complex. The governance of fisheries management is highly dependent on knowledge of fish stocks and the development of fish stocks. As a result, the CFP is dependent on an advice system, consisting of a multitude of assessment advisers. The most important are the National Fisheries Institutes (NFI) as well as the International Council for the Exploration of the Sea (ICES). The former delivers data to ICES, which compiles this data and produce scientific advice on policy actions to the EC. The Regional Advisory Councils (RAC) and the Advisory Committee on Fisheries and Aquaculture (ACFA) complements this advice with input from other stakeholders (fishing industry, environmental NGOs etc). Taken together, these assessment advisors represent the majority of the affiliated stakeholders, i.e. member states, scientists, environmental groups and the fishing industry. The Scientific, Technical and Economic Committee for Fisheries (STECF), which is a body of DG Mare, reviews and assesses the advice given by ICES, and formulates a proposal to the Council of Ministers (COM), who is responsible for the final decision on the Total Allowable Catch (TAC) which is divided into quotas for each member state. The decision of how much each member state is allowed to catch is in force for one year at a time.

The CFP was subject to structural reform in 2002. The object of the reform was to emphasise a stronger focus on the long-term effects of the policy and increased stakeholder participation as well as changes in fish fleet policy. The success of the reform has been disputed. EU’s own assessment considers that while stakeholder participation has increased, the RACs (in which two third of the seats are allocated for the fishing sector and one third to 'other interests', including environmental NGOs) were established as a result of the reform, the other focus areas of the reform has not been met (and the mixed results of the Baltic Sea RAC are discussed in the WP3 deliverable). This is mainly a result of five crucial issues: (I) fleet overcapacity, (II) imprecise policy objectives and insufficient guidance for decisions, (III) a decision-making system that still emphasises a short-term focus, (IV) application of a framework that does not give enough responsibility to the industry and (V) a lack of political will to ensure compliance as well as poor compliance by the industry in general (CEC 2009: 8). To address these problem areas, the 2009 Green Paper of the European Commission
launched a new reform process containing some proposals to differentiate between principles and implementation within the decision-making process. The respective roles played by the Commission and the Parliament have been emphasised as important within the Lisbon treaty in relation to decision-making on principles on responsibility for the implementation of initiatives to strengthen regional governance levels.

**Case 4: Chemical pollution**

**Identified risk**
Chemical pollution constitutes a largely uncharted threat to the Baltic Sea. The Baltic Sea is at risk in particular due to the sea being relatively young and shallow, with an ecologically vulnerable water body consisting of a very special marine and coastal environment, making the sea very sensitive to the impact of pollution (Ducrotoy and Elliott, 2008). There are numerous pollution sources; not only municipal waste water and agricultural leakages pollute, but many toxic and persistent substances have, through local or global production and product chains, found their way into the Baltic Sea. Examples of such substances include PCBs, DDT, endocrine disruptors (EDCs) and dioxins, which pose dangers for the ecosystem of the Baltic Sea as well as the population in the Baltic Sea region. The area of chemical pollution of the Baltic Sea is characterised by a high degree of uncertainty. The effects from many of the substances that appear in marine habitats are not known, and even less so are the combined 'cocktail-effects' from different mixtures of various substances.

**Scope**
The Baltic Sea Region is at risk for contamination of chemical pollutions. There are severe risks related to chemical pollutants. It is however uncertain if the effects of chemicals cover the entire region or only part of it, as there is often not enough knowledge of the effects of chemicals and chemical combinations on ecosystems. The lack of knowledge relates to the complexity of finding the sources and assessing the risks of the chemicals, as there is a multitude of organisms in the Baltic Sea, all with varying sensitivities to chemicals.

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10 This section summarises findings in Udovyk et al. (2010).
**Governance pattern**

Despite numerous global agreements, such as the United Nations Environment Programme (UNEP), the Basel, Rotterdam and Stockholm conventions, EU authorities and directives are at the centre of the regulatory framework of chemicals in the Baltic Sea. Among the EU authorities, the DG Enterprise and the DG Environment are essential for the regulatory framework, as they either support chemical development (DG Enterprise) or deal with chemical safety (DG Environment) related to the environment and human health. The European Chemicals Agency (ECHA) is also of significance, as it acts as the central point in the REACH (Registration, Evaluation, Authorisation and restriction for Chemical substances) directive. The REACH directive is an effort to address the complexity and the controversy within the regulatory framework of chemicals. With the creation of REACH, some of the responsibilities of risk assessment of chemicals have been expanded from authority experts to also cover industries. Furthermore, REACH differs from other regulations as it has the ability to ban chemicals, while other EU directives that deal with environmental risks of chemicals, such as WFT and MSFD, have a stronger focus on assessing and monitoring chemicals. The European Environmental Agency (EEA), the Scientific Committee on Health and Environmental Risks (SCHER) and the Joint Research Centre (JRC) comprise the basis of the EU bodies that are involved in EU policies on the regulation of chemicals.

Given that HELCOM is the only authority where all Baltic Sea states are represented, it is an important regulatory body in the area of chemicals despite the fact that it lacks legislative power. HELCOM’s importance is primarily related to provision of information and data in managing chemical pollution of the Baltic Sea. The Baltic Sea states’ management of chemical pollution varies. While the Nordic countries and Germany are perceived as forerunners in regulating chemical pollution, the rest of the Baltic Sea states’ regulation is rather dependant on HELCOM action plans, like the BSAP or EU regulation. Russia, in particular, is dependent on international assistance in regulating and implementing HELCOM recommendations.

There are also some international NGOs, such as the International Council of Chemical Associations (ICCA) and the European counterpart European Chemical Industry Council (CEFIS) and the International Panel on Chemical Pollution (IPCP) as well as ICES that are involved in regulating chemical pollution. Their involvement is mostly restricted to provision
of knowledge and scientific data on the chemicals and chemical pollution in a marine environment, or to act on behalf of the chemical industry. Also, some international environmental NGOs, e.g. European Environmental Bureau (EEB) and the European Consumers Organisation (BEUC) are active, however their influence in setting chemical policies are much more limited compared with scientific or industrial NGOs.

The regulatory framework that is the basis of the management of chemicals in the Baltic Sea is complex and inert (Udovyk et al. 2010). This is a result of the Baltic Sea states having ratified various conventions, which have different priorities, but also because the states are members of different organisations. A web of regulations have appeared, which have considerable gaps because they are very far from covering all existing chemical pollutants. Another main problem is the conflicts that can arise when objectives and operations of interrelated policy and management efforts contradict each other. Such contradictions may ultimately hinder an effective implementation of the current regulations.

**Case 5: Maritime transportations**

**Identified risk**
The risks associated with maritime transportations refer usually to a discharge of oil or oily mixtures into the Baltic Sea from either a cargo ship or a tanker. The combination of heavy shipping traffic in the Baltic Sea and the characteristics of the sea; brackish water, widespread archipelago, comparable cold temperatures and icy conditions makes the Baltic Sea especially sensitive to oil spills. Although the shipping traffic has increased in the past and is expected to increase further in the future, especially oil transportations, the level of shipping accidents has decreased, partly due to the introduction of land based monitoring system for ship traffic, Automatic Identification System (AIS), which covers the entire Baltic Sea. Still, an average of 120 accidents occurs each year in the Baltic Sea as a result of groundings or collisions (BRISK, 2010). In many cases, the accidents have been caused by various forms of human error (Knudsen and Hassler 2011).

**Scope**
The risk of oil spills is not restricted to a specific area of the Baltic Sea, albeit the probability of an oil spill to occur is most likely in heavy traffic in shipping lanes in the Baltic Sea. While
the short term and local effects of an oil spill are rather predictable, i.e. most of the local marine environment affected is severely disturbed, the long term effects of oil spills are however not well known. This is mainly due to the unpredictability of the long term effects of oil spills, as the effects are often not visible and is often dependent on geographical location, temperature of the water, type of oil, what kind of marine habitat is affected and due to the fact that it is rather difficult to establish whether changes in the ecosystem in the Baltic Sea is caused by oil spills or by other human or non human factors.

Governance pattern
The regulatory framework of oil transportations can be characterised as a structure mainly consisting of vertical governing components, with a regulatory hierarchy between global conventions and regional rules and procedures and national legislation, but simultaneously also as rather complex, due to regulatory overload.

The basis of the regulation framework of maritime oil transportations is a number of international conventions, such as the International Convention for the Safety of Life at Sea (SOLAS), the International Convention for the Prevention of Pollution from Ships (MARPOL) and International Convention on Oil Pollution Preparedness, Response and Cooperation (OPRC). The coordinating body for the international conventions is the International Maritime Organisation (IMO), which is an UN body responsible for maritime safety, pollution and global regulations.

The major regulations of HELCOM, especially the annex dealing with prevention of pollutions from ships, and MARPOL 73/78, which prohibits and restricts discharges and dumping of oil or oily mixtures, noxious liquids and garbage or waste into the sea, constitute the basis of the regulatory framework of oil transports in the Baltic Sea. Whereas HELCOM comprise the regional facilitator of cooperation with Baltic Sea states regarding the prevention of oil pollution and detection, the European Maritime Safety Agency (EMSA) constitutes the equivalent at the European level. EMSA is also responsible for auditing community-recognised classification societies and strengthening of Port state control regimes, the latter in particular is of importance as the Port state control mechanism constitutes the foundation for enforcing regulatory compliance, as it has been shown that Flag state control is often inadequate to enforce existing regulations.
There are several sector organisations involved in the regulatory framework of oil transportations, representing, for example, the international tanker industry, e.g. the International Tankers Owners Pollution Federation (ITOPF), the International Association of Independent Tankers Owners (INTERTANKO) or the Oil Companies International Marine Forum (OCIMF). Their role is mainly focused on providing technical advice, e.g. training personnel and damage assessments or providing information on safety, or general lobbying. Regional and sub national as well as environmental NGOs have less influence in the regulatory framework, mainly due the international character of oil transportations and the almost exclusive reliance on global governance. However, some of the dominating environmental NGOs with close to global reach such as World Wide Fund for Nature (WWF), Greenpeace and Friends of the Earth have been quite active in trying to put these issues higher on the political agenda in specific, targeted efforts.

Before turning to the analysis of how Baltic Sea marine governance could be improved and better integrated, the main findings from this section are summarised in Table 1 below.
### Identified risks

<table>
<thead>
<tr>
<th>Identified risks</th>
<th>Scope</th>
<th>Governance patterns</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Eutrophication</strong></td>
<td>Nutrients causing hypoxia, algae blooms etc. leading to potentially severe ecosystem disturbances and economic losses.</td>
<td>Essentially regional. Different sub-regions unequally affected. National governments and EU are the main actors. Contradictions between CAP/CFP and environmental directives.</td>
</tr>
<tr>
<td><strong>Invasive alien species</strong></td>
<td>Introduction of invasive alien species, potentially severe effects on ecosystems and economic losses.</td>
<td>Global, as ballast water from marine shipping is the main vehicle of transportation. Only weak structures in place. No binding regulations, but voluntary guidelines. Few stakeholders involved</td>
</tr>
<tr>
<td><strong>Over-fishing</strong></td>
<td>Risk of extinction of stocks and disturbances on ecosystems. Socioeconomic consequences. Considerable ambiguities.</td>
<td>Primarily regional, but sub-regional genetic variation may make local protection imperative. EU exclusive competence. ICES plays important role. RACs as an attempt to decentralize and improve stakeholder involvement</td>
</tr>
<tr>
<td><strong>Chemical pollution</strong></td>
<td>Considerable uncertainties. Potentially serious effects on ecosystems as well as human health.</td>
<td>Depends on substance and interactions, but primarily regional, apart from global product chains. Often most serious effects near the pollution source. Several global conventions, but EU plays the major role (ECHA and REACH). HELCOM important complement.</td>
</tr>
<tr>
<td><strong>Oil discharges from marine transportations</strong></td>
<td>Large oil spills may severely harm local ecosystems and socioeconomic interests. Long-term effects uncertain.</td>
<td>Essentially global, as vessels travel globally. Clean-up capability local, national and sub-regional. IMO plays central role as an umbrella for global conventions. HELCOM initiator. EU may strengthen enforcement.</td>
</tr>
</tbody>
</table>

Table 1. Summary of identified risks, scope and governance patterns in the respective case study areas.
6. Analysis

The governance structures of the five cases will now be addressed in an integrative manner, using the nine groups of governance items elaborated in section 2 above on theory as the main analytical vehicles. It is clear that there are significant differences between the problem areas, which make a unified approach to risk governance in the Baltic Sea problematic. However, despite these differences the similarities should be noted as well. First, all five risks referred to turn out to be hard to delineate. In fact, the substantial amounts of uncertainty involved means that risk assessments in traditional terms are hard to envision. This means that governance modes that focus more on how to handle uncertainties and induce reflexivity than on predicting hazardous effects need to be developed. Second, all areas are characterised by significant amounts of ecological complexity. This makes the assessment of scope difficult, but at the same time means that over-arching governance mechanisms targeting complexity issues in different risk areas potentially could be developed. Third, also governance characteristics in general are complex in all five areas. Ways to deal with, for example, regulatory overlap and overload, antagonistic institutional interactions and lagging enforceability are badly needed in all areas. Despite the variation in solutions that most likely is needed, learning between risk areas can potentially improve over-all environmental safety levels and benefit long-term sustainability.

Economic and political pressures for improvement

It can be instructive to start the analysis with some observations in sectors where risk governance appears to have been improving, not the least to better understand the motivations behind these pressures for improvement (as well as counter pressures). It is clear from the case study on marine transports that technological development has led to safer vessels. Today, most experts agree that remaining risks have more to do with human factor errors than with technical malfunction. These improvements have to some extents been driven by economic interests (costs caused by lost oil and insurance costs), but political pressures have sometimes been decisive. The new standards on double hulls had not been adopted so quickly without pressure exerted by the US government (banning single hull oil tankers from US ports), the EU and proactive member countries in IMO. In a similar vein, the establishing of
the HELCOM AIS system where all large vessels can be tracked in real time in the entire Baltic Sea had hardly come about without the pressure exerted by proactive HELCOM member countries. Without doubt, the devastating oil spills that have taken place off US and European costs have been critical in creating political momentum for these and other initiatives.

However, it seems to be the case that some other risk areas that could be assessed to have comparable potentials to find technological means to reduce risks have been less successful. Attempts have been made to reduce risks for negative effects from invasive alien species by e.g. cleaning ballast water before it is released or to find other means to avoid these kinds of threats to Baltic Sea species and ecosystems, but so far progress has been slow, which in part may relate to low degree of public visibility and political pressures surrounding this issue. Also in regard to eutrophication caused by emissions of nitrogen and phosphorous to the air from marine vessels, progress has been slow despite considerable technical potentials for improvements.\(^\text{11}\) Despite the sizeable contributions from marine transportations to Baltic Sea eutrophication and that several potentially effective means to reduce emissions are forthcoming, change is slow.

The problem structure concerning oil spills and invasive alien species has a global scope as these risks concern world-wide sectors of shipping. The global scope makes joint regional action difficult since universal agreement is required. However, the advancements in vessel safety show that governance probably could be improved, given sufficient amounts of political pressure in combination with economic incentives and better opportunities for what may be called trans-sectoral reflexivity. The latter is most likely a necessary requirement as an alternative driver for the larger political momentum built up by large scale oil spills in combination and the considerably longer history of dealing with vessel safety compared with invasive alien species and air emissions from combustion-driven sea vessels.

In such risk issues as over-fishing and eutrophication we note lower degrees of improvement, but these "failures" are certainly not due to lack of political pressures. There is a strong focus on these risks both in the general risk communication (Dreyer et al. 2011) and in risk management. However, there are, first, also strong counter pressures to keep 'business

\(^{11}\) See, for example information on the on-going (2011-2013) EU Interreg. III project Baltic Sea Region – InnoShip at http://www.baltic.org/projects/bsr_innoship.
and usual', particularly in the agricultural sectors, and second, other institutional and ecological patterns that make these sectors complicated to handle.

Acknowledging uncertainty

While interviewees in the various case studies in general acknowledge the complexities and uncertainties surrounding the environmental risks (regarding causes and effects), it is less the case that they use tools to systematically take into account uncertainties; particularly those that stem from combined risks (e.g. cocktail-effects regarding chemical risks). Second-order reflexivity would entail an awareness that current modes of risk governance potentially could produce new side-effects, new risks. Acknowledging uncertainty is thus something more than just a matter of trying to close information or knowledge gaps (Lidskog et al. 2009:131-2). Indeed, uncertainty has equally much to do with informational overflow and multiple knowledge and perspectives as it has to do with the absence of information and knowledge (cf. Mol 2008: 290).

The general picture of environmental risk governance of the Baltic Sea does not yet seem to imply the existence of this level of acknowledgement. Risk assessment tends to go on as usual: "no real specific mechanism for dealing with scientific uncertainty exists in the eutrophication policy of the BSAP" (Haahti et al. 2010: 45). Likewise, in the chemical case, no clear strategies or guidelines on how to deal with uncertainty could be found. In the over-fishing case it was found that risk management “demands numbers” as input for further decision making and communication, whereas science often cannot produce other than qualitative statements; which is also one variant on how uncertainty is actually not acknowledged in the risk governance. Furthermore, while the precautionary principle is increasingly stipulated for coping with uncertainty, there is little agreement and guidelines on how this principle should be implemented in practice.

At the same time, the case studies indicate a growing awareness among scientists and other stakeholders that science alone cannot answer all questions. In the case study report on chemicals it was suggested that regulations such as REACH, the WFD, the MSFD and the BSAP should be improved regarding how the precautionary principle could be implemented. The case study on chemical risks (Udovyk et al. 2010) discussed the need for more
transparency in risk governance into underlying assumptions regarding how uncertainties are handled.

*Multi-scale approach*

A crucial issue is here to what extent the interaction space are congruent with the problem space. It is more the rule than the exception that environmental risks are trans-national in character. The consequence is that the responsive and robust handling of such risks necessitates the parallel development of new kinds of political and regulatory arenas, frameworks, actors, and interactions that better correspond with the problem structures (cf. Lidskog et al. 2009). The cases of over-fishing and eutrophication are most clearly regional problems and *collective bads* (although similar problems exist everywhere on the globe). A robust governance of these problems accordingly requires regional collaboration. Yet, existing regulatory failures are not only due to the fact that the Baltic Sea countries are different. It was also noted that they are affected differently, which causes extra challenges to jointly collaborate on the regional level. Depending on sizes of costs and benefits (increased/improved ecosystem services) governments tend to adopt somewhat different strategies and to be unequally ambitious when it comes to implementation, monitoring and enforcement.

Key EU directives and strategies may help to establish a regional approach to problem-handling. We see in the cases of agriculture and fishing a comparatively integrated European level approach to problem-handling, which constitute a platform for the search of improved environmental risk governance. EU can thus help to move beyond a merely national view on these regional problems. The fact that the Baltic Sea countries have joined the EU at different enlargement phases and thus have had unequal amounts of time to adapt to EU regulations and practice in combination with very different political backgrounds as well as economic development means that it is still rather complicated to assess the full impact of EU.

One claimed problem is that the relatively centralized EU regulatory framework has prevented sustainable regional solutions in both the over-fishing and eutrophication case. While we have seen the beginning of a regionalisation trend in the case of over-fishing, the eutrophication case study reported a general view among interviewees that also the CAP needs to be further regionalised (establishing regional collaboration) and better take into
account regional variation (see Haahti et al. 2010: 57-58). Recent discussions have also focussed on giving farmers as well as the fishing industry more knowledge, incentives and room to act responsibly.

The cases on IAS, oil-spills and chemical pollution exemplify regional risks that more clearly relate to global flows of raw material, products and people. The management of these risks are more reliant on linking regional governance to global frameworks. As shipping activities are increasing - with important implication for the two former risks - there is a parallel increasing demand for multi-scale risk governance. The effectiveness of all the actions undertaken against these problems crucially depends on international cooperation. IMO plays a very important role in the oil case and appears to be a regulatory body that can relatively well foster and institutionalise such collaboration (Knudsen & Hassler 2011). The case study on IAS, in contrast, showed there is quite a recent global regulatory framework (BWMC), and its implementation is still very week. In this case, the connection between global frameworks and relevant EU directives is yet to be established. Furthermore, there is no mechanism to support harmonisation or consistency of approaches between neighbouring countries or countries in the same sub-region. At the same time, the Convention on Biological Diversity serves as a key reference to bring legitimacy to this topic. In the chemicals case, the EU has institutionalised a structure for chemical safety regulation. Indeed, there are some elements in this regulation that serve to combine vertical (within EU) and horizontal governance (along global product chains). Importers (public and private) need to be better aware of the chemical contents in products, which in turn mean that they have to facilitate dialogue and information-sharing with suppliers in other parts of the world (Boström et al. 2011). However, this kind of combination is only in an embryonic stage. The chemicals case study reported that REACH represent an inert regulation/administration with substantial gaps (many unregulated dangerous chemicals); so there is a considerable need for various voluntary mechanisms (e.g. eco-labelling, codes of conduct) that complements the regulation (see also below on governance plurality).

HELCOM has played an important role to establish a political and regulatory space on the regional level, and more recently has begun trying to harmonise its regulations with EU regulation (Kern & Löffelsend 2008:124). Furthermore, it plays an important role in linking Russia with the EU in debates and policy-making. In fact, after the 2004 enlargement of EU
when the Baltic States and Poland became members of the union, the political axis between EU and Russia has become crucial in regard to collaborative environmental governance in the Baltic Sea region. HELCOM serves as an important arena for information sharing, negotiations and policy-making and has probably become more relevant now compared with the period before 2004, despite the parallel strengthening of the EU competence in the Baltic Sea region.

In general, interviewees reported in the case studies emphasise many important roles that HELCOM plays. It embodies an important part of the governance structure, as it is the only regional forum for negotiations where the entire BSR (Baltic Sea Region) is represented, including Russia. Although HELCOM lacks regulatory power and can only make recommendations, action plans constitute a basis for the environmental governing of the Baltic Sea. For example, the BASP (Baltic Sea Action Plan) adopted by HELCOM in 2007 and integrated into the EU Baltic Sea Region Strategy, is one of the most important initiatives for the mitigation of eutrophication in the Baltic Sea.

HELCOM helps to coordinate countries in areas with many, partly overlapping and conflicting regulations (eutrophication, chemicals case). It provides data, action plans (BSAP), and identifies hotspots. Based on such information, national NGOs can then promote the implementation of programmes, projects and decisions made by HELCOM. HELCOM can thus function as an important reference - a cognitive authority rather than rule-setting authority - for national-based campaign organisations. HELCOM can also take a pro-active approach in issue-areas that are little developed. HELCOM tries to push and prepare countries to adopt the global convention on control and management of ship ballast water as well as develops a ballast water roadmap and voluntary guidelines to business (IAS-case). To be sure, there are also other kinds of regional trans-national collaborations that, in effect, help to establish and form a regional political and regulatory space (NOBANOS, ICES, BA21, UBC) (see also Kern & Löffelsend 2008), but it is clear from our studies that IMO, EU, ICES and HELCOM crystallise as the key players.

However, there are some aspects to consider concerning HELCOM’s governance position. Besides having no mandate to form regulations, the perception of the importance of HELCOM as a legitimate governing body varies among the riparian Baltic Sea nations. Whilst e.g. Russia wants to focus on HELCOM work and cooperation, and not interconnect
the HELCOM work with the EU regulatory framework, the situation is somewhat divided among the new EU member states, as their focus is predominately on the implementation of EU directives.

One important aspect of multi-scale approaches concern re-scaling of particular issues. Typically, re-scaling is a conscious attempt by one or several actors to move decision-making authority from one level to another in order to alter expected outcomes. Re-scaling implies a vertical movement within a specific institutional setting or regime. For example, some environmentally proactive Scandinavian countries managed to rescale important parts of the HELCOM Baltic Sea Action Plan to the EU level. In doing this, enforcement capability was strengthened and impact substantially enhanced. Other examples include when the European Commission decided to re-scale the IMO voluntary regulations on Port state control to the EU level and turning the rules into a directive that is mandatory for all EU member countries (van Leeuwen 2010) and attempts to re-scale decision-making competency on EU fisheries in order to alter the structure of the Common Fisheries Policy (Griffin 2009).

It should be noted that such re-scaling as the ones described above typically is assumed to be driven by interest promotion. The nature of these interests does not necessarily have to comprise economic and/or national interests but could also be ideological (e.g. concern for the environment). Nevertheless, they do in most cases reflect the interests of a particular actor or small group of actors. To increase legitimacy and decision-making robustness it could be important to build adequate preconditions for reflective and responsive governance, where the legitimacy of the grounds for re-scaling is deliberated among stakeholders. If re-scaling is left to individual actors’ promotion of self-interests stable outcomes are unlikely, since power relations between actors change and thereby re-scaling capability. Arenas for these deliberations therefore need to be built, where also overarching issues related to, for example, sustainability foresight and adaptive planning may be brought to the table (Voss et al. 2006c; Weber 2006).

Multi-sector approach
Marine ecosystems are complex arrangements. The governance so far seems to have been able to cope with this complexity primarily on the discursive level, but not translated into reformed practices. The ecosystem approach to management, which endorse a multi-sector approach,
has recently been embraced by key policy and regulatory actors (expressed in WFD and MSFD; and the EU 6th Environmental action program stressed the importance of an integrated approach). And possibly even more so by the EU's Baltic Sea Strategy and the EU Maritime Policy. Yet, the case studies reveal substantial difficulties to translate this principle into practice. The sector-wise governance within EU is seen as one of the key obstacles to interaction and communication (Haahti et al. 2010 p.59). Each issue-area has traditionally been handled separately by regulations and institutions. A narrow focus on sector governance, in which cross sector cooperation was basically absent, were reported or indicated in all case studies. The governance relies on various assessment and management techniques (such as the TAC system in the over-fishing case) that are difficult to reconcile with an ecosystem-based approach to management.

However, the, at least potential, role of HELCOM could be highlighted. It is not only a body that contributes to the carving out of a regional regulatory and political space. It is also a 'multi-issue' organisation. According to our informants in HELCOM the different sections and working groups usually work separately. Yet, it is not hard to imagine that the increasing focus on the ecosystem approach can pave the way for more systematic cross-sector collaboration (e.g. committees, working groups) within this organisation. A limit, on the other hand, is that HELCOM might be able to achieve integration among environmental issues, but may face difficulties to reach out to other sectoral interests (agriculture, fishery). Also ICES have recently started to work with an ecosystem management mindset.

Another observation that could be made in relation to this dimension is that Baltic 21 is very scarcely mentioned in the case studies. One possible interpretation is that interviewees do not see this organisation as particularly important for the environmental risk governance of the Baltic Sea. This is a problem in relation to ambitions to establish cross-sectoral collaboration and reflexivity, because Baltic 21 has indeed been seen as an organisation with the greatest ambition and potential to foster cross-sectoral work (Kern & Löffelsend 2008).

It is likely that day-to-day concrete management of environmental risks in the Baltic Sea, as in other regions, will continue to be undertaken within sectoral administrations. The need for expertise, experience, hardware and specialised institutional structures makes this almost unavoidable and in many ways preferable to more amalgamated organisational arrangements. However, this means that forums have to be created to enable cross-sectoral reflexivity and
collaborative learning processes between sectors. As different cross-sectoral organisations such as HELCOM and BALTIC 21 develop different kinds of networks involving different sets of experts and type of expertise, close contacts between these, and other, organisations would most likely be beneficial for creation of dynamic arenas for cross-sectoral reflexivity. However, to ensure that this reflexivity interacts with concrete management levels and thereby influences day-to-day governance it is necessary that arenas of reflexivity and practical management bodies find appropriate ways to communicate.

**Interest, knowledge and value conciliation**

Stakeholder inclusion is generally seen as a necessary element in reflective and responsive governance. Different actors can shed additional light on common problems. The case studies definitely show there are lot of various stakeholders involved in the governance. The Baltic Sea region score relatively well as a marine region in terms of development of trans-national networks (Kern & Löffelsend 2008; Joas et al. 2008). Nonetheless, there are a striking lack of structures for stakeholder participation and communication. The interplay between HELCOM and non-state actors has been expanded, something we also touched on earlier in the report. HELCOM has undergone an attitude change and now allow for non-state actors to take part as observers (see also Dreyer et al. 2011).

The analyses within WP3 (ibid.) pay attention to the relative lack of institutionalised forms for inclusion at the regional level, although recent innovations are to be found (for instance, the RACs in the fishing sector). In general, the WP3 analysis reported a fairly big gap between ideal and practice when it comes to broad stakeholder participation and communication of environmental risk governance of the Baltic Sea (including the EU level). There were scant evidence of a real reflection on participatory and communication activities and the forms that are used. Forms for horizontal interaction among groups are generally lacking (also with the exception of such NGOs as Coalition Clean Baltic). HELCOM and other governance arrangements seem, at least so far, not to be a sufficient means to foster such horizontal interaction. Available forms of stakeholder interaction are fragmented and only allows for some restricted inclusion of various stakeholders, as within the EU WFD. The institutional design of the RACs presents one of the most innovative and interesting models. Yet, the RACs only apply to the risk management phase, not earlier phases during, for
example, risk assessment and risk appraisal where the problem framing mainly occurs (see Sellke et al. 2010). The WP3 analysis furthermore noticed a dominant functionalist view of participation in which stakeholders are at the service for policy. Stakeholders are supposed to improve implementation and providing useful knowledge to policy, but not expected to express their values or provide criticism based on reflective thinking. Some interviewees express a demand for (Udovyk et al.: 43) guidelines that more precisely define the relationship between the scientists, decision makers and stakeholders. For example, in the framework of the WFD, “We need to clarify our roles” said an interviewed expert from one authority regarding the chemicals case (p. 43). Such self-reflective discussion about governance structures and procedures has to be part of the process.

However, the critical issue is not merely to increase inclusion. On tensions between inclusion of stakeholders and decision efficiency Voss et al. (2006b) make an important observation by referring to an "efficacy paradox", between "opening up" for the inclusion of more actors and "closing down" for decision-making. The more actors that become involved, the trickier the decision-making process is likely to be. This paradox cannot be eliminated but need to be recognised and somehow organisationally balanced. In the eutrophication case it was reported:

On one hand, many of the persons involved in the governance structures of different levels think that the number of organisations is too many, which is leading to overlapping and an absence of a clear goal. On the other hand, other organisations see the diversity of networks as strength for the collaboration, when there is more than one single approach on the agenda.

Arguably, a perception that there are too many actors engaged is likely to emerge if there is lack of clear forms and structures for stakeholder input. Absence of structures for stakeholder participation and communication correspond with lack of coordination among actors. Furthermore, it should be carefully noted that reflexivity within the stakeholder participation process can be expected to suffer if dominating participants too closely guards specific interests. For example, it was clearly shown in the case studies on eutrophication and over-fishing in this project that sectoral interests (agriculture and fisheries respectively) made reflexivity, open-ended discussions and long-terms strategic thinking problematic. In other areas, where stakeholders do not have as strong sector interests to defend, progress is more likely.
Path dependency

Some of the dominating intergovernmental organisations in relation to environmental risks in the Baltic Sea have comparably long histories. HELCOM is approaching its 40 years anniversary, IMO has already turned 60 and ICES has a history that goes back all the way to 1902. Although they all have evolved over time, affected by external as well as internal change pressures, it is quite clear that large organisations tend to change only slowly. This is natural, as procedures, practices and expectations become increasingly established and part of the organisation’s identity. Moreover, as long as most of the staff remains in the building for a long time, change is often circumscribed because of existing expertise and the perspectives adopted by leading experts and administrators within the organisation. This may sometimes create organisational inertia and a limited ability to adapt to changing societal expectations (Ahrne & Papakostas, 2002). However, the experiences, know-how and expertise that have been built up in the organisations over time can also be their biggest assets. The authority and influence exerted by these organisations is often the result of well established expertise (Barnett & Finnemore 2004).

It is important to note that both aspects – potential organisational inertia and established expertise – contribute to path dependence, that is, difficulties in changing perspectives such as moving from a traditional reductionist and sectoral scientific perspective to the ecosystem approach. From a policy perspective, this needs to be carefully assessed in relation to the creation of space for second-order reflexivity. Looking, for example, at the emerging attention being given to fishery and eutrophication issues by HELCOM, it is possible that a strengthened role of HELCOM in these areas will increase the weight given to traditional scientific stances (first-order reflexivity), as it is here this organisation has its strongest merits. On the other hand, it is also possible that entering into for HELCOM less chartered areas creates opportunities for the adoption of new perspectives, perspectives based on contemporary thinking on sustainability and holistic ecosystem approaches (second-order reflexivity). Compare this with the contemporary trend towards EU regionalisation in fisheries and possibly in the near future also on agriculture, where new bodies (RACs) have been set up according to the perceived importance of stakeholder participation, utilisation of different forms of knowledge and decentralisation. Here, the creation of new organisational bodies
creates space for new thinking and breaking up of organisational inertia, while at the same time previously built up experience and knowledge to some extent may be lost.

Building on reflexive governance thinking, an argument could be made that is in favour of allowing for, or even stimulating, a plurality of approaches. Uncertainty means that future consequences related to environmental risks cannot be predicted. It is therefore important to establish different arenas with different historical trajectories in order to stimulate reflection, decrease potential lock-in effects and preserve manoeuvring room for policy-making in the future and to embrace incrementalist policy-making, simply not to excessively streamline, but rather allow similar issues to be addressed in different forums.

It should be noted that not only organisations can be trapped in various forms of (physical) path dependency, so can individual sectors, not the least in ways of thinking and perspectives adopted. It is possible that the fishery sector in the EU to considerable extents suffers from what may be called TAC path dependence (Sellke et al. 2010). Reflection on how to better manage Baltic Sea fish stocks is still hampered by traditional thinking on MSY and TACs which makes elaboration of concrete management plans based on the ecosystem approach slow to emerge. In some ways similarly, eutrophication caused by agriculture seems to be trapped in natural resource thinking, where the EU/CAP system often sets the agenda for discussions and circumscribes what is being brought to the table (Haahti et al. 2010). The vested interests in CAP and pork barrel fighting over EU funds are important in relation to policy outcomes, but so are also the definition of the problem; natural resource use and profits versus ecosystem based management and long-term sustainability.

The breaking loose from negative aspects of path dependency is difficult. Established organisations are often inert and slow to change, historic investments create vested interests and expert as well as public deliberation is often dominated by prior discourses. However, one way to move forward can sometimes be to establish new institutions for discussion and reflection, to stimulate new projects or programmes in established organisations by e.g. providing ear-marked funding and to support organisations in approaching for them new areas, such as HELCOM’s emerging interest in fishery and agriculture. An argument could be made that this “redundancy” where several organisations deal with the same risk sector – but based on different perspectives and approaches – could, in fact, in the long run be more adequate than too much streamlining and specialisation. Considering the tremendous
Difficulties in reforming CAP and CFP to become more in line with sustainability ambitions, different ways to find new perspectives and approaches are without question badly needed.

**Dynamic perspective**

Governance need to be long-term and adaptive. But this is challenging. For example, despite recent reform of the CFP, regulatory failures persist and one key reason is a decision-making system that still emphasises a short-term focus. The reform of the European chemicals regulation assumes a long perspective, but the case study report shows that the regulation process is way too slow. In most of the other sectors that have been studied in the case studies there are considerable gaps between stated political long-term visions on sustainability and ecosystems in balance, and concrete measures being undertaken.

A particular problem facing risk areas where change sometimes is dramatic – oil spills from shipping, fish stock fluctuations, chemical “alarms” and others – is related to short term political pressures. When a large oil spill occurs, for example, there is typically an instant demand for political action (Knudsen & Hassler 2011). More often than not, the resulting regulatory changes are more closely related to short term political benefits than to forward-looking strategies to increase long-term marine safety. It has been shown in the case study on marine transportations (Hassler et. al. 2010) that poorly reflected new regulations and requirements can contribute to regulatory overload and sometimes actually reduce long term and over-all safety. In a similar vein, political pressures to increase fishing quotas tend to build up quickly after reports on possible stock recoveries. Knowing that stocks may fluctuate because of many different reasons it may not be wise from a long term perspective to increase quotas too swiftly. Nevertheless, pressure from sector interests may make precaution difficult to uphold.

A possible - at least partial solution - to this problem, albeit most likely difficult to garner political support from national governments, could be to give international bodies more autonomy and decision-making power. National governments are typically highly sensitive to domestic political pressures and may not be able to always refrain from short term actions to please key parts of their electorates or sector interests. Giving a higher degree of autonomy to international organisations may thus make environmental governance more robust, as these organisations are, or could be made, less directly susceptible to these kinds of political
pressures and could offer better grounds for reflective thinking and long term strategy-making. It should be noted, though, that this increased autonomy of supra-national organisation could be criticised from a democratic perspective, since important decisions on environmental governance would then be taken further away from voters. Public accountability would thus become less straightforward. It is unlikely, indeed, that institutional solutions could be found that give more influence to voters at the same time as political pressure for immediate action in minimised.

**Governance plurality**

A fundamental problem is that most regulatory frameworks for the marine area do not reach beyond the limits of national jurisdictions when it comes to implementation and enforcement. Still, tools beyond that level certainly exist.

Examples of mandatory regulation beyond the nation-state level are contained in REACH and in the CFP, but still, not covering Russia. Such regulations are of course important, but at the same time insufficient or too slow and costly (Young 2009) to deal with the urgent transnational risks. For example, there are still many unregulated dangerous chemicals and there are still many perceived failures within the common fisheries policy. Within the oil case, key regulation is centred to IMO. According to most experts, the conventions guarded by the IMO are in most cases relevant and reasonable. Initiatives to improve vessel technical safety during the last decades have largely been successful. However, when it comes to aspects such as crew training, staffing, Flag state control, Port state control and surveillance targeting marine pollution in national waters and EEZs (Exclusive Economic Zones), outcomes are extremely diverse and reflect individual governments’ ability and willingness to abide by international regulations more than anything else.¹²

There are several EU directives in each of the studied risk areas, but it is not always the case that a constructive plurality could be said to exist. While the work of HELCOM connects closely to EU regulations, it is also apparent that EU directives to a considerable extent contradict each other. For example, regarding eutrophication, CAP in supporting intensive farming contradicts WFD and the MSFD.

¹² Exclusive Economic Zones are marine areas outside but adjacent to territorial waters where the Coastal state has specific rights, as formulated in the UN Law of the Seas.
Various forms of economic instruments are moreover being increasingly applied not only in national but also in international contexts. Arguably, such instruments are considerably more difficult to implement at the international level, but examples including burden-sharing agreements, financial funds for investments in developing countries, emission trading and flexible implementation are either being tried out or are under development. For example, it is now being investigated whether it would be possible to connect emission trading in land-based and marine emissions to the air of nitrogen and phosphorous.\(^\text{13}\) Considering the fact that reduction of marine pollution of nutrients lags far behind what has been achieved on land transportations, the creation of a joint market in this area would most likely increase efficiency considerably.

Voluntary or soft regulation (e.g. through the recommendations of HELCOM) can be helpful to fill some of the gaps and to serve as a testing ground for subsequent hard regulations. An interpretation of the interviews made in the respective case studies one could do is that the perceived importance of this body (HELCOM) reflects the widely observed difficulties to formulate effective command and control based approaches in ever more globally interdependent societies.

Initiatives for voluntary or soft regulation are quite often taken as a response to inert intergovernmental regulatory processes. Such initiatives could take a variety of forms: for example, labelling and certification such as organic agriculture, various kinds of information disclosure, public-private agreements and partnerships. Among our cases, we can for example pay attention to the Globalallast partnership (Lemke et al. 2010: 25-26). It is interesting to note that businesses take their own initiatives and engage in risk assessments and research in order to develop technical solutions. This occurs as a response to the slow implementation of the only existing convention (BWMC). In the case study, it was also reported that companies encouraged states to ratify the convention. As long as shipping companies can continue their business in a technically and economically feasible way, there is no self-evident reason for them to counter-act environmentally sound regulation. As Oran Young observes (2009:25): "corporate actors are frequently more concerned with the development of stable rules and a uniform and predictable regulatory environment than with the exact content of the resultant

\(^{13}\) See, for example information on the on-going (2011-2013) EU Interreg. III project Baltic Sea Region – InnoShip at http://www.baltic.org/projects/bsr_innoship.
governance systems". This is important to remember when discussing, for example, the issue of varying practices in Port state control of visiting vessels. It has been shown that these controls differ substantially between regions, but also within regions (Knudsen and Hassler 2011). Attempts to make the Port state control mechanism more uniform in different ports, countries and regions could make them more predictable. This may be preferable to most operators compared with the present, unpredictable situation, even though it would mean that some port authorities would be stricter in their control than they previously have been.

Often there is also a need for voluntary approaches when the regulatory space is diffuse and relatively unregulated. Some actors need to take initiatives and suggest templates. Bodies that mainly engage in voluntary or soft regulation (e.g. HELCOM) can be more progressive and suggest policies that are somewhat stricter than existing legislation. This is a view that several interviewees expressed in relation to HELCOM.

Voluntary regulation can sometimes, in effect, appear as strict and compelling as mandatory regulation (or even more strict, because there can be considerable interpretative flexibility and room for manoeuvre within measures that are defined as mandatory). Delmas (2009) explains this observation by referring to March and Olsen's well known distinction between 'the logic of consequences' and 'the logic of appropriateness'. The first one relates to calculation of positive economic or non-economic benefits for individual and collective actors, whereas the latter refer to when actors respond to cognitive or normative pressures in order to establish legitimacy or avoid reputation damage. Soft approaches can very well relate to both these types of logics. Moreover, mandatory regulation - or the potential threat of stricter legislation - can pave the way for soft approaches. If business actors perceive a realistic threat that state actors will regulate a particular problem area unless serious voluntary measures are taken, then this very perception can be sufficient for actions to be taken. Due to the ever present 'free rider' problem, it is furthermore essential that there is a regulatory framework with at least minimum mandatory performance requirements, because otherwise it becomes comparatively more expensive for fore-runners to voluntarily use strict measures.

A combination of voluntary and mandatory regulation is also necessary in the cases when global flows of raw material and products relate to the regional risks, and where effective global conventions are absent. The mix of hard and soft approaches should accordingly be seen as context-dependent and could thus be adjusted depending on the scale and scope of the
problem structure. For example, as briefly discussed earlier, the REACH regulation provides some hints for how such vertical (within a territory) and horizontal (along global products chains) can be combined (although still very insufficient; see Boström et al. 2011).

Voluntary or soft regulation can moreover be important for focusing attention on certain priorities, principles, and perspectives. One could see this as a kind of discursive impact that might have strong effects on the longer term (cf. the focus on sustainability since the Brundtland Commission and UNCED in Rio). The potential role of WFD, MSFD, BSAP etc in helping actors to formulate new agendas must be highlighted in this regard. These regulations may not alter the current mode of risk governance in the short term; but they can be very instrumental in legitimising new perspectives such as precaution, the ecosystem approach and sector integration. Furthermore, regulations such as the WFD, MSFD, and also REACH are related to an information gathering type of regulation. A considerable part of the type of governance related to these directives could be described as informational governance (Mol 2008), which also relate to environmental monitoring (see below). Arthur Mol speaks of an information explosion; a new era in the role of information and informational processes in governing the environment.

In sum, the governance plurality argument says that to improve management the choice is not between mandatory, economic and soft regulation. Rather, the challenge is to find the appropriate mix between them and to reach contextually adapted combinations that take advantage of synergy effects.

**Monitoring and self-monitoring**

There are a number of institutions engaged in environmental monitoring, both on the EU, regional (ICES, HELCOM MONAS, ECHA etc) and national levels; which is required by frameworks such as the WFD and MSFD. In many cases, monitoring is undertaken under the auspices of national governments but is coordinated by supra-national authorities. However, it is not uncommon, despite this coordination, that somewhat different data are collected or that they are collected in different ways, making comparisons difficult, sometimes impossible as there is no unified monitoring system for IAS in the Baltic Sea.

Environmental monitoring is also an important role played by various sector organisations, NGOs, and citizens (Mol 2008) which experience risks as well as observe, collect, compile
and interpret data and then engage in framing and politicising of issues. In, for example, the marine transportation sector associations such as the International Association of Dry Cargo Ship-owners (INTERCARGO), the International Association of Independent Tanker Owners (INTERTANKO) and the Baltic and International Maritime Council (BIMCO) play important roles as producers of data, statistics and expertise advice. In a somewhat similar vein, stakeholder associations in the fishery sector contribute with data and knowledge over especially local stocks and populations.

Two features are especially important in regard to these types of monitoring activities performed by sector organisations or by individual operators/users. First, it is often underlined that these actors command a different kind of knowledge compared with scientific experts. Whereas scientific experts primarily are interested in general phenomena of various kinds, local users are more interested in matters specific to their specific activities. They may possess local and time-bound knowledge that could be more detailed than scientific data for that particular place and time. From a management perspective, this type of knowledge can be of great importance and thus needs to be incorporated into management and governance strategies. Second, the fact that sector organisations have direct interests in the activities they undertake may create biases in data. As in other political areas, actors that have a stake in an issue cannot be assumed to always be impartial. However, an argument can be made that although temptations could exist to “produce” data or data compilations that fit sector interests, credibility is a valuable asset that should be nurtured, also from a purely self-interested perspective. Sector organisations can be assumed to have an interest not only in producing data reports in line with internal interests, but also make sure that the data that is distributed is perceived as neutral and balanced. In other words, inclusion of stakeholders in decision-making processes may potentially increase the value of sector organisations’ credibility and thus strengthen incentives to produce and distribute high-quality data.

It is important that monitoring is diffused among a plurality of actors, since this widens the way environmental risks are measured or estimated, which in turn can increase likelihoods that less appropriate methods and practices are weeded out. The simple fact that similar risks are approached from somewhat different angles can be assumed to stimulate discussions on methods and methodology and contribute to refinement of environmental risk monitoring.
We have noted that many institutions and actors are involved in environmental monitoring. Yet, it is another question if the risk governance as such includes a self-monitoring component; that is, if it has institutionalised mechanisms for reflexive governance. Lidskog et al. (2010: 22) argue that 'risk governance is not limited to the technical calculation of risk, but includes also the evaluation of organisational aspects in the regulation of risk'. To what extent does it monitor and assess its own achievements, limitations, and conditions? In the risk sectors discussed in this report, few concrete examples of institutionalised mechanisms for self-reflexive governance have been noted. A considerable amount of work is undertaken within all sectors on improvement of existing monitoring, technical improvements as well as refined analysis of the collected data. This is important work and its value should not be underestimated. However, this work is to considerable extents built on historical methods and practices and typically does not comprise much of the kind of reflection and reflexivity that is being discussed in this report.

It seems to be a common case that if reflexivity is evoked, it is typically not evoked within the bodies that actually undertake monitoring activities, but rather in other forums. For example, HELCOM and Baltic 21 coexisted for a number of years during the 1990s and 2000s. Whereas HELCOM primarily has been devoted to scientific monitoring, assessment and political negotiations on new Recommendations, Baltic 21 was established as a regional Agenda 21 undertaking where holistic sustainability perspectives were placed in focus. As far as has been found in the five case studies underpinning this report continuous interaction aimed at reflexive and self-critical deliberation in the governance of environmental risks in the Baltic Sea had not taken place at all.

In some cases, though, self-critical evaluations have been undertaken, for example in the case of EU regulation of fisheries (Sellke et al. 2010:11-12). The problems in the CFP has been apparent to most observers, including EU officials, since there have been continuous and substantial differences between expert recommendations on quotas and what has been politically decided, as well as diminishing stocks in important fish populations. At present, the route embarked upon seems to be to put increased emphasis on devolution of responsibility to the regional level, and to actively involve stakeholders. The EU Regional Advisory Councils (RACs) is the most obvious sign of this tendency. Whether this trend will continue and real decision-making power will be given to the regional stakeholders and if so, whether this will
improve reflexivity, responsibility and accountability, is yet too early to tell.

7. Conclusions and recommendations

I see that international cooperation around the Baltic is improving. All existing regulations WFD, MSFD, EU BSS and HELCOM BSAP are good tools for cooperation. The only way we can go forward is by cooperation.

(Respondent from authority, cited in Udovyk, 2010: 16)

This quote is quite telling because it suggests that there are already existing (at least initial) infrastructures with regulatory frameworks, regulatory bodies, environmental monitoring and risk assessment procedures. Although the regional regulatory space is certainly still in the making, there is not just void. In at least four of the cases (maybe IAS as an exception), the chief task does not seem to be to establish fundamentally new frameworks and bodies. A good part of the infrastructure already exists so it is more a matter about reforming, expanding, and improving existing ones as well as developing connections between fragmented efforts. For example, in the chemicals case, the problem is rather the complexity of regulations (causing confusing overlaps and competition) than their absence (although a large number of potentially toxic chemicals are unregulated). This is both an opportunity and a barrier (in the sense of path dependency). In the IAS case, relevant frameworks, methods and bodies do exist, but it has a very recent history and much remain to be implemented.

Three steps for improved marine governance in the Baltic Sea

It has been found in this report that a first important step that has to be taken in order to make marine governance better adapted to contemporary needs concerns systematic vertical and horizontal governance, not least as a means to link regional/European level collective problems with global flows of raw material, products and people. In each sector there is a need for the exploration of gaps and overlaps in existing regulation and stimulate the development of soft approaches that can cover such gaps or provide templates for other regulatory measures. To overcome bottlenecks and inertia, appropriate mixes of command and control mechanisms, economic incentives and soft regulatory measures need to be developed in order to improve long-term sustainability and governance robustness. However,
to avoid lock-in effects and negative path dependency, incremental policy-making will most likely characterize most aspects of within-sector governance improvements.

As a second step, inter-sectoral collaboration and integrated environmental management need to be addressed more systematically than what has been done up to now. The five case studies have shown that inter-sectoral collaboration is limited, which means that the potential for learning between sectors is not realised to its full extent. This strategy needs to be pursued in parallel with Step one above in order to make sure that there is a reasonable congruence between key management bodies at different regulatory levels. For example, the fact that HELCOM deals with the full spectrum of environmental threats to the integrity of Baltic Sea ecosystems creates good opportunities for inter-sectoral collaboration. But to improve adequateness in relation to contemporary multi-level governance practices, the comparably well integrated internal structure of HELCOM has to be matched with something similar at lower levels (e.g. national levels) as well as at higher ones (e.g. EU and global levels). Of course, full congruence between different levels is not achievable, and probably not preferable, but the point is that if environmental risk management is highly sectoral at one dominant level (e.g. national or EU levels), there is a considerable risk that this sectoral structure affects practices at other, less sectoral, levels. Not the least the entrenched sectorisation in EU where closely related areas often are managed in different DGs needs to be opened up. Improved congruence between levels needs to be continuously addressed. For example, the well-known needs to reform CFP and CAP have to be undertaken in close relation to relevant environmental directives such as the WFD and the MSFD and integrated perspectives among the involved DGs need to evolve. This is probably necessary in order to effectively address especially hazards related to eutrophication and over-fishing as these areas are intimately linked to agriculture and fishing respectively, but is at the same time one of the most challenging marine governance tasks.

Active support of multi-sector governance bodies at regional levels may be important as a mechanism to promote interaction between sectors. For example, HELCOM may serve as an arena for development of regional action plans such as the BSAP. Potentially, such programs can also comprise financing mechanisms and separate funding agreements between governments, international funding institutes and other stakeholders. Selected parts of these multi-sector plans may then by empowered if they are brought into the EU system and turned
into binding directives. Moreover, administrative structures within EU are thereby stimulated to address issues that are part of action plans and cut across different sectors. In a somewhat similar vein, EU RACs may serve as regional platforms for stakeholder deliberation, especially if they are given expanded mandates and include broader and better balanced spectra of stakeholders than they do today.

There is a broad public awareness of the problems surrounding the Baltic Sea which is a basic condition for reflexivity and contributes to put pressure on business and politics. This broad public awareness is particularly the case around issues such as eutrophication and over-fishing (cf. Jönsson 2011), but is lacking most clearly in the IAS-case. Building on step one and two above, step three comprises the building of institutions for governance reflexivity. These institutions are important not the least as they would facilitate learning between sectors as well as between organizations and geographical regions. However, two things need to be noted at this stage. First, the three steps above should not be seen as measures that should be taken in a consecutive order. Even though some achievements in step one and two need to be made before it is meaningful to address the issue of building institutions for reflexivity, there need to be continuous and interactive feedback between the three steps. Second, building institutions for reflexivity does in most cases not mean establishing new organizations or administrative bodies. Rather, it means creating opportunities for increased levels of reflexivity largely within existing organisational structures. The creation of closer inter-sectoral collaboration and interaction between different governance levels makes up important prerequisites for improved institutions for reflexivity.

One of the most important objectives of the governance reflexivity initiatives is to provide fertile soil for institutional learning between different regional seas. The example of the Baltic Sea regionalization shows that it is possible to improve marine governance through interaction between widened sets of actors and strategic interaction between institutions at different regulatory levels. Lessons learned in this region could possibly be used to carefully stimulate similar initiatives in e.g. the Mediterranean, the Black Sea and the North Sea. Concretely, increased interaction between key regional bodies such as HELCOM, OSPAR, MEDU (Coordinating Unit for the Mediterranean Action Plan) and BSEP (Black Sea Environmental Programme) could be encouraged in order to share knowledge and gain experiences. However, to increase impact of these envisioned initiatives joint strategies and discussions are
needed in Brussels as well, as EU is the main regulatory body in these regions. A significant challenge is here to balance regional influence together with bottom-up processes and needs for coordinated initiatives in all EU macro regions. The value of strengthening regional bodies as a means to increase flexibility and making the search for contextually adapted solutions successful should be underlined, also as a way for central authorities in Brussels to increase legitimacy, make use of local knowledge as well as engagement and to improve implementation effectiveness. Furthermore, regional bodies may have special roles to fulfill when it comes to interaction with other regional initiatives (e.g. HELCOM interaction with NDEP (Northern Dimension Environmental Partnership) within the larger Northern Dimension initiative).

Finally, it should be noted that even though the Baltic Sea could be seen as a model region in terms of engagement, expertise and collaboration, its experiences ought not to be used as blueprints for other regions, but rather as inspirations of building of contextually adapted structures for improved inter-sector interaction and reflexivity. Although the other regions often share similar environmental challenges related to, for example, over-fishing, chemicals, marine transportation and invasive alien species, there is an abundance of differences between them when it comes to areas such as economic capability, socioeconomic conditions, administrative traditions, political systems, culture and history of regional collaboration. Because of these differences, activation of bottom-up reflexive processes is crucial in order to find well-adapted institutional solutions. At the same time, because of the shared environmental challenges, there is also lot to be gained from learning between regions.

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