The Arctic Shipping Regime: Regulating vessel-source pollution in Arctic Waters

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ABSTRACT:

The Arctic Ocean are currently undergoing dramatic changes of decreasing ice cover and increasing human activity – all of them direct consequences of global climate change.
This thinning and melting of Arctic ice cover has led to increasing access to natural resources which means more human activity will follow, including shipping. Future scenarios of the Arctic anticipate the opening up of Arctic sea routes, although the opinions and predictions are diverging on whether the Arctic Ocean will ever develop into a central pathway of global trade, at least not in the immediate future. Yet, there is no doubt that Arctic conditions are changing, economic interest and investment in the regions is growing steadily accompanied by a strong concern for the increasingly exposed and vulnerable environment. The question is: Will the current existing international legal regimes for regional maritime governance be adequately equipped to deal with the changing conditions and emerging challenges?

The emerging economic opportunities in the Arctic raise a number of governance challenges for the Arctic states and the international community in general. Of particular concern is the potential environmental impact of increasing offshore activities and trans-Arctic commercial shipping. Even though the exact timing and extent of the opening of the Arctic Ocean remain uncertain at present, the fact that these issues will arrive on the international agenda seems today generally accepted and will require much more international attention in the coming years.

The objective of this paper is to analyze forms and effects of different governance tasks that the Arctic shipping regime provides concerning marine pollution. I will look at the problem of vessel-source pollution and examine whether the existing Arctic shipping regime is adequately equipped to manage it.

CONTENTS

List of Abbreviations

ABS	American Bureau of Shipping
AC	The Arctic Council
ACAP	Arctic Council Action Plan
ACIA	Arctic Climate Impact Assessment
AEPS	Arctic Environmental Protection Strategy
AIS	Automatic Identification System
AMAP	Arctic Monitoring and Assessment Programme
AMSA	Arctic Marine Shipping Assessment
AMSP	Arctic Marine Strategic Plan
APM	Associated protective measure
ATS	Antarctic Treaty System
BEAC	Barents Euro-Arctic Council
BEAR	Barents Euro-Arctic Region
BRC	Barents Regional Council
BWE	Ballast water exchange
BWM	International Convention for the Control and Management of Ships' Ballast Water and Sediments
CAFF	Conservation of Arctic Flora and Fauna
CDEM	Construction, design, equipment and manning (standards)
COLREG	Convention on the International Regulations for Preventing Collisions at Sea
COMSAR	Sub-Committee on Radiocommunications and Search and Rescue (IMO)
DAT	Double Acting Tanker
DE	Sub-Committee on Design and Equipment, of the MSC (IMO)
EBM	Ecosystem-based management
EEZ	Exclusive Economic Zone
EIA	Environmental Impact Assessment
EPPR	Emergency, Prevention, Preparedness and Response
GAIRAS	Generally accepted international rules and standards
GBS	Goal-based ship construction standards
HNS	Hazardous and Noxious Substances
IACS	International Association of Classification Societies
IAMSAR	International Aeronautical and Maritime Search and Rescue Manual
IASC	International Arctic Science Committee
ICJ	International Court of Justice
IGO	Intergovernmental organizations/International governmental organizations
IHO	International Hydrographic Organization
IMO	International Maritime Organization
INSROP	International Northern Sea Route Program
IPY	International Polar Year
ISO	International Standardisation Organisation
LNG	Liquid natural gas

LME	Large marine ecosystem
LRIT	Long-range identification and tracking of ships
MARPOL	International Convention for the Prevention of Pollution from Ships
MEPC	Marine Environment Protection Committee (IMO)
MOU	Memorandum of Understanding
MPA	Marine Protected Area
MSC	Maritime Safety Committee (IMO)
MSI	Maritime safety information
NAMMCO	North Atlantic Marine Mammal Commission
NATO	North Atlantic Treaty Organization
NAV	Sub-Committee on Navigation (IMO)
ND	European Union's Northern Dimension
NF	Northern Forum
NRF	Northern Research Forum
NGO	Non-governmental organization
nm	nautical mile (1 nm = 1,852 meters)
NORAD	North American Aerospace Defense Command
NRF	Northern Research Forum
NSR	Northern Sea Route / Northeast passage
NWP	Northwest Passage
OPRC	The Protocol on Preparedness, Response and Cooperation to Pollution Incidents by Hazardous and Noxious Substances (HNS)
OSPAR	Convention for the Protection of the Marine Environment of the North-East Atlantic
PAME	Protection of the Arctic Marine Environment (Arctic Council working group)
PSSA	Particularly sensitive sea area
SAO	Senior Arctic Officials (of the Arctic Council)
SAON	Sustained Arctic Observing Networks
SAR	Search and Rescue
SDWG	Sustainable Development Working Group of the Arctic Council
SOLAS	International Convention for the Safety of Life at Sea
SRS	Ship reporting system
TEK	Traditional ecological knowledge
UNCLOS	The United Nations Convention on the Law of the Sea
UNEP	The United Nations Environmental Programme
VTS	Vessel traffic services
WMO	World Meteorological Organization
WWF	Worldwide Fund for Nature

1.0 INTRODUCTION

At the heart of the Arctic lies a vast frozen ocean where only icebreakers have yet been able to permeable – often in the name of research, discovery and national assertion. But the ice cover is slowly thinning and melting. Increasing access to the Arctic Ocean has significant implications for marine activities such as shipping, fisheries, tourism and the exploitation of natural resources that was previously unavailable. Expansion of human activity in the region has already begun.
All in all, it is sadly ironic that the market-driven activities (i.e. trade and offshore development) which are contributing factors to global climate change that is causing the melting of Arctic, is the very same activities that might benefit from it. So when the Arctic Climate Impact Assessment (ACIA) in 2005 brought forward substantial observational evidence that the sea ice cover in the Arctic was melting, it was like opening Pandora's box bringing both hope and concern to the region; Hope of economic growth and concern for the environmental impact it entails.

In August 2009, a cargo ship departed from Korea to explore the new navigational opportunities in the High North and the potential of a new maritime trade route between East-Asia and Europe. The maritime Silk Route has been important for trade from East to West for four centuries is now under great threat from pirates, in particular in the ocean near Somalia. The Asian countries also recognize the importance of diversifying their sources of energy, and are looking for energy transported from the Russian Federation and other regions. These circumstances are at the heart of search for alternative sea routes. Like the maritime Silk Route that opened up in the Southern hemisphere four centuries ago and brought growth and opportunities, will this new northern passage bring growth and opportunities to the High North? And should we worry?
These are the big questions lurking in the background when I now set out on a journey through the regulations and policies that aims to protect the Arctic environment from the impacts of shipping.

Even though the exact timing and extent of the opening of the Arctic Ocean remain uncertain at present, the fact that these issues will arrive on the international agenda seems today generally accepted and will require much more international attention in the coming years. The United Nations Convention on Law of the Sea (UNCLOS), in conjunction with other international agreements and national law, form a general legal framework for regulating activities in the Arctic. However, changing conditions may call for new rules – or at least revision of existing rules – to preserve and protect the Arctic marine environment in the face of expanding marine activities. Does this include the existing environmental regulation of Arctic shipping?

Increasing Arctic shipping raises a number of governance challenges for the Arctic states and the international community in general. Of particular concern is the environmental impact of vessel-source pollution. Scientists are uncertain about the potential impact increasing shipping

can impose on the Arctic ecosystems, but given its global importance, taking preventive and precautionary action is of utterly importance.

1.1 Problem statement

There seem to be a common acceptance among states in general that the United Nations Convention on Law of the Sea (UNCLOS) contains the generally applicable legal framework for Arctic Ocean governance and additional international agreements have so far been considered unnecessary (Franckx 2009). At the time when UNCLOS and the main International Maritime Organization (IMO) Conventions were drafted, no one could predict the extensive melting of the Arctic. Therefore, the drafting process of the main international conventions targeting shipping and ocean governance did not take into consideration an opening of new sea routes in the Arctic Ocean. The Arctic Ocean has previously been inaccessible for commercial shipping and distinguishes itself from other marine areas in terms of climate, ecosystems, infrastructure, jurisdiction, etc. This raises questions about the vulnerabilities of the existing framework in facing the challenges of increased Arctic shipping and the amplified pressure it puts on the marine environment.

The purpose of this paper is to assess the adequacy of the existing international regulations that aim to protect the Arctic marine environment from vessel-source pollution in the context of diminishing sea ice and increasing shipping activity. Although the focus is on the regulation of vessel-source pollution, I will still take into account regulation and guidelines that are primarily aimed at ensuring maritime safety and secure navigation if they have a significant subsidiary purpose of pollution prevention. Throughout the paper I will make reference to two selected topics of vessel-source pollution – ballast water discharges and standards for construction, design, equipment and manning (CDEM) – for in-depth case study and comparison.

Several earlier studies have addressed the environmental threats concerning Arctic shipping and the adequacy of the existing governance regime to deal with these. These studies usually highlight the governance gaps and particular challenges of the Arctic shipping regime and some even make recommendations and predict future scenarios of Arctic Ocean governance. However, their contributions rarely relate the findings of gaps and challenges to the distinctive features and capacities of Arctic institutions. Olav Schram Stokke (2010a; 2011b) has attempted to do that by introducing a conceptual framework of four governance tasks (i.e. knowledge building, norm building, capacity building and rule enforcement) to systematically examine the effectiveness of environmental regimes. He argues that examining the governance tasks that institutions are set to fulfill in a specific issue area will reveal their success or failure to do so, but it also help to identify interaction and division of labor within or between institutions (Stokke 2010a).

I will use the same methodology and concepts when I now set out to systematically examine the governance gaps in the Arctic shipping regime in relation to the distinctive features of Arctic institutions and the typically variables of regime effectiveness.
The analysis will take form as a so-called diagnostic institutional approach (Young 2002c; Pahl-Wostl 2009) that aims to;

I. Describe the current Arctic shipping regime and what measures that have been taken to cope with marine pollution challenges the Arctic is facing as a consequence of increasing shipping activities.
II. Evaluate the effectiveness of the Arctic shipping regime in addressing vessel-source pollution in Arctic waters.

The Arctic shipping regime embodies a range of domestic and international legal instruments and regional soft law agreements. There is no comprehensive international agreements specifically targeting the Arctic, such as in the Antarctic (Antarctic Treaty System), but there is a number of international conventions that relates to the Arctic Ocean in the same way as to other international waters. Additionally there is a fragmented array of non-binding instruments at the regional level.

Table 1 provides an overview of the international legal and policy framework targeting vessel-source pollution in the Arctic. Note that this table excludes conventions related to oil spill pollution and regulation of fishing vessels. This paper will only cover regulations related to commercial shipping. There are separate regulations for cruise ships, ships assisting offshore hydrocarbon activities, larger fishing vessels, warships and other government ships operated for non-commercial purposes, and these will not be covered here.

REGULATIONS and GUIDELINES related to Arctic vessel-source pollution:	*Entry into force:*	**General discharge and emission standards**	**Ballast water**	**CDEM standards**	**Special marine area protection**
United Nation Convention on the Law of Sea (UNCLOS 1982)	1994	X	X	X	X
International Convention for the Safety of Life at Sea (SOLAS 1974)	1980			X	
International Convention for the Prevention of Pollution from Ships (MARPOL 1973) *- 1978 Protocol* *- 1997 Protocol (Annex VI)*	1983	X			X
International Convention for the Control and Management of Ships' Ballast Water and Sediments (BWM 2004)	Not yet		X	X	
Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter (LC 1972) and the 1996 London Protocol	1975/ 2006	X			
Protocol on Preparedness, Response and Co-operation to pollution Incidents by Hazardous and Noxious Substances (OPRC-HNS Protocol 2000)	2007	X			
Protocol relating to Intervention on the High Seas in Cases of Marine Pollution by Substances other than Oil (INTERVENTION Protocol 1973)	1983	X	X		
International Convention on the Control of Harmful Anti-fouling Systems on Ships (AFS Convention 2001)	2008			X	
IMO Guidelines for Ships Operating in Polar Waters (2009)	Non-binding			X	
IMO Guidelines for Ships Operating in Arctic ice-covered Waters (Arctic Shipping Guidelines, 2002)	Non-binding	X	X		
IACS Unified Requirements for Polar Class	-			X	
PSSA Guidelines (IMO)	-				X
OSPAR Convention (1992)	1998				X

Table 1: A categorical listing of regulations relating to vessel-source pollution from Arctic shipping

1.2 Structure

This paper is structured in eight main sections.

Part 1.0 introduces the conceptual and theoretical framework as well as the methodology used to assess the effectiveness of the Arctic shipping regime.

In Part 2.0, I will first look at the general picture of current and future level of Arctic shipping, including factors such as Arctic ice conditions, possible transport routes and the general prospects for increasing shipping activities in Arctic waters. Part 2.0 will also provide a general picture of the possible impacts increasing shipping can have for the Arctic marine environment and identify challenges for Arctic environmental governance.

Part 3.0 provides a brief history of cooperation and governance trends in the Arctic and gives an introduction to the current Arctic shipping regime. Special attention will be given to the Law of the Sea Convention, the International Maritime Organization, Paris MOU, and the Arctic Council.

In Part 4.0, I will take a closer look at the global and regional regulation of vessel-source pollution in the Arctic Ocean, followed by a particular focus on ballast water exchange management (Part 5.0) and CDEM standards (Part 6.0).

In Part 7.0, I will examine of the effectiveness of the Arctic shipping regime in addressing vessel-source pollution in Arctic waters by assessing its capacity to fulfill four governance tasks; knowledge building, norm building, capacity building and rule enforcement.

I will conclude this paper (Part 8.0) by a discussing the prospects of each of the three future scenarios as the way forward for Arctic shipping governance. I will incorporate the findings from the assessment of the current Arctic shipping regime in Part 7.0 into a strategic dialogue about the critical uncertainties and indications of expected development of environmental governance in the High North.

1.3 Conceptual Framework

1.3.1 International Environmental Governance

The concept of governance appeared in institutional theory during the 1970s when the large supply of institutional arrangements lacking a government at the core made it necessarily to formulate a clear distinction between governance and government (Young 2010). Governance includes not only government, but extends to interactions between a great variety of institutions, actors (i.e. communities, businesses and NGOs), resources and the technologies used (Vatn & Veldeld 2011).

Lemos and Agrawal (2006:298) define environmental governance as; ”*the set of regulatory processes, mechanisms and organizations through which political actors influence environmental actions and outcomes.”* This definition points out the two core elements of governance structures: First, the actors involved and their power, resources, rights and responsibilities that will define their capacity and incentive to influence environmental action and outcomes. And second, the institutional structures available to facilitate the processes of human coordination, shaping social priorities, and resolving conflicts (Vatn & Veldeld 2011:3).
Additionally, there are often some distinct features that characterize environmental governance. There is often a high level of formal and informal interaction between a variety of actors on a local, national and global scale. The complex causality of environmental issues often calls for institutional dynamics and flexibility (Young 2010). And finally, there are often a set of “good governance” principles that influence rules, procedures, processes, and what is considered widely-accepted behavior. In the context of Arctic Shipping, good governance is closely related to the notion of sufficient environmental standards and ecosystem-based management.

The current system of international environmental governance consists of three basic components. First there is the collection of intergovernmental organizations, such as the International Maritime Organization (IMO) or the United Nations Environment Programme (UNEP) that are responsible for coordinating policy that will protect the environment and promote sustainable development at the international level. Second there is the framework of international environmental law and treaties, such as the the United Nations Convention on Law of the Sea (UNCLOS) and International Convention for the Prevention of Pollution from Ships (MARPOL). A third component of international environmental governance system is financing mechanisms to implement commitments of treaties, either by building the institutional capacity for rule enforcement or through funds specifically targeting environmental efforts (Rosen et al. 2003).
Supplementing these elements is a range of international environmental summits and forums intended to gathers numerous government officials, scientists, organizations and stakeholders to put environmental issues on the international agenda and to advance the global discourse on how to address them (ibid.).

Although international environmental agreements usually are referred to as *laws* and *treaties*, bear in mind that they do not fulfill the traditional definition of law in terms of a granting an international institution the authority to enforce compliance and sanctions that might jeopardize national sovereignty. Instead, each nation is responsible for implementing treaty commitments at the local or national level. Without a central institution to insist on compliance and with the authority to overrule national sovereignty, the international environmental governance system is struggling to implement and enforce strong environmental protections at the international level.
Not to despair by the outlook of it, Rosen et al. (2003:139) reminds us that the international environmental governance system first started to take form three decades ago and should still be considered “a work in progress” that continues to evolve.

In fact, a looser and more dynamic system of international environmental governance is emerging with more heterogeneous participation in decision-making processes and influential coalitions and partnership between civil society groups, businesses, and governments (Rosen et al. 2003:138).

1.3.2 Governance gaps

For the purpose of this thesis, *governance gaps* (also referred to as regulatory gaps) are understood as gaps in the international institutional framework, including issues which are currently unregulated or insufficiently regulated at the global, regional or national level as well as international organizations who's mandate are inconsistent or ineffective to fulfill their objectives (Koivurova & Molenaar 2009).
Most policy strategies that aim to address environmental governance gaps typically include prevention, mitigation and adaption measures – often in combination; *Preventive* measures denote precautionary action to prevent harmful pollution from occurring. An example is implementing requirement of treatment equipment, banning of certain pollution hazards and establishing special protection areas. *Mitigation* measures refer to action taken to reduce or eliminate the causes of pollution (Åtland 2010:33), such as emissions and discharge standards. *Adaptation* denotes efforts to enhance a regime's ability to adjust to the consequences of environmental impacts either by curbing harm and/or taking advantage of potentially new opportunities (ibid.).

1.3.3 Institutions and Organizations

In political science the terms *institution* and *organization* are often used interchangeably (Young 2000a). For the purpose of this paper it is important to clarify the distinction between institution and organization, since confusion arises from the recognition that organizations also are actors. Furthermore, distinguishing between institution and organization allows me to explore the interaction between them, which is a core aspect of interplay management.

Traditionally, institutional theory was biased towards *functional* definitions of institutions and organizations – which mean they were related to their function in the society. Other theories emphasize different aspects of the *establishment* of institutions, for example if they evolved spontaneously or intentionally to solve human coordination problems, or if they developed from calculating actors' aspiration for material or immaterial goods. I will here focus on the functional aspect of institutions since I want to evaluate the effectiveness of the existing regime.
Several studies have showed that "by fulfilling the function of both arena and actor, institutional infrastructure can facilitate the spread of ideas and amplify their impact on policies and practices" (Underdal 2010:21). So when I use the terms *institutional setting* or *institutional regime* it refers to institutions and organizations as arenas and organizations as actors (Underdal 2010).

An organization is a material entity that typically possesses a secretariat, staff, offices, equipment, and budgets (Young 2000a). The International Maritime Organization (IMO) is a good example of an organization that plays an important role in administering or managing international regimes. Organizations are always costly to form and operate, thus many regimes lack the administrative apparatuses that an organization can provide. However, it is not always necessary for the well-functioning of international regimes. For instance, the absence of administrative mechanisms in the 1959 Antarctic Treaty has not constrained it from function effectively. Young (2000a:10) argues that;

> Form should follow function with regard to the establishment of organizations. Because organizations are always costly to operate, the burden of proof should lie with those who advocate the creation of new organizations. When organizations are established, their founders should make every effort to design them in such a way as to fit the distinctive features of the institutions they are expected to serve.

Institutions can take form as conventions, norms, principles, operating procedures and formally sanctioned rules that intends to prescribe and coordinate behavior (Chasek et al. 2010; Simmons and Martin 2002; Vatn 2005; Young 2000a). Through these rules institutions define who has access to resources, in what form and to what degree (Vatn 2005) – or as North (1990) puts it; institutions defines "the rules of the game".
North represents the individualist perspective that sees institutions as external constraints that influences how actors calculate the optimal choice. But the individualists do not believe that institutions influence behavior beyond pure rational calculation (Vatn 2005). For this reason, this paper follows the social constructivist perspective acknowledging that institutions influence individuals and vice versa.[1] According to their perspective, society has in fact provided institutions with a mandate to influence behavior, support values and produce and protect interests. In essence, institutions play an active role in shaping expectations about the actions of others, and providing stability and meaning that is crucial for the coordination of human action (Vatn 2005:83).

However, it is important to emphasize that institutions are dynamic and are continuously experiences change. These features are particularly pervasive in environmental governance. The understanding of institutional dynamics in environmental governance is essential for the problem-solving capacity of institutions (Young 2010). On the other hand, we need to acknowledge that institutions are not able to control the process of institutional change and the results of institutional instruments may not coincide with the expectations (Vatn 2005). These perspectives are important to keep in mind when analyzing the many new institutional arrangements and components that are emerging in international environmental governance.

[1] Both the individualist and the social constructivist perspective on institutions are based on theories about human rationality: If we see the individual as autonomous and choices as maximizing individual gain, institutions can only operate as constraints. If one opens up for individuals and their preferences being formed by the institutional context, a very different form of interactions between individuals and institutions are possible since people are assumed to act on the basis of different kinds of rationalities in different contexts – e.g. individual vs. social rationality (referred to as the "I" and "we" paradigm in sociology) (Vatn 2005).

New forms of inter-governmental cooperation and soft law arrangements are forming which are difficult to classify as either institutions or organizations (Churchill & Ulfstein 2000; Young 2000a). They are also difficult to evaluate based on traditional institutional and juridical theory (Churchill & Ulfstein 2000).

1.3.4 International Environmental Regime

Regimes are a crucial component of international governance systems (Chasek et al. 2010; Stokke 2010a). International environmental regimes refer to a set of interconnected institutional arrangements that govern human-environmental interactions (Young 2010). Regimes are typically associated with governance of specific issue areas, defined by activity and geographic area, and are organized around certain functions or purposes (e.g. protecting the environment from harmful pollution) (Meadow 2008). This relatively clear delimitation of a regime's focus and function facilitates the analysis of interaction between regimes (Stokke 2001).
The global and regional institutions and organizations targeting the environmental impact of shipping in the Arctic Ocean is a typical example of an international environmental regime. I will refer to it as *the Arctic shipping regime*.

A regime encompasses institutional arrangements on all levels of social organization (i.e. local, national, sub-regional, and regional), but they are usually nested into an overarching international framework that affects their implementation (Young 2010). According to Chasek et al. (2010:20);

> A regime usually centers on one or more formal international agreements, but key elements can also include the relevant actions of important international organizations, parts of other interrelated international agreements, and accepted norms of international behavior among actors active in the issue area.

Both are true for the Arctic Shipping regime which centers on the formal rules of UNCLOS and the actions taken by the IMO.

Pahl-Wostl (2009:354) identifies the major structural characteristics of governance regimes as "the influence of formal and informal institutions, the role of state and non-state actors, the nature of multi-level interactions and the relative importance of bureaucratic hierarchies, markets and networks." Furthermore, environmental regimes should be treated as complex and dynamic systems and is often linked to concepts like robustness, adaptive capacity, resilience and vulnerability drawn from the theories of socio-ecological systems[2] (Young 2010).

[2] See e.g. Berkes, F., J. Colding, and C. Folke. 2003. *Navigating social-ecological systems: Building resilience for complexity and change*. Cambridge, UK: Cambridge University Press, and L.H. Gunderson and C.S. Holling (eds.). 2002. *Panarchy: understanding transformations in human and natural systems*. Washington D.C.: Island Press.

1.4 Theoretical Framework

Analyzing international environmental regime, such as the Arctic shipping regime, will require an analytical framework that can handle great institutional dynamics and complex causalities.
The study of international environmental regimes has evolved from early focus on the formation and creation of regimes (1980s) to an emphasis on regime effectiveness and interaction (1990s) (Young 2010). The current research frontier has directed its attention towards questions on how to manage the increasingly complex and dynamic nature of human-environment interaction. Concepts like adaptive capacity, ecosystem-based management and regime interplay have become common in institutional theory.
The analysis here will combine regime-effectiveness theory with recent concepts in the study of institutional interplay. There is an abundance of literature on regime effectiveness and institutional interplay, but the theoretical framework of this paper is mainly based on the work of Oran Young (2002; 2008; 2010), Olav Schram Stokke (2010a; 2011b), and Arild Underdal (2002; 2010).

I will touch upon the following perspectives within institutional theory;

- The diagnostic method for assessing complex environmental governance issues
- The effectiveness of international environmental regimes

The framework introduced in this paper provides a coherent approach to analyzing the structural characteristics of a the Arctic shipping regime, the nature of human-environment interactions on marine issues, and how regime structure is influencing policy processes and vice versa.

10.4.1 Institutional Diagnostics

The analysis of the Arctic shipping regime will take the form of a diagnostic approach. The diagnostic method provides "a step-by-step procedure that is applicable to specific issues in every issue area" (Young 2008:144).
Explaining the characteristics and performance of regimes intended to solve large-scale environmental problems or to govern complex socio-ecological systems requires a sophisticated, flexible framework. Because, as Pahl-Wostl (2009:355) puts it;

> On the one hand, too generic and simplistic approaches will hardly be able to address the complexity of real governance regimes. […] On the other hand, too specific and detailed analyses will hardly lead to insights that can be generalized across individual case studies. A framework of intermediate complexity should support context sensitive analysis without being case specific and thus not transferable. What is required may be called a diagnostic approach taking into account complexity in a systematic fashion.

So far the diagnostic approach has targeted the initial stage of creating and forming institutions (Young 2008). I want to find out whether this approach also could be useful in the assessment of a well-established regime. When evaluating Arctic environmental governance it is essential to find an approach that combines the need to think in terms of complex human-environment interactions while at the same time is able to generate insights that are transferable into sufficiently clear policy recommendations (Young 2003).

A sizable set of components need to be considered systematically in order to confirm and dismiss their relevance for explaining regime performance. However, the diagnostic method is confronted with some practical problems related to the time and resources needed to evaluate a wide range of potential variables in order to eventually formulate a set of variables that are relevant for the distinct features of the problems at hand (Young 2008).
However, scholars have over the past two decades identified a range of institutional and exogenous factors that explain variation in regime effectiveness, which is supported by extensive empirical research in evaluating regime performance. This provides a good foundation on which to develop metrics used for evaluation that provides a rich and nuanced picture of institutional performance that is also useful for practitioners (Mitchell 2008). Thus, future efforts to evaluate regime performance should aim to employ as many dimensions and metrics as are available and feasible in terms of leading indicators; economic, social, and cultural impacts; and criteria for good governance and institutional function (Mitchell 2008:113-114).

The advantage with a diagnostic approach is that it that it is flexible and it allows the analyst to choose and tailor the selection of variables according to the needs of the issues under consideration (Pahl-Wostl 2009).
I have carefully chosen a set of variables as the baseline for a diagnostic analysis of the Arctic shipping regime based on the study of environmental regimes of several researchers (e.g. Chasek et al. 2010; Miles et al. 2002; Stokke 2001, 2010a, 2011b; Vatn 2005; Underdal 2010; Young 2002c, 2003). I have organized the variables of interest in a nested framework of four governance tasks.

10.4.2 Measuring regime effectiveness

Skjærseth et al. (2006:105) consider a regime to be effective "if it contributes significantly to solving the problems that motivated its establishment, notably by shaping the behavior of relevant target groups." In similar terms, although more simply put, Stokke (2001:1) explains regime effectiveness as "to whether regimes contribute to the reduction or solution of the problems they address" whether it involves providing marine safety at sea, or preventing marine pollution, etc.
The concept of effectiveness has multiple dimensions (Skjærseth & Andersen 1999). However, most theories on regime effectiveness converge in considering a regime to be effective to the extent that it solves the problem it was established to deal with (Mitchell

2008; Underdal 2002), or successfully perform a particular governance function (Stokke 2010a).[3]

When evaluating regimes it is important to distinguish between *effectiveness* and *efficiency*. Evaluating a regime's *efficiency* means comparing goals attainments to the costs of reaching them, for instance through a cost-benefit analysis (Vatn & Veldeld 2011). Instead of exclusively measuring cost and benefit, assessing regime *effectiveness* implies measuring distance from a set goal (Mitchell 2008; Underdal 2002). In this paper I will focus on measuring the effectiveness, and not the efficiency, of the Arctic shipping regime – although some discussion of costs and benefits will be necessary when evaluating the regime's ability to shape the behavior of relevant actors.

In operational terms, regime effectiveness can be measured by comparing the outcome achieved with a *no-regime counterfactual*, which means the hypothetical state of affairs that would have obtained in the absence of the regime (Underdal 2010). Regime effectiveness can also be measured by comparison with the *collective optimum* which refers to what extent the problem is in fact solved under current arrangements (ibid.). Nevertheless, determining the no-regime counterfactual and the collective optimum is not often that easy in practice. Additionally, it is important to be aware of that any evaluation of effectiveness will necessarily involve some degree of subjective reasoning (Underdal 2002).

The point of departure in this paper is that regime effectiveness concerns whether or to what extent the goals and the related governance tasks of an institution are accomplished.

14.3 The four tasks of governance

Thus, in addition to identifying the object to be evaluated (i.e. the Arctic shipping regime) I need to define what constitute the Arctic shipping regime to be able to explain actual performance.
International environmental regimes consist of several institutions operating at different levels of governance or focusing on different areas of activity, or aspects of the same activity. Faced with such institutional complexity it is important to find some common standard of measurement to stipulate a comparison. The literature on international environmental governance often refers to *ecological sustainability*, *socially desirability*, *political feasibility* and *economic viability* as standards to which regime performance is weighed and reviewed (Underdal 2002:10-11). However, these terms are often too diffuse to serve as suitable assessment tools for the Arctic shipping regime. In this regard, Stokke (2001; 2010a) introduces a useful model to assess the performance of a regime on the basis of its ability to realize a particular governance function or tasks where the goal and instruments are clearly defined. Thus, the Arctic shipping regime will be evaluated according to its ability and

[3] Analogous definitions of regime effectiveness are used by Haas et al. (1993), Keohane and Levy (1996), Stokke and Vidas (1996), Victor et al. (1998), Young (1999), Miles et al. (2002), Levy, Young and Zürn (1995).

success in fulfilling four governance tasks corresponding to the different stages of policymaking processes.

a) First, the task of *knowledge building* is essential since effective governance requires that the regimes policymakers have adequate knowledge about the severity of the problem at hand and preferably of the effects of various solutions (Stokke 2010a; 2011b). Knowledge building also corresponds to the general mechanism highlighting *cognition* and the process of *learning* within a regime (Stokke 2010a; Underdal 2002).

b) A second governance task is *norm building* which encompass elaboration of behavioral norms, whether formal rules or informal norms (Stokke 2010a; 2011). Norm building relates to regime *outcome* in terms of changing actors' behavior through institutional measures (Underdal 2002). Outcome concerns the implementation of a regime in terms of changing behavior (ibid.).
But norm building also relates to regime *output* in form of existing incentive structures influencing the forming of a regime – setting premises for which institutional measures are feasible to implement and most effective to enforce. Output is the formal norms, principles, rules and regulations that results from a decision-making or regime formation process. It concerns whether a formal solution (e.g. a regime) is established and if it contain the necessary elements for problem-solving (Underdal 2002).
This aspect of norm building is centered on the general mechanism of *normative pull* which means that coherence with other norms acknowledged by the international community can influence the compellingness of a provision (Franck 1990).

c) Third, *capacity building* also relates to the outcome of a regime in terms of facilitating the implementation of norms and rules (Stokke 2010a). The ability of a regime to implement and adapt to new challenges, new policy or institutional change is an indicator of its *adaptive capacity.* In this paper the focus is on the capacity building inflicted by the choice of legislation form. Victor et al. (1998) suggests that regime effectiveness is somehow premised on the initial rule construction (whether global or regional, formal or informal, etc.). Thus capacity building invokes the *logic of consequentiality* (March and Olsen 1989) and the causal mechanism of utility alternation; "regimes may affect behavior by altering the *utility* that actors assign to behavioral options within an issue-area, for instance by providing incentives for rule adherence or adding costs to non-compliance" (Stokke 2011b:146).

d) A fourth task, *rule enforcement*, relates to the impact of a regime which is often a weak point in international governance. This is because the structures of monitoring, compliance review, and administration of sanction are often weak or non-existent (Stokke 2010a; 2011b). It is also difficult to measure the direct impact that a regulation has on the targeted environmental issue. I will therefore relate impact to the assessment of the level and form of compliance, assuming that compliance is a good indication of the state of the problem.

Impact represents the tangible consequences affecting the physical problem at hand, e.g. providing biophysical change in environment as a consequence of changing behaviour. Prediction of impacts is difficult because targets of regulation can adjust different than predicted, and because correlation between outcome and impact can be misunderstood (Underdal 2002).

The analysis of the Arctic shipping regime will assess the extent to which four specific governance tasks are fulfilled as a systematic approach to evaluating the effectiveness of the regime. Each governance task is evaluated on the basis of a set of components that institutional theory often refer to as essential for executing the task successfully.

The governance tasks appear to me not so much as theoretical perspectives on regime effectiveness, but rather a way to structure the analysis of a complex institutional process.

Goals and tasks are often multidimensional. Thus, each of the governance tasks above will consist of several variables where the success rate could vary. In order to evaluate regime effectiveness, I have linked each governance task to various variables and hypothesis from a broad specter of regime effectiveness scholars.

The range of variables selected here is specifically tailored to the substantive focus of the analysis, namely the regulation of vessel-source pollution. For a variable to meet the *fruitfulness* criterion it must refer to reliable literature that can support theory-based propositions regarding the conditions that determine whether the variable in question is supportive or obstructive in their contribution to fulfill a governance task and influence the larger governance issue (Stokke 2001). Note that these variables represent only a small number of factors within a broad explanatory framework.

14.4 Elements of knowledge building

The role of knowledge has gained considerable attention from those who study the formation and effectiveness of international environmental regimes. They tend to treat knowledge as a form of power distinctive from structural power and emphasize the role of consensual knowledge and social learning in the formation of international regimes (E. Haas 1990). Thus, production and distribution of knowledge is an important task of an international environmental regime (Vatn & Veldeld 2011:5). Empirical research demonstrates that a solid *state of knowledge* is an essential determinant of a regime's problem-solving capacity (Andresen et al. 2000; Underdal 2010). The state of knowledge refers both to the *level of knowledge* and the amount of *intellectual capital and energy* invested in the issue (Chasek et al. 2010; Underdal 2010).
Literature on resource regimes frequently refer to serious knowledge gaps, the absence of intellectual leadership, and the lack of a solid framework for promoting inter-institutional learning as common challenges to effective governance.

Of course, a solid knowledge base "is not by itself a sufficient condition of effectiveness, nor can we claim that it is strictly necessary" (Underdal 2010:19). But lesson learned is that regimes should invest in activities that produce a solid base of *consensual* knowledge in order to provide better foundation for decision-making and thereby potentially enhance the effectiveness of governance, especially when dealing with malignant problems (ibid.).

I. The level of knowledge

Policymakers are more likely to act on knowledge that are considered consensual and well established than on scientific inputs that involves a *veil of uncertainty* that can be openly challenged by states opposed to international action (Chasek et al. 2010; Underdal 2010). It follows that the usual explanation for a weak state of knowledge is that the issue at stake is inherently complex and difficult to assess scientifically. Another explanation is that a general lack of political will or effort to address the issue (Underdal 2010).
Insufficient knowledge about the scope, severity, impact and/or time frame of many environmental problems create several obstacles for governance; 1) difficulty of building sufficient institutional design; 2) undermining concern; 3) lead to prioritizing of other more clear-cut goals; and 4) create diverse understanding of the issue and thereby different perceptions of payoff which complicate negotiations (Chasek et al. 2010). On the other hand, empirical research indicates that in some cases of environmental threat, great scientific uncertainty has produced more political concern and thereby greater political will to address the problem (Young 2002c). This follows the admonition given on the 1992 Earth Summit that:

> *"In order to protect the environment, the precautionary approach shall be widely applied by States according to their capabilities. Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation."*[4]

Thus, the task of knowledge building involves efforts to build consensus on the nature of a problem and the optimal solutions, by assessing the science, economics, policy, and ethics surrounding the issue (Chasek et al. 2010). However, the importance of consensual knowledge as an independent variable to explain or predict effective governance is unclear given the numerous examples of states reacting in different ways to the same consensual scientific evidence (P. Haas 1992). Peter Haas (1992) observes that the organizational structures through which consensual knowledge is disseminated and applied in policymaking may be equally important. In a comparative study of efforts to protect regional seas, Peter Haas (1992; 1998) finds that there are three ways of incorporating science in regional marine regimes that will contribute to more effective governance. That is; (a) the existence of *epistemic communities* or *transnational network of expert* that are able to influence national governments and international organizations by occupying niches in advisory and regulatory

[4] Principle 15 in Report of the United Nations Conference on Environment and Development (A/CONF.151/26, Vol. I), Rio de Janeiro, 3-14 June 1992.. Available at: http://www.un.org/documents/ga/conf151/aconf15126-1annex1.htm.

bodies, (b) that the authority and expertise of these groups of experts and scientists are respected by policymakers, and (c) the existence of channels of contact or influence between the scientific community and policy makers. Nevertheless, the institutionalization of science is a slow process (P. Haas 1998).
The most influential scientific component in international environmental regimes has been the requirement for institutions to base decision-making on *environmental impact assessments* (EIA) which have fostered a range of networks and epistemic communities of scientists that are mobilized whenever new assessments are requested (Oberthür 2009).

Stokke (2011b) refers to the terms *credibility, legitimacy, and saliency* when evaluating the institutional basis for knowledge building.[5]
Credibility relates to the cognitional mechanism and is an indication of the prevailing perception among policy-makers on whether the scientific input reflects the best available knowledge (i.e. expert consensus and scientific certainty) on the issue at hand (Andresen et al. 2000; Stokke 2011b). The governance structures will shape both the quality and type of information production (Vatn & Veldeld 2011:5).
The legitimacy of scientific input to the process of policymaking depends on the extent to which actors believe it reflects their concerns, values, and that broad involvement of actors in the process of knowledge building will enhance the legitimacy of the regime and subsequently generate normative commitment to the measures that scientists recommend (Stokke 2011b). Another aspect influencing the legitimacy of knowledge building is the transparency and accessibility of data and information systems (Vatn & Veldeld 2011).
Finally, saliency concerns how actors perceive the relevancy of scientific input in responding to pressing policy concerns and clarifying the costs and benefits of policy actions available to them (Mitchell, Clark and Cash 2006; Stokke 2010a; Stokke 2011b). Thus, efforts to enhance the saliency of knowledge building efforts must address the relation between 'senders' and 'receivers' of scientific input in order to coordinate and harmonize what kind of information and knowledge is accepted as basis for decisions (Vatn & Veldeld 2011:5)

An increasing number of environmental regimes recognize the importance of traditional ecological knowledge (TEK), as well as the participation of local and indigenous communities, in preservation of natural ecosystems and implementation of adaptive management of natural resources (Hasanat 2009). Traditional ecological knowledge is defined as "a cumulative body of knowledge and beliefs, handed down through generations by cultural transmission, about the relationship of living beings (including humans) with one another and with their environment" (Berkes 1993:3). Since TEK is an attribute of societies with historical continuity in resource use practices, opportunities to combine modern science with TEK will allow us to extend our knowledge of the global ecosystems farther back in time (Berkes 1993; Mitchell 2008).

[5] See also Mitchell, Clark and Cash (2006:314–324).

II. Intellectual leadership

The skills and energy invested in knowledge building is likely to increase with the *supply of intellectual leadership* (Underdal 2002). Underdal (2002:35) has observed that "the *need* for leadership tends to increase with problem malignancy. However, *supplying* such leadership tends to become increasingly difficult as malignancy increases. Instrumental leadership thus tends to make the most difference in dealing with problems that are moderately malign."

States that take a leading role in knowledge building are often motivated by being the first – and often the most – affected by environmental damage. Moreover, state leadership is frequently spurred by strong domestic pressure. These states are expected to have higher levels of concern and capacity than others and therefore invest more resources in building knowledge that will shape the way issues are framed and invigorate the occurrence of social learning (Haas, Keohane & Levy 1994). For instance, domestic pressure led to U.S. leadership in marine oil pollution in the 1970s and ozone in the 1980s. Asymmetric affectedness motivated the leadership of Sweden and Norway in acid rain, and Britain in marine oil pollution (ibid.).

However, non-state actors may also assume leadership in knowledge building (Underdal 2002). The secretariat of IGOs may act as instruments for inter-institutional learning, exchange of information and raising awareness. Thus, IGOs can play a vital role as knowledge brokers and negotiation facilitators when they are mandated and resourceful enough to feed information into political decision-making (Oberthür 2009). IGOs have often supported scientific expert assessments that align with their political perspectives (ibid.). I have already mentioned the important role of epistemic communities and transnational networks of scientists and policymakers who become disseminators of ways of thinking about international problems and their solutions (P. Haas 1992; 1998).

Given their economic power, technological assets, and scientific knowledge, corporations hold great potential as important collaborate partners within environmental regimes. But there are some general conditions that often need to exist to awaken corporate enthusiasm for regime partnership;

> Corporations are more strongly attracted to joining a partnership if profits from the enterprise appear likely. The uncertain regulatory and investment climates surrounding partnerships and their creation, however, tend to dissuade corporate participation. For corporate behavior, greater transparency equates with the prospect of inheriting greater accountability, and greater uncertainty equates with accepting greater risk to investment (Joyner 2005:115).

Nevertheless, investment in research and innovation that succeed in developing new technologies or new knowledge can alter the relative bargaining power of parties involved in the process of regime formation. However, note that those who hold (material) power are often able to maintain and even enhance their access to superior knowledge (Levy, Young & Zürn 1994).

III. Knowledge-sharing & Learning

International regimes governing issue areas characterized by high scientific uncertainty and costly information gathering would largely benefit from cooperation on research and knowledge interchange (Joyner 2005; Numminen 2010). Furthermore, the effectiveness of long-term ecosystem-based ocean management depends on a high level of collective knowledge on marine ecosystems, drawing on both scientific knowledge and TEK, that is shared among all bodies and actors who are engaged in an issue (Siron et al. 2008).

However, the outputs and outcomes of a regime can never be fully predicted. This call for a process of continuous learning and change where the parties reflect on and reframe the lessons learned during the research process to improve performance (e.g. interplay management) and enhance their understanding of the mechanisms at work (Underdal 2002; Van Brabant 1997).

Van Brabant (1997:37) describes *institutional* or *organizational learning* as;

> … the whole feedback loop of gathering and reflecting on information and lessons learned of what has worked and not worked, and using the information to help shape the decision-making processes and possibly make adjustments or changes at a variety of levels, i.e., from the focus of a specific strand of research to the communication mechanisms used to interact with partners. […] A process of learning is perceived that starts from information gathering about action, moves through analysis and synthesis, to dissemination, memorizing, and new (better informed), action.

Moreover, *inter-institutional learning* is a product of continuous interaction within international regimes where parties meet in different settings and across different parts of an organization/institution that fosters the development of a common understanding of the problem and the options available for dealing with it (Checkel 2001; Joyner 2005; Stokke 2010a; Underdal 2010). Learning of this sort may also enhance the understanding of cause-effect relationships within and across issue areas, and better insight to the intentions underlying the actions of others (Levy, Young & Zürn 1994). In the face of such new insight, actors might respond by modifying perceptions, reassessing values and adjusting behaviour. The learning process within international regimes can also make the constellation of international interests more conducive to institutionalized cooperation (ibid.).
Obviously, the process of institutional and organizational learning requires the existence of deliberate and critical self-awareness among actors and a capacity and culture of reflective learning within organizations (Van Brabant 1997).

Regimes that give strong impetus to learning are more likely to be successful in problem-solving in the long run (Levy, Young & Zürn 1994). At best learning becomes an adaptive mechanism in response to governance gaps or ineffective performance (Cyert & March 1963). Thus learning is usually easier to attain in soft law arrangements because of their greater propensity towards adaptive mechanisms (Baldersheim et al. 2011). There are also

observations that indicate that agreements that include non-state actors will enhance the level of learning (P. Haas 1992; Haas, Keohane, and Levy 1993). For instance, epistemic communities and international networks of scientists and policymakers are often referred to as facilitators of learning since they provide more sustained mechanisms for knowledge sharing and learning likely to have broader effects than the one-off meeting, conference or workshop (Levy, Young & Zürn 1994). Baldersheim et al. (2011) have also observed a trend of so-called *reflexive learning* where network participation may lead to higher aspirations in the wake of learning what other, similar organizations or institutions have achieved.

Nevertheless, the actual processes of learning are not well understood (Levy, Young & Zürn 1994) and the literature on institutional learning is brief in pinpointing indicators of learning except from referring to general outcomes such as knowledge, skills, abilities, and attitudes (Van Brabant 1997). Moreover, there is a greater potential for a more targeted, structured and systematic framework for the promotion of inter-institutional learning which is currently only weakly developed (Oberthür 2009).

14.5 Elements of norm building

Elaboration and adoption of behavioral norms under international institutions – whether formal rules or informal norms – are typically tasks for political regime bodies made up of representatives of member states (Stokke 2011:148). But what determines the norm-building capacity of a regime?

First, it depends on the issue at hand; whether the problem structure is considered benign or malign to address politically – and what transaction costs it involves (Underdal 2002). *Second*, it depends on the problem-solving capacity of a regime; whether the institutional setting, the distribution of power and the supply of leadership is conducive to efficient problem-solving in terms of changing actors' behavior through institutional measures to achieve a specific objective (Underdal 2002). *Third*, it depends on the level of concern for a problem and the political will to take action. *Fourth*, it depends on the institutional measures available and the values and incentives influencing the decision-making (Vatn 2005). *Fifth*, it depends on the applicability, coverage, and substantial strength of the normative commitments that is decided upon (Stokke 2011b).

I. Problem Structure

a) Nature of the problem

The characteristics of an environmental issue require careful consideration in order to develop effective norms and regulations. Young (2008) has observed that a *problem of fit* recurrently influence the effectiveness of international environmental regimes. He sees the problem of fit as "a matter of the match or congruence between biophysical and governance systems" and suggests that "carefully specified 'diagnostic approach' can help policy-makers design

institutions and regulations that 'fit' characteristics of the problem to be dealt with" (Young 2008:26). In other words, the nature of a problem is closely linked to the problem-solving capacity of a regime. Thus the characteristics of an environmental issue is influenced by actors' perception of the issue and the availability of technologies and resources to address it.

Some problems are *intellectually* more difficult to deal with than others (Underdal 2010:19). As I've already discussed in previous section, intellectual aspects of a problem are related to the task of knowledge building and the regime's scientific capacity to develop adequate solutions (Andersen & Skjærseth 1999).
Some problems are *politically* more intricate than others (Underdal 2010:19). Political aspects of a problem are predominantly linked to the degree of asymmetry and or incongruity in the configuration of actors' interests and preferences it generates (Underdal 2010). Moreover, it relates to the task of norm building in terms of aggregating (divergent) preferences into collective decisions and coordinating collective action (Andersen & Skjærseth 1999:19).

Underdal (2002) simply categorizes the problem structure as either benign or malign depending on the effect it has on a regime's problem-solving capacity. Thus, political malignancy is primarily caused by two features; *Incongruity* arises when the interests of a party deviate from those of the group at large due to differences in cost/benefit calculus. It is often triggered by externalities[6] and/or competition[7] which typically cause problem structures to be malign (Underdal 2010). In the worst case scenario it can alter behavior so that the pursuit of self-interest by each leads to a poor outcome for all (Underdal 2010). *Asymmetry* occurs when the interests and preferences of one party deviate from those of another, e.g. between port states and flag states in their vulnerability to pollution incidents (Andersen & Skjærseth 1999; Underdal 2010).

The most essential prerequisite for voluntary cooperation to be established is "the existence of at least one cooperative solution that is better for all parties than the best unilateral options available to each of them, or at the very least better for one party and inferior for none of the others" (Underdal 2010:19). However, incongruity and/or asymmetry frequently limit the set of politically feasible solutions available to policymakers and might even fail to find a solution that satisfies the minimal requirement of effective voluntary cooperation (ibid.). Underdal (2002) found that the link between problem malignancy and poor regime effectiveness was only firmly observed in cases where incongruity and/or asymmetry was substantial and frequently combined with a weak knowledge base and unfavorable distribution of power. Political malignancy and uncertainty in knowledge tend to interact and may fuel political controversy and obstruct the development of consensual knowledge

[6] Externalities are consequences of one actor's behavior that (a) affect the welfare of some other party or parties, and (b) do not appear in the cost/benefit calculus of the actor himself. At the international level externalities are often caused by incongruity between domains of national jurisdiction and the boundaries of ecosystems, resource reservoirs, or systems of human activities (such as production, distribution and consumption of goods and services). Particularly vulnerable are scarce common pool resources (Underdal 2010:13).
[7] A relationship of *competition* exists wherever the outcome for each individual party depends on how well it does *relative to* other parties. Competition is found wherever the supply of valued objects, events or relationships falls short of meeting demand. The more competitive a given setting, the more concerned actors tend to be with relative rather than absolute gains and losses (Underdal 2010:14).

(Underdal 2002:22). The adverse influence of problem malignancy on regime effectiveness is most evident in the early stages of cooperation processes (Underdal 2002b).
Sand (1990) has shown that parties quite often succeed in escaping the so-called "law of the least ambitious program" by clever use of selective incentives, differential obligations, fast-track options, and similar measures for cooperative behavior. Another approach to enhance a regime's problem-solving capacity when dealing with real malign problems is to form linkages to more benign (and important) issues and/or to encourage actors to invest greater skill and energy to address the problem (Underdal 2002:22-23). Additionally, the more politically "malign" a problem is the greater the need for a neutral third party and ideally entrepreneurial leadership (Chasek et al. 2010).

b) Transaction costs

An essential aspect concerning norm building is the choice of forming new institution(s) as opposed to strengthening existing institutions when confronted by governance gaps and new challenges. The reasoning for establishing new institutions is often that existing institutions is perceived as ineffective in addressing the problem at stake. The incentive of states to establish new institutions to address environmental issues is often dependent on their estimation of transaction costs (Raakjær Nielsen 2003). Vatn & Veldeld (2011:5) note that "transaction costs vary both due to the characteristics of the issues/goods involved and the type of governance system." Thus, before establishing new institution there should be a more careful assessment of what the additional gains a new institution would provide compared to the costs of establishing it. In international environmental governance one could suspect that some actors have interest in that much funding and political time and energy is invested in forming institutions because it takes time before they actually provide regulatory bite (Andresen & Skjærseth 1999).
The perspective of institutional economists argues that the incentive of states to establish new institutions to address environmental issues depends on their estimation of transaction costs, i.e. the costs of establishing and running the regime (Raakjær Nielsen 2003). Transaction costs cover costs of information gathering, formulation of agreements/contracts, and establishing systems for enforcing and controlling the obligations of an agreement (Dahlman 1979). Institutions play a significant role in coordinating various interests and reduce high transaction costs in environmental management (Raakjær Nielsen 2003).

II. Problem-solving capacity

Underdal (2010:18) assumes a regime to be effective "when problem-solving capacity matches the challenge". This leads us to the following key determinants of a regime's problem-solving capacity; the nature of the challenge and the capacity of the involved institutions, organizations and actors to deal with this challenge. Indeed, these two determinants are interlinked in the sense that problem-solving capacity can only be defined and measured in relation to a certain problem or function (Andersen & Skjærseth 1999; Underdal 2002). The level of collaboration is an intervening variable – it's affected by

problem malignancy and the problem-solving capacity, but anyway it makes a (modest) positive contribution to effectiveness (Underdal 2002).

All I can offer in this paper is a brief outline of a selection of variables that affect the capacity of the Arctic shipping regime to deal with the problem of vessel-source pollution. I will focus on three factors that are generally conceived as important in determining the problem-solving capacity of a regime;

Underdal (2002; 2010) introduces a model for assessing the problem solving capacity of a regime that conceptualizes capacity in collective action terms most relevant to (relatively) malignant problems. This is only a brief and sketchy model, but it is adequate to assess the conditions for Arctic institutions to fulfill the norm building task concerning marine pollution. Underdal's model depicts problem-solving capacity as a function of three components that are generally recognized as important and therefore extensively studied: the institutional setting, the distribution of power, and the supply of leadership.

III. The Institutional Setting

The institutional setting includes relevant procedures aimed at handling collective choice situations such as decision rules (Andersen & Skjærseth 1999; Underdal 2010).
Underdal (2010:21) uses the term *institutional setting* broadly as a label for two different notions – namely regimes and organisations as arenas and organisations as actors.
Several researchers have observed that by fulfilling the function of both arena and actor the institutional infrastructure can "facilitate the spread of ideas and amplify their impact on policies and practices" (Underdal 2010:10).

a) Institutions and organizations as arenas

Institution can function as an *arena* which provides a "framework within which politics take place" (March and Olsen 1989:16). This means that an institution are able to define the rights and "games" to be played under its auspices by determining the rules of access, rules of decision-making and rules of institutional procedures (Underdal 2010). In that way, the institutional setting may amplify or modify the incentive structure and power distribution (ibid.). In terms of being an arena, institutions are also meeting places for actors to exchange information and experiences, coordinate behavior, and reviewing performance (ibid.).

Decision rules are an important aspect of international cooperation, in particular the rule of consensus since it "is often seen as blocking progress by loading the burden of proof on parties who are in favor of a new solution and giving anyone opposed the right to veto that solution" (Underdal 2010:22).

The problem-solving capacity of an institution is also dependent on the rules of access which determine the actors' capacity to participate and influence political decision-making (Young 2002a).

b) *Organizations as actors*

All organizations can serve as arenas, but only some are eligible to be significant *actors* that provide independent inputs into the policymaking process and contributes to amplify the outputs (Underdal 2010). Miles et al. (2002) found a relatively consistent pattern of positive correlations between regime effectiveness and the institutional capacity in terms of input functions – often combined with a solid knowledge base. Studies by Breitmeier et al. (2006) and Miles et al. (2002) both report that secretariats expert bodies, conference chairs and others charged with the mandate of serving common rather than national interests can make *some* contributions to moving complex negotiations forward (Underdal 2010). Indeed, the mediation skills of state delegations or IGOs bureaucrats can be an important driving force of environmental negotiations (Chasek et al. 2010).

IV. The distribution of power

Power is an integral element of governance, sometimes working through institutional mechanisms, but more generally through control over important goods or events (Andersen & Skjærseth 1999; Underdal 2010). Some analysts argue that international agreements reflect the interests of the powerful and have no independent effect; when underlying power structures or interests change, regimes may collapse or change to reflect the new configuration of power (Victor et al. 1998).
I will discuss the concept of power in terms of sovereignty and how it affects the effectiveness of norm building within the Arctic shipping regime.

V. Configuration of Interests and the Supply of Leadership

Although reaching agreement on how to manage the problem is in a state's best interest, the literature on game theory and international bargaining suggests that state have an incentive to gain as much as possible while giving up as little as possible. Nevertheless, despite the obstacles of veto power and sovereignty, the outcomes of multilateral bargaining processes usually result in cooperative efforts at curbing environmental threats (although not all of these efforts are successful) (Chasek et al. 2010).

It is almost universally accepted that global environmental threats can be successfully addressed only through the active cooperation of the key actors. This is essential due to the anarchical structure of the international political system with no world government and national sovereignty as the highest authority (Chasek et al. 2010).
Since the international political system is anarchical in the sense that it lacks an effective supranational government, many scholars of international relations have taken a strong interest in the roles that dominant states can play in establishing and maintaining order (Underdal 2010). Morover, international cooperation is frequently hampered by the states' reluctance to give up some of their sovereignty to international bodies.

The supply of leadership can be important factors in environmental negotiations (Underdal 2010). Andersen & Skjærseth (1999) and Chasek et al. (2010) refer to this as how much skills and energy that is invested in the effort of developing cooperative solutions.
Chasek et al. (2010) argues that regime formation requires leadership by one or more states committed to problem-solving – often motivated by particular vulnerability or an advantageous legal or economic status.

Furthermore, powerful economic actors (e.g. domestic industry) can affect the positions of states and even the outcome of bargaining on international agreements (Chasek et al. 2010). Environmental regulations often directly affect the economic interests of corporations and economic actors.

VI. Political concern and discourse

The normative pull of obligations given by an international regime is dependent on external coherence with other norms acknowledged by the international society (Franck 1990; Stokke and Vidas 1996). Furthermore, provisions can be more effective in changing behavior if they provide linkages with other (more important) issues and objectives. For instance, in order to establish peaceful cooperation during the Cold War, the Soviet Union and Western countries cooperated on global environmental issues such as transboundary air pollution as a mean to decrease political tension (Victor et al. 1998).

The precautionary principle, the polluter pays principle and ecosystem-based management are all dominant paradigms for environmental policy today. Still it appears that multiple paradigms are in effect simultaneously and compete for primacy (Chasek et al. 2010). Establishing "principled priority" for the objectives and management of environmental institutions would provide important guidelines to current mechanisms of institutional interaction.

VII. Availability and obtainability of institutional instruments

In order to safeguard the gains from cooperation it may require some degree of legalization. Forming legally binding treaties or protocols can have a significant *expressive* value that signals political commitment to a task, issue, or cause. However, formal rules introduced mainly for their *instrumental* value aims at facilitating the management of complex systems of activities. Instrumental formalization typically involves explicit rules of behavior, regulatory consistency, and organizational arrangements with specified delegation of management authority (Underdal 2010). Various types and forms of norm-building will have different effects on the outcome of a regime. Thus, states are facing tradeoffs in choosing levels of legalization (Abbott & Snidal 2000). The most crucial choice concerning institutional measures for norm-building is that between binding rules versus voluntary norms, also referred to as hard law versus soft law. This I want to explore the reasoning for deciding on soft law versus hard law and how it is affecting institutional effectiveness.

The term *hard law* as used in this paper refers to legally binding obligations. An important component of hard law is precision (i.e. unambiguity with respect to the behavior required, authorized, or proscribed) that also includes delegation of authority to third parties for interpreting and implementing the law (Abbott & Snidal 2000). Hard law are often accompanied by enforcement instruments such as sanctions and dispute settlement to increase incentives to comply with the rules and more stringent procedures for verification, review and response (Abbott & Snidal 2000).

In this paper I use the term *soft law* to describe nonbinding measures and norms developed to influence state behavior on environmental issues (Skjærseth et al. 2006). The term *soft law* includes legal arrangements that is weakened along one or more of the dimensions of obligation, precision, and delegation that characterizes hard laws. But soft law can also refer to purely political arrangements in which legalization is largely absent (Abbott & Snidal 2000).
Since soft law comes in many varieties, note that the choice between hard law and soft law is not a binary one (Abbott & Snidal 2000). Important examples of soft law arrangements are resolutions by international organizations, codes of conduct, declarations of principle, and global action plans.

Often can the specific forms of legalization chosen reflect the nature of the problem and the problem-solving capacity of the regime in terms of variables such as transactions costs, uncertainty, state sovereignty, divergence of preferences, power differentials and the risk of defaulting (Abbott & Snidal 2000). Thus, norm-building is a strategic choice through which actors pursue their interests and values and institutional bodies can shape actors' behavior and preferences (Abbott & Snidal 2000).

Soft law has been widely criticized and even dismissed as a factor in international affairs. Realists focus on the absence of an independent third judicial party with supporting enforcement powers to conclude that all international laws are in fact soft (Abbott & Snidal 2000). One could even question the validity of using the term "law" to describe most international agreements since they cannot overrule national sovereignty – even though international environmental regimes are largely described in terms of "law" in most literature on the subject.

14.6 Elements of capacity building

The usage of the term *capacity building* is widespread and diffuse, and the diversity of definitions includes technological, educational, organizational, scientific, cultural, financial, and institutional aspects. The term is also frequently used by IGOs and NGOs to guide their internal development, programs and activities. Many of the activities often referred to as "capacity building" may at closer inspection be identified as policy dialogues, discussion workshops, regional meetings, etc. since they usually have no clear definition of objectives or methodologies for actual capacity building (UNEP 2006).

With the widespread and sometimes deviating use of the concept it is therefore difficult to draw a clear picture of the true meaning of capacity building. However, since I am evaluating the effectiveness of the Arctic shipping regime, I will focus on the institutional aspects of capacity building.

Miles et al. (2002) found institutional capacity to have a fairly consistent influence on regime effectiveness, most often in combination with a solid state of knowledge (Underdal 2010:23). In the literature on international environmental regimes, capacity building relates to the outcome of a regime and refers to the task of facilitating implementation of norms and rules, for instance by removing impediments to norm adherence (Stokke 2010a). It is typically achieved through funding, dissemination of knowledge, collective action or specific capacity-building programs. UNEP (2006:2) sees capacity building as a conceptual approach where the first step is to understand the obstacles that inhibit people, governments, IGOs and NGOs from realizing their objectives. The next step is to take measures that will enhance their capabilities (i.e. skills, abilities, values and relations) to improve performance and get closer to achieving their objectives.

Stokke (2011b:149) identifies three mechanisms that influences a regime's potential for capacity building; (1) the existence of models or strategies for problem-solving that can assist the implementation process and/or provide lessons to learn from; (2) the existence of normative commitment to the task of implementation; and (3) the willingness to provide funding among regime members either in form of technology, financial assistance or other resources needed to assist the implementation process.
I will draw on the same three mechanisms when evaluating the capacity building within the Arctic shipping regime. In addition, I will introduce a fourth mechanism, interplay management, as an intervening variable that influences the institutional capacity to implement commitments.

I. Models

According to Stokke (2011b:149); "the existence among regime members of models of implementation, including conducive technologies, that other states may learn from and adaptively apply is a basic requirement for occupying [a capacity building] niche."

Approaches to implementation often involve conducting needs assessments to assist priority setting and program design. Carefully performed needs assessments are essential in order to develop models for implementing international agreements at the domestic level so that they reflect the specific conditions and priorities of the targeted countries (UNEP 2006). A step equally important is the assessment of already existing capacity in a country that new capacity building activities can build on. It contributes to identifying the local institutions and professionals that could be involved – or possibly take the lead – in the design and implementation of capacity building activities. A capacity assessment includes an evaluation of the impact and lessons learned from past and ongoing capacity building programs as well as the existing structures and institutional settings supporting them (UNEP 2006:3).

I will look at some of the existing approaches to implementing regulations concerning marine pollution within the Arctic shipping regime and examine whether they classify as a model for other states or institutions to learn from and adaptively apply.

II. Normative Commitment

Normative commitment relates to the amount of effort invested in implementing norms and rules that are agreed on. Since the problem of vessel-source pollution is largely a trans-boundary issue that requires joint efforts to provide effective problem-solving, I will focus on the Arctic states' commitment to cooperation and collective action. Strengthening the capacity for collective action is significant both on the regional and international level (Griffiths 2009).

Cooperation involves *joint* decisions and *collective* action (Underdal 2010:5). Cooperation offers an exchange of conditional promises that can restructure actor's incentives and enable the parties to reach joint gains and produce Pareto-optimal outcomes.[8] There is a common understanding that cooperation can add value to a regime when individual efforts lead to suboptimal outcomes. Although cooperation is "needed", there is a very real risk that parties will fail to agree on the terms of cooperation if interests are diverging (Underdal 2010). In addition, the fear of free-riding will reduce the benefits of cooperation.

Some cooperative projects can be achieved with the leadership of one or several actors with the appropriate capabilities and a strong interest in joint efforts (even if it becomes available also to free-riders). Yet some collective requires high or universal participation which can be a significant obstacle to effective international governance (Miles et al. 2002; Stokke 2010a).

III. Funding

Lack of funding is frequently referred to as restraining states from implementing the recommended capacity improvements (UNEP 2006). Truly, one of the obstacles of capacity building is the lack of financial resources or effective implementation of financial investments (Mayer 2007 in Barrett et al. 2011). There is usually a lot of funding needed to build up institutional architecture before investments start going specifically to a project and one finally are beginning to see some results (Andersen & Skjærseth 1999). Furthermore, lack of funding is often stated as the main reason for the ineffectiveness of international institutions and organizations since they have to spend time and energy on fund-raising instead of realizing their primary tasks. Stability and predictability of financial resources would provide better condition for long-term planning and goal achievements. Nevertheless, stable and high level funding does not necessarily lead to efficient performance (Andersen & Skjærseth 1999).

[8] Underdal (2010:19) defines Pareto-optimal outcomes for voluntary cooperation as "the existence of at least one cooperative solution that is better for all parties than the best unilateral options available to each of them, or at the very least better for one party and inferior for none of the others."

IV. Interplay Management

An increasing body of literature has demonstrated that international institutions provide substantial influence on each other's formation and development as well as implementation and performance (Mitchell 2003). As Stokke (2011:144) points out, "the human activities an international institution seeks to influence are often subject to rules or programs under several institutions operating at different levels of governance or focusing on different areas of activity, or aspects of the same activity." This type of interaction is often referred to as *institutional interplay* (Young 2003).
Stokke (2010a) uses a trichotomy of causal mechanisms to distinguish among different types of interplay. *Cognitional interplay* occurs whenever an institution influences how actors operating another institution define a problem, including their assessment of the risk it poses relative to other challenges and the options available for mitigating and solving the problem. *Normative interplay* denotes one institution reinforcing the conviction of norms upheld by another. And finally, *utilitarian interplay* involves cases where rules or programs under one institution alter the costs or benefits of the activity that another institution addresses (Stokke 2010a). These distinctions are helpful when examining whether the interaction between two or more institutions governing the same issue – or the same aspects of it – are able to trigger interplay that provides effective problem-solving. These theoretical perspectives will be instructive when developing approaches to interplay management in order to enhance the Arctic shipping regime's capacity for implementing norms and rules.

14.7 Elements of rule enforcement

I. Behavioral Monitoring

Rule enforcement aims to discourage non-compliance by raising the risk of detecting non-compliant behavior (Stokke 2010). Mitchell (2006:81) argues that "the less transparent one state's behaviors are to others, […] the more likely it is that states will carefully craft institutional monitoring provisions".
Monitoring compliance means supervising activities and behavior to ensure they correspond to the objectives and performance targets of international agreements.
In most regulations concerning shipping, the ship management is usually allocated the burden of dealing with a problem, while the port authorities are responsible for the policing role (Muirhead 2007). Monitoring systems must be available to track down vessels that are identified as security risks and allow for effective intervention by the Coast Guard if required (Barrett et al. 2011).

Civil society is also developing to be a potent force in the monitoring of compliance with agreements. Non-governmental organizations, particularly in the areas of human rights and the environment, are particularly active and can have a telling impact. Thus the involvement of civil society in monitoring is significant (Warioba 2001).

II. Verification and Compliance Review

Structures and mechanisms for monitoring and reporting on compliance often take time to build up. Thus, when creating a regulatory regime, one of the first priorities should be developing systems for collecting, verifying and reviewing data on compliance that is adequate to monitor regulations (Victor et al. 1998).

Compliance review is an important component of rule enforcement through which the imposed regulations can be controlled and reviewed to foster compliance (Raakjær Nielsen 2003). Clearly it depends on the availability and transparency of data. National reports are the main source of these data. Even though national reports are becoming more complete, the overall accuracy and comparability of their data remains low (Victor et al. 1998). Thus, verification of data becomes significant. According to Stokke (2011b:150), "verification entails an assessment of the completeness and accuracy of compliance-related information and its conformity with pre-established standards for reporting."
Institutions conducting compliance reviews should obtain verification of reported compliance based on independent sources of information (Stokke 2011b). However, it also depends on an institution's competence to review reports on compliance against a state's commitments and pass a compliance judgment. Within most international institutions, compliance reviews are conducted by a conference of the parties or – in some cases – not carried out at all (Stokke 2011b).

As environmental regimes mature and commitments get more profound and specific, the importance of providing verifiable data will become more important.

III. Sanctioning

Rule enforcement aims to discourage non-compliance by adding costs to violation – typically by raising the risk of exposure and sanctions (Stokke 2010b). Violation of rules and norms also entails reputational cost that is equivalent to the extent that states or actors see themselves as members of an international society structured by international law (Abbott & Snidal 2000). States normally want to look good in the eye of the international community (Warioba 2001). With today's technology and social media network, a state's failure to comply with international commitments can become world news and provoke reputational costs on several levels. Particularly civil society has become a potent power in rule enforcement (Warioba 2001). One of the most important factors contributing to compliance is probably public concern in form of providing normative yardsticks, influence incentives, domestic scrutiny, and yield public pressure (Victor et al. 1998). For instance, the method of shaming has been used by NGOs and activist campaigns to expose gaps between international commitments and actual government behavior (Abbott & Snidal 2000).
Another factor influencing the effectiveness of rule enforcement is a regime's capacity for administering sanctioning (Stokke 2011b). In the case of shipping, rule enforcement and sanctioning rely largely on the emerging importance of port state jurisdiction. In Arctic

waters, port state control will be practical and relevant. Long-distance voyages will give Arctic port states both the incitement and the opportunity to control compliance with international regulations and administer punishment in cases of deliberate non-compliance (Jensen 2007).

IV. Legitimacy

In the literature, the concept of compliance is rarely discussed without mentioning the concept of legitimacy. It means that actors will comply with the rules of a regime if they are accepted and justified by the community at large (Bernstein 2005:142). Jentoft (1989) understands legitimacy as a normative phenomenon which corresponds with Beetham's (1991) characterization of legitimacy as giving the subordinate moral reasons for compliance. As such, legitimacy will offer a governance system an independent "compliance pull" (Franck 1990). Obviously there are many causal mechanisms interacting when it comes to explaining compliance, and compliant behavior does not presuppose high legitimacy, but the long-term stability of a political system is more likely to be depended on legitimacy beliefs (Mayntz 2010).
The overall legitimacy of institutional systems is very much related to how actors perceive the rules of access (i.e. whom are included in the decision-making) and how authority has been generated (i.e. whose interests are protected and how are decision-makers made accountable) (Bernstein 2005; Vatn & Veldeld 2011). Thus core aspects of legitimacy include accountability, empowerment and participation (Vatn & Veldeld 2011).

1.5 Method

The analysis will take the form as a so-called diagnostic institutional approach that allows us to assess complex environmental regimes in a systematic way (Young 2002c; Pahl-Wostl 2009). This approach has been used to analyze the conditions and potentials in the early stage of establishing a regime. I want to see if this diagnostic institutional approach also could be useful in evaluating the effectiveness of an already established regime, namely the Arctic shipping regime.

In the diagnostic institutional approach to studies of regime effectiveness, researchers and analysts of international interrelation become institutional "doctors" who help institutions design and redesign themselves. In doing so institutions can become increasingly compatible with the environmental problem they seek to resolve, as well as working synergistically with other institutions (Young 2002c).
This metaphor on "institutional doctors" inspired the overall objective and the method used in this paper. My contribution to the field of international environmental governance is therefore the sketching of a "catalog of diagnosis" for assessing regime effectiveness based on a wide range of theoretical perspectives. The hope is that this "catalog of diagnoses" – a framework of potential explanatory factors – will function as a guideline when evaluating the complex issue of regime effectiveness. Due to time constraint I have only chosen two case studies

which mean the potential for generalization and validation control of the variables' explanatory weight will be limited. Nevertheless, the guideline to variables of regime effectiveness might contribute with explanatory support in evaluating a complex governance issues. The pitfalls are many – and justified as such. These disputes includes; Too general assumptions. Too many interacting variables. Too complex array of variables. Too few and similar empirical cases to prove the validity of selected variables.
Taking Young's doctorial metaphor a step further, I would describe my point of reference as an analyst as similar to that of general practitioner in medicine; capable of relating common symptoms to general diagnosis. The gain of such an approach is the broader theoretical perspective of complex issues which and hopefully also a framework that is applicable on several other issues as well. I believe that the task of more profound and detailed explanations of specific factors is reserved for more experienced and competent specialists within the field.

The paper is both descriptive and theoretical. I aim to compare and contrast cases and issues to analyze the effectiveness of the Arctic shipping regime concerning vessel-source pollution. Many factors influence the effectiveness of international environmental regimes, which makes research aiming to trace cause and effects particularly complex and difficult. I address this problem in the following way;
In order to examine the institutional effectiveness I will conduct a comparative case study of several international conventions and regional soft-law agreements governing two specific issues on vessel-source pollution in the Arctic. Comparing multiple agreements offers three advantages over analyzing single agreements.

First, comparisons with multiple cases allow us to move more confidently from claims that an agreement was influential to claims regarding which variables, of the many proposed by scholars, explain such influence. In a single case, it is often difficult to determine which of several institutional features or other factors, all of which were present, actually explains observed outcomes.

Second, analyzing multiple agreements also increases opportunities to assess how institutional influence depends on non-institutional conditions, since it is often difficult to exclude the possibility that the agreement's effectiveness was contingent due to the "benign" nature of the problem or exogenous facilitating factors. Examining several agreements allows us to determine whether the influence of particular institutional features are unique to particular contexts, are systematic across contexts, or are fostered or inhibited by particular aspects of the context.

Third, comparing multiple agreements makes it easier to detect the influence of a particular institutional feature on other institutional or non-institutional features (Mitchell 2006).
Two empirical cases on vessel-source marine pollution are examined to shed light on the propositions of Part1.4. These cases are selected for three main reasons. First, they are sensitive to a broad range of the explanatory factors commonly used in the assessment of effectiveness of international environmental regimes. These variables, as elaborated in Part 1.4, influence regime effectiveness either directly or by interacting with other factors. Second,

the selected cases allow comparison in that they display similarity with regard to the phenomenon under scrutiny. The international political context is hold "constant" in terms of affecting similar range of actors and power structures, the same spatial scope, and relates to the same overarching global legal regime. Moreover, in both cases there is significant interplay between distinct institutions based on different types of law within the same issue-area. Second, these cases differ on other key variables. The factors varying across the cases are the comparative costs and benefits of rule compliance, the forms of legislation, and the degree of implementation and rule enforcement. This allows me to explore some of the implications of such differences for the effectiveness of environmental regimes dealing with similar problem-structure and institutional setting. That said, I can certainly not claim that the limited sample of cases within a single regime is representative of the expanding universe of environmental regimes or that findings allow readily generalization beyond it. In that sense my methodological point of departure follows the hypotheses of Mitchell (2006) stating that selecting cases in which both problem structure and institutional design differ would constrain efforts to assess which best explains variation in behavioral outcomes. He claims that to support comparative analysis the selected cases need to be sufficiently similar in problem structure (Mitchell 2006).

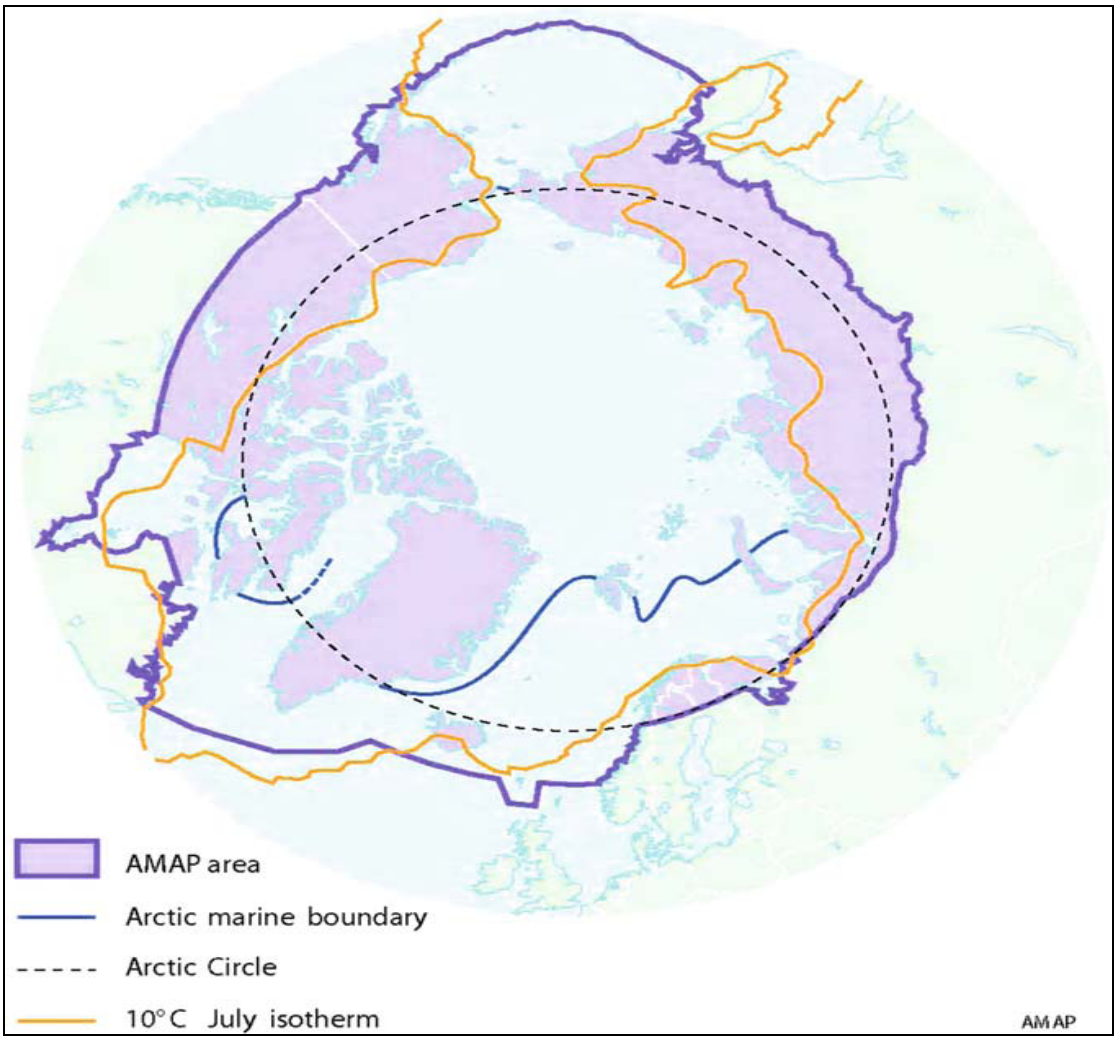
Measuring effectiveness should preferably contain both qualitative and quantitative assessments. Due to the limited scope of the paper, the analysis here will have to focus exclusively of qualitative assessment of two case studies. The analysis is also mainly theoretical drawing on a broad range of literature on international environmental regimes. Since I have taken an institutional approach with heavily focus on legal regulation, the empirical data has naturally been gathered from the legal documents of international treaties and regional agreements, institutional declarations, national legislation and government documents. For the purpose of assessing incentives and compliance among the range of affected actors, data has been collected from conference and workshop papers concerning Arctic shipping, interviews with government officials and representatives of IGOs, NGOs, and marine industry hearings report from the negotiation of conventions and agreements. Over the last decade there has also been conducted several scholarly evaluations and assessments of the Arctic shipping regime, the prospects of Arctic shipping and the marine environmental challenges it involves. This has been an important scientific basis for the paper.

2.0 ARCTIC SHIPPING AND THE ARCTIC MARINE ENVIRONMENT

2.1 The Spatial Scope of the Marine Arctic

The Arctic is a massive area covering over one sixth of the Earths' landmass consisting mostly of frozen sea water. It has a population of about four million, comprising over thirty different indigenous groups (Arctic Council 2011).
There is currently no universally accepted definition for the spatial scope of the Arctic or the Arctic Ocean. However, it seems generally accepted that there are five coastal states to the

Arctic Ocean, namely Canada, Denmark (Greenland), Norway, the Russian Federation and the United States. These are referred to as *the Arctic states*, in addition to the three other members of the Arctic Council; Finland, Iceland and Sweden (Molenaar 2009).
Given the institutional emphasis of this paper I will generally refer to the politically based definition of the Arctic established by the Arctic Monitoring and Assessment Programme (AMAP), which includes eight states and areas ranging from between 60◦ N and the Arctic Circle to the pole (AMAP Assessment Report 1998). Much of the region falls under the sovereign rights of the eight Arctic states (Corell & Molenaar 2009).



Map 1: AMAP area. Delineation of the Arctic as applied by the Arctic Monitoring and Assessment Programme working group of the Arctic Council. Source: AMAP Assessment Report 1998.

Map 2: The Circumpolar Arctic. Source: Solveig Glomsrød and Iulie Aslaksen (eds.). 2007. The Economy of the North. Statistisk Sentralbyrå

2.2 Arctic Sea Ice Coverage

Since 1978, satellites have monitored sea ice growth and retreat, and they have detected an overall decline in Arctic sea ice coverage, in particular during the summer season.[9] In fact, Arctic summer sea-ice coverage has declined by 11.2 percent each of the past three decades. The rate of decline steepened after 2002 when the summer minimum ice extent was the lowest it had been since 1979 (NSIDC 2010). This marks the beginning of a series of record lows of sea ice coverage in the Arctic, combined with poor wintertime recoveries starting in the winter of 2004-2005. The minimum Arctic sea ice extent in 2010 was 4.90 million square kilometers (1.89 million square miles), the third-lowest in the satellite record (NSIDC 2010).[10]

[9] Link to an animated time series that shows ice extent for each of the past thirty-one Septembers, 1979 to 2010: http://nsidc.org/images/arcticseaicenews/20101004_Figure7.mov.
[10] Lowest satellite record of minimum Arctic sea ice extent is 4.28 million km2 in 2007 (NSIDC 2007; http://nsidc.org/news/press/2007_seaiceminimum/20070810_index.html)

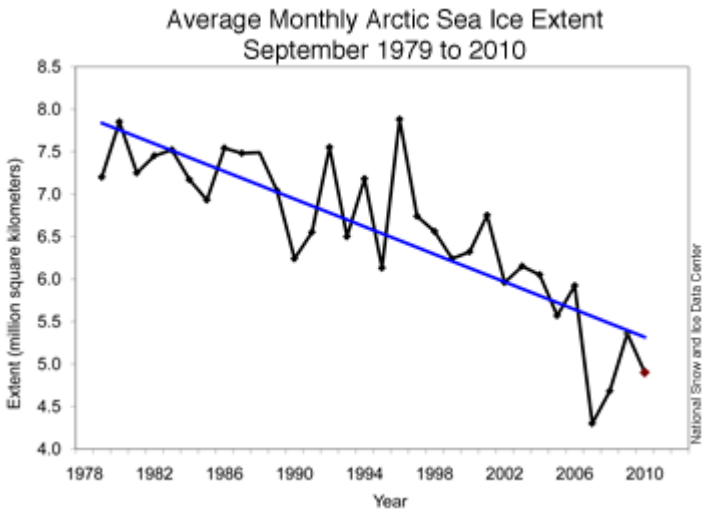


Figure 1: September ice extent from 1979 to 2009 shows a continued decline. Source: National Snow and Ice Data Center (in NSIDC 2010)

Also worth noting is that the thick multiyear ice is being replaced by thin first-year ice,[11] making the ice pack increasingly vulnerable to melt during future summer months. In the 1980s an average of 2 million square kilometers of multiyear ice remained at the end of summer. In September 2010 less than 60,000 square kilometers of multiyear (i.e. ≤ 5 years) ice remained in the Arctic Basin (NSIDC 2010).

The decline of sea ice coverage and thinning of the icecap are proceeding more rapidly than many models have predicted and several analysts are now expecting that the Arctic Ocean can be nearly ice free during late summer months within this century (Wang & Overland 2009). In 2006 scientists estimated ice-free summer conditions in the Arctic by the end of the century. Since then, several researchers have suggested that the date for a seasonally ice-free Arctic could even occur as soon as 2025 (AMSA 2009).
Although there is great uncertainty over the rate of ice reduction, there is striking evidence that the Arctic ice will continue to diminish due to ocean warming. Furthermore, this is expected to accelerate the major physical, ecological, social and economic changes already underway in the Arctic marine environment (ACIA 2004; IUCN/NRDC 2010). The 2007 reports on dramatic low extent of summer ice coverage in the Arctic had significant political ramifications and spurred increased political and economic interest in the region's potential for more accessible resources and shipping routes (Nilsson et al. 2010). Regardless of how rapidly the Arctic ice cap is melting, the fundamental question for this paper is *how* to respond to the potential challenges it brings.

Note that despite the changes in coverage and icecap thickness, much of the Arctic Ocean today remains fully or partially ice-covered for most of the year. This is a significant factor when considering the current regulation of the Arctic shipping (Brigham 2010).

[11] Estimated from recent satellite measurements compared with declassified sonar measurements from U.S. Navy submarines (Brigham, L. B. E. 2004. Arctic Marine Transport Workshop. Anchorage, Alaska, Northern Printing**:** 56).

2.3 Possible scenarios for future Arctic shipping

Today's shipping activities in the Arctic Ocean is primarily related to exploitation of minerals, marine tourism, major fisheries, oil and gas exploration, summer sealift to supply northern settlements and installations, and scientific exploration (Corn 2008). In other word, it is mainly intra-Arctic (Molenaar 2009). But as a consequence of retreating Arctic sea ice cover we begin to witness increasing Arctic resource development (i.e. oil, gas, and minerals), increasing marine access and potentially longer seasons of navigation. Accordingly, the Arctic will increasingly be linked to the global economy, potentially by new modes of transportation (i.e. transport of goods, oil and gas, tourism, research, etc.) (Corbett et al. 2010). Indeed, the prospect for commercial shipping routes through the Arctic is perceived as an appealing alternative to the much longer routes using the Panama and Suez Canals (Molenaar 2009).

Although there are convincing evidence that the Arctic is melting, ships operating in Arctic will still have to struggle with navigation in ice-covered water. Lasserre (2009) stresses that we have to expect great variations of ice conditions, and that the transit routes therefore are not of interest in the short time horizon except for some kinds of bulk shipping with ice strengthened ships. The risk assessments of classification societies and the marine insurance industry are likely to be a crucial factor for the economic viability of all Arctic shipping (Corell & Molenaar 2009). As of now, ships operating in Arctic waters experience very high costs of insurance, equipment, labor and administration (transit fees) (Batalden 2011).

Due to the high costs and risk of Arctic operations, the Arctic Marine Shipping Assessment (AMSA 2009) assesses that shipping in the coming decades will still be dominated by an increase in regional transportation, and that regular trans-polar shipping may not occur before 2025 (Ho 2010). Further development of Arctic marine transportation will be depending on several factors, such as the international governance framework, new business models, technological challenges, incentives to ship owners and the potential of the market (Brigham & Ellis 2004).

2.4 The Arctic Sea Routes

The observed retreat of Arctic sea ice presents three main plausible trans-Arctic shipping routes in the future; the Northern Sea Route, Northwest Passage, and Central Arctic Ocean (see Map 3) (Brigham & Ellis 2004). I will now provide a brief introduction of each of them.

Map 3: The Arctic Sea Routes. [12] *Source: Griffiths 2009*

[12] This map is a general portrayal of the major Arctic marine routes. The official Northern Sea Route encompasses all routes across the Russian Arctic coastal seas from Kara Gate (at the southern tip of Novaya Zemlya) to Bering Strait. The Northwest Passage is the name given to the marine routes between the Atlantic and Pacific oceans along the northern coast of North America that span the straits and sounds of the Canadian Arctic Archipelago. Shown is the ice edge for 16 September 2004. Noted are ice-free coastal seas along the entire Russian Arctic and a large, ice-free area that extends 300 nautical miles north of the Alaskan coast. The ice edge is also shown to have retreated to a position north of Svalbard (Brigham & Ellis 2004).

2.4.1 The Northern Sea Route (The Northeast Passage)

For almost a century, the Russian Federation has been sailing the Northern Sea Route (NSR) near the coast and has maintained year-round intra-Arctic shipping since 1978-79 (Molenaar 2009). It is only in recent years that international shipping companies have estimated that the Northern Sea Route can be profitable for commercial shipping, optimizing cost in time and distance between the largest markets of Europe and the Asia-Pacific region (Kramer 2011).

The climate prognoses are signaling a quicker opening of the Northern Sea Route than of the Northwest Passage (Corell & Molenaar 2009). At present, the NSR is fully open up to eight weeks a year, with ships transporting about a 1.5 million tons of goods (Ho 2010). Over the next decades we are likely to witness expanding trans-Arctic shipping along the Northern Sea Route (NSR) due to prediction of longer ice-free seasons; greater access and longer navigation seasons (Brigham & Ellis 2004).
In late summer 2008, the Arctic Ocean experienced for the first time an ice-free and navigable Northern Sea Route along the Siberian coast (Ho 2010). In August 2009, the potential of trans-Arctic transport was demonstrated by the transit of the first two international commercial cargo vessels traveling from South Korea to the Netherlands along the Northern Sea Route, cutting off 3,000 miles and ten days of the trip compared to the Suez Canal route. The two Beluga ships were escorted by an ice-breaker but report that they could have done without it. Despite high fees for transit and potentially icebreaker escort service to the Russian Federation, the shipping companies claims to save up to 600 000 US dollar per trip by using the NSR (Brigham 2010). Distance savings of 50% (and coincident time and fuel savings) is estimated for using the Northern Sea Route instead of the route through the Suez (Corbett et al. 2010). The Russian Ministry of Transport predicts cargo transport through NSR will increase from last year's 1.8 million tons to 64 million tons by 2020 (Kaltenstein 2011).

The Russian Federation has already invested considerably in marine infrastructure and services along the NSR, but there are still shortcomings if the amount of traffic is to be increased significantly (Christensen 2009). In addition to the unpredictability of ice conditions, there is generally a lack of marine infrastructure, limited availability of search and rescue services, unsolved inter-state disagreements over the legal status of the waters and straits along the Route, and insurance-related issues (Åtland 2010).

As a consequence of these uncertainties and shortcomings, many foreign as well as Russian shipping companies have no plans to start regular or year-round trans-Arctic operations (Åtland 2010). They question the economic viability of commercial trans-Arctic voyages arguing that the NSR saves distance but not fuel and other costs, since ships have to push through ice and thereby use more fuel and time (ibid.). In addition the Russian Northern Sea Route Administration is collecting high transit fees and there are high costs related to insurance and manning (ibid.). Furthermore, short season with a lot of unpredictability along the route will make it difficult for ships to keep pre-set time schedules which might lead to costly delays (AMSA 2009).

Given the many constraints on the prospect of commercial trans-Arctic shipping, many envisage that the expansion of Arctic shipping will primary be related to future linkages of Russian Arctic natural resources to global markets (Brigham 2010).

Thus, although trans-Arctic commercial shipping probably will be long in coming, we will probably see an increase in shipping activities in the west-northern and eastern parts of Russian Arctic waters in relation to the exploitation of resources and transporting of commodities.

2.4.2 The Northwest Passage

The Canada Government have clearly expressed that they do not perceive the Northwest Passage as a potential international commercial shipping route – either now or in the coming decades (Brigham and Ellis 2004). The unusual geography of the Canadian Arctic Archipelago creates complex sea ice conditions with high year-to-year variability and more icebergs moving into the routes normally used for navigation (Corell & Molenaar 2009). Due to the risk it poses to maritime safety and marine environmental protection, Canada is not willing to open their waters for the prospect of commercial shipping. Consequently, the marine infrastructure along the Northwest Passage is limited and there are no suitable harbor facilities along the route if the ships get damaged on their way (Christensen 2009). Thus, the Canadian marine industry views the Northwest Passage as a destination route and not a short-cut between the Atlantic and the Pacific (Brigham & Ellis 2004). Anyhow, the number of vessels transiting the Northwest Passage is increasing also here, although to a lower extent (Corell & Molenaar 2009).

2.4.3 The Central Arctic Ocean Route

The shorter trans-Arctic sea route through the Central Arctic Ocean is still considered a so-called “wildcard”. The ACIA climate model projects an ice-free Arctic Ocean during summer season by 2050 (Brigham & Ellis 2004), while other predict 2025 (AMSA 2009). Nevertheless, many analysts and shipping companies argue that it is too early to talk about Arctic transit through the Central Arctic Ocean (Christensen 2009). At present time, trans-Arctic shipping dependents on the service of icebreakers currently only provided by the Russian Federation, and this voyages are currently only aiming at resource exploration, research, tourist cruise, and military activities (Kramer 2011).

2.5 Impacts on the Arctic Marine Environment

The actual and potential impacts of shipping on the marine environment and biodiversity in the Arctic are not fundamentally different from other marine areas in the world. On the other hand, some of these impacts may involve higher risk and vulnerability due to the presence of ice (i.e. icebergs, floating pack-ice, etc.) and the remoteness of much of the region (AMSA 2009). These factors provide distinctive regulatory, operational and infrastructural challenges

concerning maritime safety, navigation and marine pollution. I will continue with a short presentation of all these challenges before continuing with a more in-depth description of the one challenge in focus here, namely marine pollution.

2.5.1 Emergency Response

There are four realistic emergency scenarios caused by shipping activities that might, and probably will, occur in the Arctic; (1) Shipping incidents (grounding, collision, vessel caught in ice, etc.) leading to accidental discharges of polluting substances (cargo or fuel); (2) oil spills; (3) physical damage on components of the marine ecosystem (e.g. large marine mammals); and (4) negative impact on indigenous communities (AMSA 2009).

Emergency response is particularly challenging in the Arctic for a variety of reasons. The remoteness and great distances of much of the Arctic marine area (combined with low population and infrastructure density) means that emergency response resources are thinly spread over a large area. So once shipping accidents do occur, an emergency response will take relatively long and may even be inadequate to provide sufficient aid to ships or address damages to the marine environment and biodiversity. Furthermore, harsh weather and ice conditions and low temperatures make it a difficult operating environment for response personnel and equipment. There is also a general lack of marine infrastructure that limits the emergency response capabilities, such as search and rescue assets, adequate charts and communication systems, supporting shore-side infrastructure to respond appropriately to marine incidents, and availability of deep-water ports, places of refuge and salvage resources for vessels in distress (AMSA 2009).

2.5.2 Navigation and Maritime Safety

The current increase in shipping and other human activity in the High North is placing new demands on Arctic infrastructure to provide maritime safety, protect the environment and respond to emergencies. As of now, vast areas of the Arctic have insufficient marine infrastructure. I have already mentioned the infrastructural needs to improve emergency response capabilities in the Arctic. But there is a general lack of maritime infrastructure to support both current and future levels of Arctic marine operations. Another obstacle to Arctic shipping is that marine personnel often have insufficient knowledge and experience in navigating in ice-covered areas. To ensure safe navigation in Arctic waters one have to improve the accuracy and availability of maritime safety information (MSI) and charts, port facilities, communication systems, aids to navigation, marine personnel training and certificate, and possibly introducing a Vessel Traffic System (VTS), particularly for the Bering straits (Molenaar 2009). Furthermore, to assist with ship navigation, adequate forecasting on weather and ice condition along with warning capabilities is essential and this further necessitate adequate meteorological observations and models (AMSA 2009). The challenging climate also dictates the need for innovative technical solutions for vessel design and equipment, navigation system and information exchange. This will require substantial, costly and timely investment by the coastal states and marine operators. There are certain

areas where marine infrastructure is more developed, particularly in the Russian Arctic, but that is perceived as exceptions rather than the rule (ibid.).

2.5.3 Marine Pollution

Typical marine pollutants related to shipping activities are (Molenaar 2009);

- operational discharges and emissions (cargo residues, fuel residues, bilge water, waste, sewage, etc.);
- accidental discharges of polluting substances (cargo or fuel);
- introduction of alien organisms through ballast water exchanges or attachment to vessel hulls;

The magnitude of the threats from marine pollution in the Arctic is largely unclear. However, the potential impact of these threats warrant both further research and precautionary actions, especially concerning ballast water exchange and the threat of invasive species since it is might be too late to control their spread and impacts after the introduction.
The precautionary principle is crucial in protecting the Arctic marine environment and biodiversity from pollution and other environmental threats from shipping given the difficulties of responding once an incident has occurred. It is still important to improve pollution response assets in the High North. Nevertheless, developing preventive measures to ensure safe navigation is even more valuable. Preventive measures include appropriate design, construction and equipment (CDEM) standards for Arctic vessels; require training and certification of marine personnel operating in ice-covered waters; and establish adequate maritime infrastructure to support safe navigation as listed above (AMSA 2009). There are also measures directly linked to pollution prevention such as building port reception facilities for ship-generated waste; implement emission and discharge standards on vessel-source pollution; promote so-called “clean technology” for ship construction and equipment; and improve instruments for environmental monitoring (e.g. reporting system, inspection and port control) (Corell & Molenaar 2009).
While there are many challenges associated with strengthening Arctic marine shipping infrastructure, there are also opportunities to and protect the Arctic environment in anticipation of the continuing increase in Arctic marine activity, rather than responding after an incident has occurred. Considering the long lead time to put marine infrastructure in place, this should be considered early in the prioritization process (AMSA 2009).

In this paper I will focus on regulation of vessel-source pollution in the Arctic taking a closer look on ballast water discharges and CDEM standards. CDEM standards are interlinked with the issue of vessel-source pollution since improving ship design, equipment and manning may include technology that decrease pollution.

2.6 Governance Challenges

From the examination of Arctic navigational opportunities above, we can draw a widely supported conclusion that there are a number of major obstacles to Arctic shipping and that the opening of the Arctic sea routes for commercial shipping is not happening in the immediate future. Yet, we are likely to witness an increase in intra-Arctic shipping activities – in fact, it is already a reality. This provides a focal point for increasing interest in the region and new or heightened governance challenges for Arctic oceans management.

First, the Arctic Ocean suffers from a general lack of maritime infrastructure to adequately support current and future levels of Arctic marine operations (AMSA 2009; Brigham 2008). It includes ports, communications, monitoring systems, search & rescue service, emergency response, and aids to navigation, to name a few. Developing maritime infrastructure will require substantial and timely investment and cooperation by the Arctic coastal states and marine operators (Brigham 2008).

Second, the Arctic states are challenged by the ongoing development of an integrated system of rules and regulations governing Arctic navigation that will provide region-wide marine safety and marine environmental protection. This task will call for historic levels of cooperation among the Arctic states, broad participation of non-state and non-Arctic stakeholders and actors, and a well-functioning partnership with the global maritime industry (ibid.).

Security issues are another set of concerns in the wake of increasing activities and interests in the Arctic region. Regarding shipping, any increase in shipping in the region will require an increase in the monitoring and enforcement of domestic and international laws governing smuggling, environmental standards and ship safety. Given the isolated nature of the Arctic waters such requirements are challenging (Brigham & Ellis 2004).

These concerns have lately gained international attention and the Arctic states have individually formed high prioritized Arctic policies and strategy plans to address these pressing issues. Also international bodies such as the Arctic Council and the International Maritime Organization (IMO) have realized the urgent need to protect Arctic people and the marine environment. They address the key issue such as inadequate marine infrastructure, preventive measure for marine pollution and maritime safety. This has led to some positive developments towards regulating and protecting the High North, for instance the Arctic SAR agreement that was signed in May 2011 and the ongoing IMO negotiation of a mandatory Polar Code for ships travelling in polar waters intended to be finalized in 2012.

There are still many wildcard and uncertainties to be sorted out, for instance unresolved maritime boundaries, strategic interests of new stakeholders, future oil and gas discoveries, the plausible loss of multiyear Arctic sea ice, emerging seasonal shipping routes, and much

more. Yet, the Arctic Ocean will most certainly experience increasing marine use and activity in the coming years (Brigham 2010). In accordance with the precautionary principle, the Arctic states and the international community will anyhow have to prepare for the challenges that might come. This means building marine infrastructure, innovate technology (e.g. ice class ship construction), increase knowledge, provide adequate regulations and establish closer Arctic cooperation.

The remainder of the paper is divided into four major sections. The first (Part 3.0) is a very brief introduction to the development of Arctic cooperation and the global shipping regime, aimed mainly at readers who are not familiar with the region. The second (Part 4.0-6.0) provides a specific presentation of current regulation of vessel-source pollution in relation to the Arctic that includes two sub-sections looking more specifically on ballast water management and CDEM standards. The third (Part 7.0) includes a critical analysis of the effectiveness of the Arctic shipping regime in relation to vessel-source pollution. The fourth (Part 8.0) is an effort in understanding the way forward in Arctic policymaking in times of rapid environmental change based on the analysis of the effectiveness of the current Arctic shipping regime and initiatives that is currently taken.

3.0 THE ARCTIC SHIPPING REGIME

There is a comprehensive regulatory framework for shipping with an associated institutional and organizational structure. However, there are several concerns related to the capacity of the current shipping regime to cope with the environmental impact from increased shipping in the Arctic. The Arctic region has previously been unavailable for commercial shipping and the Arctic sea routes distinguishes themselves from other major shipping routes in terms of climate, ecosystems, infrastructure, jurisdiction, etc.

The purpose of this paper is to examine whether the current regime is adequately equipped to deal with the environmental challenges the Arctic marine area is facing as a consequence of increasing shipping activities. A presentation of the global framework for shipping as well as the Arctic governance structures is therefore essential, although only described in brevity since it only provides the backdrop for a thorough examination of the environmental regulation of Arctic shipping with added weight on the specific regulation concerning vessel-source pollution.

3.1 A brief history of Arctic Cooperation and Governance

Up until World War I the political climate of Arctic international relations up can be described as having a strong basis in colonialism and nationalistic interests. Still some of the international political activities were aimed at guarding “common” interests such as science and nature conservation. During World War II the security interests of the nation state became

essential with added state control of northern territory, including a strategic military presence. This development continued during the Cold War until the mid-1980s with continuous diminishing level of international cooperation. The signing of the UN Convention of the Law of the Seas (UNCLOS) in 1982 only formalized the Arctic state control by granting coastal states the right to 200 nm exclusive economic zones (Nilsson et al. 2010).
However, indigenous peoples began to organize themselves across national borders, including the establishment of the Saami Council in 1956 and the Inuit Circumpolar Conference in 1977. But it was not until the 1990s these organizations gained importance in the international politics of the High North (ibid.).

In October 1987 the Soviet President Mikhail Gorbachev held a speech in Murmansk where he encouraged the Arctic states to form *"a genuine zone of peace and fruitful cooperation"* in the circumpolar North with focus on resource management, scientific exploration, environmental protection, development of infrastructure, and the negotiation of arms control agreements (Young 2002a). This speech became a milestone in the history of Arctic cooperation, marking the transition from the Cold War to the start of a new era in the Circumpolar North with increasing diplomatic and collaborate initiatives (Young 1998).

One of these initiatives was the establishment of Arctic Environmental Protection Strategy (AEPS) in 1991 to address common concerns and challenges faced by the Arctic states. As the first step to institutionalization of a wider inter-governmental cooperation protecting the Arctic environment, the AEPS has been described as a major political accomplishment of the post-Cold War-era (Bloom 1999). AEPS was transformed into the Arctic Council in 1996 as a "high level forum" for Arctic cooperation on environmental protection and sustainable development (Young 2002a).
The post-Cold War era spurred a wave of other cooperative arrangements, including forum for political discussions in specific sub-regions (e.g. Barents Euro-Arctic Region), among Arctic parliamentarians and among sub-regional governments (e.g. Northern Forum), as well as platforms for scientific collaboration (e.g. International Arctic Science Committee and Northern Research Forum) (Young 2002a).

The burst of institutional initiatives during the 1990s was the starting point of an vibrant era of trans-national and inter-regional cooperation in the Arctic (Young 2002a). It also encouraged the rise of non-governmental and transnational actors, such as Arctic indigenous groups and organizations, environmental NGOs (especially WWF with its Arctic Program), and scientific networks. These non-state transnational actors might play an important role in the future development of the region (Nilsson et al. 2010) due to their increasing influence on international politics challenge the legitimacy of the whole sovereign state system (Heininen & Rostoks 2004).
Furthermore, global environmental conventions and global scientific assessments became increasingly important in Arctic politics and given the region a new status (Iglebæk 2010). One of the consequences is increasing interests from non-Arctic actors (Nilsson et al. 2010). For instance, the European Union and South-East Asian countries (i.e. China, Japan and Korea) have articulated strong interests in gaining a larger role in determining the future of

the Arctic region by applying for permanent observer status in the Arctic Council (not yet granted) and partake at the Arctic Frontiers conference, one of the major international forums seeking to formulate the Arctic agenda (Iglebæk 2010).

International politics and regional developments have become closely intertwined and Arctic governance has developed into an institutional complex of domestic legal instruments, international obligations and "soft law" regional agreements that link across both scales and issue areas (Nilsson et al. 2010). The main governance challenges are; (1) protecting and managing shared natural resources and ecosystems; (2) strengthening and extending the voice of the Arctic on the international arena, and (3) achieving sustainable development within the Arctic (Young 2002a). State sovereignty (or sovereign rights in the maritime sphere) is still the dominant paradigm in the Arctic, but the major driving force for international cooperation has been the common interest of protecting the Arctic environment through regional means (Nilsson et al. 2010). However, actual and potential access to resources is continuously causing friction between Arctic states (Schofield & Potts 2008).

In some ways, this institutional complex has been characterizes as fragmented, weak, and poorly institutionalized, in particular in comparison with the coherent and integrated institutional system of the Antarctic Treaty System (ATS) in which several policy makers and scientist frequently make reference to (Young 2002a). However, the Arctic context has facilitated some innovative institutional features, for instance launching states as the members and indigenous peoples' organizations as the permanent participants of the Arctic Council (Heinenen & Rostoks 2004; Young 2002a).

The recent changes in the physical environment in the Arctic have had profound effects on the political landscape of the High North and restored some of the geopolitical concerns and security interests of the past in addition to creating new economic interests. Still it seems that recognition of the importance of Arctic cooperation remains core focus in political discourse, although experiences more conflicting interests and sharper political debate (Young 2009). In contrast to the Cold War, the Arctic states have expressed interest in continued international collaboration, including intentions to use agreed upon dispute settlement procedures to solve conflicts (Nilsson et al. 2010).

The burst of regional institutional initiatives during the 1990s has led to a positive development for Arctic governance, but the history of Arctic cooperation is still brief. Will the Arctic governance systems prove solid enough to support to development of more broader and comprehensive cooperative efforts that is needed to meet the future governance challenges in the Arctic? This will be the returning theme in the remainder of the paper.

3.2 The Arctic Shipping Regime

This section provides an overview of the international legal and policy framework related specifically to environmental regulation of Arctic shipping – referred to as *the Arctic shipping*

regime – with a special emphasis on vessel-source pollution. This paper will cover shipping activities related to commercial and transportation purposes because there are separate treaties and agreements for other forms of shipping. Thus the regulation of cruise ships, ships assisting offshore hydrocarbon activities, larger fishing vessels, warships and other government ships operated for non-commercial purposes, and these will not be covered here.

In legal matters it is common to distinguish between prescriptive jurisdiction (i.e. formation and adoption of rules and standards) and enforcement jurisdiction (i.e. implementation of the prescribed rules and standards). This paper mainly covers prescriptive jurisdiction, but also discuss enforcement jurisdiction when this is available (Molenaar 2009).
The substantive standards or requirements in the legal framework related to shipping activities can broadly be distinguished into seven categories (Corell & Molenaar 2009); 1) Discharge and emission standards[13]; 2) contingency planning and preparedness standards[14]; 3) maritime safety and security[15]; 4) protection of marine ecosystem and biodiversity[16]; 5) construction, design, equipment and manning (CDEM) standards; 6) navigation standards[17]; and 7) liability and insurance requirements. I will focus on the first and fifth category in this paper, namely discharge and emission standards, and CDEM standards.

In a speech held The European Parliament in May 2008, the Norwegian Minister of Foreign Affairs, Jonas Gahr Støre, posed three key questions states should ask when confronted with a particular issue in the Arctic Ocean: 1) are existing rules also applicable there; 2) are these rules widely known, binding on relevant actors and actually being applied; and 3) are there needs still not met through effective regulation (Støre 2008). These are the very same questions I will touch upon in this paper.

Many have tried to assess the vulnerability as well as the adaptive capacity of the Arctic shipping regime in the face of substantial changes in the Arctic. This is an important step to better meet the future environmental challenges that increased shipping poses for Arctic waters. But first, what is the present-day legal status of the Arctic?

Arctic shipping is governed by a complex of domestic and international legal instruments and regional "soft law" agreements. There is no comprehensive international legal regime for the Arctic, but a number of international treaties (e.g. UNCLOS, SOLAS, MARPOL, and SAR) relates to the Arctic waters in the same way as other international waters. As of today, none of these includes specific requirements for the Arctic – only non-binding guidelines. However,

[13] Include standards related to ballast water exchange.
[14] Include accidential pollution such as invasion of foreign species, and oil spill
[15] Include search and rescue and other relevant infrastructures; e.g. ports and repair of damaged ships, security and environmental monitoring (who, how, available sanctions), and training of marine personell (sertification, course standards, exercises).
[16] Include the protection of endangered species, habitat, and particular sensitive areas, and increasing the level of knowledge about the Arctic ecosystem and documented impacts.
[17] Include ships' routeing measures, ship reporting systems (SRSs) and vessel traffic services (VTS); information and communication (satellite coverage, accurate and updated charts, databases for past experience for information exchange); and improving weather and ice forecasts (both models and technology).

important emerging standards for Arctic maritime operations are under negotiation (e.g. the IMO Polar Code) (MarSafe North 2011).

The 1982 *United Nations Convention on the Law of the Sea* (UNCLOS) has been generally accepted by the international community, and by the Arctic states in particular, as the jurisdictional cornerstone for the legal status of Arctic waters (Franckx 2009). UNCLOS provides rules concerning maritime boundaries, claims to an outer continental shelf, sovereign rights over resources and the protection of the marine environment. UNCLOS safeguards the International Maritime Organization's agreements by only allowing coastal states unilateral prescriptive jurisdiction in a limited set of situations. Although shipping is a global issue, the regulation of shipping, particularly in the Arctic, is by coastal states and port states considered a regional issue. The regional bodies with mandate to exercise prescriptive or enforcement jurisdiction do this in their capacities as flag states or port states.[18] An example of this is the regional agreements on port state control, the *Paris Memorandum of Understanding* (Paris MOU) (Molenaar 2009).[19]

Since shipping is largely considered a global issue, the international community has a general preference for globally uniform international regulation. Therefore, international regulation of vessel-source pollution is primarily provided by the *International Maritime Organization* (IMO) (Molenaar 2009). The IMO, a specialized agency in the United Nations system, addresses a broad range of issues pertaining to international shipping. Over the last 20 years or so, the IMO has developed a number of requirements, guidelines and recommendations regarding navigation in polar ice-covered waters related to maritime safety and marine pollution prevention. Relevant for this paper are provisions given in the *Ballast Water Management Convention* (BWM Convention), and the *International Convention for the Prevention of Pollution from Ships* (MARPOL 73/78). It has also established some non-binding instruments that are specifically tailored to the Arctic, such as the non-binding *Guidelines for ships operating in polar waters* (also referred to as the *Polar Shipping Guidelines*). Other intergovernmental and regional organizations, including *International Association of Classification Societies* (IACS) and the OSPAR Commission, work closely with the IMO in regulating international shipping (AMSA 2009).

Additionally there is a fragmented array of regional "soft law" instruments relevant for environmental protection from Arctic shipping impacts. The most important is the Arctic Council, a cooperative forum for discussion of various Arctic issues, including the environmental concerns of shipping activities in the Arctic (AMSA 2009). Some of the Arctic coastal states, such as Canada and Russia, have also adopted national legislation specifically for Arctic shipping issues (Molenaar 2009). The Arctic states have also adopted several

[18] The Law of the Sea Convention, Article 211(3) (acknowledging the right of port states to prescribe, individually or in concert, more stringent standards than generally accepted international rules and standards (GAIRAS)).
[19] Paris Memorandum of Understanding on Port State Control, *entry into force* July 1, 1982, *available at* http://www.parismou.org/upload/PSCC/MOU,%20incl.%2031st%20%20Amendment.pdf (as regularly amended).

relevant bilateral and regional instruments on preventive marine pollution, such as the 1992 OSPAR Convention which cover the North-East Atlantic and thereby parts of Arctic waters.

I will now take a closer look at the most important institutions, organizations and non-binding arrangements governing vessel-source pollution in the Arctic, including a discussion of on-going development to adjust and improve these regulations for the Arctic context.

The main international agreements and guidelines relevant to prevention of marine pollution from ships are listed in Table 2 below. Note that this table excludes conventions related to oil spill pollution and regulation of fishing vessels.

REGULATIONS and GUIDELINES related to Arctic vessel-source pollution:	*Entry into force:*	**General discharge and emission standards**	**Ballast water**	**CDEM standards**	**Special marine area protection**
United Nation Convention on the Law of Sea (UNCLOS 1982)	1994	X	X	X	X
International Convention for the Safety of Life at Sea (SOLAS 1974)	1980			X	
International Convention for the Prevention of Pollution from Ships (MARPOL 1973) *- 1978 Protocol and 1997 Protocol*	1983	X			X
International Convention for the Control and Management of Ships' Ballast Water and Sediments (BWM 2004)	Not yet		X	X	
Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter (LC 1972) / 1996 London Protocol	1975/ 2006	X			
Protocol on Preparedness, Response and Co-operation to pollution Incidents by Hazardous and Noxious Substances (OPRC-HNS Protocol 2000)	2007	X			
Protocol relating to Intervention on the High Seas in Cases of Marine Pollution by Substances other than Oil (INTERVENTION Protocol 1973)	1983	X	X		
International Convention on the Control of Harmful Anti-fouling Systems on Ships (AFS Convention 2001)	2008			X	
IMO Guidelines for Ships Operating in Polar Waters (2009)	Non-binding			X	
IMO Guidelines for Ships Operating in Arctic ice-covered Waters (Arctic Shipping Guidelines, 2002)	Non-binding	X	X		
IACS Unified Requirements for Polar Class	-			X	
PSSA Guidelines (IMO)	-				X
OSPAR Convention (1992)	1998				X

Table 2: A categorical listing of regulations relating to vessel-source pollution from Arctic shipping

4.0 REGULATING VESSEL-SOURCE POLLUTION IN THE ARCTIC

Marine environmental pollution is defined in UNCLOS as;

> … the introduction by man, directly or indirectly, of substances or energy into the marine environment, including estuaries, which result or is likely to result in such deleterious effects as harm to living resources and marine life, hazards to human health, hindrance to marine activities, including fishing and other legitimate uses of the sea, impairment of quality for use of sea water and reduction of amenities.[20]

Typical types of such pollutants are hydrocarbon compounds, persistant toxic substances, heavy metals, radioactive materials, and nutrients. The definition relates only indirectly to operational marine pollution (e.g. discharges of ballast water, bilge water, anchoring impacts, blackwater, solid waste, greywater, greenhouse gas emission, air pollution, and oil spill).

The scope of analysis is limited to the regulation – or lack of regulation – of vessel-source pollution in Arctic waters. I have chosen two issues of vessel-source marine pollution for an in-depth case study, namely the regulation concerning ballast water exchange and construction, design, equipment and manning (CDEM) standards for ships. These case studies will provide as reference points throughout the paper.

But before examining the issue-specific regulation and guidelines related to ballast water management and CDEM standards, I will describe the broader global and regional framework governing vessel-source pollution and discuss what measures that have been taken to cope with heightened vulnerability of the Arctic marine environment.
I start with an elaborating on the provisions and national jurisdiction provided by the United Nations Convention on the Law of the Sea (UNCLOS), followed by a presentation of the IMO instruments, and finally describing the regional approach to address vessel-source pollution; namely the Paris Memorandum of Understanding (Paris MOU) and the Arctic Council.

4.1 The Law of the Sea Convention

The *United Nations Convention on the Law of the Sea* (UNCLOS) came into force in November 1994 and lays out the legal framework for the regulation of shipping according to maritime zones of state jurisdiction (AMSA 2009). UNCLOS balance among the powers of coastal states, flag states and port states to exercise sovereign rights over ocean resources, regulate shipping and protect the marine environment (AMSA 2009; Franckx 2009).

[20] The Law of the sea Convention, Article 1(1)(4).

So far, 156 countries and the European Community have ratified the treaty, which include all Arctic states except the United States. In fact, the United States played a pivotal role during the initial negotiations of the treaty, but ultimately refused to sign the convention over concerns about a provision involving deep-seabed mining that they feared would dilute US voting power (Stokke 2010a). Since the United States already adheres to the provisions of UNCLOS under customary international law, some critics assert that there is no longer any compelling reason for them not to ratify the convention. Their reluctance to sign rest in the argument that customary international law is constantly evolving and does not offer the stability and predictability afforded by the convention. However, many diplomats and national security experts maintain that ratification will advance US national interests and communicate their support of multilateral cooperation. President Obama recently proposed U.S. ratification, but this was refused by the Senate (Schlakman 2009).

UNCLOS neither has a specifically established body nor a conference of the parties with the specific task of developing the treaty itself (Franckx 2009).[21] Furthermore the treaty includes no procedure to further develop the instrument through protocols or annexes, only an amendment procedure[22] which has proved difficult to apply in practice (Freestone & Elferink 2005).

4.1.1 Maritime Boundaries Disputes in the Arctic

There are still a few unresolved maritime boundary issues in the Arctic Ocean where adjacent states have overlapping maritime claims.[23]
Lack of clearly delineated maritime boundaries for territorial seas and EEZs is a potential distress for future shipping in the Arctic. Particularly controversial are those disputes concerning internal waters and straits used for international navigation which could hamper opportunities to expand shipping in the Arctic Though supportive of the potential for trans-Arctic shipping, Canada and the Russian Federation do not accept the whole Northwest Passage or the Northern Sea Route to be international waters. The United States and the European Union are forcefully claiming the opposite – emphasizing that the right to innocent

[21] The conference of the parties is mentioned in Art. 319, but this body has merely been attributed with administrative powers relating to appointments or financial matters. Whether this body also has the power to review the functioning of UNCLOS itself is far from clear since widely diverging opinions exist among states in this respect (Franckx (2009). Climate Governance in the Arctic. Environment & Policy T. K. e. al. 50**:** 23).
[22] Law of the Sea Convention, Art. 312-316.
[23] The unresolved bi- and multilateral disputes over maritime borders and jurisdiction include the following; (1) The legal status of the Svalbard Fisheries Protection Zone and the shelf area around Svalbard (Norway and Russia, however no dispute over Norway's sovereignty) , (2) the Bering Sea (U.S. and Russia), (3) the Beaufort Sea (U.S. and Canada), (4) the Nares Strait/Hans Island (Canada and Denmark), (5) the Northwest Passage (Canada and the U.S.), (6) the Northern Sea Route (Russia and the U.S., primarily), and (7) the delimitation of the Arctic continental shelf outside the 200 nautical mile boundary – the Lomonosov Ridge (Russia, Canada, and Denmark, primarily) (Åtland 2010; AMSA 2009). On April 27, 2010, Norway and Russia announced an end to their 40-year arctic border dispute in the Barents Sea.

passage would still apply (Molenaar 2009).[24] States with large fleets engaged in international shipping are likely to share this view (Corell & Molenaar 2009).

So far the Arctic states have managed to play down the maritime disputes and attempts comply with the provisions in UNCLOS on territorial claims. Canada and the United States are in fact collaborating on mapping the North America's Arctic continental shelf (Griffiths 2009).

4.1.2 Coastal State Jurisdiction

There are five coastal states in the Arctic Ocean; Canada, Denmark (Greenland), Norway, the Russian Federation and the United States have coastal frontage in the Arctic Ocean (AMSA 2009).[25] The term *coastal state* means having coastal frontage and refers to the rights, obligations, and jurisdiction within its own maritime zones prescribed them by the UNCLOS (Molenaar 2009; AMSA 2009). The extent of legislative and enforcement control over foreign vessels by the Arctic coastal states varies according to the different maritime zones established by UNCLOS, namely: internal waters,[26] territorial sea, the contiguous zone, the exclusive economic zone (EEZ), and the continental shelf (see Figure 2) (AMSA 2009).

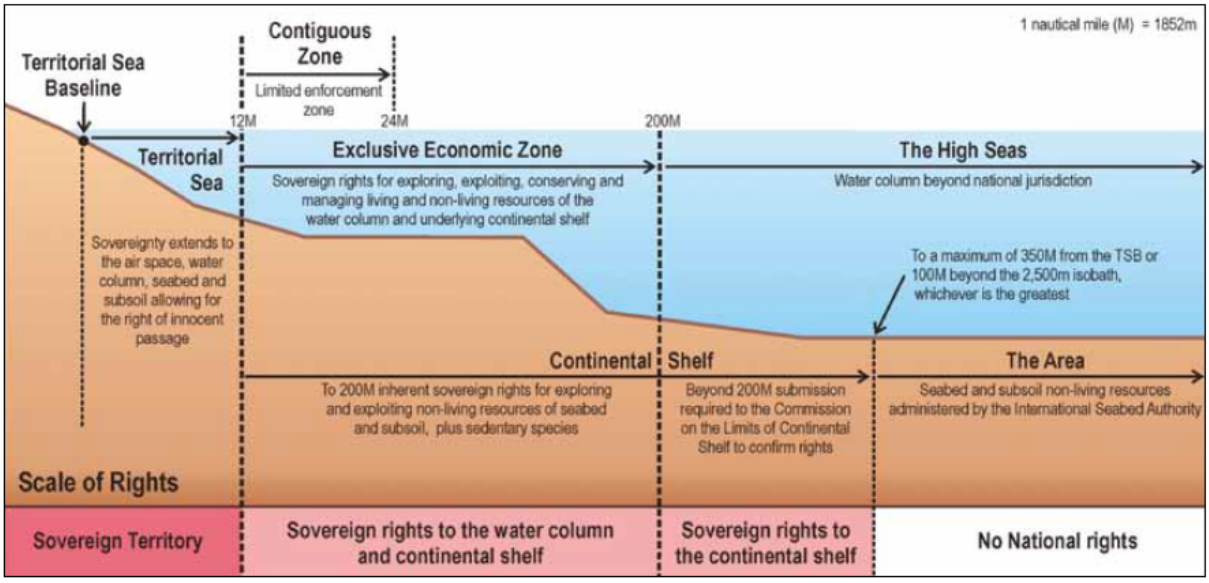


Figure 2: Illustration of maritime zones. Source: AMSA 2009.

The coastal state jurisdiction over various marine activities decreases with distance from the coastline; and is more limited in relation to navigation than for scientific research and resource management (Stokke 2010a).
For internal waters, coastal states are entitled to exercise full sovereignty and maximum jurisdiction over ships and can prescribe conditions for entry into its ports (AMSA 2009).

[24] Law of the Sea Convention, Art. 8(2).
[25] Iceland has coastal frontage on the Norwegian Sea and Finland and Sweden in the Baltic Sea (AMSA 2009).
[26] Internal waters include marine areas on the landward side of closing lines for bays, ports and harbors and historically recognized internal waters. A coastal state can also choose to draw straight baselines around a deeply indented coastline or where there is a fringe of islands in the immediate vicinity of the coast. Waters enclosed would be internal. UNCLOS sets forth the rules on setting baselines (AMSA 2009).

This means that coastal states are allowed to prohibit entry of certain "risky ships", such as substandard ships or those carrying hazardous cargoes, or impose "zero discharge" limits on particular ship-source pollutants (ibid.). If coastal states establish particular requirements they must communicate these to a competent international organization, i.e. the IMO.[27]

In the territorial sea, the coastal states have the authority to adopt laws and regulations for the safety of navigation, preservation of the marine environment and marine pollution control from foreign vessels with the exemption of CDEM standards which must correspond with global regulations.[28] Foreign ships retain the right to innocent passage.[29]

One of the central features of the UNCLOS is the coastal states right to establish a 200 nautical mile exclusive economic zones (EEZ) measured from the territorial sea baselines (AMSA 2009). Coastal states have sovereign rights over most activities undertaken within their EEZ with the exception of navigation that remains a high-seas freedom also within the EEZ (Stokke 2010a).[30] However, coastal states can only regulate foreign ships to ensure they comply with international rules and standards (GAIRAS) aimed at pollution prevention (AMSA 2009; Stokke 2010a).[31] Their enforcement powers in the EEZ are limited to physical inspection of a foreign ship causing or threaten to cause substantial pollution of the marine environment. In such cases, the only sanction available to coastal states are imposing monetary penalties (AMSA 2009).

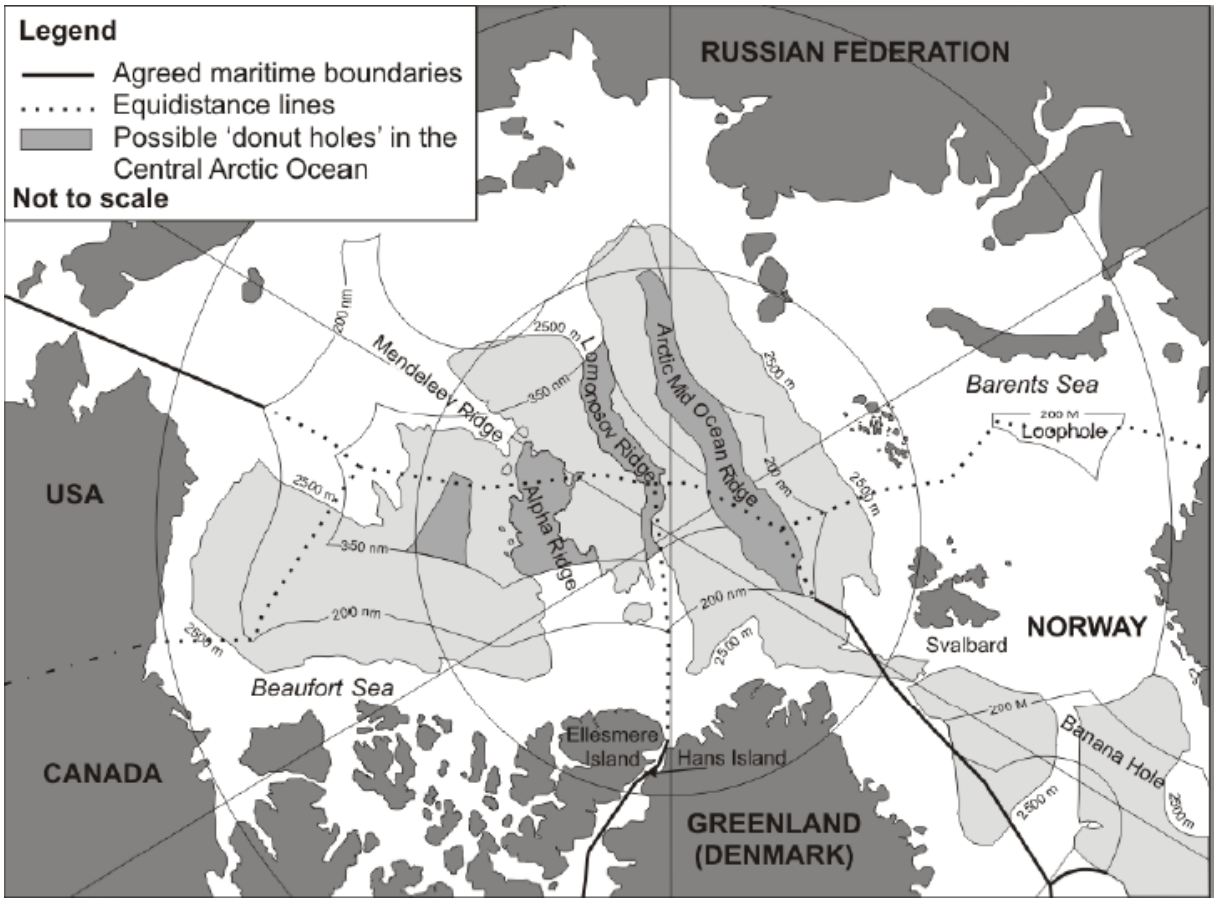
In accordance with provisions given in Article 76, the coastal states can extend their sovereign rights beyond the usual 200 nautical mile limits in relation to the following issues; jurisdiction over the living and non-living resources of the seabed and subsoil; control over the emplacement and use of submarine cables and pipelines, artificial islands, installations, and structures; regulation of drilling; control and prevention of marine pollution; and regulation of marine scientific research (Brigham & Ellis 2004).[32]

Coastal states bordering a strait used for international navigation (e.g. the Bering Strait within the Canadian EEZ) hold limited authority over foreign ships because of their right to transit passage and may only adopt vessel-source pollution laws applicable to foreign ships in accordance with GAIRAS. Coastal states may designate sea lanes and traffic separation schemes, but it needs IMO approval (AMSA 2009). Article 37 of UNCLOS stipulates that the regulations of transit passage only apply to "straits which are used for international navigation". Apparently, Canada and the Russian Federation interpret these words as

[27] Law of the Sea Convention, Art. 211, para 3. The only likely constraint on the exercise of this power is the traditional and customary duty to grant refuge in sheltered waters to a ship in need of assistance (AMSA 2009).
[28] Territorial sea includes marine areas within the limit of the 12 nautical miles (AMSA 2009).
[29] Law of the Sea Convention, Art. 211, para 4. Passage is "innocent so long as it is not prejudicial to the peace, good order or security of the coastal State;" among the acts considered as prejudicial in those respects are "wilful and serious pollution contrary to this Convention." See Art. 19, paras 1 and 2(h).
[30] Law of the Sea Convention, Art. 58 and 87.
[31] Law of the Sea Convention, Part XII, Art. 211, para 5.
[32] The coastal state may locate artificial islands, installations or structures on an extended continental shelf and include safety zones that are consistent with international standards. However, it may not establish them where interference may be caused to the use of recognized sea lanes essential to international navigation (AMSA 2009).

requiring an actual degree of usage while rejecting potential usage. Presently is navigation in the parts of the Northwest Passage and the Northern Sea Route that are within coastal state jurisdiction much more constrained than elsewhere (Molenaar 2009). The changing ice conditions may soon put pressure on the current interpretation of Article 37 (ibid.). The exercise of coastal state jurisdiction over shipping through the Arctic waterways could give rise to severe disputes in the future. On the other hand, if they are defined as international waters, then the shipping regulations and standards are to be determined by the competent international organizations (Huebert in Brigham & Ellis 2004; AMSA 2009).

The waters beyond EEZ or the extended continental shelf are high seas. There are four high seas pockets in the Arctic marine area (see Map 5). These are the so-called "Banana Hole" in the Norwegian Sea, the "Loop Hole" in the Barents Sea, the "Donut Hole" in the central Bering Sea and the central Arctic Ocean (Molenaar 2009). The coastal state has no jurisdiction over foreign ships in the high seas – with very few exceptions.[33] Trans-Arctic shipping in the high seas would only be subject to global shipping safety, environmental and security rules and standards adopted through the IMO and as may be applied by the flag states (AMSA 2009).



Map 5: Possible "donut holes" in the Central Arctic Ocean. Source: Schofield & Potts (2008)

[33] One exception being where a foreign ship is undertaking exploration activities on the continental shelf without its consent (AMSA 2009).

4.1.3 Port State Jurisdiction

The term "port state" refers to the jurisdiction of a state over foreign ships that are voluntarily in one of its ports. Port state authority is supported by customary international law that gives foreign vessels no general right of access to ports. Articles 25(2), 211(3) and 255 of the UNCLOS implicitly confirm this. A port state has the right to impose conditions for entry into port that are more stringent than GAIRAS and can deny access or use of port (services) to certain types of ships by incorporating the IMO Polar Shipping Guidelines into their legislation (Molenaar 2009). But there is uncertainty regarding how a port state's residual jurisdiction is affected by international trade law. International law rarely authorizes port states to impose enforcement measures that are more stringent than denial of access or use of port (ibid.). However, in accordance with Article 218 ("Enforcement by port states", Part XII) of the UNCLOS, if foreign ships are voluntarily in the port of another state, the port state has broad inspection and enforcement powers for pollution violations beyond the coastal state's maritime zones (i.e. the high seas and the maritime zones of other states if they request the port state's assistance) (ibid.). If a port state uncover that a foreign ship is unseaworthy and may cause substantial marine environmental damage, it may prevent the ship from sailing until the deficits are corrected (AMSA 2009). In the case of pollution offenses on the high seas, flag states may request the port state's assistance in imposing sanctions. A port state must also follow up on requests from other states to investigate reports of discharge violations (ibid.).

Molenaar (2009:321) identifies three options to strengthen port state jurisdiction in the Arctic; (1) Develop a strategy for port state control in the Arctic, for instance by establishing an Arctic MOU on Port State Control or by adjusting the Paris and Tokyo MOUs on port state control to ensure that proper account is taken of intra-Arctic and trans-Arctic marine shipping; (2) implement Article 218 of the UNCLOS in concert; or (3) exercise port state residual jurisdiction in concert – relying in part on Article 234 of the UNCLOS – in case the IMO Polar Code is not made mandatory anytime soon.

4.1.4 Flag State Jurisdiction

The term "flag state" denotes the state in which a ship is registered and/or whose flag it flies.[34] The domestic legislation of a flag state also applies to its ships and ship crew. Thus, the flag state is responsible for making sure that its ships conform to GAIRAS on issues like safety at sea and marine pollution control. On the high seas, the flag state is granted exclusive jurisdiction with very few exceptions (AMSA 2009).

Note that the provisions of UNCLOS regarding the protection and preservation of the marine environment do not apply to any warship or other government ships operated for non-commercial purposes (ibid.).

4.1.5 Arctic-specific provisions; Article 234

[34] Law of the Sea Convention, Article 91(1).

Part XII (Protection and Preservation of the Marine Environment) in UNCLOS contains only one Article exclusively dealing with the Arctic; that is Article 234 on "partly ice-covered areas". It lays out the following conditions:

> Coastal States have the right to adopt and enforce non-discriminatory laws and regulations for the prevention, reduction and control of marine pollution from vessels in ice-covered areas within the limits of the exclusive economic zone, where particularly severe climatic conditions and the presence of ice covering such areas for most of the year create obstructions or exceptional hazards to navigation, and pollution of the marine environment could cause major harm to or irreversible disturbance of the ecological balance. Such laws and regulations shall have due regard to navigation and the protection and preservation of the marine environment based on the best available scientific evidence.[35]

Article 234 is quite exceptional in the over-all framework of UNCLOS, for this is the only place where national rules concerning vessel-source pollution need not conform to GAIRAS adopted by the competent international organization (i.e. IMO) (Blanco-Bazán 2009). Article 234 of UNCLOS grants coastal state powers to unilaterally impose and enforce stricter rules concerning maritime safety and vessel-source pollution in the Arctic within the limits of their EEZ when certain conditions are met (Stokke 2010a; AMSA 2009).
Nevertheless, Blanco-Bazán (2009:2) argues that "Article 234 should be read together with other provisions of UNCLOS according to which coastal states should abide to international rules and standards adopted by IMO in matters of safety of navigation and prevention of marine pollution from ships." Therefore coastal states must seek IMO's approval even for relatively modest amendments (Franckx 2009).

Article 234 contains several vague notions that has or might give rise to differing interpretations. First, what is the precise geographic scope of coverage that meets the Article's requirement of "ice covering such areas for most of the year?" (Franckx 2009) Second, what are the regulatory implications of giving special power to the coastal state only in the EEZ? One interpretation is that coastal states are granted no greater authority than those applicable in the territorial sea. Another is that coastal states are granted extended regulatory powers, in particular the right to unilaterally impose special CDEM standards (AMSA 2009). Third, what is the significance of giving "due regard to navigation?" Klein (2005) notes that "due regard" obligations require the availability of third-party procedures to regulate potential disputes between states. Application of Article 234 to straits used for international navigation may also be questioned due to differing interpretations on geographical scope of coverage and the breadth of coastal state regulatory powers (AMSA 2009).

Franckx (2009) argues these vague notions gives necessary flexibility to an area of circumstances in flux and thus enhances the adaptive capacity of Article 234. He does not consider the often differing interpretation of these notions as an added vulnerability, because Article 234 remains subject to the system of compulsory dispute settlement, as stressed by Conclusion No. 14 of the Committee on Coastal State Jurisdiction Relating to Marine

[35] Law of the Sea Convention, Section 8, Art. 234.

Pollution of the International Law Association. If shipping increases in the future, a neutral third party will be appointed in accordance with Part XV (Settlement of Disputes) of the UNCLOS to balance the coastal state powers granted in Parts V (Exclusive Economic Zone) and environmental provisions in Part XII (Protection and Preservation of the Marine Environment) to the advantage of the freedom of navigation. While Article 234 leaves a large discretion to the coastal state in regulating navigation in ice-covered waters, it allows for the orderly development of the law if shipping were to increase in the future (Franckx 2009:134).

One could certainly question how one short single article could possibly deal sufficiently with all the maritime issues of the Arctic (Dubner 2005). The points made by Franckx (2009) indicate that Article 234 will be well suited to take into consideration new developments in the Arctic. Furthermore, he characterizes the fact that there is no special Arctic law of the sea regime as a low level vulnerability (Franckx 2009).
But the Article 234 lacks specificity to ensure clear guidance – which is not surprising knowing that it was negotiated between countries with opposing interests in the region (i.e. Canada, the Russian Federation and the United States). Article 234 has been referred to as "probably the most ambiguous, if not controversial, clause in the entire treaty" (Jensen 2006:7). Franckx (2009) evaluates the interpretive problems of open textured language in Article 234 and UNCLOS in general as a medium level vulnerability. It can indeed contribute to diffusion and de-stabilizing in some contexts. On the other side, such open textured language increase the flexibility of the Article because it allows for evolutionary interpretation (Boyle 2005). Furthermore, Article 234 is conceived as adaptive because its interpretive and flexible character implicitly refers to a potential third party authority for dispute settlement (Franckx 2009).

4.1.6 Regulation of vessel-source marine pollution

Pollution of the marine environment is defined by UNCLOS (Art.1) as:

> The introduction by man, directly or indirectly, of substances or energy into the marine environment, including estuaries, which results or is likely to result in such deleterious effects as harm to living resources and marine life, hazards to human health, hindrance to marine activities, including fishing and other legitimate uses of the sea, impairment of quality for use of sea water and reduction of amenities.[36]

Since this definition does not seem to cover the discharges of ballast water, the restriction on coastal state jurisdiction over vessel-source pollution does not apply either (Molenaar 2009). Most of the UNCLOS' provisions on vessel-source pollution are laid down in its Part XII ("Protection and Preservation of the Marine Environment") and is predominantly aimed at flag and coastal states jurisdiction, although Article 192 lays down the general obligation for all states "to protect and preserve the marine environment." This is elaborated in Article 194 which outline measures to prevent, reduce and control pollution of the marine environment, with particular measures for vessel-source pollution in paragraph (3)(b); that gives weight to

[36] Law of the Sea Convention, Article 1 (1)(4).

"measures for preventing accidents and dealing with emergencies, ensuring the safety of operations at sea, preventing intentional and unintentional discharges, and regulating the design, construction, equipment, operation and manning of vessels". Other relevant obligations concerning marine pollution from ships are the introduction of alien species (Art.196), co-operation on a global or regional basis (Art.197), contingency plans against pollution (Art.199), monitoring of the risks or effects of pollution (Art.204), and assessment of potential effects of activities (Art.206). Article 207-222 encompass separate provisions on prescription and enforcement for each of the sources of pollution (Molenaar 2009).
As a general rule, flag state jurisdiction must have at least the same level as GAIRAS[37] and coastal states provisions cannot be more stringent than the GAIRAS, with the exception of ice-covered waters in Article 234 (Corell & Molenaar 2009).

4.1.7 Vulnerabilities in the UNCLOS

A legitimate and effective applicability of UNCLOS in the Arctic will be of great importance for protecting of the marine environment with the increased access and extended navigations seasons (Corell & Molenaar 2009). Presently there are several features of UNCLOS that potentially could add to environmental vulnerability in Arctic shipping governance. The level of impact these vulnerabilities might have on the effectiveness of Arctic environmental protection would probably vary considerably. The vulnerabilities are believed to stem from the following factors in the discussion above;

a) *Open textured language in Article 234*
Article 234 lacks specificity to ensure clear guidance. On the other side, open textured language is by some regarded as preferable in a context referred to as a *veil of uncertainty* which calls for flexibility and evolutionary interpretation (Franckx 2009).

b) The absence of a real conference of the Parties of the UNCLOS.
However, this does not necessarily accounts for a considerable vulnerability since change can be accommodated in other ways including through open textured language like mentioned above (Franckx 2009).

c) The exemption of warship and other government ships
The UNCLOS provisions on the protection of marine environment are not applicable to warships or other government non-commercial ships. This is considered a low level vulnerability since these ships are owned or operated by the Arctic coastal states that have vested interest in marine environmental protection.

d) The United States has not ratified UNCLOS
Even though the United State adheres to the provisions of UNCLOS under customary international law, they are not subject to the compulsory third party dispute settlement in

[37] Law of the Sea Convention, Art. 211(2)

Part XV if dispute should occur (Molenaar 2009). This can be labelled a high level vulnerability that affects the overall legitimacy and effectiveness of UNCLOS.

e) Creeping jurisdiction

Creeping jurisdiction refers to a practice where states to make unilateral claims in an attempt to change the content of certain provisions or set up as a package deal from which no derogations are allowed. An example would be the extensive Canadian claim on coastal state jurisdiction in their Arctic internal waters (Franckx 2009). This is considered a high level vulnerability since it might contradict the basic legal framework.

f) *Differing interpretation of the right to innocent passage within Arctic EEZs*

Imposing restrictions on navigation, which is acknowledged as an international freedom enshrined in international law, in the name of environmental concerns have historically met strong objections (Roberts 2007). So it is considered a controversial issue that the Arctic states have differing views on the provisions by Article 234 to expand coastal state jurisdiction. The UNCLOS gives no direction as to whether the regime of transit passage trumps the regime of Article 234 or vice versa (Molenaar 2009). This is a high level vulnerability which is linked to the risk of creeping jurisdiction.
However, despite having to oblige to give due regard to navigation, Article 234 would still provide the Arctic coastal state with a broad range of measures to regulate and mitigate the impacts of shipping in Arctic waters (Franckx 2009).

g) Unresolved maritime boundaries

There are still maritime boundary disputes between Arctic states which need to be sorted. It is nevertheless presumed that if the Arctic really starts to open up for commercial shipping, the Arctic states will feel the urge to pursue their efforts at arriving at a negotiated solution with more vigour, whether it concerns maritime boundary questions, coastal state jurisdiction and responsibility and hopefully the ratification of the UNCLOS by the United States (Franckx 2009).

h) The existence of high seas "holes"

There is no international legislation addressing damage to the high seas (AMSA 2009). Since there are four high seas areas in the Arctic this must certainly be regarded as a high level vulnerability. If the Arctic ice-cover continues to decrease the high-sea areas will be exposed for trans-Arctic shipping activities. It is important that the international community agree on responsibilities and preventive measures to protect the marine environment in these high sea "holes" outside national jurisdiction – possibly through a regional approach by the Arctic states (Franckx 2009).

The considerable list of vulnerabilities mentioned above should not give the impression that the UNCLOS necessarily is not effective or would be difficult to change or develop further. UNCLOS has already proved changeable since it has been 'implemented' twice (Franckx

2009).[38] Furthermore, many of the vulnerabilities could possibly be solved in a satisfactory manner on the basis of UNCLOS itself. It is widely acknowledged that UNCLOS have a high adaptive capacity in order to deal with the different possible scenarios (ibid.). I will see if this hypothesis proves valid in the regulation of ballast water management and CDEM standards in Arctic shipping.

Since many of the vulnerabilities mentioned above can hardly be considered as specific to the Arctic region, it raises questions regarding the call for a new legally Arctic treaty.
Now that UNCLOS finally seem to be recognized by all Arctic stakeholders as a the cornerstone of Arctic legal regime, more binding hard law agreements have so far been considered unnecessary by many actors. Also it is considered counterproductive by many to create a totally new overarching global agreement when UNCLOS shows potential for sufficient adaptive capacity (Franckx 2009).

4.2 The International Maritime Organization

The *International Maritime Organization* (IMO) is a specialized agency of the United Nations with mandate to develop and facilitate implementation of most international conventions in the field of global shipping and the effect of shipping on the marine environment. The IMO also adopts codes and guidelines aimed at operationalizing and facilitating the implementation of international rules and standards (IMO 2011; AMSA 2009). The IMO body of international conventions and guidelines address every facet of shipping including safety, environmental concerns, legal matters, technical co-operation, maritime security and the efficiency of shipping. Key treaties of the IMO include the *International Convention for the Safety of Life at Sea* (SOLAS), the *International Convention for the Prevention of Pollution from Ships* (MARPOL), and the *International Convention on Standards of Training, Certification and Watchkeeping for Seafarers* (STCW) (IMO 2011).

IMO's mandate is global and thus, most of its legally binding instruments have a global scope of application and in principle applicable to the Arctic marine area as well. The only IMO instrument that is specifically tailored to the Arctic are the non-legally binding *Guidelines for ships operating in polar waters* (2009), that are currently undergoing revision by DE and might become a mandatory Polar Code in the near future (target completion date 2012) (ibid.).

The work of the IMO is carried out by the IMO Secretariat, 170 Member States (flagging 98 percent of the world's tonnage), and various intergovernmental organizations (IGOs) and non-governmental organizations (NGOs). The day to day running of the IMO is conducted by the Secretariat. The Member States, IGOs, and NGOs are represented at the IMO through the

[38] The 1994 Agreement relating to the Implementation and the 1995 Agreement for the Implementation of the Provisions. UNCLOS is also a renegotiated agreement following (and prevailing) the Geneva Conventions on the Law of the Sea of 29 April 1958.

various IMO bodies; the Assembly, the Council, five Committees, and nine Sub-Committees (IMO 2011).
The Assembly is the highest Governing Body of the IMO. It consists of all Member States and it meets once every two years in regular sessions. The Assembly is responsible for approving the work program, voting the budget and electing the Council (ibid.).
The Council is the Executive Organ of the IMO and is responsible, under the Assembly, for supervising the work of the Organization. Between sessions of the Assembly, the Council performs all the functions of the Assembly, except the function of making recommendations to Governments on maritime safety and pollution prevention (ibid.).
The five policy-making Committees are responsible for the development, review, updating, and approval of the organization's guidelines and regulations. The Committees report to the organization's Council and Assembly on the status of their Committee and respective Sub-Committees (ibid.). The nine technical Sub-Committees support the work of the five policy-making Committees. The Sub-Committees are under the direct instructions of the MSC and MEPC. The IMO bodies of most relevance to this paper are the Marine Environment Protection Committee (MEPC), the Maritime Safety Committee (MSC) and its Sub-Committee on Design and Equipment (DE). The Sub-Committee DE considers the following issues; (a) design, construction, structure, equipment, machinery installations and electrical installations of all types of ships, vessels and craft covered by IMO instruments; (b) life-saving equipment, appliances and arrangements; and (c) survey and certification (ibid.).

4.3 The Paris Memorandum of Understanding on Port State Control

The Paris Memorandum of Understanding on Port State Control (Paris MOU) is a system of harmonized inspection procedures for port state control designed to target sub-standards ships with the main objective to eliminate the operation of sub-standard ships. The inspections are supposed to ensure that ship complies with international safety, security and environmental standards, and that crew members have adequate living and working conditions. It currently has 27 participating Maritime Authorities and is covering the waters of the European coastal States and the North Atlantic basin from North America to Europe (Paris MOU 2011). All the Arctic states except from the United States are member of the Paris MOU.

The MOU parties draw their authority from the port state jurisdiction provided in UNCLOS and undertake to conduct port state enforcement of IMO conventions relating to maritime safety and the prevention of pollution, and are thereby relevant for the enforcement of the provisions in both SOLAS 74 and MARPOL 73/78 (Tan 2006). MOU inspections are meant to target all aspects of vessel safety, pollution and crewing standards, including operational requirements, for instance ballast water exchange. MOU parties are expected to conduct inspections of 25 per cent of all vessels that entry their port. Since it was adopted in 1982, the Paris MOU has been amended many times to accommodate new rules and standards (Paris MOU 2011).

MOU parties also generate profiles of the most deficient and sub-standard ships and their flag state in order to facilitate the targeting of ships for future inspections. These profiles are shared among the MOU members through a sophisticated computer network and average tables of the most deficient ships are also published by the MOU Secretariats as a so-called "shaming" or "warning" measure to encourage compliance (Tan 2006).

4.4 The Arctic Council

The Arctic Council is a high level forum that according to their founding document, the *Ottawa Declaration* (1996), shall provide;

> … a means for promoting cooperation, coordination and interaction among the Arctic states, with the involvement of the Arctic indigenous communities and other Arctic inhabitants on common Arctic issues, in particular issues of sustainable development and environmental protection in the Arctic.[39]

The Arctic Council is an outgrowth of the *Arctic Environmental Protection Strategy* (AEPS) (Bloom 1999). There are eight member states to the Council, all territorially linked to the Arctic region; Canada, Denmark, Finland, Iceland, Norway, the Russian Federation, Sweden and the United States of America. In addition, six Arctic indigenous organizations[40] are granted permanent participation in the Council (Hasanat 2009). Observer status in the Arctic Council are granted to a number of non-arctic states[41], international organizations[42] and non-governmental organizations[43] which possess significant expertise and experience that contributes to the work of the Council (ibid.).

4.4.1 Protection of the Arctic Marine Environment (PAME)

The main work of the Arctic Council is carried out in six expert working groups focusing on different issues concerning environmental protection and sustainable development in the

[39] Declaration on the Establishment of the Arctic Council, para. 1(a), 35 ILM 1387 (1996).
[40] The Aleut International Association; the Arctic Athabaskan Council; the Gwich'in Council International; the Inuit Circumpolar Council; the Russian Association of Indigenous Peoples of the North; and the Saami Council.
[41] France, Germany, Poland, Spain, the Netherlands, and the United Kingdom.
[42] International Federation of Red Cross & Red Crescent Societies (IFRC), International Union for the Conservation of Nature (IUCN), Nordic Council of Ministers (NCM), Nordic Environment Finance Corporation (NEFCO), North Atlantic Marine Mammal Commission (NAMMCO), Standing Committee of the Parliamentarians of the Arctic Region (SCPAR), United Nations Economic Commission for Europe (UN-ECE), United Nations Development Program (UNDP), United Nations Environment Program (UNEP-GRID/ARENDAL)
[43] Advisory Committee on Protection of the Seas (ACOPS), Arctic Circumpolar Gateway, Association of World Reindeer Herders (AWRH), Circumpolar Conservation Union (CCU), International Arctic Science Committee (IASC), International Arctic Social Sciences Association (IASSA), International Union for Circumpolar Health (IUCH), International Work Group for Indigenous Affairs (IWGIA), Northern Forum (NF), University of the Arctic (UArctic), World Wide Fund for Nature-Global Arctic Program (WWF).

Arctic. The programs and assessments of the working groups are supported by a number of experts and by senior officials representing the Arctic states (Siron et al. 2008).

The most relevant working group concerning vessel-source pollution is the *Protection of the Arctic Marine Environment* (PAME)[44] with the objective of addressing policy and non-emergency response measures related to protection of the Arctic marine and coastal environments from existing and emerging challenges of land and sea-based activities. These measures include coordinated action plans and guidelines complementing existing legal arrangements (Arctic Council 2011).

PAME's work agenda became increasingly ambitious with the adoption of the 2004 *Arctic Marine Strategic Plan* (AMSP). Following up the AMSP (2000) and the marine aspects of the Arctic Climate Impact Assessment (ACIA) from 2004, the *Arctic Marine Shipping Assessment* (AMSA) was published in 2009. The AMSA (2009) assess the prospects of trans-Arctic shipping and made 17 recommendations on possible ways forward in strengthening the protective regime for Arctic shipping both regionally and internationally. Recommendations on pollution prevention and mitigation included (AMSA 2009);

- Making the voluntary Guidelines for Ships Operating in Arctic Ice-covered Waters (2002) a legally-binding code.
- Augmenting existing IMO conventions on ship safety and pollution prevention with specific requirements for ship construction, design, equipment, crewing, training and operations
- Exploring the possible harmonization of national standards for regulating ship-source pollution
- Ratifying as soon as practical by all Arctic States of the IMO *Ballast Water Convention* and assessing the risks of invasive species introductions in the Arctic through ballast water
- Developing further circumpolar environmental pollution response capabilities

4.4.2 The challenges of the Arctic Council

The policy documents of the Arctic Council (e.g. guidelines, manuals of good practice, and recommendations) have no legally binding character, and their implementation is voluntary (Bloom 1999). The informal cooperative structure of the Arctic Council where decisions have built on consensus was initially an important feature since it was difficult for the Council's members to be bound by any legal obligation due to conflicts of interests on controversial issues (Hasanat 2009; Bloom 1999). Consequently, the commitments to the activities of the Council have tended to vary between the Arctic states.

Another obstacle for the Council has been the lack of independent funds and instead it has relied on donations from member states (Hubert & Yeager 2008). Despite its ambitious

[44] Originally an AEPS working group established at the Ministeral Meeting in Nuuk, 1993.

objectives, the Arctic Council has more or less been limited to activities of collecting data, research, assessment, information exchange, and cooperation (Hasanat 2009).

Since the Arctic Council is project-driven and does not have an operational body, there is a lack of follow-up mechanisms which makes implementation and effectiveness of the non-binding guidelines difficult to measure (Bloom 1999; Molenaar 2009).Yet some of these policy documents have been influential in many international policy-making processes on environmental protection.

However, in May 2011 the first legally binding instrument negotiated under the auspices of the Arctic Council was signed, namely the Arctic SAR agreement. Many commentators have expressed this event as "historic" for Arctic cooperation and that this marks the beginning of a new "trend within the [Arctic] Council for more policy-making" (CBC News, 12 May 2011). Furthermore, the May 211 decision on establishing a permanent secretariat will also hopefully contribute to strengthen the role of the Arctic Council in influencing policy-making on Arctic issues (Baker 2008).

5.0 A CASE STUDY OF ARCTIC BALLAST WATER MANAGEMENT

5.1 The problem of ballast water discharges and invasive species

Ballast water is a mixture of seawater taken on at one port and discharged at the next port of call after the vessel discharge wastewater or more cargo is loaded. Ballast water is carried by cruise ships, large tankers, and bulk cargo to compensate for cargo, maintaining stability and hull integrity (Brodie 2010).

Ballast water discharged by ships can have a negative impact on the marine environment because it usually contains a variety of plants, animals, viruses, and bacteria. When discharged in a distant marine ecosystem these species might compete with, prey upon, parasitize, or otherwise alter the habitat of local species and thereby causing extensive ecological damage to aquatic ecosystems (ibid.). Moreover, invasive species can also spread human pathogens and other harmful diseases and toxins potentially causing health issues for humans and marine life. The long-lasting negative impacts of invasive species are perceived even more devastating than oil spill or toxic dumping incidents. The spread of alien invasive species has been named by the International Maritime Organization (IMO) as one of the major threats to the marine environment (Brodie 2010; Lassuy & Lewis 2010).
Non-indigenous species can severely affect the structure of ecosystems. For example, the comb jelly which feeds on zooplankton and fish eggs was introduced to the Black Sea through ballast water in the 1980s and has been associated with dramatic changes in the pelagic food web and the collapse of commercial anchovy fisheries (OSPAR Quality Status Report 2010).

Billions are annually spent on control measures for invasive species, in addition billion in lost revenue (Brodie 2010). According to Lassuy & Lewis (2010), the annual economic impact of invasive species has been estimated at between $13-34 billion in Canada and around $138 billion USD in the United States.

The OSPAR Quality Status Report (2010:98) reports that "the risk of new species introductions is related to the amount of ballast water discharged, the frequency of ship visits and the match between environmental conditions where ballast water originated and where it is discharged." Thus, the threat of introduction of alien species and pathogens through the discharge of ballast water are increasing parallel with the expanded shipping activities in the Arctic Ocean (ibid.). Shipping accidents increase the potential for invasive species being dumped into the marine ecosystem (Brodie 2010). During emergency ships might begin emptying ballast tanks to lighten the vessel for recovery. There have already been several grounding incidents in Arctic waters, but by luck no significant harm has been documented so far. Next time we might not be that lucky, especially considering the increased risk of running into shifting pack ice (ibid.).

Studies of polar shipping operations have shown that the external hull and ballast tanks can support a wide range of foreign species (Lassuy & Lewis 2010). Currently, the level of threat of invasive species in the Arctic Ocean is uncertain, but precautionary measures and further research are of upmost importance – especially since climate change is expected to enhance the migration of new species into the region (Hansen et al. 2003). The Arctic marine environment might be more vulnerable to exotic invasions than other regions in the world due to its low biodiversity and therefore lower resistance to foreign species invasions (ibid.).

5.2 Current regulation of ballast water discharges

Ballast water exchange is still mainly conducted at sea since most existing vessels do not have any treatment system on board. Though designated sites in deep water for the flushing or exchange of ballast tanks can only be seen as an interim measure (Brodie 2010).
There is a general international acknowledgement on the necessity and benefits of developing a safer and more effective management of ballast water that would eliminate the risk of harmful aquatic organisms and pathogens spreading from one part of the world to another causing harm to the environment, human health and property. An effective regulation of vessel-source pollution such as ballast water exchange will require cooperation and coordination among governments, the marine industry, non-governmental organizations and international organizations (ibid.). UNCLOS provides the global framework for such cooperation by requiring states to;

> .. take all measures necessary to prevent, reduce and control pollution of the marine environment resulting from the use of technologies under their jurisdiction or control, or the

intentional or accidental introduction of species, alien or new, to a particular part of the marine environment, which may cause significant and harmful changes thereto.[45]

In addition to UNCLOS, there are two international legal frameworks in place that specifically aimed at protecting the marine environment from pollution from human activities, including shipping. The 1972 *Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter* (London Convention) and its *1996 London Protocol* was one of the first international agreements to protect the marine environment from human activities. It aimed at promoting effective control of all sources of marine pollution and to take all practicable steps to prevent pollution of the sea by dumping of wastes and other matter (IMO 2011). The *1973 Convention for the Prevention of Pollution from Ships* (MARPOL 73/78), as modified by the *Protocol of 1978,* is the main international convention covering pollution prevention of the marine environment by ships from operational or accidental causes. It currently includes six technical Annexes that set out minimum international standards for operational discharges and emissions from ships covering pollution by oil, chemicals, harmful substances in packaged form, sewage and garbage (IMO 2011).

There are additionally two international protocols that cover diverse forms of marine pollution, namely the *Protocol relating to Intervention on the High Seas in Cases of Marine Pollution by Substances other than Oil* (INTERVENTION Protocol 1973) and the *Protocol on Preparedness, Response and Co-operation to pollution Incidents by Hazardous and Noxious Substances* (OPRC-HNS Protocol 2000). However, none of these conventions provide specific regulation of ballast water. Even the UNCLOS' definition of marine pollution seems diffuse concerning vessel-source pollution such as ballast water discharges (Molenaar 2009). This view is supported by the fact that, instead of an Annex to MARPOL 73/78, IMO decided to deal with ballast water management in a separate convention, the 2004 *International Convention for the Control and Management of Ships' Ballast Water and Sediments* (BWM Convention) (ibid.).

5.2.1 The 2004 International Convention for the Control and Management of Ships' Ballast Water and Sediments (BWM Convention)

Canada brought their concern about invasive species to the attention of IMO's Marine Environment Protection Committee (MEPC) in the 1980s. Since then, IMO has taken on the lead in international efforts to address the problem of invasive species caused by shipping activities (IMO 2011).

In 1991, MEPC adopted the first non-binding *Guidelines* for preventing the introduction of invasive species from ships' ballast water and sediment discharges.[46] In recognition of the limitations of the *Guidelines*, the current lack of effective solutions and the serious threats still posed by invasive marine species, the IMO Assembly requested the MEPC and the MSC to

[45] Law of the Sea Convention, Article 196 (1).
[46] MEPC resolution 50 (31)

review the *1991 Guidelines* and develop it further towards an international legally binding convention (IMO 2011).

Yet, it took more than 14 years of complex negotiations between the member states of IMO before the *International Convention for the Control and Management of Ships' Ballast Water and Sediments* (BWM Convention) was adopted by consensus in February 2004. However, it still needs more nations to ratify it before it enters into force (ibid.).

I. Provisions and standards

The 2004 BWM Convention is intended to "prevent, reduce and ultimately eliminate the risks to the environment, human health, property and resources caused by the transfer of aquatic organisms and pathogens" by ships.[47] The Convention contains technical standards and treatment methods for the control of ships' ballast water and sediments with the goal of transforming ballast water management from exchange to treatment for all ships by 2016.

The BWM Convention will apply to ships from flag states that have ratified it and also to ships entering the jurisdiction of those states that are party to the Convention. Since ships differ in type, size and configurations it means that they would have asymmetric implementation capabilities to meet the requirement of ballast water treatment. Consequently, the Convention will allow for two standards of ballast water management until 2016.[48] The ballast water exchange standard, which is considered an interim measure, requires that ships should not discharge ballast water within 200 nm from the nearest land or in waters less than 200 meters deep and must meet an efficiency of at least 95% volumetric exchange.[49] The performance standard mandates that all ships install a ballast water treatment system by 2012 for new-build vessels and 2016 for all existing vessels.[50]

In order to check and assist with the compliance to the regulations, the Convention imposes strict requirements in relation to documents that each ship must have on board at all times:

1) A *Ballast Water and Sediment Management Plan* which details safety procedures for the ship and the crew as well as actions taken to implement the exchange and treatment requirements of the Convention. It must also include the procedures for the disposal of sediments at sea and to shore, designate the officer on board in charge of the implementation of the plan and contain reporting requirements (IMO 2011).
2) A *Ballast Water Record Book* that details each operation in relation to ballast water, including accidental and exceptional discharge (ibid.).
3) An *International Ballast Water Management Certificate* which has been issued by the flag state and is valid for five years. During that period, the ship will be subjected

[47] The 2004 BWM Convention, Article 2.1 (Preamble)
[48] Regulation D – 1 "Ballast Water Exchange Standard" (BWE) with two methods: (i) Sequential method or (ii) Flow-through method. Regulation D – 2 "Ballast Water Performance Standard" (BWP) with three methods: (i) Mechanical treatment, (ii) Physical treatment, or (iii) Chemical treatment.
[49] The 2004 BWM Convention, Regs. B-4 & D-1 (IMO).
[50] MEPC resolution 173 (58)

to a number of surveys by their flag state to ensure full compliance with the requirements of the Convention at all times (ibid.).

Note that the invasive species can also be introduced through hull fouling and anchor chains (Muirhead 2007). The BWM Convention does not include regulation of other ship-associated vectors since these are dealt with by separate agreements.

Also note that ballast water treatment systems and CDEM requirements are both preventive measures and require adjustments by operators. Therefore are the ballast water treatment requirements in the BWE Convention often regarded as, or treated analogous with, CDEM standards (Molenaar 2009).

II. Implementation

The Convention allows port state inspection of the ship to check if it has a valid certificate, to inspect the Ballast Water Record Book and to take a sample of the ship's ballast water (IMO 2011). In addition, the BWM Convention allows states to take additional measures and introduce more stringent regulation than in the Convention, either individually or in concert (Molenaar 2009). These will be subject to criteria set out in the Convention and to IMO guidelines (IMO 2011). IMO has developed 15 specific guidelines on the uniform implementation of the BWM Convention.[51]

The Convention requires a review to be carried out within three years before the first deadline for compliance with the performance standard in order to determine whether appropriate technologies are available to achieve the standard. The first review took place in 2005 and concluded the ballast water management technologies and type-approved systems that meet the Convention's requirements would probably be available by 2008. The second review confirmed that such systems would probably be available for installation prior to the first application date of the BWM Convention. Anyhow, due to procedural and logistical problems the MPEC was concerned regarding the compliance capability of all ships subject to meet the performance standard within 2009. Thus, the MPEC issued a resolution to prolong the compliance deadline until 31 December 2011, and at the same time, it called on states to ratify, accept, approve or accede to the Convention as soon as possible.[52] At the 59th session, MEPC stated that the approved ballast water treatment technologies were available which confirmed that the compliance deadline was realistic (IMO 2011).

III. Compliance

The Convention will enter into force 12 months after ratification by 30 states that together cover 35 per cent of world merchant shipping tonnage. As of October 2011, 30 States have ratified the Convention, but only representing 26.44% of world merchant shipping tonnage,

[51] Approved by the MPEC in April 2004 at the 51st session, further expanded in July 2005 at the 53rd session, and finally adopted by resolution in October 2008 (IMO 2011).
[52] Assembly Resolution A.1005(25).

which means that the Convention needs to be ratified by more states before it enters into force (IMO 2011).

Among the Arctic states, only three (Canada, Norway and Sweden) have ratified the Convention. Finland is a signatory and subject to acceptance and Denmark has signaled that they will start the ratification process by the end of 2011. However, the United States and Russia have implemented their own national legislation on ballast water management. MPEC's introduction of guidelines for the uniform implementation of the Convention and the approval and certification of modern ballast water treatment technologies have removed the last barriers to ratification and several countries have now indicated their intention to adopt the Convention in the near future (ibid.).

The BMW Convention encourages establishment of regional cooperation, including the conclusion of regional agreements. An example is the 2007 non-binding IMO *Guidelines for Ballast Water Exchange in the Antarctic* (AMSA 2009). I will now look into the potential and initiatives for an Arctic-specific approach to ballast water regulation.

5.2.2 Regional approaches

No doubt, ballast water exchange could pose serious challenges to the Arctic marine ecosystem which is characterized as fragile with significant wealth in biodiversity (Corell & Molenaar 2009). It also raises important concerns whether the Arctic needs special regulation for treatment and concern for safety on the issue of ballast water. Due to icing that might, the waters in the ballast tanks may need constant heating to ensure stability to the ship. With constantly shifting Arctic weather conditions it limits predictability regarding decisions over ballasting and de-ballasting. The Ballast Water Convention does not take into consideration any of these issues rising from harsh environmental conditions. Moreover, the existence of both national waters and high sea areas in the Arctic poses special challenges in managing ballast water and sediments (Corell & Molenaar 2009).
Since the Arctic state has the responsibility to protect the inland waterways of the Arctic regions (Brodie 2010), ballast water regulation should be of priority interest, in particular for the Arctic coastal states and for states engaged in Arctic fishery.

In July 2007, IMO adopted *Guidelines for Ballast Water Exchange in the Antarctic Treaty Area*. Although not mandatory, these Guidelines provide guidance on how ballast water is to be managed in regions of extreme cold with fragile ecosystems. The aim of the Guidelines is to adopt an interim measure for all ships entering the Antarctic Treaty area until the BWM Convention enters into force. The Guidelines encourage ships with ballast tanks entering the Antarctic waters to prepare a ballast water management plan with sufficiently consideration for the additional challenges of ballast water exchange in harsh Antarctic conditions. The Guidelines recommend ships to conduct exchange before entering Antarctic waters and propose special measures with respect to sediment in ballast tanks (Corell & Molenaar 2009). These Guidelines could provide as a model for a similar regional approach in the Arctic. The IMO *Polar Shipping Guidelines* do not provide special attention to ballast water management

adapted to the Arctic. It refers to ballast water in only one regard; that "special attention" should be given to "the potential for ice building up inside the ballast tanks".[53]

I. The OSPAR Commission

The only Arctic regional approach to ballast water management is currently taken on by the OSPAR Commission, but it only covers parts of the Arctic waters[54] and includes only five of the Arctic states (OSPAR 2012).

The OSPAR Commission is required to first inform IMO before taken supplementary regional or local action. The OSPAR Commission has already adopted regional voluntary guidelines to reduce the risk of the introduction of foreign species through ships' ballast water, as an interim measure before the BWM Convention enters into force (ibid.). The OSPAR guidelines recommend all ships entering the North East Atlantic to have a Ballast Water Management Plan, to record all ballast water operations and to exchange ballast water at least 200 nm from land (Molenaar 2009).

Since the OSPAR Convention is limited in its geographical scope and membership base (only covering the North-East Atlantic part of Arctic waters), it does not provide an adequate platform for developing a regional approach to ballast water management of the Arctic Ocean. Currently, the effectiveness of controlling and managing ballast water in the Arctic marine areas is dependent on national legislation within each of the Arctic states.

II. The Arctic Council

The Arctic Council address the threat of introduction of invasive species through ballast water in their *Arctic Marine Shipping Assessment* (AMSA) in 2009 and thereby providing added scientific weight to the Arctic concern on ballast water. The AMSA Progress Report (2011:10) encourages the Arctic states;

> … to consider ratification of the IMO International Convention for the Control and Management of Ships Ballast Water and Sediments, as soon as practical. Arctic states should also assess the risk of introducing invasive species through ballast water and other means so that adequate prevention measures can be implemented in waters under their jurisdiction.[55]

5.2.3 National policy and legislation

In accordance with Article 234 in the UNCLOS, Arctic flag and coastal states can, individually or collectively, impose standards on their vessels that are more stringent than GAIRAS. That also includes ballast water exchange standards (Corell & Molenaar 2009).

[53] IMO Resolution A.1024(26), 2/12/2009, *Guidelines for ships operating in Polar waters,* Article 1.1.6.
[54] Region I in the North East Atlantic.
[55] Recommendation II(E), AMSA Progress Report 2011:10.

Yet only Canada, Norway, Russia and the United States have implemented ballast water provisions into their national legislation – and to varying degree. Moreover, Canada, Norway and Sweden are the only Arctic states that have ratified the BWM Convention, and Sweden has yet to implement its requirements into their national legislation. However, Denmark and Finland have signaled their ratification by the end of the year.

Norway recognizes the potential introduction of foreign species as a real threat and has implemented national regulations awaiting the BWM Convention to enter into force (AMSA Progress Report 2011).

In January 2010, Iceland implemented national regulations that ban all releases of ballast water within the Icelandic jurisdiction. The regulation is based on and includes the same provisions that eventually will be given by the BWM Convention (ibid.).

Canada has a comprehensive set of regulations for ballast water discharge. Control of ballast water in Canada is governed by the Ballast Water Control and Management Regulations, under the *Canada Shipping Act 2001* (came into force in July 2007) and guidelines for ballast management are found in *A Guide to Canada's Ballast Water Control and Management Regulations* adopted in 2007 (Arctic Frontiers 2010).

In 2004, the United States implemented a national mandatory ballast water management program for all vessels equipped with ballast water tanks that enter or operate within their waters. These regulations oblige vessels to develop a ballast water management plan and be subject to penalties if vessels entering U.S. waters fail to submit a ballast water management reporting form (U.S. Coast Guard 2011).

With its *1996 Requirements*, Russia imposed stricter ship-source pollution standards for the Northern Sea Route than normal MARPOL requirements (at least in some dimensions). The *1996 Requirements* prohibits discharges of ballast water from tankers. It further requires ships to carry treatment equipment for waste water, as well as a bilge water separator, together with storage tanks sufficient for a 30-day navigation period (Art. 5(1)–(3)). Special requirements apply to the stability of the ship because of ice conditions (Art. 6(2) & (5)) (Corell & Molenaar 2009).

In sum, we see that at present time national standards for regulating ship-source pollution in the Arctic are not consistent among Arctic states (AMSA 2009). For instance, Canada and the United States have different requirements concerning report procedures. Canadian legislation requires ships to take direction from Transport Canada regarding the discharge of ballast water, even when the ship is facing difficulties in complying with the regulation or its Ballast Water Management Plan. The Canadian regulations may prove inadequate in a situation where a ship is caught up in turbulent weather condition and where decisions have to be made quick to protect the best interests of the ship and its crew. In contrast, U.S. regulation provides

the master, operator, or person-in-charge of a vessel with considerable discretion in determining the safety exemption (Corell & Molenaar 2009).

These national legislations are applicable only to areas that fall within its jurisdiction (ibid.). In that case, questions can be raised regarding the effectiveness and adequacy of the national legislations to protect the Arctic marine environment as a whole since there is a lack of cooperation and correspondence on this particular issue and there exist no regulation for ballast water management in the high sea areas.

6.0 A CASE STUDY OF CONSTRUCTION, DESIGN, EQUIPMENT AND MANNING STANDARDS CONCERNING ARCTIC SHIPPING

6.1 An introduction to CDEM standards

Construction, design, equipment and manning (CDEM) standards aims directly at the ship manufacturer to implement ”clean” technology to reduce the potential for pollution and increase maritime safety. CDEM standards are technological constraints on vessel construction and equipment, for instance certifications, fuel content specifications, double hulls and vessel design that meets the internationally acknowledged requirements. CDEM standards are a preventive instrument related to both marine pollution and marine safety both in the sense of require “cleaner” and safer equipment and construction aiming at zero emission operation, but also to prevent emergency incidents and accidental discharges of pollutants. The harsh climatic conditions give additional challenge to ship construction and equipment. For example can deck machinery and equipment be affected by extremely the extreme cold, and icing can generate additional loads on the hull, propulsion systems and appendages.[56]

At present most vessels are built for multipurpose in order conduct various types of operations. This often means that the ships have open deck, low towing capacity and construction that easily accumulate icing – all factors that are unfavorable for operating in Arctic climate conditions (MarSafe North 2011). Thus, shipping in the Arctic demand more stringent standards of ship construction, including ice strengthening, double hulls, covered lifeboats and advanced navigation equipment. Still there is a lack of risk assessment and risk mitigation studies to agree on the specific demands for Arctic CDEM standards (Marintek 2011).

6.2 CDEM standards relevant for Arctic shipping

[56] IMO Resolution A.1024(26), 2/12/2009, *Guidelines for ships operating in Polar waters*, P-1.1.

Article 234 in UNCLOS allows coastal states to set stricter discharge standards in water under their jurisdiction, but coastal state "shall not require foreign vessels to observe design, construction, manning or equipment standards other than generally accepted international rules and standards".[57] Exception exists where the environment is "exceptionally vulnerable", but no such status are given to Arctic areas yet. The rational for the prohibition of unilateral CDEM standards is to protect the integrity of international navigation. CDEM standards are considered a much more obstructive measure to shipping than discharge standards, since it might impact the right of innocent passage (AMSA 2009). Another reason is that compliance to unilateral CDEM standards could require substantial and costly adjustments to vessels (Molenaar 2009). UNCLOS oblige flag states to ensure compliance by their ships to follow the generally accepted international CDEM standards (GAIRAS).[58] GAIRAS generally refers to the rules and standards established through the IMO and all the existing CDEM standards have in fact been established in or by the IMO.[59]
Restrictions on CDEM standards are laid down in the main legally binding IMO instruments, 1974 *International Convention for the Safety of Life at Sea (*SOLAS 74) and the 1973 *Convention for the Prevention of Pollution from Ships* (MARPOL 73/78). CDEM standards concerning the certification and security of vessel crew is contained in the 1978 *Standards of Training, Certification & Watchkeeping Convention* (STCW 78), but is not explicitly relevant for marine pollution and will not be covered here.

6.2.1 The Convention for the Prevention of Pollution from Ships (MARPOL 73/78)

In the wake of the Exxon Valdez disaster in 1989 the international community recognized the need to improve the requirements for the design and construction of oil tankers. In 1992, IMO adopted mandatory double-hull standard on oil and chemical tankers in Annex 1 of the MARPOL 73/78 to provide an increased standard of protection against accidental oil pollution in the event of collision or grounding. In 2001 the IMO adopted a phase-out schedule of single hull tankers to accelerate compliance which was revised to set out even more stricter timetable in 2003. The goal is to eliminate single hull vessels and Annex 1 requires oil tankers built after 1996 to have mandatory double hull or similar design (IMO 2011).

The Convention also outlines monitoring measures to ensure compliance. These are inspections (especially reinforced in-depth inspections of the use and state of oil tankers), records (oil records, records of cargo); and port procedures (record of disposal of cargo residues, port cleaning of tankers). Ships that do not comply with these regulations can be retained by the state carrying out the inspection (ibid.).

The IMO's phasing-out measures led to a massive retirement or conversion of old vessels.In 1993 only 9 per cent of crude oil tankers had double hull. By 2010, 81 per cent of all oil

[57] Law of the Sea Convention Article 211, para. 6(c).
[58] Law of the Sea Convention Article 217, para. 2.
[59] Law of the Sea Convention Article 211, para. 5.

tankers had double hull. Thus the level of industry compliance with MARPOL 73/78 has been high regarding double hull standards, but also regarding equipment regulations in general (Tan 2006).

6.2.2 The 1974 International Convention for the Safety of Life at Sea (SOLAS 74)

The *International Convention for the Safety of Life at Sea* (SOLAS 74) is generally regarded as the most important of all international agreements concerning ship safety. The convention's main goal is to specify minimum standards for the construction, equipment and operation of ships to ensure increased maritime safety. SOLAS also include double hulls requirements, but these cover passenger ships, and thereby not overlapping with the double hull standards of MARPOL 73/78 which cover oil and chemical tankers (IMO 2011).

Since the beginning of the 2000s, member states and international organizations have urged the IMO to play a larger role in setting standards for ship construction. Therefore the notion of *goal-based ship construction standards* (GBS) was introduced at the 89th session of the IMO Council in November 2002. The philosophy underpinning this initiative is that ship construction standards set by the IMO would permit innovation in design but at the same time ensure that ships remain safe and environmentally friendly throughout their service life (IMO 2011). To accommodate this request, MSC recently adopted *International Goal based Ship Construction Standards for Bulk Carriers and Oil Tankers*, along with amendments to SOLAS to make their application mandatory. The new SOLAS regulation enters into force 1 January 2012 (ibid.).

The only requirements in the SOLAS Convention directly relating to polar areas are contained in SOLAS chapter V (Safety of Navigation) and concern the safety of navigation (ibid.). In 2008, the Intact Stability (IS) Code was adopted under the SOLAS Convention (and the 1988 Load Lines Protocol). It contains both mandatory and recommendatory criteria and other measures concerning the intact stability of all ships covered by IMO instruments to ensure safe operation and to minimize the risk to ships, crew and the environment. One of the recommendations gives guidance for ships operating in polar areas on stability considerations where ice accretion is likely to occur) and recommend that icing allowances should be included in the analysis of conditions of loading (Chapter 6: Icing considerations) (Deggim 2009).

UNCLOS oblige flag states to ensure that their ships comply with global CDEM requirements, and SOLAS 74 prescribes a number of certificates as proof that this has been done. SOLAS 74 also gives provisions that allow member states to conduct inspections of the ships of other member states if there are strong grounds for assuming that the ship does not comply with the requirements of the Convention. This procedure is what UNCLOS refers to as port state control (IMO 2011).

6.2.3 Regional approaches

I. The Polar Shipping Guidelines (IMO)

Marine safety and pollution prevention in polar waters was first addressed by the non-mandatory *Guidelines for ships operating in Arctic ice-covered waters*, adopted by the IMO in 2002 and meant to complement the mandatory and recommendatory provisions contained in SOLAS and MARPOL.

The Polar Guidelines are based on input from various nations, in particular the Canadian *Ice Navigator Standards,* based on their experience with operations in ice covered waters (Jensen 2008). A revision of these guidelines was initiated already in 2004 to extend their applicability to cover both polar oceans (Stokke 2010a) and also extend and elaborate previous recommendations. The *Guidelines for ships operating in polar waters,* also referred to as the *Polar Shipping Guidelines*, was adopted at the 26th IMO Assembly in December 2009 as a recommendatory document.[60]

The main objective of the *Polar Shipping Guidelines* is to promote the safety of navigation and to prevent pollution from ship operating in polar waters.[61] The *Guidelines* takes into account the added risk and challenges of polar environmental and climatic conditions and address the demand for additional provisions beyond the requirements of the SOLAS and MARPOL Conventions (Deggim 2009). Thus it contains recommendations on CDEM standards adapted for polar conditions regarding navigation, communications, life-saving appliances, main and auxiliary machinery, environmental protection and damage control, training and operational procedures. All parts and chapters of the Guidelines should be applied to all ships in polar waters, but separate Guidance is provided for new Polar Class ships.[62] The recommendatory provisions in the Polar Shipping Guidelines have an intentional strong linkage with the IACS Unified Requirements concerning construction requirements on Polar Class ships (Molenaar 2009).

The Polar Shipping Guidelines provides the following recommendatory provisions concerning CDEM standards[63];

- Only those ships with a Polar Class designation or a comparable alternative standard of ice-strengthening appropriate to the anticipated ice conditions should operate in polar ice-covered waters (G-2.1).
- The prescribed hull structural design, material quality, subdivision and segregation measures should be adequate to reduce the risk of human casualties, pollution incidents or ship losses (G-2.2).
- No pollutants should be carried directly against the shell in hull areas at significant risk of ice impact (G-2.3).

[60] IMO Resolution A.1024(26), 2/12/2009, *Guidelines for ships operating in Polar waters*.
[61] IMO Resolution A.1024(26), 2/12/2009, *Guidelines for ships operating in Polar waters*, P-2.1.
[62] IMO Resolution A.1024(26), 2/12/2009, *Guidelines for ships operating in Polar waters,*.
[63] IMO Resolution A.1024(26), 2/12/2009, *Guidelines for ships operating in Polar waters*, G.2.

- Operational pollution of the environment should be minimized by equipment selection and operational practice (G-2.4).
- Key safety-related, survival and pollution control equipment should be rated for the cold temperatures in polar areas (G-2.5).
- Navigation and communications equipment should be suitable to provide adequate performance in high latitudes, areas with limited infrastructure and unique information transfer requirements (G-2.5).
- Sea suction(s) should be capable of being cleared of accumulation of slush ice (G-2.6).

Even though the Guidelines are recommendatory in nature, states can make their provision mandatory in their territorial waters by incorporating them into their national laws (Blanco-Bazán 2009). At present none of the Arctic states have done that. Therefore it may prove difficult to document compliance, but it does not preclude the possibility of certain important practical effects (ibid.).

II. IACS Unified Requirements for Polar Class

In parallel to the development of the IMO Arctic Shipping Guidelines, the International Association of Classification Societies (IACS) adopted a set of *Unified Requirements for Polar Class* for member societies addressing important aspects of the construction for ships of *Polar Class* (UR-I) to enhance the quality standards of ships operating in ice-covered waters.[64] There is a strong linkage between the Polar Shipping Guidelines and the IACS in that the IMO Guidelines recommend that only those ships with a Polar Class designation in accordance with the IACS Unified Requirements or a comparable alternative standard of ice-strengthening appropriate to the anticipated ice conditions should operate in polar ice-covered waters. The Polar Class standards are uniformly applied by IACS member societies to ships built after 1 March 2008 (IMO 2011). However, specific international construction requirements for cruise ships operating in polar waters have not been adopted and this is a severe concern given the increasing cruise ship activity in Arctic waters (AMSA 2009).

Presently the harmonization process of Polar Class ships is not fully accomplished, and ships navigating in the Arctic may still be certified under differing standards (Jensen 2008). But if the application of the harmonized *Polar Class* in the Polar Code should be made mandatory, it would effectively strengthen safety and environmental protection in Arctic waters (AMSA 2009).

III. The Arctic Council

The Arctic Council contributed with recommendatory provisions to Canada that was leading the IMO negotiations of the *Guidelines for Ships Operating in Arctic Ice-Covered Waters*. The PAME working groups has since 1998 been working on an legally binding international code of safety for ships operating in polar waters (Polar Code) under the auspices of IMO

[64] IMO Resolution A.1024(26), 2/12/2009, *Guidelines for ships operating in Polar waters*, P-2.8.

(Hasanat 2009). The AMSA (2009) recommends that the Arctic states support the IMO's efforts to strengthen, harmonize and regularly update international standards for vessels aimed at safety and pollution protection, and supports updating and mandatory application of relevant parts of the Polar Shipping Guidelines.[65]

6.2.4 National policy and legislation

In the IMO negotiations of the Arctic Shipping Guidelines – intended as a mandatory Arctic Code for shipping – the United States was the main reason for it becoming downgraded to a set of recommendatory guidelines. The United States insisted that the prohibition by UNCLOS to grant coastal state authority to enforce unilateral CDEM standards within internal waters and the territorial sea was an infringement of the coastal state sovereignty. The United States had already implemented certain unilateral design and construction standards on visiting ships in the 1972 *US Ports and Waterways Safety Act* (PWSA). In this respect, the UNCLOS prohibition on unilateral CDEM standards and the IMO proposal of a mandatory Arctic Code would both undermine their own national legislation (Tan 2006). The United States has adopted a number of instruments including CDEM standards that give effect to obligations under SOLAS 74 and MARPOL 73/78 as well as laws imposing criminal and civil penalties on foreign-flagged vessels for polluting (Deggim 2009).

Canada's Arctic Policy can be characterized as *leading* in terms of setting of strict national standards for vessel-source pollution and construction, equipment and crewing requirements for the Arctic in its *Arctic Waters Pollution Prevention Act* (AWPPA). Canada is also a lead state in the ongoing negotiations within the IMO to establish a mandatory Polar Code. On the contrary, Canada can be characterized as *pondering* in terms of adopting and mandating the IACS polar class construction standards for new ships (VanderZwaag in Arctic Frontiers 2010).

The Russian Federation has developed a series of regulations adopted in the 1990s that currently govern all shipping activities in the Northern Sea Route, including strict CDEM standards (*Requirements for Design, Equipment, and Supply of Vessels Navigating the NSR*, 1996) (Deggim 2009).

The other Arctic countries have not adopted any specific Arctic maritime legislation regarding CDEM standards except from giving effect to international provisions in SOLAS 74 and MARPOL 73/78.

Only Canada and the Russian Federation have enacted laws and regulations that are significantly more stringent than GAIRAS, including CDEM standards. This would be considered legitimate assuming that Article 234 triumph the regime of transit passage in the

[65] Status on Implementation of the AMSA 2009 Report Recommendations, PAME, May 2011.

UNLCOS. The illegitimate aspect of the Canadian and Russian CDEM standards for vessels navigating their Arctic waters is that the provisions include warships and government vessels in their application which exceed the scope of Article 234 of UNCLOS (Deggim 2009).

7.0 THE EFFECTIVENESS OF THE ARCTIC SHIPPING REGIME

I will now embark on the examination of the effectiveness of the Arctic shipping regime in addressing vessel-source pollution in Arctic waters.

The analysis builds on the essential groundwork of several scholars that has evaluated regional and international institutions relevant to Arctic governance and identified both gaps in their coverage and options for improvement.

Olav Schram Stokke (2010a; 2011b) has introduced a conceptual framework of four governance tasks (i.e. knowledge building, norm building, capacity building and rule enforcement) to systematically examine the effectiveness of environmental regimes. He argues that examining the governance tasks that institutions are set to fulfill in a specific issue area will reveal their success or failure to do so, but it also help to identify interaction and division of labor within or between institutions (ibid.).

The analysis of the Arctic shipping regime will build on this methodology and assess the extent to which four specific governance tasks are fulfilled as a systematic approach to evaluating the effectiveness of the regime in regulating vessel-source pollution.
Each governance task is evaluated on the basis of a set of variables that regime effectiveness theories often refer to as relevant for executing the task successfully. The selection of variables is specifically tailored to the substantive focus of the analysis, namely the regulation of vessel-source pollution.

Furthermore, the analysis will address the contributions that Arctic regional institutions, with a particular focus on the Arctic Council, can make to improve the global shipping regimes in dealing with potential environmental pollution problems following the growth of Arctic shipping.

7.1 Knowledge building

7.1.1 The level of knowledge

I. The veil of scientific uncertainty

The scientific, environmental, economic and political realities of the High North are changing dramatically, and new problems and challenges call for new or improved scientific knowledge

which includes attention to the basic research, scientific assessments, scientifically based scenarios of change, monitoring, and technologies.
One type of uncertainty is related to the diagnosis of the problem and/or the effects of mitigation measures (Underdal 2010). Problems related to issues like climate change, invasive species, and many types of marine pollutants that are characterized by very long time-lags between measures and effects. Here, the future gains from mitigation measures will be far more distant and uncertain and therefore 'underrepresented' in cost/benefit calculations (ibid.).
The second type of uncertainty is related to the interests, beliefs, intentions and behavior of other parties. It thus becomes relevant to examine how the framing of an issue can influence whether actors act on self-interest and/or the interest of others (Nilsson et al. 2010). As the multilevel interactions between parties grow more complex and dense, the more difficult, costly and risky it will be obtain information or assumptions regarding other parties through unilateral efforts (Underdal 2010). Therefore, the role of knowledge becomes crucial – as a competitive advantage for Arctic stakeholders and as a necessary feature of ecosystem-based ocean management in the Arctic. Mitchell (2008:96) observes that "better knowledge of the causes of an environmental problem and of technological alternatives can increase the motivation to avert environmental change while decreasing the countervailing pressures that inhibit changes to existing behavior patterns."

The threat of invasive species through ballast water fits to the category of complex environmental problems that are difficult to assess scientifically due to the long time-lags between the first introduction of a foreign species and the emergence of effect it has on the ecosystem (normally it can take 50-100 years) (Alsos 2012). There is also a lack of knowledge on what kind of species is transported through ballast water and their survival ability in different ecosystems (ibid.). There have been few problems of invasive species in the Arctic marine ecosystem so far and therefore also limited research on the threat of invasive species in the Arctic. Thus it comes as no surprise that there is a so-called *veil of uncertainty* regarding the actual impacts of invasive species could have in the Arctic marine environment and whether special considerations need to be taken with the prospect of future scenarios of increased commercial shipping (Alsos 2012; AMSA 2009).

However, there is a high level of *risk awareness* regarding ballast water discharges. This supports empirical research that indicates that in some cases of environmental threat, great scientific uncertainty will produce more political concern and thereby greater political will to address a problem (Young 2002c) which is linked to the *precautionary principle*. The high risk awareness in the case of ballast water is probably linked to lessons learned from the high comparative cost of foreign species invasions in other marine areas, in particular in the Great Lakes of the United States.
Political efforts have been made by the Arctic states to address the threat of foreign species in the BWM Convention, but it has still not entered into force. This is because efficient technology for ballast water treatment depends a great deal on continued research and technological innovations. It is expected that new scientific evidence and technological

solutions might move states towards ratifying BWM Convention in the coming years (Mitchell 2006).

II. Operational knowledge

Vessel-source pollution prevention also involves measures for reducing the risk of accidental spill and emission from vessels. Thus, the level of and access to region-specific meteorological, oceanographic and hydrographic information for safe navigation and voyage planning in Arctic waters is of upmost importance (Brigham & Sfraga 2009). Yet, the operational network of meteorological and oceanographic information services for providing Arctic operators with accurate weather, wave, sea ice and icebergs forecasting, is extremely sparse (AMSA 2009). For instance, significant parts of the Arctic shipping routes, particularly in the Canadian Archipelago and the Beaufort Sea, do not have adequate hydrographic data, and therefore not accurate charts, to support safe navigation (ibid.).
Furthermore, the added risk and potential for accidents and environmental harm in Arctic waters will require accurate early warning systems in place to maximize operational safety and minimize environmental damage (ibid.). In March 2011, the IMO (COMSAR) successfully expanded the World-Wide Navigational Warning System (WWNWS) into Arctic waters. The expansion means that ships operating in the harsh Arctic environment can automatically receive vital information about navigational and meteorological hazards and other urgent information to shipping, via five new navigational areas (NAVAREAs) and meteorological areas (METAREAs) (IMO resolution A.706(17)). This service is a very significant development needed to address the increased risks to ships from a combination of expanding economic activity and extreme weather conditions.
The IMO Sub-Committee on Radiocommunications and Search and Rescue (COMSAR) has also concluded that there is a need for a common broadcast system for Maritime Safety Information (MSI) and an regional satellite service provider for the Arctic region, but these are not yet in place (IMO resolution A.706(17)).

III. Modeling and simulations

Another deficiency of the Arctic knowledge base is the limited availability of scenario analysis and forecast models (Johnsen 2012). Although the AMSA presents possible scenarios of Arctic shipping, these are general and superficial. Actors of both industry and government act on the basis of expectations and predictions about what will happen in the future. Thus, modeling and simulations would help Arctic inhabitants, policymakers and actors within shipping to refine adaptation strategies so they can cope with changing environmental conditions (Siron et al. 2008). However, satisfactory forecasting and prognoses on Arctic shipping are almost non-existing (Johnsen 2012). In recent years maritime agencies, institutions and researchers have made efforts to generate forecasting models and scenarios

analysis of Arctic shipping to assess the future needs of vessel technology, marine infrastructure, and safety and environment regulations. For instance, there are ongoing projects (e.g. Arc Act) that aim to develop simulation models for vessel traffic in the Arctic Ocean. Particularly relevant variables to predict changes in different segments of marine transportation are the socio-economic driving forces and activities, route selection, search and rescue services and infrastructure, and the environmental regulations of emissions etc. But due to the great uncertainty and complexity of these variables, forecasting models are largely imprecise and questionable (Johnsen 2012). Furthermore, a model of forecasting must have a sufficient number of variables that are obtained through monitoring. Yet statistics and data on Arctic marine activities are fragmented and difficult to access (ibid.). In fact, there are none recent overview of the Arctic shipping activities than a snapshot from 2004 that was published in the AMSA (2009). Due to the great uncertainty and imprecision in prevailing scenario analysis and forecast models, the initial enthusiasm about the prospects for trans-Arctic commercial shipping has decelerated in many shipping companies, and more or less halted concerning commercial shipping through the Northwest Passage.

IV. Environmental Impact Assessment

In the absence of regulatory authority, the most influential component of Arctic environmental governance has been the requirement for soft law institutions to base their relevant decisions on *environmental impact assessments* (EIA) and the creation of epistemic communities of scientists, stakeholders, and decision-makers sharing this knowledge and consulting decision-making (Oberthür 2009; Schützenmeister & Crawford 2010).

The Arctic Council has developed a strong basis for influential assessments to inform policy-makers, companies, and other actors who act on very different levels of governance from the village to international negotiations. These are widely regarded as independent and authoritative. The EIAs, reports and research programmes of the Arctic Council are especially valuable since the demand for knowledge in the Arctic region is high and research expensive (Schützenmeister & Crawford 2010). The assessments of the Arctic Council differ from other international assessment (e.g. the IPCC) by discussing the position of different actors, in particularly of indigenous people, in relation to natural resources and changes in the environment. Moreover, the assessments draw on both scientific and local knowledge (e.g. TEK) and aims at informing a wide, not clearly defined audience of actors and policy makers across all levels of governance (ibid.).

Over the years the Arctic Council has completed a number of major regional surveys and assessments of challenges and opportunities that derive from Arctic marine activities A selection of these are; The Arctic Marine Strategic Plan (AMSP 2004), Arctic Climate Impact Assessment (ACIA 2004), Arctic Oil and Gas Assessement (2007), Arctic Marine Shipping Assessment (AMSA 2009), Arctic Biodiversity Trends (2010), Arctic Biodiversity Assessment (ongoing), Arctic Ocean Review Project (ongoing), and various reports of the Arctic Monitoring and Assessment Programme *(*AMAP*)* working group.

However, AMSA (2009) is currently the only assessment with exclusive focus on Arctic shipping. It describes and evaluates the history, current state, and future scenarios of Arctic shipping in the context of the particular challenges of the region in terms of geography, climate, and sea ice (Stokke 2010a). Furthermore, AMSA examines the need for improvements of national and international governance structures and marine infrastructure and presents a list of recommendations for national and collective action to enhance marine safety, protection of local populations and the environment in the Arctic (ibid.). Although with limited elaboration and specification, AMSA (2009) includes identified governance gaps in both ballast water management and CDEM standards and provided recommendations for individual and joint action by the Arctic states.

V. Credibility, legitimacy, and saliency

Mitchell, Clark and Cash (2006:314–324) refer to the notions of *credibility, legitimacy, and saliency* in evaluating the institutional basis for influential knowledge building, such as EIA. The AMSA have proved adequate in relation to all three notions and thus must be regarded as influential in the sense of increasing knowledge, raising awareness and providing policy advices (Stokke 2010a). However, the explicit effect it has had on national implementation and policy-making is difficult to measure due to the lack of follow up procedures and reviews within the Council. Also, there is a potential constraint to the legitimacy of EIA conducted by the Arctic Council in that it's funded by Arctic states and thus running the risk of criticism for being biased on issues affecting global interests, for instance on the controversial issue of navigation in Arctic waters. However, the various means for involvement during the assessment period of a broad range of experts and stakeholders with complementary and competing perspectives, serve to argue against such criticism (ibid.). For example, the lead countries (Canada, Finland and the United States) represent in fact both sides in the main geopolitical issue concerning Arctic shipping, namely the right of free passage in Arctic waters (ibid.). Furthermore, the AMSA (2009) is a major collaborative assessment reports that has fostered the creation and maintenance of circumpolar expert networks that are mobilized whenever new assessments and reports are requested. More than 180 experts participated directly in AMSA. The lead countries also recognized the importance of incorporating contributions from the broader, global maritime community early in the AMSA planning process. These key stakeholders included non-Arctic states (e.g. the United Kingdom and Germany), shipping companies, ship designers, shipbuilders, ship classification societies, non-commercial partnerships, marine insurers and non-governmental environmental organizations (AMSA 2009:10). Another legitimizing factor is that the Arctic Council organized more than fifty reach-out events, such as town hall meetings in selected Arctic communities, to listen to issues and concerns about future Arctic marine activity (ibid.). AMSA topics were presented on 12 workshops and 56 professional venues throughout the world during 2005-2008. In fact, a large number of source documents that provided the background for drafting the AMSA 2009 Report were collected from these activities, in addition to the AMSA Data Survey, special reports created by maritime experts, and reviews of AMSA topics drafted by lead and contributing authors (AMSA 2009:11).

All together, these factors serve to reinforce the overall legitimacy of the reports and the perception among decision makers that the report findings constitute the best available knowledge on the issue (Stokke 2010a).

Drawing on such broad network of experts and stakeholders also contributes to enhance the credibility of the reports (ibid.). This corresponds to the argument of Levy, Keohane and Haas (1993:410-12) that the credibility of knowledge building within or across international institutions is enhanced by diffusing research findings because it contributes to leveling the factual basis for assessment of risks and options (Young 1999:262–263). Stenlund (2002) argues that the Arctic Council has in fact become specialized in collaborative knowledge, for instance through the Arctic Monitoring and Assessment Program (AMAP) which serves as a collaborative research instrument that systematically examines the sources and concentrations of pollution and their impacts on the inhabitants and ecosystems of the Arctic (Stokke & Hønneland 2007).

Stokke (2011b) argues that the Council's assessments in areas such as shipping, toxics, and climate change have elevated the saliency of the Arctic dimension of international problems and succeeded in mobilizing non-Arctic states and actors to address Arctic issues.
Since policymaking requires constantly estimation of trade-offs at different levels of scale and with differing interests and stakeholders, the scientific information it is based on needs to be relevant to people's needs and stakeholder's interest in order to stay on the policy agenda. Furthermore, scientific knowledge needs to keep pace with environmental and political changes and communicate results in a precise fashion, in particular regarding the consequences of different approaches and scenarios (Yalowitz et al. 2008).
Yalowitz et al. (2008:10) have recommended that "scientists must tailor their messages to treasuries, which increasingly are playing an important decision-making role [in order] to push Arctic science and policy issues closer to the top of the list of national and international policy priorities".
The saliency of AMSA has widely been perceived as significant since its publication corresponded with recent findings that the Arctic multi-year sea-ice was melting more rapidly than envisaged in the 2004 ACIA report (Stokke 2010a). In addition, the Arctic region obtained global attention in light of the shipment of two German heavy-lift vessels through the Northern Sea Route in October 2009 which opened their eyes to the possibilities of enhanced Arctic shipping (ibid.). The timing of AMSA was also fortunate considering the rising interest of Arctic states in the natural resources in the region. In fact, national Arctic strategy documents (United States, Canada, Russia and Denmark) was released in the same period as the AMSA report implying that the states governing the Arctic were highly alert to the issues addressed by this assessment (ibid.). Simultaneously, at the international level, the Arctic states had contributed to the revision and transformation of the IMO Arctic Shipping Guidelines (2002) into the Guidelines for Vessels Operating in Polar Regions (2009). All together these events added value to the saliency of the Arctic Council's knowledge building efforts since it concerns policy issues that decision-makers are presently facing at domestic as well as international levels (ibid.).

VI. Indigenous and traditional ecological knowledge

Huebert & Yeager (2008) have observed that local and/or indigenous traditional knowledge is increasingly being acknowledged by the Western science community and is gradually able to influence policymaking processes. Although the value of is now widely accepted within the scientific community, the process of integrating local traditional knowledge and indigenous people into policymaking and the way they are used in research varies considerably (Schützenmeister & Crawford 2010). Under some circumstances local traditional knowledge are in fact conflicting with Western science and the rational objective of modern governance systems (ibid.). In other cases, demonstrated by the Arctic Council, combining Western science with local ecological knowledge when evaluating and addressing environmental change can provide a more sound and legitimate management of the Arctic's natural resources. Arctic governance requires a holistic view, and this is more commonly found in indigenous resource management systems than in modern government (Schützenmeister & Crawford 2010:22). The integration of traditional ecological knowledge (TEK) into Arctic research and resource management can be seen a response to the inherently complex relationships between nature, culture, and resource use where the application of modern scientific management methods would be extremely costly and include high risk of failure (ibid). TEK can support EBM in the Arctic with historical and current in-situ observations to fill knowledge gaps and verify modern scientific theories or predictions (Siron et al. 2008).

The use of different forms of knowledge often requires new institutional arrangements (Schützenmeister & Crawford 2010). At the local level in the High North it has led to a strong focus on various forms of co-management and partnerships with resource users taking more direct responsibility (Nilsson et al. 2010). For instance, in Canada it has led to a greater tendency of government agencies insisting upon local consultation (ibid.). The emergence of ecosystem-based co-management of the Barents Sea and Beaufort Sea is also related to the growing acknowledgement of local ecological knowledge. Regional, ecosystem-based co-management regimes encourage flexible and participatory processes that place much weight on collective knowledge and learning among resource users, stakeholders, and government (Larsen 2010).
Since the indigenous peoples are central stakeholders in Arctic policymaking, the Arctic Council has granted permanent membership to six organizations that represents the indigenous people of the region (i.e. the Aleut International Association, Arctic Athabaskan Council, Gwich'in Council International, Inuit Circumpolar Council, Russian Association of Indigenous Peoples of the North, and the Saami Council). During the IPY, new forms of scientific collaboration with the inhabitants of the High North emerged (Schützenmeister & Crawford 2010). Also innovative educational programs that disseminate local traditional knowledge have been established, either through educating local inhabitants or placing them in the role as educators (Yalowitz et al. 2008). Concurrently with filling gaps in modern scientific knowledge base, these efforts to incorporate TEK into Arctic policymaking and knowledge building are also enhancing the legitimacy of the Arctic regime.

7.1.2 Intellectual Leadership

During the last decade Arctic issues have gained high policy priority in all Arctic state and there have been considerable investment in Arctic research and infrastructure, also by non-Arctic actors. Numerous institutions, research stations, and networks for scientific studies have been established (Sakhuja 2010). The Arctic region represent the new frontiers in ocean research and marine technology (Reve 2009), especially as the oil and gas industry moves into the Arctic Ocean and new shipping routes are opening. But which actors are contributing to the building of Arctic knowledge and whom stands out as intellectual leaders?

I. Norway as a leader state

Norway is well positioned to take the lead in knowledge building within Arctic Ocean governance due to their geographic location, industrial knowledge and long polar experience (Reve 2009). The main strategy for the Norwegian Government is that Norway by 2020 is a leading state in Arctic research, a respected steward of the natural resources in the High North and that Northern Norway is a strong and diversified industrial and R&D region (Norwegian Government's High North Strategy Plan 2006).[66] Norway is a small high cost economy that needs to specialize in a few areas where they have a competence advantage (Reve 2009). Norway's positioning as an intellectual leader in the High North can be understood in this perspective. Additionally, Norway has the financial resources needed for profound investment in knowledge building (ibid.).

The key Norwegian industries are the maritime and offshore sector and the energy industries, and these are also key areas for research and innovation. Thus, Norway has already built a strong global maritime knowledge base, including shipping and maritime operation, offshore oil and gas, and fisheries and governance of marine resources (ibid.). Norway is regarded as one of the nations which actively promotes and supports conservation of natural resources, especially the marine eco-system, and combines the knowledge and technology targeting the marine, maritime and energy industries (Norwegian Government White Paper 7 (2011–2012)). For sustaining such a strong global knowledge position in the maritime areas, Norway needs to develop highly qualified and specialized Research and Development Infrastructure (RDI) to attract talent and technology on a global basis.
Norway is currently planning to establish a Global Maritime Knowledge Hub[67] in Trondheim, called the Ocean Space Center, that is sustainable and internationally attractive (Reve 2009). The ambitious plan of building a global Ocean Space Center in the coming decade is a clear signal of the Norway Government's intention to take a lead position in Arctic maritime knowledge building (Norwegian Government White Paper 7 (2011–2012). The Norwegian Ministry of Trade and Industry first launched the idea of a World Ocean Space Center in 2008

[66] This is reflected in the priorities of the Norwegian Research Council (MAROFF programs) and Innovation Norway for allocating funds for marine research and ocean technology innovation.
[67] A global knowledge hub is a supercluster of industrial and knowledge actors, driven by research and innovation, and fueled by competent risk capital and investors. Research and innovation, taking place at Public Research Organizations (PROs), form the core of a global knowledge hub, but it also requires world class Research and Development Infrastructure (RDI) (Reve 2009:36).

and a preliminary report was concluded on February 2010 (ibid.). It is envisioned as a global knowledge center and important landmark for maritime studies covering a large range of ocean space challenges of the future, including the high priority arctic and climate challenges (Reve 2009). Building a Global Maritime Knowledge Hub that can offer a sufficient knowledge base for ecosystem-based management of the Arctic Ocean will require close international cooperation with maritime industry and research institutions of other nations. For instance, there is a strong knowledge base on marine issues to be found in Europe, Germany and the Netherlands, and Korea and China are the strongest competitors when it comes to ship building and maritime technology. Norway and the United States remain prominent in offshore technology, and the Russian Federation has a strong position in Arctic technology (ibid.).

Another initiative by the Norwegian Ministry of Trade and Industry is *Maritime21,* a new long-term maritime research and innovation program that aims to create a shared strategy and knowledge platform for Norwegian maritime industry, research and politics (Norwegian Government White Paper 7 (2011–2012). The Maritime21 Program has Arctic marine transportation and operation as one of its priority areas and is based on input from over 400 maritime employees and a corresponding working group that was established in June 2011 (ibid.).

II. IGOs as knowledge builders

For many institutions addressing environmental problems; "evidence of improved scientific understanding of the environmental problem and potential solutions provides a useful leading performance indicator" (Mitchell 2008:96). Institutions may enhance scientific knowledge directly by making it an objective of regulatory efforts and provide funding for research, or indirectly by raising the salience of an issue so that government, institutions, private stakeholders, and scientists dedicate more time and resources on solving the problem (ibid.).

The knowledge building within the Arctic shipping regime has generally proved influential due to the broad network of Arctic institutions and organization devoting skills and energy into Arctic issues and consulting with epistemic communities and networks of experts, stakeholders and scientists.
Negotiations within international environmental regimes often involve scientific or technical aspects that require special attention. One alternative is the establishment of consultative committees or formal international organizations that are empowered to make rules more precise as learning occurs. However, this may require a certain autonomy that states may be reluctant to grant on crucial issues (Abbott & Snidal 2000). Another alternative is to incorporate mechanisms for feedback input from groups or networks of experts into the negotiations procedures in order to overcome dramatic differences in technical understanding (ibid.). But since there is rarely an established representative network or group of experts ready to step in, technical issues often cause delays in negotiation.
However, the Arctic shipping regime confirms the trend pointed out by Chasek et al. (2010) that over the past two decades, international networks of cooperating scientists and scientific

institutions have become important actors in global environmental policy providing independent and authoritative information.

In the negotiations of CDEM standards within the IMO, there were particularly one international organization that stood out as an important contributor of input and feedback, notably the International Association of Classification Societies **(**IACS). IACS is as an international non-governmental organization that holds observer status at IMO and cooperates with the IMO in order to enhance the determinacy applicability and clarity of IMO regulations to avoid differing interpretations by targeted actors (IACS 2011). IACS provides technical support and guidance and develops unified interpretations of the IMO regulations and thus plays a unique role in knowledge building within the IMO (ibid.). In the case of CDEM standards the relation between IACSs Unified Requirements and the IMO Polar Shipping Guidelines proves as an example of supportive collaboration on developing provisions on Polar Ship Class by effectively dividing responsibilities between them, but at the same time facilitating sharing of information (ibid.).

The Arctic Council holds some distinctive features that made it possible to gain a leading position in producing scientific knowledge on various Arctic issues (Hasanat 2009; Stokke 2011b). Among these features are the wide acknowledgement of the Council's specialization in collaborative assessment reports and its long-standing emphasis on indigenous concerns and traditional ecological knowledge (Stokke 2011b).
The Arctic Council has collaborated with hundreds of scientists and experts in producing numerous guidelines, codes of conducts and strategy plans on a range of issues. Although not formally binding, their recommendations and guidelines have become compelling coordination points for states and private actors (Abbott & Snidal 2000). Assessments of the Arctic Council, such as ACIA (2004) and AMSA (2009), supports high standards of research and have influenced the negotiations in the IMO on issues concerning shipping and put pressure on the implementation of national Arctic action plans (Stokke 2010a). The Arctic Council has also played a central role in the revision and transformation of the IMO's Arctic Shipping Guidelines (2002) into the Polar Shipping Guidelines (2009) (ibid.).
Because of its central role in collecting information and conducting scientific assessments, the Arctic Council could be mandated and endowed with the necessary resources to provide more formal input and feedback into policy-making processes. In the meanwhile, the Council should intensify efforts to coordinate the working groups to avoid duplicity work and develop strategies on how to better inform politicians and policymakers about issues affecting the Arctic (Hasanat 2009). An impediment to the knowledge building capacity of the Arctic Council is the poor accessibility to data. While huge efforts go into collecting and amassing data for the Council's Working Group assessments and reports, it reminds difficult to find and access. There are a multitude of separate archives for Arctic Council data and the format and manner of information is not easily useable and transferable for the public and scientific community. Thus data from the Arctic Council remains under-used and the benefit to research and education from its wealth of collected data is currently limited (CAFF 2012a**)**.

Yet, the Arctic Council is largely predisposed to facilitate inter-institutional learning, exchange of information and awareness-raising. It is argued that the Council has succeeded in creating a resilience loop. That means that if scientific assessments show that the existing governance arrangement does not meet its intended purpose, it might lead to social learning by either changing the strategies of a regime (single-loop learning) or even revising the existing values and norms on which the governance arrangement is built (double-loop learning) (Koivurova 2008). The release of the finding in ACIA and AMSA stimulated some learning processes within the Arctic Council where the Ministers of the Member States took into account the research results and recommended actions and committed themselves to transmit the information to all the relevant stakeholders (ibid.). The decision to establish a permanent Secretariat in May 2011 is to a large extent a result of single-loop learning through experiences, evaluation reports and assessments that made the state representatives of the Council aware of the need for a permanent Secretariat.

In comparison with the AEPS and the early years of the Arctic Council, the Council has become much more ambitious in recent years. Koivurova (2008:21) believes that "this is mostly due to the fact that the working groups, most of which began to function at the beginning of the 1990s, have only in recent years been able to deliver substantive suggestions and conduct important scientific investigations."
Some credit should also be given to the emergence of stronger commitment and more resources devoted to Council issues by member states. For instance, at the Council's Ministerial Meeting in April 2009, the Norwegian Foreign Minister encouraged the Arctic Council to play an even more active part in providing guidelines, best practices and knowledge for other international forums where decisions on Arctic environmental issues are made (Støre 2009).
However, the increase of international shipping in the Arctic region and the trans-boundary nature of marine pollution require action under regimes with broader membership than the Arctic Council, such as the IMO. Although actions taken by the Council to mitigate marine pollution are important, their primary source of influence are generating knowledge that may fuel regulatory processes in the IMO and other international institutions (Stokke 2011b). This influence will be enhanced and considered more legitimate if the Arctic Council would expand their member base to include a wider set of non-Arctic states and actors with knowledge about and ownership in Arctic Council assessments and recommendations (ibid.).

One of the main contributors and coordinators of objective and independent scientific advice to the Arctic Council as well as to other Arctic organizations is the International Arctic Science Committee (IASC). IASC is an international non-governmental organization that functions as a coordination body for Arctic science (Langlais 2000) and aims to "encourage, facilitate and promote leading-edge multi-disciplinary research to foster a greater scientific understanding of the Arctic region and its role in the Earth system" (IASC 2009:10). Since the Arctic Council is more generally constituted whereas Arctic issues and policies often require largely specialized knowledge, the IASC obtains a vital role in assisting Council with advices in order to assess projects (Langlais 2000). However, one of the problems of the IASC is that its structural architecture has been inadequate to meet the organization's move towards

synchronizing its agenda and funding proposals to always on-going national and international policy processes (Langlais 2000:19). To address these problems, the IASC recently went through a restructuring process in order to meet the new demands for more integrative polar research (IASC 2009). They have, among other thing, established Scientific Standing Committees (SSCs) with access to a high profile network of expertise in the field of marine research in the Arctic. With the commitment, input and support from all its member states and scientific networks, the IASC is now able to strengthen its position as the leading international organization of scientific expertise in the Arctic (ibid.).

III. Technological innovation

The marine industry[68] plays a critical role in building the knowledge base necessary for the adoption of rules and standards concerning shipping. Their main contribution includes technical knowledge, management know-how and practical experience (VanderZwaag et al. 2008). VanderZwaag et al. (2008) note that an international standard often emerges or is updated in new industry practices prior to being incorporated in a proposal of one of the IMO committee. This observation is largely relevant for the process of adopting standards to reduce vessel-source pollution in the Arctic Ocean.

Assessing sufficient CDEM standards aimed at zero emission operation as well as adequate adaptability for Arctic conditions, is more of a technical issue depending on available technology and constructional solutions (Marintek Annual Report 2009). This is demonstrated in the case of ballast water where the ratification of BWM Convention was haltered by the lack of sufficient technological equipment for ballast water treatment.
It demonstrates that efficient measures for pollution prevention depend largely on continued research and technological innovations which are paradoxically closely linked to economic growth and development. Thus, pollution prevention becomes somewhat a matter of regulating such growth in an efficient and sustainable matter (ibid.).
A key indicator of the increasing investment in Arctic shipping is the rapid growth of polar class vessels. At the same time the ship construction industry has made important advances in ship design that improves the polar class vessels performance, efficiency and costs as well as reducing vessel-source emissions (Ocean Futures 2005). One of the findings of *The International Northern Sea Route Program (INSROP)* is that technology needed for building operationally and environmentally safe ice breaking cargo vessels is definitely within reach, but it will require a development towards less costly technology and larger ship types (FNI 2011).

Another essential component of ocean management is the availability of sufficient monitoring systems which also depends a great deal on technological innovation. The remoteness of the Arctic Ocean requires new or improved technology and combination of technologies for effective monitoring and data collection of ocean, ice and ecosystems (Reve 2009). Indeed,

[68]In the process of policymaking the marine industry is broadly represented by organizations that speak for ship- and cargo-owners, insurers, salvors, port authorities, among others.

there is great potential in the current development of technological solutions for monitoring and data sampling. The increasing automation of monitoring technology, combined with the progress within communicative technologies for processing and transmission of information, will reduce the need for human presence and use of helicopters and vessels for research purposes in the Arctic (Eltoft 2012). This again reduces costs and environmental impact of research. Simultaneously, new technologies are developing that broaden the methods available for observation and sampling. For instance, satellite radar altimetry echoes enable analysts to distinguish between first-year-ice and multi-year-ice that will improve planning of shipping routes (ibid.). There are also ongoing efforts to improve satellite monitoring so that it will be possible to scale up to larger areas as wells as improve the methods for interpreting satellite images (ibid.). But until these new technological solutions are in place, the monitoring capacity of the Arctic remains sparse.

7.1.3 Shared Collective Knowledge & Learning

The added pressure on the environment from climate change and increasing human activities, in addition to the implementation of EBM, leads to a growing demand for knowledge about the Arctic. It has made international cooperation even more essential. To address the current knowledge gaps, the Arctic states need to develop a coordinated system for collecting and reporting information. This will enhance the effectiveness of regulations and other measures for managing impacts from Arctic shipping (OSPAR Quality Status Report 2010:106). In many cases, joint efforts in research and monitoring are more efficient for knowledge building than unilateral efforts (Underdal 2010). For instance, regional cooperation on knowledge production and monitoring would help adapt international regulation to Arctic conditions and enhance the effectiveness of information and warning systems that could substantially reduce the rate of accidents and pollution incidents (ibid.). Furthermore, sharing of geographic information such as meteorological and oceanographic data between the circumpolar countries is an important part of any capacity enhancement strategy of the Arctic shipping regime (Griffiths 2009). In sum, regional cooperation in the Arctic region "is establishing a common knowledge base, is spreading information on best practices and lessons learned and has an important role in the development of policy recommendations" (Stenlund 2002:839).

In comparison with the Cold War era, the general level of trust among the Arctic states has increased considerably and several cooperative efforts have arisen over the last two decades (Underdal 2010). These are typically practical level cooperative projects that respond to the high costs and specific technologies that are required to collect data from Arctic Ocean seabed (Numminen 2010). For example, since 2007, Denmark and Canada have collaborated in mapping the continental shelf and monitoring environmental change within the ocean system. Joint fact-finding and monitoring that serve both their national interests and the common concerns have the potential to build trust and reduce inter-state tensions (ibid.).
Conflicts concerning jurisdiction and control over natural resources are still present, but there has definitely been a move towards more dialogue and partnership – signified by the implementation of EBM in the Arctic Ocean management. There is a wide range of view and practices of EBM, but the basic principles remain generally the same, one of them being that

"successful management is adaptive and based on scientific knowledge, continual learning and embedded monitoring processes" (Rosentrater & Ogden 2003:113-114). Currently, EBM has been implemented in bilateral manner in the Barents Sea and the Beaufort Sea, but the long-term vision is an Arctic-wide EBM system that coordinates best practices and sharing of information among all bodies and people involved in Arctic policymaking (Baker 2008; Siron et al. 2008).
Although only small steps have been taking towards region-wide cooperation on EBM in the Arctic region, generating positive experiences from cooperation on Arctic issues is an important strategy to increase general trust and thus facilitate new (and more ambitious) cooperative efforts (Underdal 2010).

I. Epistemic communities and Networking

Baldersheim et al. (2011) note that the capacity of regions to organize and run network activities is essential for the effectiveness of **regional governance regimes of** today. They observe "an overall trend where the learning and adaptive capacity of regions is developed by adding new dimensions to the already existing structures. The result is a more complex governance structure that may enable regions to deal more effectively with a more complex and dynamic environment" (Baldersheim et al. 2011:16).

The benefits of regional cooperation and networking is that it enhances the prospect for regulating complex and malign issues that is trans-boundary and will require that actors pool their resources and share information. Baldersheim et al. (2011) assume that network participation is a particularly rational option when actors are faced with changing environments because involvement in cross-border networks may enhance the regime's adaptive capacity by boosting l*earning and innovation and* allow for flexible and experimental policy commitments.
Current Arctic political climate corresponds to political theory that suggests "the symbolism of high political involvement signals that the competitive aspect of relations between regions is played down while that of mutual interest is in the foreground" (Baldersheim et al. 2011:51). This is understandable considering the high level of mutual trust that is required when states are asked to pool resources and share knowledge in the absence of authoritative mechanisms of decision-making. Indeed, there is a substantial risk that cooperative networks fall victim to the classical free-rider problem of *collective decision-making (*ibid.).

Nevertheless, in recent years more profound international research networks and cooperative projects on Arctic issues have been formed or are under development (Reve 2009).
These epistemic communities and networks of scientists and experts have emerged in response of demand for knowledge beyond the capacity of individual Arctic states or institutions, for instance when major environmental impact assessments such as AMSA are conducted.

Another profound example is the International Polar Year (IPY) that took place in 2007-2009 and included over 200 collaboration projects with thousands of scientists from over 60 nations examining the effects of global change, environmental degradation, and wildlife and resource management challenges in the Arctic and Antarctic (Schützenmeister & Crawford 2010). The IPY attracted massive media attention that heightened public awareness on important issues in the polar region (Koivurova 2008). More importantly, the IPY offered a unique opportunity to stimulate cooperation and coordination of Arctic research and facilitate inter-institutional learning (ibid.). The IPY also provided a platform for multidisciplinary examination of Arctic issues in a much larger scale than previous polar research and developed epistemological plurality by linking scientists within natural science, technology, law, social science and political science (Berkes et al. 2001). Moreover, the IPY reflected the heightened role of local knowledge, for example by placing indigenous people in the role as educators, facilitating dialogue between scientists, indigenous people, and the public, improving the level of education among Arctic inhabitants, and establishing new educational centers focusing on dialogue and exchange between different knowledge forms on Arctic topics (Schützenmeister & Crawford 2010). However, the IPY did not escape the classical challenges related to unifying different disciplinary and knowledge cultures which resulted in decreasing funding towards the end of the two-year effort (ibid.). Nevertheless, in addition to the massive amount of new scientific data, the IPY legacy includes a wide range of new partnerships, networks, and co-operations that was established during the IPY period (Arctic Council 2011).

Another significant research program is *The International Northern Sea Route Program (INSROP)* which was primarily a joint Norwegian-Japanese-Russian initiative to assist public authorities and private interests to make rational science-based decisions regarding the development of NSR (Brigham & Ellis 2004). INSROP was a six-year (1993-1999) multidisciplinary and multinational research program that aimed to build up a scientifically based foundation of specialized and integrated knowledge encompassing all relevant aspects related to navigating the NSR (ibid.).[69] The INSROP program concluded that a substantial increase in international commercial shipping *is* feasible both in economic, technological and environmental terms (FNI 2011). The research program also enabled the identification and mapping of ecologically vulnerable areas and areas of special importance to local indigenous peoples to be shielded from shipping activities (ibid.).

IPY and INSROP are just a few of the numerous research programs highlighting Arctic environmental concerns that have emerged during the last two decades. A wide range of scientific networks and shared portals on Arctic affairs has also arisen, such as the Arctic Net, Fram Center, UArctic, Barents Portal, Arctic Data, Arctic Governance Project (AGP), Arctic Centre, ARCUS, Northern Research Forum (NRF), and the Arctic Portal – to name a few. Additionally, several annual conferences on Arctic issues have become important meeting place for the marine industry and policy-makers (e.g. Arctic Frontiers, ACI's 3 Polar Shipping

[69] INSROP was organized in four sub-programs; 1) Natural conditions and Ice navigation; 2) Environmental factors and Challenges; 3) Trade and Commercial Shipping; and 4) Political, Legal, Cultural and Military-strategic factors (Brigham & Ellis 2004).

Event, Barents Sea Conference, Annual Arctic Shipping Summit, and Arctic Technology Conference). Together they have providing a platform for networking and exchanging information and ideas, and on several occasions also contributed to raising awareness and concern and generate publicity that enhance the incentives for compliance.

II. Sharing of knowledge

The benefits of international cooperation on sharing data are great compared to the cost of duplicative work and the tremendous effort needed for retrieving data from diverse sources to create a more comprehensive, system-wide view of the Arctic and its global scope (SAON Implementation Plan 2011). Even though there are a many ongoing scientific programs, networks and platforms in the Arctic, most existing observing activities are project-based or managed by individual sponsors for specific purposes. The result is that Arctic observation programs and networks are fragmented and often exist in varying stages of development. Hence there is a need to fill spatial, temporal and disciplinary gaps in observing records and improve the availability of data. Many Arctic issue areas require observations over both long time-scales and large spatial scales to strengthen the credibility and sustainability of observing programs (ibid.).

Given the fragmented and uncoordinated range of ongoing research programs, networks, and scientific platforms, one of the highlighted recommendations of the IPY scoping document (2007) and the AMSA (2009) is the implementation of an Arctic Observing Network among the eight Arctic states and non-Arctic states to support scientific research and marine operations (Brigham & Sfraga 2009). Thus, as a legacy of the IPY, the *Sustained Arctic Observing Network*s *(SAON)* was initiated in 2007 under the leadership of the Arctic Council. The purpose of SAON is to coordinate and sustain an Arctic-wide observing and data sharing systems facilitated by multinational partnerships and synergies among users, providers and operators of existing observing and data networks that enable users to have access to free, open and high quality data. The SAON will encourage inter-governmental cooperation and funding to sustain and increase Arctic observing activities (SAON Implementation Plan 2011). In 2009, a SAON Steering Group (SG) was established composing representatives from the Arctic Council, the IASC, and the World Meteorological Organization (WMO). The SAON implementation plan was launched February 2011, including the proposed scope of activities, and a structure for implementing the activities (ibid.).
Programs such as SAON can potentially provide greater participation and coordination of the extensive network of weather observing stations and field research stations that would increase the empirical base for scientific modeling. And modeling is in fact among the most effective means to communicate scientific knowledge to policymakers and would respond to the call for more effective and accurate informing of policymakers (Yalowitz et al. 2008).

Recent initiatives like the SAON are promising, but is still at the early stages of implementation and it remains uncertain whether this network will succeed in closing some of the gaps in Arctic-wide observing and data sharing. The repetitively obstacle for Arctic cooperation is that knowledge sharing and participation in networks is voluntary and therefore seldom fully implemented (SAON Implementation Plan 2011).

III. Inter-institutional learning

The process of *learning* is a crucial part of forming a common understanding of the issue at stake and the options available for dealing with it (Stokke 2010a). In the word of Underdal (2010:12);

> Learning can facilitate cooperation. For example, learning can lead to the emergence of a common base of state-of-the-art knowledge about the nature of the problem and alternative options for dealing with it. […] such a knowledge base is a very important platform for effective international governance. Quite often, learning lead to convergence of preferences and positions.

A majority of the Arctic institutions and organization were established in the 1990s and thus have had two decades to accumulate experience, knowledge and learning. There is a considerable aspect of learning in the process of conducting major collaborative assessment and the fostering of networks of experts that are mobilized whenever new assessments are requested. This form of learning has been cultivated within the Arctic Council through its long experience in producing assessments. Additionally, many of the IGOs and NGOs involved in Arctic environmental governance operate in the same forums and arenas and often share observer status at each other's meetings, and such recurrent interaction is likely to facilitate inter-institutional learning. There is a general potential for a more targeted and coordinated forms of information sharing in order to enhance inter-institutional learning within the Arctic governance regime (Oberthür 2009), in particular between institutions and organizations with the same membership base such as the Arctic Council and the BEAC.

Many experts have suggested that Arctic policymakers could learn from the experiences of the Antarctic Treaty regime in the field of environmental protection – despite some fundamental differences between the two polar regions (Loukacheva 2010; Nowlan 2001). The *Commission for the Conservation of Antarctic Marine Living Resources* (CCAMLR) manages the marine living resources in waters surrounding Antarctica and has practiced ecosystem-based and precautionary ocean management for over 20 years (Potts 2010). Thus, the CCAMLR is well-experienced in developing innovative tools to manage marine resources in cooperative manners. For the Arctic region, there are at least three lessons learned from the Antarctic Treaty System; *First*, the CCAMLR has successfully coordinated the actions of 34 states through a centralized Regional Fisheries Management Organization (RFMO) that

coordinate scientific analysis, policy formulation, and apply conservation measures on a multi species and ecosystem basis. Although the CCAMLR applies to a simpler governance system focused on fisheries, the useful lesson for the Arctic Council is that it should encourage harmonization of various national, bilateral and regional agreements and institutions on a regional and ecosystem basis. *Second*, the CCAMLR has determined its boundaries on the basis of oceanographic and ecosystem considerations instead of political boundaries. It should motivate the Arctic states to better balance sovereign maritime rights and ecosystem (LME) boundaries. *Third*, the incorporation of the ecosystem approach to Arctic Ocean management should draw upon the experience of the CCAMLR in terms of its CCAMLR Ecosystem Monitoring Program (CEMP) and what precautionary measures and policy instruments work in particular contexts (Potts 2010).

7.1.4 CONCLUSION

Even though the Arctic suffers from a veil of uncertainty regarding scope, severity, causal relationships, impact and/or time frame of marine pollution, there exists a general consensus among Arctic states and stakeholders that the probable environmental consequences could be catastrophic and the call for precautionary measures is appropriate. Still, issues of scientific complexity and uncertainty often lead Arctic states to become more reluctant to alter their behaviors which explains their preference for soft law arrangements in such occasions (as I will discuss in more detail in Part 7.2.4). However, it also prompts them to make scientific components, such as EIA, more central to any institutions they may establish (Mitchell 2006).

On the issue of shipping and marine environmental protection, Arctic institutions and especially the Arctic Council is well placed to take on a knowledge-building role due to its experience in producing influential large-scale collaborative assessment that concerns salient policy issues. Other supportive features are the transnational expert networks it supports and the broad participatory process in the process of assessment and research that also includes indigenous and traditional ecological knowledge. All together these features support the credibility and legitimacy of findings and recommendations (Stokke 2010a).
The influential role of Arctic institutions in knowledge building was exemplified by the case of ballast water treatment and CDEM standards, where the identification of risks and governance challenges was high due to significant research and awareness raising by the Arctic Council and the IACS. However, the assessment of impact specific to Arctic conditions was weakly developed, in particular regarding ballast water management. Even though the risk concerning ballast water was generally considered a much more severe threat than substandard vessels, and the skills and energy invested in addressing the problem of ballast water is greater, the ballast water regime is less effective and weakly developed compared to the regime governing CDEM standards. Instead, this has to do with the lack of technological innovation that could provide ballast water treatment equipment that was efficient enough to meet the requirement of the BWE Convention. The case of ballast water treatment and CDEM

standards both demonstrated the crucial role of the marine industry[70] in building the knowledge base to produce technology and constructional solutions that support the adoption of rules and standards concerning shipping. Thus, corporate partnership between the maritime industry and Arctic policymakers would be mutual beneficial in terms of enhancing the effectiveness of shipping regulations.

Despite the high level of scientific knowledge of the Arctic, in particular through environmental impact assessments such as AMSA and research projects such as INSROP and IPY, there are still great knowledge gaps concerning scenario analysis, models and simulations that could assist stakeholders and policymakers in developing adaptive strategies. Furthermore, the operational network of meteorological and oceanographic information services and communication systems that provide maritime safety is extremely sparse. The Arctic states have also inadequate capacity to monitor and collect data from several parts of the Arctic Ocean, and there is no comprehensive system for sharing such information within the Arctic shipping regime.
Recently some cooperative efforts were initiated to close gaps in Arctic-wide observing and data sharing, such as the SAON. These initiatives are promising, but still at the early stages of implementation. Indeed, the repetitively obstacle for Arctic cooperation is that knowledge sharing and participation in networks is voluntary and therefore seldom fully implemented, often as a consequence of insufficient funding and inconsistent priority.

Nevertheless, the conditions for effective knowledge building are largely present.
The Arctic shipping regime holds three important characteristics for effective knowledge building: *First*, it supports the integration of local ecological knowledge into the research and management systems of natural resources. *Second*, important stakeholders such as the maritime industry, NGOs and the indigenous people of the Arctic are largely involved in scientific research and institutions. In fact, interactions between institutions, organizations and actors within the Arctic shipping regime are mainly research-based. *Third,* the emergence of new epistemic communities and scientific networks has spurred innovative forms of knowledge production and exchange, as well as created new forums for collective learning. The Arctic shipping regime confirms the trend pointed out by Chasek et al. (2010) that over the past two decades, international networks of cooperating scientists and scientific institutions have become important actors in global environmental policy providing independent and authoritative information.

Speaking of trends, the ecosystem-based, integrated management is gradually becoming the primary approach to ensure sustainable development and environmental protection in the Arctic. All the Arctic states already has or prepare to incorporate the EBM approach into their national legislation and policy instruments for managing activities and resources in marine areas under their jurisdiction (Siron et al. 2008). Arctic policymakers could definitely benefit from learning about the experience of the Antarctic Treaty System in incorporating EBM into

[70]In the process of policymaking the marine industry is broadly represented by organizations that speak for ship- and cargo-owners, insurers, salvors, port authorities, among others.

the field of ocean management and marine environmental protection. The EBM approach requires a high level of shared collective knowledge on marine ecosystems and this will hopefully boost regional cooperation on research and knowledge exchange.

In sum, the Arctic shipping regime in general, and the Arctic Council in particular, demonstrate a strong capability of knowledge building due to the capacity to produce influential assessments, the strong leadership by the Arctic Council and Arctic states like Norway, the increasing investment in Arctic marine research, and the numerous scientific networks and forums that provide high qualified knowledge and facilitate learning. But there is a general potential for a more targeted form and comprehensive structure to promote information sharing, joint transnational research cooperation and institutionalized learning, especially with the introduction of EBM into Arctic Ocean governance. Also there is a need for policies to enhance the impact of Arctic research and access to data as well as policies to ensure sustained funding and of expanded long-term observation and monitoring of Arctic change.

With these observations, we can thus quite convincingly argue that the Arctic shipping regime has been largely successful in fulfilling the task of knowledge building. But can the Arctic Council and other regional institutions move beyond their presently largely knowledge-building role to become more decisive for the advancement of rules governing maritime transport in the Arctic? This is the central theme in the following section.

7.2 Norm building

7.2.1 Problem structure

I will discuss the nature of vessel-source pollution in terms of the malignancy of the problem structure and the transaction costs involved in establishing regulatory solutions.

I. The nature of vessel-source pollution

It took IMO 14 years of intricate negotiations before the BWM Convention was adopted in 2004 and still more states need to ratify it before entering into force. It is then natural to ask why it has taken so long to reach an agreement and why are states still reluctant to ratify it? I've already mentioned the scientific difficulty in assessing the direct impact of ballast water on marine ecosystems. On the other hand I found that risk awareness and the acknowledgement of the importance of precautionary action were significantly high.
The political aspects of ballast water regulation can perhaps provide additional explanatory weight to the deficiency of effective governance. Mike Hunter, Chairman of the IMO Ballast Water Working Group, has expressed that "the ballast water issue must be one of the most difficult issues that have faced IMO" (Galil & Hülsmann 2001:2).
The current (interim) method of open water ballast water exchange (BWE) in designated areas is currently the only available ballast water management method. The BWE method is

difficult to monitor and enforce due to the remoteness of the Arctic Ocean and the lack of monitoring infrastructure. The ballast water exchange regime is particularly vulnerable to high sea violations because standards for permitted discharges cannot easily be monitored on the high sea (Victor et al. 1998) and the international community has not agreed on the distribution of responsibilities in protecting the high sea "governance gaps" that lies beyond national jurisdiction (Franckx 2009). Moreover, the efficiency of the method itself is questionable. Together these factors give vessels operating in the Arctic incentives and opportunities for non-compliant behaviour with low risk of being sanctioned.
The nature of ballast water discharges also complicate liability and compensation issues. While there are methods for tracing the responsible vessel concerning oil spill and dumped bilge-water by their chemical signature, it is much more problematic to correlate invasive species impacts to a ballast water dumping incident and even more so to the responsible vessel (Brodie 2010).

It is expected that the recent availability of ballast water treatment equipment will support constructing a regime that is better fitted. It has already been incorporated into the BWM Convention that awaits ratification. Thus, the effectiveness of the ballast water exchange regime will hopefully increase as soon as the requirement for treatment equipment becomes mandatory through the BWM Convention as a type of CDEM standard.
The ratification of the BWM Convention is significant in terms of changing the current perspective that regulatory responsibility for marine pollution rests with coastal states and port states, by targeting the ship-construction industry and by changing the focus of normative commitment from pollution mitigation to biodiversity protection which generates more international obligations (Muirhead 2007). The problem of invasive species related to ballast water from shipping falls into the category of *systemic issues* which "involve macro-level forces or processes whose impact is likely to be felt throughout the region rather than in particular parts of the circumpolar world" (Young 2000a:14). With regard to systemic issues the role of the Arctic Council would be to amplify the voice of the Arctic in relevant international forums. On this task, the Council has been relatively successful during the last couple of years, in particular as a result of the International Polar Year.

The nature of CDEM standards appears to be more intellectually benign than BWE regulation in terms of rule enforcement and monitoring. CDEM standards require only a one-time action (e.g. installing prescribed equipment or constructional requirements such as double hull). This is because a vessel subject for port state inspection during the ship's stay in port implies detecting (non-)compliance beyond port and new violations on the same basis since a vessel's conformity with CDEM standards remains generally the same throughout its voyage (Molenaar 1998). Thus, controlling compliance on CDEM standards do not require the same extensive monitoring at sea as the ballast water exchange method.
Although intellectually benign, the political aspect of CDEM standards for polar waters is of more malign character – enhanced by the provisions in Article 234 of UNCLOS. Whereas shipping is a perceived as a global issue, vessel-source pollution is frequently treated as a regional issue. This is the underlying cause for the controversial disputes on regulation that occurred when Canada and the Russian Federation – in accordance with Article 234 of

UNCLOS – adopted stricter CDEM standards than GAIRAS in the name of environmental concern for their Arctic waters. This means additional adjustment costs for the shipping industry. It has also been perceived as an infringement to the international freedom of navigation by other flag states.
This also explains the controversy related to suggestions to implement the Special-Area status under the MARPOL Convention or to designate parts of the Arctic Ocean a PSSA in order to impose stronger than normal discharge standards in Arctic waters (Stokke 2010a). This would surely involve incongruity in costs/benefit calculus and asymmetry in interest structures between coastal states and flag states.
However, legalization of the existing voluntary guidelines for shipping activities in Arctic waters is consider a relatively benign problem because the costs are expected to be moderate and rather symmetrically distributed among the parties (ibid.).

In the Arctic there are multiple incongruities, but the consequences in terms of problem malignancy varies across issue-areas and geographical sub-regions (Underdal 2010). Besides, many incongruities are already subject to cooperative arrangements, in particular *cumulative issues* such as maritime safety concerns (e.g. search and rescue response), concerns related to the sustainability of local communities, and the construction and operation of ecosystem-based ocean management regimes (Young 2000a). Cumulative issues involve "concerns that are associated with specific areas but that recur throughout the circumpolar north in roughly similar forms" (Young 2000a:15). In addressing such cumulative issues, the main task of the Arctic Council is to assess the effectiveness of different types of governance systems and draw lessons from dealing with similar issues (ibid.) and to encourage cooperative efforts such as information sharing and co-management.

In general, marine pollution problems in the Arctic are perceived as malign due to the Arctic's vulnerable marine ecosystem, the presence of ice and low temperature hampering clean-up, and poorly developed marine infrastructure and monitoring capacity.
Furthermore, vessel-source pollution is a typical example of a negative externality caused by incongruity between areas of national jurisdiction, boundaries of marine ecosystems and trans-boundary shipping activities that – if not coordinated – will create suboptimal outcomes (Underdal 2010). However, exceptional vulnerability to the consequences of environmental issues in the High North has driven Arctic states to support strong global action on several issues, including marine pollution prevention and regulation of shipping activities (Stokke 2010a).

II. Transaction costs

IMO covers most of the conventions and guidelines addressing every facet of shipping and has long and wide-ranging experience in gathering information, formulating agreements, and implementing rule enforcement. Obviously the IMO plays a significant role in coordinating various interests of stakeholders and reducing high transaction costs concerning shipping governance. Stokke (2010a) characterizes norm-building within the IMO as dynamic since it is frequently negotiating new treaties and adding protocols or annexes to existing treaties.

All international CDEM standards are laid down in the main legally binding IMO instruments, SOLAS 74 and MARPOL 73/78, which are both flexible in the sense of having well established procedures for developing amendments and annexes concerning additional CDEM requirements. When the international community recognized the need for double hull requirements, it was quickly added to Annex 1 in the MARPOL Convention (Stokke 2010a). This has significantly reduced the transaction costs of forming and implementing CDEM standards concerning shipping. However, in the case of regulating ballast water from shipping, the IMO decided on forming a new IMO Convention compared to expanding the existing MARPOL Convention with a new annex or protocol. The result was a prolonged period of negotiation that took 14 years and which still is in the process of ratification. However, the prolonged ratification process of the BWM Convention is mainly caused by high transaction cost on the part of technical complications in realization of the requirements for ballast water management systems. The availability and approval of adequate treatment system took much longer time than predicted (UK P&I Club 2011).
The ongoing negotiation on a mandatory Polar Code with additional requirements of CDEM standards for polar areas is also facilitated by the IMO in collaboration with the IACS. Since the Polar Code would mean a regulatory hardening of already existing voluntary guidelines, the transaction costs are expected to be moderate (Stokke 2010a). Still, the negotiation process is long-drawn-out.
Thus, even though norm building through the IMO reduces the transaction cost compared to establishing entirely new stand-alone institutions, the IMO negotiations are often stretching over many years due to its focus on consensus, technical and expert-driven policy-making, its relatively inclusive character, and the steadily increasing number of IMO instruments (Stokke 2010a). Progress is additionally delayed by over-burdened agendas and infrequent meetings (La Fayette 2001). These factors are in fact confirmed by the long and complicated negotiations of both the Polar Code and the BWM Convention.
Still, taking into account that the Arctic activities and environmental challenges probably will increase rapidly, making changes and developing the existing institutional framework will probably be more effective in term of reducing transaction costs.

7.2.2 Problem-solving Capacity

I. The institutional setting

The institutional setting in the Arctic is fragmented and generally consensus-based (Underdal 2010). The consensus-based regional institutions in the High North may thus result in them not being able to take stronger actions on issues with divergent incentive structures and engage in effective international cooperation. For instance, as long as the members of the Arctic Council and the indigenous peoples of the region are not in favor of a regulatory strengthening, it is highly unlikely that a comprehensive Arctic treaty becomes a reality.

a) Institutions and organizations as arenas

One of the distinctive features of Arctic institutions is that it offer an extensive scope of subnational units of government rather prominent opportunities to exert influence in many of the emerging arrangements (Heininen & Rostoks 2004; Stokke 2010a; Young 2002a). For example, the member base of Northern Forum includes subnational units of government that allow them to pursue their interests even when they conflict with those of national governments. The Arctic Council is the central forum for region-wide interaction in the Arctic and appears to be the most inclusive arena (Griffiths 2009; Young 2000a). The Arctic Council has granted the Arctic indigenous people status as Permanent Participants which means active participation and full consultation in all the activities and work of the Council (Stokke 2010a). The Council has also granted Observer Status to various non-arctic states, inter-governmental and inter-parliamentary organizations, and non-governmental organizations.

Limitations on the current capacity of the Arctic states to engage in effective international cooperation stem from the prevalence of sub-regional perspectives and priorities among them. Indeed, many Arctic issues are dealt with also at the *international level* due to their global implications and all the Arctic states have recognized the crucial role of the international legal framework in Arctic governance, including UNCLOS and IMO Conventions. These international agreements include mechanisms for dispute settlement of maritime disputes through bilateral and multilateral negotiations, and all Arctic states have recognized the necessity of resolving conflicting interests in a peaceful manner (Åtland 2010).
However, the Arctic states and stakeholders are resistant towards linking regional bodies to an overarching international framework. The member states and permanent participants of the Arctic Council are also reluctant to include non-Arctic actors in the decision-making process of Council that exceed the current observer status (Young 2000a). The subsequent risk is that if the Arctic shipping regime is perceived as exclusive and not in correspondence with international regulations, it might result in loss of legitimacy of and compliance of non-Arctic actors and the global maritime industry.
Another criticism towards the Arctic Council is that the Senior Arctic Officials (SAOs) are all representatives of Arctic states' foreign ministries which mean that national positions on Council issues are developed through processes dominated by foreign ministries of the Arctic states (Young 2000a). This may eventually lead non-state actors, and particularly the Arctic inhabitants, to perceive the Council as a top-down enterprise (re)asserting the dominance of policymakers and officials located in the South (Young 2000a).

There is a growing international interest in Arctic affairs and several non-Arctic states and actors express their desire for broader participation in regional institutions. They argue that international cooperation in decision-making is important for the effectiveness of Arctic regulations since a majority of Arctic problems and solutions alike owe much to activity occurring outside the region. Certainly some issues will require participation by non-Arctic states, for example by ensuring safe and efficient marine transportation in Arctic waters. Others issues can be resolved by the Arctic states alone, for example preventing land-based sources of marine pollution. Finally, some issues will require bilateral agreements between

the Arctic states, for example in harmonized traffic management of the Northwest Passage between Canada and the United States (Griffiths 2009).

The critics request new means of coordination and many have suggested that the best solution would be an invigorated Arctic Council, for instance by extending the access of non-Arctic states and intergovernmental units to the process of decision-making in the Council (Griffiths 2009; Young 2000a). In fact, Canada are advocating for an enlargement of the Arctic Council that offer important non-Arctic states (e.g. Germany, China, Great Britain, and the European Commission) the right to participate and speak freely as consultative parties on the condition that they will make contributions to a new Arctic Fund that supports cooperative efforts on issues of common interest (Griffiths 2009).
Thus, the critics are not encouraging any radical reformation of the Arctic Council that undermines the dominant position of the Arctic states in its deliberations, but suggests a more attentive approach to participatory decision-making.

b) Organizations as actors

There are a growing number of organizations involved in Arctic affairs. The majority of these organizations place a large, but rather general focus on Arctic environmental issues (e.g. Nordic Council, UNEP/GRID-Arendal, BEAC, and Northern Forum). Still there are several organizations which possess offices, personnel, working groups and budgets specifically devoted to addressing marine pollution issues (e.g. IMO, Arctic Council, WWF Arctic, and IASC) (Young 2000a). Some of these organizations have developed their own pollution prevention policies, but their work is often targeted at increasing knowledge and raising awareness through participation in regional and global forums (Keskitalo 2009).

At the *regional level*, cooperative arrangements such as the Arctic Council and the Barents Euro-Arctic Council can contribute to the maintenance of regional stability due to their important role as arenas for interaction and cooperation among Arctic states on issues of common concern (Åtland 2010). But they are also important actors in terms of their strong scientific base that contributes to creating a common understanding of environmental issues and identify possible ways to meet them (ibid.).

But in general the IGOs and NGOs involved in Arctic governance display rather weak capacity to provide independent inputs into the policymaking process on marine pollution in Arctic waters, but they have been largely successful in coordinating knowledge-building and similar activities (Underdal 2010).

To enhance the profile and voice of the Arctic in *global* forums it is necessary to form a strong alliance of local, subnational, and national actors committed to act and speak in concert about Arctic concerns. Yooung (2002a:14) has made the following recommendation;

> A particularly attractive option would feature an explicit alliance among indigenous people's organizations representing local concerns, the Northern Forum representing the concerns of

> Arctic counties, oblasts, states, and territories, and the Arctic Council representing the interests of the eight Arctic states in the far North.

Yet, Young (2002a) points out that due to different interest structures it will not be an easy task to establish such a coalition. Still, such initiative will be essential in order to incorporate Arctic concerns into international agreements and documents that play a role in influencing the terms of the international discourse in important areas (ibid.).

Stokke and Vidas (1996) argue that the normative pull of provisions under an international regime is dependent on its internal determinacy and external coherence with other norms acknowledged by the international community. Determinacy enhances a norm's compellingness (Franck 1990). In that regard I will take a closer look at two of the most important regional institutions for Arctic shipping, respectively the IACS and the Arctic Council, and how they contribute to the determinacy and normative compellingness of international norms.

The IACS contribute to the normative pull of IMO regulations by enhancing their determinacy through its *Unified Interpretation*. Once adopted, the IACS ensures that the Unified Interpretations are applied by its member societies when certifying compliance with IMO regulations on behalf of flag state authorities (IACS 2011). Young (2002a) suggests that the mandate of IACS is extended to include assessment and monitoring activities of the shared natural resources and ecosystems of the Arctic.

The norm-building role of the Arctic Council is limited to adopting recommendatory guidelines and encouraging Arctic states to sign or ratify relevant broader instruments (Stokke 2010a), including the UNCLOS (the United States has not yet ratified), the OSPAR Convention on marine pollution in the Northeast Atlantic (The Russian Federation is not a member yet), and the BWM Convention (the United States, the Russian Federation, Denmark, Finland and Iceland have not yet ratified). The Council provides guidelines for the Arctic states to facilitate regional and national implementation of international conventions and non-binding Arctic agreements. The Council's informal and consensual character has facilitated Arctic cooperation because Arctic states are confident that the forum will not impose policies with which they disagree or require participation and funding for action programs they do not consider important (Bloom 1999).
Lately the Arctic Council has gained an increasingly important role and is contributing to defining the "rules of the game" which influences social norms and practices of Arctic actors (Young 2000a). An indication of the increasing norm building role of the Arctic Council is its support of more ambitious norms concerning vessel operations in polar waters in different international forums and multilateral negotiations. The Council has for instance encouraged and contributed knowledge to the IMO negotiations of the Polar Shipping Guidelines and the ongoing negotiation of a mandatory Polar Code (Stokke 2010a).
While considerable progress remains before the Arctic Council is capable of prompting legislative strengthening within the IMO, at present it seems well equipped to build the knowledge that often underlies such norm building capacity. The level of knowledge, skills and energy possessed by Arctic institutions like the Arctic Council could trigger more ambitious

regulations in broader institutions, especially the IMO, through its potential for norm compellingness. AMSA (2009:6-7) offers recommendations on a number of norm-building initiatives at various governance levels (Stokke 2010a) and signal that the Arctic Council has the capacity to initiate more regional and sub-regional cooperation that move beyond joint assessments and statements of good intention (Young 2000a). The legally binding Arctic SAR instrument adopted in May 2011 is a small step in that direction – moving from being purely decision-shaping to having a stronger decision-making role. The increasingly important role of the Arctic Council in Arctic governance with prospects of seizing a larger norm building role was recently confirmed by three symbolic events; first, the Council signed its first legally binding agreement in May 2011. Second, the appearance of Hillary Clinton at the Ministerial Meeting in Nuuk this year as the first U.S. Foreign Minister participating at an Arctic Council meeting. The Norwegian Government has strongly advocated for the strengthening of the Arctic Council and Canada is leading the efforts of an enlargement of permanent observers to the Arctic Council (Griffiths 2009). Third, the Council decided to establish a permanent Secretariat beginning in 2013. Nevertheless, on the account of other Arctic issues the Arctic Council seems to be of little relevance. Petroleum extraction is regarded as national affairs, and the marine jurisdiction is determined in a process between the relevant coastal states and the UNCLOS. The Arctic Council has little or no direct role to play here.

All together it seems that the IACS and the Arctic Council's capacity for norm building are overall weak, although possibly increasing in the foreseeable future. Yet both the IASC and the Arctic Council have been relatively successful in building knowledge and raising awareness that often motivates norm building.

II. The distribution of power

In recent years, as the Arctic is increasingly perceived as a strategic resource base, it has become customary to talk about the region in geopolitical terms[71] which refers to the configuration of interests, power, and geography (Åtland 2010).
This is particularly relevant for Arctic politics which are governed by powerful states and necessarily involves consideration of national sovereignty and security, resource exploitation and geopolitical relations. Obviously, identifying the configuration of interests would require a detailed mapping of power and incentive structures differentiated by issue-area and actors. Unfortunately I do not have the capacity to pursue such detailed mapping in this paper. For the purpose of exploring the problem-solving capacity of the Arctic shipping regime I will only provide a very general overview of the patterns of common and competing interests and preferences of key stakeholders related to environmental concerns of Arctic shipping. First I will examine the existing rules and norms concerning marine sovereign rights that influence the distribution of power in the High North. Then I will take a closer look at the configuration of interests and preferences of the Arctic states, non-Arctic states and the shipping industry

[71] The term "geopolitics" was first coined at the beginning of the 20th century by the Swedish political scientist Rudolf Kjellén (Åtland 2010).

concerning marine environmental protection and vessel-source pollution in particular. This will include an assessment of the supply of leadership in addressing marine pollution.

a) The Sovereign Rights of Arctic coastal states

The international environmental regime governing vessel-source pollution must balance the interests of the international community as a whole with the interests of states that in accordance with UNCLOS have rights, obligations or jurisdiction in their capacities as flag, coastal or port states (Molenaar 2009).
In global shipping, the primacy of flag states tends to impede effective pollution control (Tan 2006). The incentives for flag states to comply with UNCLOS provisions to enforce pollution control measures, to investigate alleged violations by their vessels and to impose adequate penalties if there is sufficient evidence, remain low and it is doubtful if the majority of flag states submit to these obligations (ibid.).
The exact opposite is true for the coastal states. In order to protect their water, shores and marine resources, particularly from foreign vessels, the coastal states have strong incentives to prescribe and enforce stringent discharge and performance standards to regulate vessel-source pollution effectively (ibid.).

As elaborated in Part 4.1, the Arctic coastal states benefit from the UNCLOS provision giving coastal states exclusive rights to the resources of the continental shelf up to 200 nautical miles from shore. The exclusive right of Arctic coastal states explains their reluctance towards establishing a new comprehensive global treaty that might jeopardize these rights.
Canada and the Russian Federation have asserted their sovereign rights by expanding their shelf claims and potentially oil and gas worth trillions of dollars (Åtland 2010). For the Russian Federation, the territorial claims are also encouraged by the restoration of national identity and the country's long history of polar exploration (ibid.).
In fact, nationalist identifications with the High North may provide politically resonance in both Canada and the Russian Federation (Griffiths 2009).
Although no other states have made formal protests on the shelf claims, the United States, the EU and other flag states are questioning the legitimacy of the Canadian and Russian territorial claims and emphasize that the right to innocent passage would still apply (Deggim 2009; Molenaar 2009). The United States is particularly attentive to Canada's efforts to enforce its Arctic sovereignty and do not recognize Canada's Arctic water claims (Åtland 2010). With the declining ice coverage, new conflicts may arise over the legal status of the straits along the Northwest Passage (Åtland 2010).

There are still a few unresolved maritime boundary issues in the Arctic Ocean and this could potentially cause trouble for future shipping and the marine environment in the Arctic (Griffiths 2009). Unresolved maritime boundaries bring uncertainty to ship operators over which national shipping laws are applicable in a disputed zone. It particularly concerns regulations adopted pursuant to Article 234 and laws regarding penalties and compensation for damage caused by vessel-source pollution. Disputes on maritime boundaries could also disrupt opportunities to develop marine resources (AMSA 2009). If a severe disagreement

should occur between states on Arctic issues, and the dispute settlement of UNCLOS do not prove effective (the United States has not ratified the Convention) it might in worst case scenario provoke the anarchical structure of the international political system in the sense of having no "world government" that triumphs national sovereignty.
However, in general the interests of the international community usually overlap with those of flag, coastal and port states but are normally more general and broader (Molenaar 2009). Furthermore, in spite of divergent views on the extent of coastal state jurisdiction, there is a general opinion that the maritime boundaries must be agreed on in accordance with UNCLOS (Griffiths 2009).

Yet, there exist four high seas areas in the Arctic which means they lay outside national jurisdiction and consequently no international legislation exist to address damage to the high seas (AMSA 2009). It is essential for the effectiveness of environmental governance in the Arctic that the international community agree on responsibilities and preventive measures to protect these high sea "governance gaps" – possibly through a regional approach by the Arctic states (Franckx 2009).

Indeed, all the Arctic states acknowledge that national action – and to some extent also sub-regional action – is likely to be inadequate in maintaining safe and efficient shipping traffic and marine environmental protection. Fully aware of the trans-boundary effects of marine pollution, the Arctic states are gradually introducing new modes of cooperation (Griffiths 2009) which challenges the traditional perspective on national sovereignty. One of these approaches is the joint stewardship and ecosystem-based co-management on an Arctic-wide basis. Yet, the Arctic states are not accustomed to the thought seeing far beyond the horizon of sovereignty and exclusive jurisdiction, especially considering the amount of natural resources involved and the states' predisposition to focus on resource development (ibid.). Nevertheless, the rising environmental concern among Arctic states will continuously challenge – and might even change – the perspectives on how to enforce sovereign rights and national jurisdiction in Arctic waters

b) Security concerns in a changing Arctic context

Sovereignty and security are interconnected and thereby any discourse of security is closely related to the perspectives on national sovereignty. Both sovereignty and security issues are complicated by the emerging Arctic context of trans-boundary issues and cumulative impacts (Huebert 2010). Due to the ice cap melting, previously non-pressing disputes over access to natural resources and strategic shipping routes are coming to the surface and might lead to higher interstate and intrastate tension. This raises concerns related to the ongoing "remilitarization" of the region (Åtland 2010). Petroleum activities and marine transportation, particularly tanker traffic, may generate additional environmental security concerns (ibid.). The emerging conflict lines would cut across issues, boundaries and traditional alliances which political analysts refer to as *cross-cutting cleavages*. On the other hand, political analysts have observed that the presence of cross-cutting cleavages can have a stabilizing effect on political communities (ibid.). Anyhow, the emerging Arctic context is altering security dynamics in the Arctic and

present policy makers with a wide range of challenges that will require both the presence of military capabilities as well as robust international regimes and extraordinary measures carried out at the national as well as at the regional and international levels (Åtland 2010).

At the *national level*, the Arctic states are striving to secure their strategic and economic interests in the High North that sometimes is at odds with other national interests such as environmental security. In recent years, most Arctic states have formulated its basic goals and managerial principles in a national Arctic strategy plan that seeks to balance its sometimes conflicting economic, environmental, and military security interests in the region (Åtland 2010).
The changes in the High North also affect the role of the Navy and Coast Guard. Military presence in Arctic territorial waters is still important for the traditional role of asserting sovereignty, exercise state authorities and partake in resource management, particularly for states that have prominent strategic and/or economic interests in the region (e.g. the Russian Federation, Canada, and Norway). Military presence contributes to the predictability and regional stability, and is crucial for the capacity of search and rescue. But environmental monitoring has gradually become a more central task for the military in the Arctic (Norwegian Government High North Strategy Plan 2006).
Since 2007, all the Arctic coastal states have published Arctic strategy plans and policy documents that signal more assertive foreign and defense policy, and have initiated processes of rebuilding combat-capable air and maritime forces and increased military operations and exercises in the Arctic region (Huebert 2010). Yet reference to a remilitarization of the Arctic in terms of a future armed race for natural resources – as portrayed by some newspapers and political analysts – seems rather overdrawn (Corn 2008; Griffiths 2009). As Åtland (2010:33) points out; "the Arctic is a region of economically developed and politically stable countries, which have a long tradition of peaceful coexistence" – with the exception of the Cold War era. Thus, even though the geopolitical aspects are complex and the environmental concerns are extensive, the potential for severe conflicts is relatively low (Åtland 2010).

In fact, various conditions and observations of the emerging Arctic context indicate that the shared concerns about environmental security and *cross-cutting cleavages* may even lead to increased dialogue and cooperation between states that are facing the same or similar challenges. It may also facilitate the settlement of long-standing boundary disputes (Åtland 2010). This is exemplified by the 2010 settlement of a 30 year long maritime boundary dispute between Norway and the Russian Federation in the Barents Sea, and the joint effort by Canada and the United States to map the continental shelf in the disputed Beaufort Sea as a baseline for a settlement of maritime boundaries between them. Another incentive to cooperate is that the Arctic states are likely to experience pattern of intrastate conflict related to Arctic issues that will display similarities (ibid.). By exchanging knowledge and learned lessons on shared arena like the Arctic Council the Arctic states might increase their effectiveness in addressing such conflicts. Such learning may take place on both bilateral and region-wide basis.

Environmental security challenges are sometimes conflicting with economic and military security interests in the Arctic and they are typically dealt with in different forum than state security issues (Åtland 2010). The task of addressing the Arctic environmental security issues often exceed the capacity of the individual sovereign state and will require coordination and cooperation at the national as well as at the regional and international level. Thus, as with the perspectives on sovereignty, the emerging Arctic context may force governments and international institutions to adjust the traditional perspectives on security to include the concept of environmental security and develop new approaches for exercising state authority, for instance by improving the role of armed forces in environmental monitoring through regional coordination and joint exercises.

III. Configuration of Interests and the Supply of Leadership

The High North is emerging as a region of major geopolitical significance to all Arctic states, as well as the rest of the world. All the Arctic states – as well as other states and actors – are signaling rising interest in Arctic matters. An important aspect that have boosted the high priority of Arctic issues, also in relation to environmental concern, is the increasing focus on, and competition over, the utilization of natural resources (Heininen & Rostoks 2004). This is indicated by the growth of region-building and trans-boundary activities (ibid.) and more frequent occurrence and higher priority of Arctic issues on the national and international political agenda.
Underdal (2010:13) hypothesizes that "the more competitive a given setting, the more concerned actors tend to be with relative rather than absolute gains and losses". The political climate in the High North is currently characterized by a mixed motive game with some combination of common interest supporting cooperative governance (e.g. environmental protection, EBM, infrastructure development, solving maritime boundaries) and a set of divergent interests encouraging incentives to preserve national jurisdiction and pursue unilateral solutions (e.g. resource exploitation, navigational rights, future governance framework, maritime jurisdiction) (Underdal 2010). The prospective of competition versus cooperation is to a large extent depending on how states interpret each others' interests, intentions and interdependent relations (ibid.).
It is important to note that states often have interests, rights and obligations in more than one capacity which in turn gives a more balanced compromise position. Conversely it can also lead states to take contradictory positions within different forums (Molenaar 2009).

a) The Arctic states

All the Arctic states have now established Arctic policy strategies that emphasize the role of international cooperation in the region (Stokke 2010a). The Arctic states also signal a general willingness to pay for infrastructural development and program activities, including various assessments and environmental capacity-enhancement initiatives, in particular the Russian

Federation and Norway (ibid.). Several reports note that northern Scandinavia and northwest Russia are the most developed Arctic areas (Barrett et al. 2011).
I will now take a closer look at the officially defined Arctic policy of the Arctic states. I will focus specifically on the Arctic strategy plans of the Russian Federation, Canada, the United States and Norway.

By virtue of its size, geographical location, and the length of its Arctic coastline, the *Russian Federation* has been and will remain a key player and prominent power in the Arctic and the Northern Sea Route (Åtland 2010). The Russian Federation is investing heavily in marine infrastructure along the Northern Sea Route (e.g. ice-breaker service, navigational aids, ports of refuge and search and rescue) due to the prospects of increasing commercial shipping and energy and mineral resource development which can bring economic benefits to the region (Moon & Tukhfatullin 2003).
The Russian Federation has taken the lead within the Arctic Council for developing cooperative search-and-rescue activities in the Arctic region (Barrett et al. 2011) which is strategic given their prominent role in Arctic navigation experience, operational knowledge and infrastructural development along the Northern Sea Route. Apart from that the Russian Federation is largely lagging behind in terms of environmental protection and pollution prevention efforts on both the domestic and international level (Griffiths 2009).
Griffiths (2009:10) observes that "immensely strengthened by its oil and natural gas as long as demand and prices held, Russia continues to act on an Arctic agenda of sovereignty and security that is focused on resource exploitation." The Russian Federation are currently making preparations for the Shtokman field, one of the world's largest natural gas fields, and are making plans for developing new fields on the Yamal peninsula in Western Siberia (Åtland 2010).
The last decade, the Russian Federation has experienced significant economic growth which has enabled a modernizing of the Russian armed forces (Sakhuja 2010; Åtland 2010). This rearmament effort clearly suggests that the Russian Federation may cause some concerns from the other Arctic states, in particular the United States (Sakhuja 2010).
Jensen & Skedsmo (2010) have assessed the Russian official discourse to be centered on zero-sum game and relative gains, but the approach is not as broad and coherently mobilized as in Norway. The Russian approach seems eager to assert their sovereignty, although they also recognize that there are common Arctic concerns that might require extended future cooperation, exemplified by the joint Norwegian-Russian management of the Barents Sea (ibid.).

Canada controls the second largest part of the Arctic which includes most of the Northwest Passage. Canada do not have significant military capabilities in the Arctic (Yalowitx et al. 2008) and lags behind most Arctic states in its ability to monitor and protect its Arctic areas. A study of Munk (in Barrett et al. 2011) revealed gaps of 52 percent and 45 percent in capacity to respond to emergencies and international threats. Byers (2009) made corresponding observations of Canada's poor capability to police its Arctic waters and to implement the Canadian Arctic strategy. The lack of Canadian leadership in Arctic affairs can be linked to the following factors; public predispositions, official reluctance to act and

potential resistance on the part of Canadian Arctic indigenous peoples and their organizations (Griffiths 2009:27).
But opportunities for change might be accompanying the current Foreign Minister and Prime Minister who are actively committed to Arctic international cooperation in terms of mobilizing national concern over climate change into a new national commitment to cooperative stewardship in the Arctic (Griffiths 2009). Canada has initiated the *2030 North* planning process to reshape its Arctic policies (Yalowitx et al. 2008). This strategy includes taking initiative to elicit U.S. interest in an agreement on basic principles with the Russian Federation, and expand bilateral cooperation agreements with the United States for joint planning in the region's future generally and a joint project for LME ecosystem management in the Beaufort Sea region (Griffiths 2009). In the 2030 North program, Canada also aims at leading the Arctic states to an enlargement of the Arctic Council and encourages the establishment of a new Arctic Fund that supports stewardship cooperation undertaken by varying combinations of Arctic and non-Arctic states (ibid.).

The United States have rights and interests in the Arctic region by virtue of its largest state, Alaska, which plays an important role both economically and strategically (Åtland 2010). The U.S. Arctic policy is two-fold. First, it calls for the United States to assert a more active and influential national presence by the US Navy to protect its Arctic interests such as securing free passage of all vessels throughout the Arctic shipping routes. Secondly, the US policy focuses on building infrastructure and other capabilities to prepare for the environmental challenges caused by climate change (Sakhuja 2010). The United States has the capacity to take the lead on the issue of environmental protection due to its recent interest in climate change issues, but has still not risen to the occasion (Griffiths 2009). For instance, the U.S. investment in polar research is quite limited in comparison with the other Arctic states (Yalowitz et al. 2008).
The U.S. Naval Roadmap for the Arctic and the revised U.S. Arctic Regional Policy state that the U.S. Navy's will focus on increasing its operating capacity in Arctic waters and advocate the principle of freedom of navigation (U.S. Navy 2009). Yet, the declining condition and capacity of the U.S. ice breaker fleet implies that this policy is not followed through (Yalowitz et al. 2008).

Norway has long polar traditions and history, including both scientific expeditions and commercial activities, and the enforcement of Norwegian sovereignty and authority in Arctic waters (Åtland 2010).
Since 2005, the High North has been singled out as Norway's most important strategic priority area by the Norwegian Government and was the first country to initiate large-scale petroleum operations in the Barents Sea (ibid.). Correspondently, the main strategy for the Norwegian Research Council is that Norway in 2020 is a leading research nation and a respected steward of the resources in the North, and that the northern part of Norway has become a strong and diversified concerning industry, research and regional development. Due to its long polar history and offshore activities, Norway is a natural leader on Arctic research and development of shipping and offshore technology. Norway is also pursuing a pusher state role on environmental issues, in particular concerning pollution prevention and mitigation.

Jensen & Skedsmo (2010) have described the Norwegian official discourse as forceful and generally coherent that is based on a robust and broad discursive mobilization. It is also provide a favorable climate for strengthening regional cooperation.
For Norway there are a number of potential security concerns related to the increasing Russian military activity in the Arctic region (Åtland 2010) and the increasing human activity along their northern coastline. Since Russian tankers are transporting crude oil along the Norwegian coast it is only natural that environmental concerns related to vessel-source pollution figure high on the Norwegian policy agenda (ibid.). As a result, the bilateral co-management of the Barents Sea between Norway and the Russian Federation is the most extensive and effective regional agreement in the Arctic (Griffiths 2009; Åtland 2010).

All the Arctic states seem to acknowledge the risk of invasive species and the need for improved control and management of ballast water from ships. In particular, Canada and the United States have experienced extensive problems with invasive species,[72] and have ever since given significant political attention to the issue of ballast water discharge by cargo ships as a high-risk source for species invasion (Brodie 2010). Canada was the first to express concern about invasive species to the IMO's MEPC in the 1980s. The United States and Norway have together with Canada taken the lead in the negotiations for developing the international BWM Convention to address ballast water management. However, just three of the eight Arctic States have ratified the BWM Convention (Canada, Norway and Sweden). Since the negotiation of an international approach has taken so long, the United States, the Russian Federation and Canada have implemented national legislation to address the threat of foreign species from ballast water.
Even though powerful states were leading the negotiations, it took over 14 years of complex negotiations before the BWM Convention was established. The ratification is still under process. This suggests that the presence of lead state supportive of ballast water regulation have not had compelling influence on its effectiveness, although it was important for placing the issue on the international agenda in the first place.

In the case of global CDEM standards, the United States has taken the lead in negotiations and actually demanded national implementation of the MARPOL 73/78 and SOLAS Protocols ahead of their entry into force which encouraged the prospects of early ratification and enforcement by states (Tan 2006). The United States together with other flag states and the marine industry have been more reluctant to the process of setting strict national CDEM standards specific for Arctic waters. The United States' objection against Arctic-specific CDEM standards was the main reason for the failure to adopt a mandatory Polar Code in 2002. The United States has also signalled reluctance to some of the suggested provisions in the new drafting of a Polar Code although being one of the lead states in the on-going negotiations. Canada led the initial development of the Polar Code in the mid 90's, and in recent years Norway – with the support of Denmark and the United State – has taken the lead in the ongoing Polar Code negotiation at IMO.

[72] The arrival of zebra mussels in the Great Lakes and their subsequent damage to city water supplies and electric utilities (Brodie 2010).

With the exception of the United States, the Arctic coastal states are generally supportive of stricter CDEM standards for the Arctic – which is understandable in relation to their vulnerability and responsibility as coastal states if emergency or pollution incidents should occur.

In sum, the Arctic states' capacity and incentives to pursue leadership in terms of unilateral action within a policy domain varies significantly by country and issue area. I have already made reference to the importance of intellectual leadership concerning knowledge building, and learned that Norway is typical example of small country that has taken on intellectual leadership within a policy domain where it can claim comparative advantage, namely ocean management.

However, fragmented domestic approaches are still dominating in Arctic environmental politics and there are great limitations for the Arctic states to become pushers for more coherent and coordinated Arctic governance (Andersen & Skjærseth 1999). The previous elaboration of the configuration of interests and preferences indicate that the Russian Federation and Canada are the most likely to take unilateral action in the name of national security and control of shipping activities in the Northern Sea Route and Northwest Passage. Nevertheless, there are growing links between efforts to promote international cooperation in the Arctic and the development of global governance systems. This constitutes a good foundation for nesting specific provisions dealing with Arctic issues into overarching systems (Young 2000a).

b) Non-Arctic states

The Arctic is increasingly becoming an area of interest for non-Arctic states as well. In particular, the interests of Southeast-Asian countries are growing. The development and transportation of oil and gas resources in the Arctic will demand scale foreign investments (Zonn 2009). South Korean shipyards are increasingly entering the market to build ice-capable vessels. The Japanese are investing heavily in polar research, e.g. the Northern Sea Route and new energy sources. The Chinese sees several scientific, commercial and strategic opportunities in the evolving dynamics in the Arctic region (Jakobson 2010). The Chinese government is increasing their investment in polar research, access to Arctic energy resources, and exploring the possibility of transit through the Northern Sea Route (Huebert 2010; Jakobson 2010; Sakhuja 2010).

The EU is also largely engaged in Arctic politics and their policy on Arctic issues focus on the sustainable management of natural resources, addressing impact of climate change, and calls for more inclusive participation of non-Arctic states in the Arctic Council beyond ad hoc observer status.[73] The EU has a large capacity for climate and environmental research that

[73] The Council of The European Union "Council conclusions on Arctic issues", 2985th Foreign Affairs Council meeting in Brussels on 8 December 2009. URL:

could be utilized by the Arctic Council and has also offered its assistance in building search-and-rescue capabilities and contributing to the reduction of hazardous pollution in the Arctic (Barrett et al. 2011).

It is however difficult to detect whether the rising interest of non-Arctic states in Arctic matters is based on instrumental reasons or a deeper concern for human welfare, sustainable development and environmental protection in the High North (Young 2002a).
In any case, the Arctic region is frequently referred to as an indicator region for the consequences of global climate change which provides opportunities for the voices of Arctic to be heard in larger international forums (Young 2002a).
The trend of increasing globalization of the Arctic Ocean in term of growing participation and widespread interest in Arctic politics is a relatively new phenomenon to the Arctic Council and there are divergent perspectives on how to address it (Corn 2008).

c) The Shipping Industry

The shipping industry contributes to maritime security primarily by investing in the educating of mariners in polar operations and by developing new methods and technology for ships operating in polar waters (Marintek Annual Report 2009). The marine industry in Norway and the Russian Federation are playing a prominent role here. Furthermore, the shipping industry has a self interest in building marine infrastructure, facilitate knowledge-sharing and develop maritime safety, and thus contributes to norm building within the Arctic shipping regime. The shipping industry's self interest in providing security mechanisms is in fact delimiting needs for government intervention (ibid.).
This is illustrated by the case of ballast water. Since the current regulation of ballast water exchange has been largely ineffective, technological breakthrough in ship construction has made it possible to replace the exchange method with more effective treatment equipment. The shipping industry has also been very active in helping to address the problem of invasive species introduced to marine areas through ballast water. The shipping industry participates actively in the IMO Marine Environment Protection Committee (MEPC) and their Ballast Water Working Group. Furthermore, the International Chamber of Shipping (ICS), the International Association of Independent Tanker Owners (INTERTANKO) and the IACS has published Model Ballast Water Management Plans and give practical guidance for the implementation of the IMO Guidelines on-board vessels (GloBallast 2011).
Yet, more influential shipping actors such as the oil companies, cruise ships and the cargo sector have managed to deflect or evade a large share of the current environmental regulations (Tan 2006). This suggests that economic actors, such as the shipping industry, need to uphold a balance between promoting co-operation on maritime security and protection and at the same time maintaining competition. In some aspects, these two might collide, and it is not quite clear which factor would prevail in such instances – safety or economic advantage? (Marintek Annual Report 2009) For instance, vessel owners are generally reluctant towards

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http://ec.europa.eu/maritimeaffairs/policy/sea_basins/arctic_ocean/documents/arctic_council_conclusions_09_en.pdf.

the coastal states' right to adopt stricter CDEM standards than GAIRAS. This means additional cost on the part of vessel owners by reducing the freights they can opt for in the market place for transport services. Thus, ship-owners and flag states attentive to their concerns usually prefer global CDEM standards set by widely legitimate international institutions like the IMO (Stokke 2010a).
Introducing a more extensive legal instrument, such as a mandatory Polar Code, may alienate the shipping industry and decrease the likelihood of ratification and compliance (Muirhead 2007). However, the only way to address ballast water issues in the long term is to hold the shipping industry accountable in correspondence with the polluter pays principle.

7.2.3 Political concern and discourse

I. Public awareness and concern

Nationalist identifications with the North may sell well politically in both Canada and the Russian Federation. But considering that the public of the south often perceives the Arctic region as a peripheral region with few inhabitants, subsequently Arctic affairs has limited coverage in the media and little influence on general public discourse in the Arctic states – at least until recently (Griffiths 2009; Young 2002a). Even the attentive public has little knowledge of Arctic affairs and the work of the Arctic Council (Griffiths 2009).

However, the number of stakeholders in Arctic affairs is increasing rapidly parallel with the surge of interest shown towards the Arctic as an arena for economic activity. These stakeholders include actors within the transport and energy sector that are eager to partake in new economic opportunities, coastal communities seeing opportunities and concerns of increased marine activities, environmental NGOs with concern for the environment, and indigenous groups who perceive their livelihoods to be at stake. Along with the growing global concern for the impact of climate change in the Arctic, the level of public awareness will surely increase in the foreseeable future.

II. Normative discourses and influential principles

The section presents an overview of the main policy trends, public discourses and management principles that can be said to have an influence on environmental governance in the High North. It is based on a qualitative study of several official statements and government documents in the Arctic states such as white papers, official reports, speeches and strategy plans. By applying a discursive perspective we might grasp how perceived challenges, opportunities and priorities are understood, framed and presented by the governments in their respective countries that give additional insight to the incentive structures elaborated above. The discussion is centered on three overarching and

interconnected themes that are relevant for the regulation of Arctic shipping; maritime security concerns, environmental concerns, and future scenarios of the Arctic region.

a) The Precautionary Principle

Empirical research indicates that in some cases of environmental threat, great scientific uncertainty has produced more political concern and thereby greater political will to address the problem (Young 2002c). This follows the admonition given on the 1992 Earth Summit that:;"where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation."
The increasing awareness and reference to the precautionary principle has made easier to put environmental concerns on the political agenda without awaiting scientific proof of the potential impact (Tan 2006). This is exemplified by the case of ballast water management. There is a general international acknowledgement on the necessity and benefits of developing a safer and more effective management of ballast water that would eliminate the risk of harmful aquatic organisms and pathogens spreading from one part of the world to another causing harm to the environment, human health and property. Lessons learned from harmful and costly species invasion by the zebra mussel in the Great Lakes and the comb jellyfish in the Black Sea have brought the precautionary principle into the development of ballast water management (AMSA 2009).
The threat of invasive species through ballast water has strong links to the management regimes of marine biodiversity and the fishery that also make reference to the importance of addressing their issues in a precautionary manner. This is in fact a good example of issue interconnectedness that is supportive of regime effectiveness.

b) The Polluter Pays Principle

In the case of environmental resources national or international management regimes are faced with the choice of defining the rights with the victim or the polluter. An influential ideal has been the *polluter pays principle* (PPP) which supports the argument that those responsible for environmental problems should pay (Vatn & Veldeld 2011).
As a consequence of establishing requirements for double hull and ballast water treatment systems and introducing the concept of GSB in ship construction, the lion's share of regulatory costs has ended up with the ship-owners. This could indicate that the *polluter pays principle* is beginning to affect the shipping sector to such an extent that industry actors are now much less able and willing to resist environmental regulations (Tan 2006). However, this only concerns the cost of preventive measures. In the case of major pollution incidents, difficulty in tracking the responsible polluter due to limited monitoring capacity makes the PPP is hard to enforce. If invasive species were introduced to the Arctic through ballast water, the responsible vessel(s) are nearly impossible to identify which leaves the victims to pay for the mitigation measures and loss of potential income from fisheries.

c) Ecosystem-based management

The modern trend of environmental governance is to apply ecosystem-based management (EBM) approach to regional ocean governance. EBM is an integrative and holistic approach for the sustainable management of natural resources in chorus with maintaining the structure, function and productivity of the ecosystem (IUCN/NRDC 2011).
EBM is generally accepted at the international level (ibid.) and attempts to compensate for the UNCLOS' lack of provisions on how potentially affected states can assess trans-boundary impacts on the marine environment located in another state's jurisdiction (Koivurova and Molenaar 2009).

While the Arctic states have developed differing institutional mechanisms to implement EBM into their national legislation, it is clear that they have some key themes and components in common. These core elements include (IUCN/NRDC 2011:8):

- Application of EBM is geographically-based;
- EBM considers the inter-relationship among living and non-living components;
- It provides for the assessment and management of cumulative impact of multiple human activities;
- EBM is science-based;
- EBM is a multi-sectoral approach;
- Successful EBM provides participatory decision-making processes inclusive of rights holders and stakeholders (e.g. full inclusion of indigenous people);
- Long-term scientific monitoring, assessment and feedback are key components of EBM,
- EBM provides a sound basis for adaptive management over time as information grows and conditions change.

EBM is widely incorporated into the international legal framework, and already in 2004 was the EBM approach formally embraced by the Arctic Council (IUCN/NRDC 2011). To implement EBM as a non-legally binding document developed under the auspices of the Arctic Council is likely to be timelier and to better safeguard indigenous participation than more formal legalization (ibid.).

EBM is a promising approach to increase the ability to protect and manage the living resources of the Arctic through cross-level interactions. Mechanisms to implement EBM are readily available, but have yet to be fully implemented (ibid.). Thus, benefits from this approach are still largely unrealized and there is need for further research to evaluate the benefits of an Arctic regional EBM approach as it is being implemented the coming years (Siron et al. 2008). However, the timing for undertaking EBM is favorable, as the Arctic is experiencing major change and there are growing concerns about its future. The conditions for EBM implementations are also largely present; "a strong scientific base, an extensive, inclusive and transparent management structure, and broad and high level policy support" (IUCN/NRDC 2011:12). This suggests that the EBM approach could become operational in the foreseeable future and will support addressing the complex environmental issues facing the Arctic.

One of the obstacles of a regional EBM approach is that it may interfere with the national sovereignty interests of Arctic States (IUCN/NRDC 2011). It means that parallel with the potential for enhanced regional cooperation is there a potential of real conflicts of interest. These are primarily related to the exploitation of fishery resources and future exploitation of oil and gas resources.
Another obstacle is that the EBM methodology is vague, ill-defined, and relatively ambitious (ibid.) which means that dealing with the potential of national variety in EBM approaches can be a challenge at the Arctic-wide level of ocean governance. However, "diversity will not be a problem if there are common goals, objectives, and guiding principles" (Siron et al. 2008:100).

To sum up, the Arctic States are on the path to implement EBM in the Arctic Ocean – currently in separate Arctic LMEs, but possibly in the Arctic Ocean as a whole in the years to come. Together with the polluter pay principle, the precautionary approach and the concept of goal-based standards it contributes to the normative pull for provision concerning ballast water management and CDEM standards and in broader terms an increasingly influential discourse of environmentally sound management of the Arctic Ocean. Still the indeterminacy regarding the concept of environmental protection in its compatibility with the concept of sustainable development needs further clarification in the national Arctic strategy plans and in the work of the Arctic Council.

7.2.4 Institutional instruments

In this section, we examine why actors pursue different forms of legalization. Analyzing the benefits and costs of different institutional measures and exploring hypotheses regarding the circumstances that influence actors' choice of measure may contribute to a better understanding of the norm building capacity of the Arctic shipping regime.
I will explore the tradeoffs in terms of regime effectiveness related to binding rules versus voluntary norms (hard law versus soft law) and discharge standards versus CDEM standards when it comes to regulating vessel-source pollution in the Arctic Ocean.

I. Soft law versus hard law

I will now examine whether the establishment of more formal rules and agreements will be more effective in protecting the Arctic marine environment than the current regime that is mainly based on voluntary norms.

Presently there is a majority of soft law arrangements of the Arctic. Also, the U.S. has yet to ratify UNCLOS, and several of the Arctic states have not ratified the BWC. However, we might witness the contour of a growing trend towards more formalized governance in the Arctic. The SAR agreement was signed in May 2011 with the objective of coordinating Arctic search and rescue capabilities and therefore mainly instrumental in character. However, since this is the first Arctic-specific legal agreement it holds a significant expressive value as the

first step towards more formal political commitment of the Arctic states. There is also an ongoing formalization of environmental standards for ship construction and operation in polar waters; The International Maritime Organization (IMO) is developing a mandatory Polar Code based on an existing set of IMO Guidelines. But the negotiation on the statutory language for polar waters turn out to be more difficult than expected and it is obvious that the IMO's original 2012 target for completion will not be met. If a mandatory Polar Code becomes a reality, expectantly in 2013, it will have important expressive and instrumental value for collaborative action to ensure appropriate marine safety and environmental protection of the Arctic from vessel operations.

The basic assumption underlying the preference for hard laws in Arctic environmental governance is simple; it assumes that legally binding agreements would be taken more seriously by the member states than soft law instruments. It also assumes that a hard law system would serve the region better since the Arctic ecosystem transcends national boundaries and formal international cooperation could produce substantial added value in protecting the marine environment. In general, binding rules are expected to generate higher levels of compliance than voluntary commitments that have no real risk of sanctioning (Hasanat 2009).
This observation supports the United States' experience concerning national ballast water legislation. The United States initially implemented voluntary national guidelines for Ballast Water Management in 1998, but these were eventually made mandatory after the U.S. Coast Guard reported low rate of compliance, for instance poor records of vessel operators voluntarily submitting ballast water reports to the Coast Guard (U.S. Coast Guard 2011).

So if hard law theoretically proves more effective, why are soft law arrangements so often prevalent in regional and international environmental governance?
Soft law arrangements as a basis for establishing cooperation seem to have distinct advantages in a region like the Arctic where the history of international cooperation is relatively short and there are great uncertainty surrounding many principal issues (Sand 1991).

None of the Arctic institutions have yet been endowed with competence to make legally binding decisions on behalf of its member states (Stokke 2010a) whereas the Antarctic is governed by a region-wide formal agreement, the Antarctic Treaty System (ATS).
In contrast to the Antarctic which is an ice-covered continent, the Arctic is a marine environment surrounded by land governed by eight sovereign states. These states have different legal cultures with a different understanding of environmental law. To further complicate the issue, the Arctic has a high number of indigenous inhabitants, the region is rich in natural resources like oil and gas, and there still remain maritime boundary disputes to be sorted out (Young 2000a). All together these factors underpin the main obstacle to forming formal rules; namely getting the states to agree upon diminished rights in their sovereign areas as a result of legally binding bilaterial or multilateral agreements (Stokke 2007).

Furthermore, the negotiation of legally binding instruments is often a lengthy and difficult process, in particular when it involves strong states with divergent preferences, and the results

are frequently disappointing in substantive terms (Young 2000a). For instance, it took 12 years from the signing of UNCLOS until it entered into force in 1994. The Ballast Water Convention was adopted by IMO in 2004 but is still awaiting enough signatories to enter into force. The ongoing negotiation of a mandatory Polar Code has turned out to be much harder and prolonged than predicted.
In addition, parties to legally binding agreements frequently provide themselves with loopholes and flexible terminology that limit their exposure to new or expanded commitments (Young 2000a). The flexibility inherent in the current legal framework relevant for Arctic governance (e.g. UNCLOS) allows for quite divergent interpretations. Another drawback of a formal treaty is that it might challenge the special position that indigenous peoples have gained through the Arctic Council (Hasanat 2009).

At the moment there exist an overall lack of support from the Arctic states towards more formal rules (Hasanat 2009). This can of course change with time – and with the increase of concern and severity of environmental issues. If there are considerable benefits in committing to stricter cooperative measures and the problem structure is considered fairly benign, the negotiations of more binding agreements seem more likely. This is evident in the recent negotiation of the SAR agreement negotiated under the auspices of the Arctic Council, which was signed in May 2011, and is the first legally binding instrument with specific focus on the Arctic. The SAR agreement provides better coordination of the existing national emergency capabilities to improve marine safety in Arctic waters. The SAR negotiation was confronted by rather benign problem structures with clear benefits from cooperation and symmetrically distributed costs. Another example is the ongoing negotiation and drafting of a legally binding code for polar shipping that probably will be completed within the next few years. Hardening of the existing voluntary Polar Guidelines (2002/2010) into a binding code presents the Arctic states with a relatively benign problem in that the costs are expected to be moderate and rather symmetrically distributed among participants.
Since 2010 there has been a strong support to develop a mandatory Polar Code and several Arctic have spearheaded the process. However, since the Code will affect safety, environment protection, ballast water management and anti-fouling systems, the drafting process has become more difficult than expected and will not meet the predicted date of completion. One of the challenges is the existence of various opinions on how to mitigate additional risks and the hesitation on additional environmental protection measures (ASOC 2011).

Considerable more controversial are the suggestions of formalizing special environmental area protection in the Arctic. Issue concerning area protection generally consist of a more malign problem structure since it involves asymmetric affectedness, causes greater controversy and comprises national sovereignty (Stokke 2010a). Thus, Arctic states would be asymmetrically affected by a suggested amendment of MARPOL Convention to give the Arctic, or part of the region, a Special Area status with mandate to impose stronger than normal standards regarding vessel discharges. Both the Special-Area and the PSSA status would mean that the basis for Arctic institutions to serve as generator of regulatory leadership activity within the global institution is weakened (Stokke 2010a). Russia is particularly critical of PSSA proposals for the Arctic region, and even though it already exist a PSSA area

in the Baltic Sea, Russia made sure that it does not comprise their sovereign marine rights (Chircop 2005).

Soft law systems are often conceived as a stepping stone towards hard law development (Sand 1991). It still remain somewhat of an open question as to whether it is necessary and possible to move beyond the incremental and soft instruments and negotiate a harder treaty regime in the Arctic over time. Based on the different perspectives on hard law and soft law prevailing among Arctic actors and scholars I will now look at potential future scenarios for Arctic governance.

II. Discharge standards versus CDEM standards

The case of unilateral CDEM standards in the Arctic illustrate the differing incentive structure that result from the indeterminacy of UNCLOS provisions; namely the socio-economic interests of flag states in unimpeded navigation and globally uniform CDEM standards on one side, and the environmental interests and sovereign territorial claims of the coastal states adopting restrictions on international navigation and stricter CDEM standards on the other side (Molenaar 2009).

In the regulation of vessel-source pollution, environmental standard is the dominant measure. I will discuss two types of standards – discharge standard versus CDEM standards – and to what extent they are effective in preventing vessel-source pollution.

Despite reports about its insufficiency, open ocean ballast water exchange (BWE) is currently the only IMO-required measure to reduce the risk of invasive species through ballast water (Galil & Hülsmann 2001). The IMO Ballast Water Working Group has recognized this and stated that BWE should only be seen as an interim measure to be replaced when more effective alternative ballast water treatment options is in place.[74] Considerable effort has been made to formulate appropriate standards for ballast water management in the BWM Convention.
The existence of high sea "governance gap" and inadequate monitoring measures beyond territorial waters means that the capacity building concerning ballast water exchange regulations is difficult (Victor et al. 1998). This might change as soon as the BWM Convention's objective that all ships install a ballast water treatment system by 2016 is accomplished. Transforming ballast water regulation from requirements for open water exchange techniques to performance standards on treatment equipment means that monitoring compliance will be easier to assess. In fact, ballast water exchange becomes incorporated in the category of CDEM standards which makes it subject for more effective in-port monitoring. Empirically, the level of industry compliance with MARPOL 73/78 seems to have been significant higher than for discharge standards (Tan 2006).

[74] IMO MEPC 46/3 2000

CDEM standards differ from discharge standards in that they are premised on enforcing compliance from the marine industry from the outset rather than on monitoring subsequent violations at sea. Many CDEM standards can be imposed already at the construction stage which heightens the likelihood of compliance by ship-owners. Tan (2006) argues that CDEM standards are thereby likely to permeate the entire transaction process;

> At every stage of the transaction, the act of procuring and operating a tanker rests on the knowledge and co-operation of several parties, including shipbuilders, classification societies, insurers and even banks in their role as financiers and mortgagees. In this manner, ships which do not comply with the IMO equipment specifications invariably face difficulties in securing insurance coverage or financial backing (Tan 2006:237).

There is little ability for industry actors to avoid regulation on CDEM standards on new ship orders. Real problems of compliance with CDEM standards are related to the process of proper maintenance of new vessels and the refitting or phase-out of old vessels. Thus, MARPOL 73/78 and the BWM Convention have both provided time schedule for retrofitting or complete phase-out of old vessels. Also, MARPOL 73/78 and SOLAS 74 give provisions relating to survey and certification to monitoring compliance.
In essence, CDEM standards have at large been far more effective than discharge standards in ensuring compliance with vessel-source pollution regulation. Also it gives port states an easier task in rule enforcement. CDEM standards do not require geographical specification of regulations since it allows for effective in-port enforcement. A ship's conformity with CDEM standards remains generally the same throughout its voyage and deficiencies only become apparent during the ship's stay in port which assures increased detection of violations. High risk of detection reduces competitive advantages for operating with sub-standards fleets. Certification and inspection often gives enough proof of violation to ensure legitimate use of sanctions. Sanction measures available for port state control are typically port detention, denial of port entry or judicial fines. Ship-owners usually regard sanctions measures like port state detention or denial of port entry as more disincentive than judicial fines because it leads to costly delays.
Based on these Arctic observations it seems that CDEM standard – when appropriate technological solutions exist – is the most effective measure in regulating vessel-source pollution.

7.2.5 CONCLUSION

It is IMO that holds the most prominent norm-building role in all aspects of both global and Arctic shipping and is responsible for the negotiation, maintenance and amendments of all the main treaties and guidelines regulating shipping.
When discussing future governance development in the Arctic, some points out that the IMO has a relatively successful record of addressing emerging environmental problems – and it is internationally acknowledged as the main forum for regulation shipping activities (Corn 2008). But concerning Arctic maritime shipping so far only non-binding instrument has been adopted by the IMO (Stokke 2010a) and given the delay and difficulty with drafting a

mandatory Polar Code, it might take a while to formally legalize Arctic-specific shipping regulations.

Thus, both IMO and UNCLOS recognize that additional measures may be necessary in the certain regions[75] (Stokke 2010a) as long as they do not violate any of their objectives or the rights of coastal states. As a result, many bilateral and multilateral agreements have developed in Arctic environmental management. This can potentially strengthened rights and duties of sovereign coastal states in terms of; a) providing better understanding and management of the whole ecosystem; b) legal certainty regarding maritime jurisdiction, and c) improved conditions for learning and harmonization of regulatory practices.

Arctic states and supporters of a regional approach underline the shortcomings of international organizations like the IMO in regulating Arctic shipping since most of the region lies within the EEZ of powerful states. Furthermore, since fragmented approaches dominate domestically, it is unlikely that most Arctic states will be pushers for coherent and coordinated management systems at the international level (Andersen & Skjærseth 1999).

Yet, the relevance of global governance to the Arctic is increasing at the same time that a variety of innovative initiatives with Arctic-specific governance systems are established and are still developing (Young 2000a). The regional leeway within the global shipping regime gives rise to governance niches for regional arrangements such as the Arctic Council. The Council is currently the cooperative mechanism most broadly supported by the Arctic states. It addresses governance issues arising in the region and works on the basis of consensus and soft law instruments.

One of the distinctive features of Arctic Council is in fact its participatory heterogeneity which includes in a relatively prominent way both indigenous people of the High North and other civil society organizations of various kinds. However, the Council need offer acceptable opportunities and procedures for important actors (e.g. Germany, China, Great Britain, and the European Commission) to gain observer status (Young 2000a).
This does not mean that there is need for any radical reformation of the Arctic Council that undermines the dominant position of the Arctic states in its deliberations, but suggests a more attentive approach to participatory decision-making.

Yet, without the force of law, the effectiveness of the current regional arrangements depends on the political will and scientific input invested in them and to what extent they succeed in effective interplay management with the global regime (Young 2002a). Thus, Arctic institutions role in norm building seem to be supporting not yet triggering normative strengthening.

[75]That is spatial areas with certain physical or socio-economic characteristics, such as enclosed or semi-enclosed seas, straits used in international navigation, and partly ice-covered areas. See LOSC Art. 34–36 (straits), Art. 122–123 (enclosed and semi-enclosed seas), and Art. 234 (ice-covered areas).

7.3 Capacity building

In this section I will evaluate the effectiveness of the current Arctic governance regime on the task of capacity building related to marine environmental issues. Investments in capacity building are needed to sustain a constant process of change and adaptation to improve the capabilities and effectiveness of the regime (UNEP 2006).

7.3.1 Models of implementation

There are a wide range of recommended approaches for building institutional capacity in the Arctic (see UNEP 2006). I will examine how some of these approaches are being applied within the Arctic shipping regime, and discuss whether they are effective enough to serve as models in which to learn from – and potentially follow.

I. The Guidelines and Action Strategies of the Arctic Council

In recent years capacity-building has become a key objective for the Arctic Council both in terms of enhancing the effectiveness of its own structures, programs and activities, as well as enhancing the capacity-building role for the Council in international affairs (Hønneland & Stokke 2007).
A recurrent activity of the Arctic Council working groups (mainly PAME) has been to encourage and facilitate national implementation by forming voluntary guidelines and action plans. These documents include issue-specific strategies and recommended activities intended to support governments and operators of Arctic installations and vessels in efforts to identify and address the threats to the Arctic marine environment (Arctic Council 2011). Most relevant for Arctic shipping and vessel-source pollution prevention are the 2002 *Guidelines for Ships Operating in Arctic Ice-covered Waters*, the 1997 *Arctic Offshore Oil and Gas Guidelines*, the 2000 *Action Plan to Eliminate Pollution in the Arctic* (ACAP), and the 2004 *Arctic Marine Strategic Plan* (AMSP).
These guidelines and action plans have an important norm-building as well as capacity-building function in terms of awareness raising and operational guidance in addition to facilitating monitoring, networking, and transfer of equipment and technology. These measures clearly have a potential to impact on regional pollution response, but actual effects have so far been limited (Arctic Council 2011). The authority to implement any recommendation or international regulation remains in the hands of the national governments involved (Huebert & Yeager 2008) and there is no systematic review of whether governments or others actually make use of them. The normative force of these guidelines is modest since their objectives are voluntary and rarely more ambitious or more specific than those already embraced in broader international forum. Given the largely informational character of such guidance documents, it is not surprising that dissemination and awareness-raising is the prioritized activity of Arctic institutions (Hønneland & Stokke 2007) which is considered a more diffuse form of capacity enhancement.

Fortunately, most of the Arctic states have a demonstrated capacity for implementing the global regulations on Arctic shipping (Hoel 2009). Yet, if the Arctic shipping regime are moving towards adopting binding region-specific rules, a regional institution such as the Arctic Council will be well placed to assist regional implementation, for instance through port-state enforcement measures (Stokke 2010a).

II. The LME pilot projects for implementing ecosystem-based management

Integrating EBM as the primary approach for managing the Arctic marine environment is one of the core priorities of the current chairmanships of the Arctic Council (2006-2013) and it has been one of the tasks of PAME since 2004. The Nuuk Declaration of May 2011 established an *Ecosystem-based Management Experts Group* to recommend further activities in this field to be considered by the SAOs before the end of 2013 (Arctic Council 2011).

An integrated EBM approach requires the identification of spatial units capturing the ecosystem structure and functions. Therefore, the Arctic Council has adopted a Large Marine Ecosystem (LME) framework and identified and mapped 17 Arctic LMEs for monitoring and assessment purposes (Siron et al. 2008).

The LME pilot projects initiated by the Arctic Council is a first step towards an integrated EBM approach that would encompass the Arctic Ocean as a whole and potentially provide extended regulation of marine areas beyond national jurisdiction. As elaborated in Part 7.2.4, some of the Arctic states (the Russian Federation, Norway, Canada, U.S. and Iceland) have already incorporated elements of EBM into their national legislation and policy instruments, but they are at very different stages of implementation (Siron et al. 2008). Optimally, the LME approach will ensure that national and sub-regional EBM approaches will be compatible and coherent with each other, although not necessarily similar, and facilitate knowledge-sharing and lessons learned (Siron et al. 2008). The EBM approach offers an opportunity for region-wide cooperation on environmental issues, especially on shared goals, that would enhance the overall effectiveness of the Arctic Ocean management. An Arctic-wide LME framework would; (1) take advantage of already existing approaches implemented at national or sub-regional levels for a comparison and possible future harmonization of the best regulatory practices, (2) increase the scientific base for better understanding and management of shared natural resources and large marine ecosystems, and (3) provide the "umbrella structure" that facilitate coordination in shared waters, and develop common tools and provide opportunities for collaboration in other parts of the Arctic (Baker 2008; IUCN/NRDC 2011; Young 2000a). Moreover, the "umbrella structure" of an Arctic-wide LME could contribute to supportive interplay management in terms of knitting together a range of planned and on-going Arctic Council initiatives. These include, among others, CAFF's Circumpolar Biodiversity Monitoring Program (CBMP) and its Arctic Biodiversity Assessment (ABA); the Sustaining Arctic Observing Networks (SAON), Arctic Data Spatial Infrastructure; the Arctic Ocean Review and the Arctic Change Assessment initiative (IUCN/NRDC 2011).

Yet, it is important to note that the sub-regional (in national waters) and regional (Arctic-wide) approaches to EBM are complementary because they are applied at different spatial and governance levels (Siron et al. 2008).

PAME's work plan for 2009-2011 includes planning and implementation of pilot projects for the West Bering Sea LME (United States/Russian Federation) and the Beaufort Sea LME (Canada/United States). I will take a closer look at the latter.

The Beaufort Sea LME is bordered by northern Alaska (U.S.) and Canada and includes trans-boundary issues and disputed marine boundaries that need to be addressed. In 2008, Canada and the United States began planning for a bilateral LME management pilot project in the Beaufort Sea under the auspices of the Arctic Council. The goal of the Beaufort Sea LME pilot project is to facilitate a joint baseline mapping to settle unresolved maritime boundaries – which are currently being undertaken – and to harmonize national approaches to improve legal and policy decisions affecting multiple uses of the disputed Beaufort Sea. Even though complete harmonization of national approaches is not in reach, increased compatibility is possible (Baker 2008). Favorable conditions to make EBM operational in the Beaufort Sea LME are already available; a multi-level spatial framework, science-based management tools, and sufficient governance structure (Baker 2008; Siron et al. 2008).
The Beaufort Sea LME pilot project can contribute to closing more gaps in Arctic governance if the governments of Canada and the United States, as well as indigenous and other sub-national governments with an interest in the region, succeed in applying their collective knowledge and experience to settle maritime boundaries and balance multiple uses (Baker 2008).

Among the best and most developed examples of EBM implemented in an Arctic LME is the trans-boundary cooperation between Norway and the Russian Federation in the Barents Sea. The Barents Sea Cooperation is represented by two Joint Commissions; the Joint Russian-Norwegian Commission on Environmental Cooperation (operative since 1988) and the Joint Russian-Norwegian Fisheries Commission (operative since the 1970s). A Joint Norwegian-Russian environmental Status Report for the entire Barents Sea was published in December 2009 and marked an important milestone for the Norwegian-Russian cooperation (IUCN/NRDC 2011). The Status Report will form the basis for joint environmental monitoring of the Barents Sea and for the development of a comprehensive Russian plan for the management of the Russian sector of the Barents Sea and a revision of Norway's management plan for the Norwegian sector. The Barents Sea status report concluded that the environmental situation is generally satisfactory and the joint management regime is overall effective (Johnsen 2006).
The joint management in the Barents Sea has contributed and still contributes to an increase in the common understanding of the pollution situation in the northern areas, strengthens the collaboration regarding control, monitoring and prevention of pollution (BarentsPortal 2009). Still, there are concerns of future challenges as to the effects of climate change, the continuing spread of alien species and the anticipated increases in petroleum and shipping activities. But overall, since the Barents LME is the only well-established examples of EBM implemented in

the Arctic Ocean and has proved to be largely successful in many aspects, it can serve as a model for other Arctic LME to follow and/or draw lessons from.

III. Barents 2020; A capacity building program for the Barents Sea

In November 2005 the Norwegian Government launched the "Barents 2020"; a capacity enhancement program with focus on long-term and cross-sectoral research and development in the High North. Barents 2020 has become an international joint industry project financed by Russian and Norwegian industry and the Norwegian Government's Barents 2020 programme (Norwegian Maritime Directorate 2010).
One of the main objectives of the program is creating dialogue and facilitate knowledge-sharing between authorities, academic institutions, expert groups, private enterprise and social partners in Norway and the Russian Federation regarding maritime safety of petroleum related activities in the Barents Sea (Barents 2020 Final Report 2010). Both countries have substantial, but somewhat different, knowledge and a coordinated exchange of knowledge will make both countries better equipped to meet the opportunities and challenges ahead (Johnsen 2006).
Another key objective of the Barents 2020 project is the mapping of current environmental standards in the Barents Sea with a view to arrive at common acceptable standards and practices for safeguarding people, environment and asset values in the Barents Sea that take into account the additional challenges related to Arctic conditions,. It includes standards for regular emissions and discharges from ships and offshore units in the Barents Sea. The third phase of the Barents 2020 project was completed in 2010 with a final report that included a full list of recommended standards for common Norwegian-Russian application in the Barents Sea based on best available industry practice for offshore operations (Barents 2020 Final Report 2010).
The Barents 2020 Phase 3 Final Report (2010) concluded that 64 of the standards are applicable "as is" in the Barents Sea, including the IACS Requirements concerning Polar Class. Still, 66 of the standards need special consideration/amendment for Barents Sea use concerning low temperatures and/or ice loadings. These standards include; the IMO MARPOL 73/78 Annexes with amendments, the IMO Ballast Water Convention, the IMO International Code of Safety for Ships in Polar Waters (Polar Code), and the IMO Guidelines for ships operating in Arctic Ice Covered waters[76] (Barents 2020 Final Report 2010).

The Barents 2020 reports aims at providing guidance to marine operators, contractors and manufacturers in Norway, the Russian Federation as well as globally for maritime operations related to petroleum exploration, production and transportation in the Barents Sea (Barents 2020 Final Report 2010). That way the project has brought Norwegian and Russian industrial

[76]130 standards were selected for the baseline list. These were unanimously agreed to represent best available engineering practice as a basis for execution of projects and operation in the Barents Sea.
The panel selected a set of conditions which could be applied for a uniform simplified check of the standards for suitability for Barents Sea application. The conditions were: low temperature, ice loading, darkness, remoteness, and vulnerable environment (Barents 2020 Final Report 2010).

actors closer together and contributed to making Arctic policy guidelines more viable for the industry (Johnsen 2006).
Furthermore, it is assumed that these reports will provide useful information for authorities, policymakers and standardization bodies although it is uncertain whether they will act upon the proposals for updating and revision of industry standards (Barents 2020 Final Report 2010).

Some areas of concern are not adequately covered in existing standards, and phase 4 of the Barents 2020 project is set to address these concerns and propose industry guidelines where such guidance is necessary. One such issue that needs special attention is the specification and recommendation of a regional standard for regular emissions and discharges from ships, including applying the MARPOL Special Area requirements (Norwegian Maritime Directorate 2010).

The Barents 2020 project provides as a good example of a capacity building program that has successfully performed a needs and capacity assessment in order to develop a model for implementation of environmental standards that reflect the specific conditions and priorities of the users and protectors of the Barents Sea. Yet, the project is still not completed and is challenged by the lack of infrastructure to ensure the full implementation of sound environmental standards (Barents 2020 Final Report 2010).

7.3.2 Normative commitment to implementation

I. Research and Educational programs; Forming of tomorrow's decision-makers

One approach is to invest in training, educational programs, networking and others activities that all will assist in enhancing abilities and skills of stakeholders and decision-makers (UNEP 2006). There have been large investments in educational programs on Arctic environmental issues and recruiting of scientists to engage in Arctic affairs. For instance, the Norwegian Research Council has polar research as its highest priority when distributing funding to science and innovation. The IPY in 2007-08 contributed greatly to enhance investment in polar research and facilitate Arctic cooperation and networking. During the IPY period, the University of the Arctic (UArctic) played an important role in coordinating the education and outreach activities resulting from the IPY's international scientific research projects. The Senior Arctic Officials (SAO) of the Arctic Council first presented the idea of establishing a circumpolar university in March 1997, and the University of the Arctic (UArctic) was in place in 2001. The UArctic is a cooperative network of universities, colleges, and other organizations committed to empowering northerners and northern communities through higher education and shared knowledge. The educational programs of UArctic strive to build human capital by providing northern residents the skills and the knowledge to sustainably maintain and develop the Arctic while protecting the environment and peoples (UArctic 2006).

In essence, investment in education and research is crucial for long-term capacity building. Because as UNEP (2006:4) describes it,

> Eventually, whereas the current generation of decision-makers is the most obvious target group for capacity building activities, even greater opportunities lie with the future decision makers, the students, pupils and children. There are tremendous opportunities to build capacity by bringing topics related to [Arctic environmental concerns] into the curricula of schools and universities.

II. Marine Training Programs & Corporate Partnership: The role of marine industry in Arctic capacity building;

Capacity building in terms of continuously investment in training programs that develop skills and knowledge among mariners operating in the Arctic is necessary to reduce the risk of harmful incident to environment and/or humans. Due to the operational challenges and the limited marine infrastructure, the maritime safety of vessels operating in the Arctic is often in need of the skills of a limited number of experienced mariners (AMSA 2009), and most of them are found in the Russian Federation. AMSA (2009:186) reports that while "the demand for skilled mariners is increasing, the number of experienced Arctic mariners is decreasing." Yet, there are no universal or mandatory formal education, training and certification requirements available to prepare mariners for Arctic marine operations (AMSA 2009). This will require further development of structures, facilities and financial resources targeting training of mariners (UNEP 2006) in addition to regulatory measures such as certification requirements.

The involvement of shipping companies in Arctic capacity building is essential due to the fact that they are the ones actually having the experience and knowledge of what might be needed. They contribute considerably to information exchange, research and innovative business. For instance, the shipping industry is providing innovation in ice-breaking technology and improved knowledge among ship operators regarding ice navigation. In other words, their contributions means delimiting government intervention needs in these aspects.
A good example is Beluga Shipping which has its own research and innovation department. Beluga Shipping is initiator of the public-private partnership project *Maritime Campus Elsfleth* that merges representatives from government, science, research and economy to cooperate on maritime issues (Marintek Annual Report 2009). Comparably, the leading Swedish shipping company *Transatlantic* has initiated an international ice advisory board, the *Transatlantic Ice Council* that brings together experts from Sweden, Finland, Russia, Canada, Germany and the United States to discuss Arctic security and safety issues. Furthermore, *Transatlantic* has together with Kalmar University established the *Ice Academy* which educates new ship commanders to operate in ice (ibid.).

III. Collective action

Underdal's concept of benign or malign problem structures based on evaluations of interest configurations and the nature of the issue at stake is helpful when examining the capacity of Arctic institutions to engage in collective action (Stokke 2010a).
Cooperation may in some cases come opportunistically, where actors find themselves voluntarily committing to collective action because it endorses national interest in the most timely and achievable way (Griffiths 2009).
The culmination of the Cold War set off a wave of cooperative efforts in the early 1990s fueled by wishes to cut across the boundaries of national jurisdictions in the High North, in particular across the East/West line (Young 2000a). Moreover, the transfer of authority from central governments to local/regional governments in the Northern territories, such as the North Slope Borough in Alaska (1972), the Greenland Home Rules (1979), and the Nunavut in the Canadian Arctic (1999), served to increase the capacity of inhabitants of the Arctic region to interact directly with each other instead of communicating through central governments. The enhanced capacity of regional cooperation is illustrated by the forming of Inuit Circumpolar Conference (ICC) that links the Inuit of Greenland, Canada, Alaska, and the Russian Arctic (Young 2000a).
In Arctic environmental governance, cooperation motivated by opportunism gives preferentiality to bilateral and issue-specific collaboration such as that the joint management of the Barents Sea between Norway and the Russian Federation, the Polar Bear Treaty of 1973, or the Arctic SAR agreement of 2011 (Griffiths 2009). These are all examples of opportunistic cooperation related to relatively benign coordination problems where preferences as to outcomes are relatively congruent and all parties have something to lose if they fail to cooperate (Underdal 2002).

Collaboration on capacity building in the Arctic is a good example of a benign coordination problem and highly relevant for all Arctic capacity enhancement initiatives concerning maritime pollution (AMSA 2009). The benefits of coordination are high and extended bilateral and multilateral cooperation on Arctic matters already exist (Barrett et al. 2011). This explains why Arctic collaboration on enhancing search and rescue capabilities has begun at sub-regional level. Norway and the Russian Federation were already collaborating on search and rescue response in the Barents Sea when the Arctic Council in 2009 decided to set up a Task Force for negotiating an Arctic SAR agreement that was later adopted by the IMO in May 2011 (Stokke 2010a). As Stokke (2010a:24) points out; "the synergy that can be reaped by coordinating the scarce search and rescue capabilities of Arctic states indicates that regional capacity-enhancement […] is clearly relevant also in the shipping sector."

For the most part, the existing sub-regional regimes aimed at co-management of shared national resources in the Arctic region is functioning relatively well and would surely proceed without the need of region-wide measures (Griffiths 2009; Young 2002a). Although contributing to building trust in the region (Brigham 2010), the ongoing sub-regional cooperation is not "cumulative, integrated or conducive" enough to develop a sense of shared purpose for the Arctic as a whole (Griffiths 2009:4). Instead, the present mode of Arctic

cooperation is describes as "fragmented incrementalism"[77] due to the lack of substantial domestic coalitions that causes more malign coordination problems. It means that region-wide cooperation becomes more costly and consequently the Arctic states prefer to develop its collective ability within the array of fragmented agreements and initiatives that already exists (Griffiths 2009). Obviously, given the exceedingly trans-boundary character of Arctic environmental issues and the growing global importance of the region, the Arctic shipping regime would benefit in both capacity and effectiveness if the Arctic states would agree on regional mechanisms. More regional cooperation could enhance capabilities for assessment and monitoring and supplement and streamline the flow of material resources (Young 2002a).

Without discrediting the importance of the opportunistic and incremental dimension of collective action, the future of the High North would benefit from forming a common strategic design that has the big picture in mind and therefore "would act not so much on what might seem currently doable […] but also on what is needed" (Griffiths 2009:4). Indeed, many have recognized good prospects for developing such region-wide cooperation on several Arctic issues (Nowlan 2001) that is fueled by strategic rather than opportunistic causes. The incorporation of the concept of ecosystem-based management into Arctic policy documents is a step towards developing a common strategy for ocean management. Yet, at the moment EBM is only implemented at the national and bilateral level. The EBM approach pursued by Norway and the Russian Federation in the Barents is the most advanced, extensive and effective example of strategic cooperation in the Arctic. Therefore it can provide as a model to be followed by other Arctic LMEs, such as the recently initiated LME pilot project in the Beaufort Sea between Canada and the United States (Griffiths 2009).
A holistic management like the principle of EBM envisage would help to coordinate strategies, norms/rules and linked issues to avoid fragmented, incremental and incompatible outcomes. Such cooperation would also be more encouraging to a sense of shared responsibility and purpose for the Arctic as a region (ibid.).

The essential requirement for regional cooperation is a central institution working on a consensual basis to coordinate a diversity of processes, programs and actors, provide financial resources and monitor and report on (voluntary) compliance with regulations/guidelines (Griffiths 2009; Young 2002a).
The basis for such an institution already exists in the Arctic Council even though the regional dimension is only faintly present in its common practice (Griffiths 2009). Yet, the Arctic Council provides a good basis for coordinating regional cooperation because it has managed to form a common forum that includes the eight Arctic states, non-Arctic states, indigenous peoples, IGOs, NGOs and regional councils. The large number of participants and observers allows the Council to address a number of issues simultaneously. It also enhances the resources available for capacity enhancement initiatives (Barrett et al. 2011). Many are in favor of incorporating more non-Arctic states as observers in the Arctic Council in order to

[77] The notion of fragmented incrementalism was first introduced by David VanderZwagg. *See* David VanderZwaag, *Transboundary Challenges and Cooperation in the Gulf of Maine Region: Riding a Restless Sea Toward Misty Shores*, *in* LAW OF THE SEA: THE COMMON HERITAGE AND EMERGING CHALLENGES 265, 281 (Harry N. Scheiber ed. 2000).

enhance the legitimacy of the forum as well as the supply of resources (Griffiths 2009). For example, the EU is currently applying for permanent observer status in the Arctic Council. This provides the Council with an opportunity to enhance its assessment capacity since the EU has large capacity for climate and environmental research (Barrett et al. 2011).
Indeed there are other options for future collaborative management strategies of Arctic waters (ibid.). One of them is using the ATS Treaty as a model. But the advantage of extending the scope and authority of the Arctic Council is that it allows for the involvement of both governmental and NGOs. This provides the Council with more flexibility to accommodate various interests and issues than the alternative approach of creating a formal IGO which is more rigidly structured (Nowlan 2001). Another advantage is that this approach is perceived as more respectful of national sovereignty which is important for getting the Arctic states on board.

7.3.3 Funding

Capacity enhancement activities of the Arctic Council depend on state funding which is voluntary and decided on a case-by-case basis. Thus, lack of financial contributions and political might reduce the practical significance of the Council's programs and action plans (Hønneland & Stokke 2007). This is why the Canadian Government and various scholars (e.g. Griffiths 2009; Young 2002a) are advocating for the establishment of a new Arctic Fund that is pooling funding and coordinating investments among the Arctic states to support cooperative efforts on environmental protection and sustainable development in the Arctic. The creation of a dedicated Arctic Fund could help to provide the resources needed to broaden the activities of existing regimes dealing with shared natural resources and ecosystems in the Arctic (i.e. oil-spill response capabilities, regional sharing of national satellite monitoring assets) (Young 2002a). Griffiths (2009) advocates for the Arctic Council to establish such a fund by incorporating more non-Arctic states as observers with a requirement to make annual contributions to the region-wide Arctic fund. In the present system there are limited predictability and regularity in the funding of initiatives of the Arctic Council working groups and, and no assurance of sufficient funding constitutes a major shortcoming of existing governance arrangements in the Arctic. Thus, an Arctic Fund would provide added capacity to implement stewardship projects and enhance the consistency of funding (Young 2002a).

"Funding for the operation of subregional regimes dealing with the Arctic's shared natural resources and ecosystems comes largely from national sources. For the most part, this means agencies of central or federal governments" (Young 2002a:11). Yet, substantial public and private funding will be needed to fill existing Arctic regulatory gaps for marine operations and environmental protection, for instance by requesting public-industry investments in a mandatory ship tracking and monitoring system, hydrographic surveys and charting, construction and maintenance of icebreakers, and improvement of weather and sea ice information (Brigham & Sfraga 2009).
One solution is cost recovery through industry user fees. Another source of financial assistance is the World Bank and other international financial institutions that are relevant

contributors to the development of Arctic port facilities and overall marine infrastructure (ibid.).

Russian Arctic policy statements signal that they will build and develop new marine infrastructure along the NSR, including ports, customs facilities and marine checkpoints in the period 2011–15 (Blunden 2012). The Russian government will remain the principal shareholder given that they already control much of the existing resources (icebreakers, forecasting facilities, support equipment and infrastructure, ports and port facilities). There exist opportunities for creating a joint-stock corporation that will unite the interests of all potential users of the Northern Sea Route (Moon & Tukhfatullin 2003). Some of the Russian users (e.g. LukOil, Norilsk Nickel) have expressed interest in contributing to such a project, while most potential users of the NSR are reluctant to financing its development (ibid.). This is mainly because there are little sign of Russian willingness to allow international participation in its management (Blunden 2012).
Another Arctic sea route, the Northwest Passage, does not have the *marine infrastructure* to support increased activity, and the investments of Canada and the United States are only aim at enhancing emergency response capacity in their part of Arctic waters.

7.3.4 Interplay Management

Given the complexity of the Arctic shipping regime, the occurrence of some sort of institutional interplay is inevitable. Even if the concept of interplay is not directly focused on capacity building as such, interplay management can be regarded as an institutional measure that could enhance the capacity of the existing institutional structure and increase regime effectiveness. The form of interplay will give indications on how well a regime is positioned to address environmental problems or resource management (Young 2003). While some cases of interplay can be conflicting or obstructive, others are synergetic or supportive (Kim 2003; Young 2002a).

As Arctic issues are gaining increasing priority on the international agenda, the links between regional initiatives and global arrangements are becoming more significant. It means that we can expect more substantial forms of interplay between global but functionally specific arrangements and regional but functionally broad arrangements operating in the Arctic (Young 2000a:11).
Given the mosaic of Arctic institutions and organizations, there is a real risk of overlap or collision of relations and tasks causing them to work at cross purposes and thereby reduce the effectiveness of Arctic governance (Keskitalo 2009; Young 2002a). AMSA has identified some aspects of institutional interplay within the Arctic shipping regime and suggested measures to by increasing the synergy of interplay relations and most of these focus on the Arctic Council (Brigham & Sfraga 2009).

The first of the AMSA recommendations is that the Arctic Council and its member states should to a greater extent link with international organizations (IGOs). AMSA specifically refers to international organizations such as the International Maritime Organization (IMO),

the International Hydrographic Organization (IHO), the World Meteorological Organization (WMO) and the International Maritime Satellite Organization (IMSO), whom all are dedicated to advance the regulation of environmental threats and maritime safety of Arctic marine shipping (Brigham & Sfraga 2009).
Most of the activities of the Arctic Council are linked to a broader global framework (Hønneland & Stokke 2007). Consequently, the activities of the Arctic Council and its member states to address marine pollution in Arctic waters must be coordinated with the IMO, UNCLOS, IACS and MOU. Even more important is it that there is no conflict or overlap in the relation between coastal state legislation under Article 234 of UNCLOS and the main IMO safety and anti-pollution conventions (Blanco-Bazán 2009).

A second recommendation is that the Arctic Council and its member states should take measures to enhance the uniformity of Arctic shipping governance. Greater uniformity in policy approaches would certainly help coordinate, harmonize and enhance the implementation of the Arctic maritime regulatory framework (Brigham & Sfraga 2009). The process of information exchange will also facilitate partnership between regional and international organizations and programs, local authorities and indigenous organizations that can be used for promoting joint efforts in capacity building.
There is a complex network of Arctic institutions that engage in capacity-building and state-of-the-environment reporting in the Arctic. Multilevel collaboration to share and coordinate information and develop policy documents already exist. An example is UNEP/GRID-Arendal which has established the International Arctic Environment Data Directory (ADD) and through collaboration with other Arctic institutions and stakeholders has managed to develop it into the most comprehensive international gateway to environmental data and information for the Arctic (Langlais 2000). WWF Arctic, an environmental NGO with observer status in the Arctic Council, has largely developed its policy work and assessments through interaction within multi-level networks that includes the Norwegian Polar Institute and various working groups of the Arctic Council (Keskitalo 2009). The work of the Northern Forums has largely a sub-regional focus and have benefited from collaboration with national departments and the BEAC. The BEAC has developed networks at both regional and national level and facilitate joint meetings between representatives at both levels to discuss Arctic policy (ibid.).
Still, the policy work of national and regional institutions are largely perceived as fragmented. In order to better link with international organizations and harmonize safety and pollution prevention measures, AMSA recommends that PAME takes on the proactive task of bringing together experts and stakeholders in Arctic shipping to identify common interests and develop unified regional positions before approaching IGOs. In order to develop a consistent approach on Arctic shipping, the Arctic states (through PAME) should coordinate and take into consideration input from domestic actors and stakeholders in each state as wells as stakeholders and government departments/agencies who attend various IGOs (e.g. IMO, WMO, IHO, IMSO) (Brigham & Sfraga 2009).
Furthermore, the AMSA has advised PAME to conduct surveys and inventories of national and regional regulations and guidelines with the aim of and ensure that they are consistent with UNCLOS provisions (ibid.).

A third recommendation is that the Arctic Council should strive to align linked issues by improving cross-sectoral coordination. Linked issues can be understood as cases where efforts to deal with one issue have unintended consequences for another issue (Kim 2003). For example, reduction of marine pollution will have positive consequences for the protection of fish stocks and marine mammals because they are functionally linked issues. By contrast, efforts to protect the environment and efforts to promote economic development can in many cases lead to colliding objectives (Chasek et al. 2010).

In general global regimes are issue-specific and organized around a functional concern. By contrast, the agenda of the Arctic Council – although confined to a well-defined geographical area – covers a broad range of issues and functional concerns (Young 2000a). Since the Arctic Council has functionally broad policy agenda it frequently causes problem of linked issues and overlapping of work. In such cases, the important part of the interplay management tool kit is developing a clear set of objectives for capacity building that is mutually agreed on by providers and beneficiaries. According to UNEP (2006:3), "a clearer set of objectives, mutually agreed among beneficiaries and providers, will help to effectively target activities, reduce redundancy, improve synergies and ensure that capacity building genuinely meets the needs of countries.

There is also a concern related to the limited capacity of actors to deal effectively with a number of items on the policy agenda at the same time. As a consequence, actors need to prioritize which implies loss of attention directed toward other issues on the policy agenda that may be equally important (Young 2000a:11). The main objective of the Arctic Council is to promote sustainable development and protect the marine environment. However, concern are rising fuelled by that fact that these issues are closely linked but for the most part dealt with by different working groups with little coordination. Since the interplay between the concept of sustainable development and environmental protection can be both supportive and obstructive it is utterly important that the Arctic Council working groups strive to coordinate how they address the issue to create more synergy between the two objectives. And if colliding, they need to sort out which objective to prioritize.

7.3.5 CONCLUSION

Although there are some promising capacity enhancement initiatives, the institutional capacity of the Arctic shipping regime is still fragmented and weak. Building program and models and providing funding to enhance the capacity for implementing commitments usually take many years, and the Arctic shipping regime is still in an early stage of implementing environmental policy strategies and regulations in the High North. There is also a general demand for more effective institutional interplay management in Arctic governance. However, an institutional feature favorable to capacity building is that the Arctic Council has developed guidelines and strategy plans for implementation that links up to broader concerns among member states that motivates them to support programs beyond their own borders.

7.4 Rule enforcement

Even though the parties initially succeed in signing and ratifying a treaty, there is still a long way to go for translating rules and norms into action (Andersen & Skjærseth 1999; Victor et al. 1998). Rule enforcement means taking measures to ensure that parties comply with international agreements and standards. When examining the Arctic shipping regime's capacity for rule enforcement, I will focus on three such measures; behavioural monitoring, verification and review of compliance, and sanctioning of non-compliance. Finally I will discuss legitimacy as an intervening variable that influences the level of compliance.
But first, in order to get a picture of the level of compliance among maritime stakeholders, let us examine the comparative costs and benefits of compliance in the case of vessel-source pollution in the Arctic.

In the case of ballast water, comparative benefits of effective regulation clearly outweigh the costs. Along with the potential severe ecological harm, it also causes great economic harm, for instance to the fishery sector. On the other hand, there is high cost of control measures in addition to difficulty of administering liability and compensation. Preventive measures seem much cheaper in comparison. Given the lessons learned from harmful and costly species invasion by the zebra mussel in the Great Lakes and the comb jellyfish in the Black Sea costing billions of dollars in control measures in addition to billions in lost revenue would predict extensive political effort in preventive measures – in particular by the Arctic coastal states. Yet, both the global and regional ballast water regimes have turned out to be greatly ineffective.

The case of ballast water management is an example of how effective outcome of a certain regime also depends on the availability of technological solutions. It supports the perspective of economic institutionalists that policy makers can shape technological development by changing the resource regime, and thereby altering the comparative costs of technological innovation and production (Chasek et al. 2010). With strict environmental standards and regulation combined with great risk of sanctioning, incentives will naturally exist to develop new "cleaner" technology.
The BWM Convention stipulates that all ships should install the approved ballast water treatment equipment to meet the ballast water performance standards by 2016. This transfers most of the responsibility and cost of adaption to the marine industry. The private marine sector has over the last decade made a crucial contribution to the effectiveness of the ballast water regime by their investment in research and development of cost-efficient technology solutions to control and manage the ballast water and the sediments in ballast tanks (GloBallast 2011). A treatment system for ballast water that meets the criteria of the BWM Convention was just recently available on the market. The long wait for technological innovation has been blamed on the lack of a clear international standard that in turn inhibits investment in treatment equipment (GloBallast 2011)

Although available, the installation of the treatment system and the tight deadline to do so hold some challenges for the marine industry. Also the approval of adequate treatment system and the ratification of the Convention have taken longer time than expected which delays the whole rule enforcement process (UK P&I Club 2011).

The regulation of double hulls and ballast water exchange treatment are examples of the polluter pays principle coming into effect where the ship-owners have ended up with the lion's share of costs for adaptation (Tan 2006). Regarding the requirement for Polar Class ship in a future Polar Code, it is uncertain whether the costs of modifying existing ships or designing new polar classed ships will exceed the benefits of Arctic operations (MarSafe North 2011).

Corell & Molenaar (2009:7) have identified three opportunities to improve regime effectiveness in regulating Arctic vessel-source pollution by alternating comparative cost of compliance. These are the following:

1) Obliging the marine insurance sector to encourage shipping companies to comply with IACS Unified Requirements concerning Polar Class, for instance by linking the level of compliance to the height of premiums.
2) Insist on more transparency of data that reveal IACS members' compliance with the Unified Requirements concerning Polar Class.
3) Encourage self-regulation by the shipping industry by means of positive and negative incentives.

In particular regarding vessel-source pollution, active participation by industry and other targeted actors of regulation will most likely make the implementation and enforcement process more effective. The reason is that these stakeholders often possess the best practical information on feasibility and costs, and their inclusion might increase the legitimacy of regulation and incentive to comply (Victor et al. 1998).

7.4.1 Behavioral Monitoring of Arctic shipping

Enhancing ships' compliance with discharge and CDEM standards depend on active monitoring, particularly of shipping activities along the North Sea route and the Northwest Passage.

I. Surveillance systems

Surveillance systems are already in place in the Arctic (Barrett et al. 2011; Victor et al. 1998). One of the most prominent surveillance systems is the NORAD Joint Surveillance System that is linked to the U.S./Canada joint air defense system, but it only covers the North American part of the Arctic Ocean. The Russian Federation is currently developing a surveillance system that includes both satellite imagery and communications links to improve it capacity to police its Arctic waters (Barrett et al. 2011).

In 2011 Norway began the initial work on establishing a comprehensive monitoring and information system for the Barents Sea, the so-called Barents Watch, as part of the Norwegian Government's High North strategy. This project is currently being finalized and scheduled to be launched on May 30th 2012. The system will connect the existing Norwegian subsystems for monitoring into an integrated monitoring system for the entire Barents Sea (Barents Watch 2012).

Still, the AMSA report and the Arctic coastal states have emphasized the need to improve surveillance of the Arctic Ocean. The existing national monitoring systems are not comprehensive or detailed enough to ensure sufficient policing of coastlines and particularly sensitive marine areas in order to prevent collision or pollution incidents (AMSA 2009; Barrett et al. 2011). For instance, there are severe limitations to radio and satellite communications for voice or data transmission in the Arctic due to the lack of complete satellite coverage of the region, in particular of satellites in high latitude orbits (AMSA 2009; Barrett et al. 2011; Brigham & Sfraga 2009).
AMSA recommends the Arctic states to urge shipping companies to collaborate and pool resources in the improvement and development of national monitoring systems (Brigham & Sfraga 2009).
Furthermore, it is worth assessing the feasibility of integrating NORAD‘s surveillance capacity with other Arctic monitoring systems, such as the Canadian RADARSAT-2 and the Russian GLONASS satellite systems, in order to extend monitoring capacity in the Arctic (Barrett et al. 2011). A joint monitoring system that in an effective and practical way facilitate sharing of data, would assist all parties involved in identifying potential threats and dangers – most likely at an earlier time and with using less resources (Barrett et al. 2011).
AMSA (2009) have called for an assessment of the Arctic states’ ability to enforce mandatory reporting and the potential of harmonization of mandatory reporting systems, for example between the Northern Sea Route, Canadian Arctic and Bering Strait regions (Brigham & Sfraga 2009).

II. *Tracking systems*

Mandatory reporting systems are a simple but effective way of monitoring ship movements and are already used to some extent in Arctic waters. Yet, AMSA emphasizes the need for full tracking of Arctic commercial ships and suggests introducing a mandatory Automatic Identification System (AIS) (Brigham & Sfraga 2009). AIS is a tracking system that supplements marine radar in identifying and locating vessels by electronically exchanging data with other nearby ships and AIS Base stations (IMO doc. DE55/12/X). Information exchanged through AIS includes static data (e.g., IMO number, vessel type), dynamic data (e.g., position, course and speed over ground), and voyage-specific data (e.g., possible hazardous cargo, destination). However, due to a lack of land-side communication infrastructure and limited VHF signal coverage, the use of AIS in the Arctic has remained limited. Nevertheless, enhanced forms of AIS that integrate new satellite technology (Satellite AIS) can now cover vessel activity on both poles (ibid.).

Also relevant for Arctic environmental monitoring is the development of Long Range Identification and Tracking (LRIT) which enhances coastal states' capacity to identify and improve compliance by ships (Jensen 2008). It provides for global identification and tracking of ships with information on ship identity and current location, and although initially intended to support international security, the purpose and scope has been extended to include safety and environmental protection (IMO doc. DE55/12/X). LRIT could be integrated with a system like CleanSeaNet which is a near-real-time satellite-based oil spill and vessel monitoring service currently available to the EU Member States. The CleanSeaNet is able to interpret radar images to trace discharges from ships and thus important in detecting severe incidents of marine pollution (ibid.).

The monitoring systems of the marine Arctic are still inadequate to deal with increasing shipping activities, but the building blocks for more integrated and improved systems already exist (ibid.). Although environmental monitoring will be enhanced through surveillance and tracking measures such as AIS and LRIT, it does not assist in detecting all forms of marine pollution. This is where the capabilities of the military become significant.

III. The capabilities of the military for environmental monitoring

Several scholars have suggested that the Arctic coastal states could use military ships and aircrafts more actively for inspections and enforcement of shipping and environmental standards and possibly enhance the Coast Guard capacity in the High North (Barrett et al. 2011). In fact, to one extent or another, all the Arctic coastal states have signaled that they will enhance military capabilities in the Arctic to strengthen circumpolar environmental pollution response capacity and enforcement capacity of environmental standards for shipping (Barrett et al. 2011; Smith 2011). Especially the Coast Guard needs funding to fully carry out its mandate in the Arctic and meet future challenges, and the first step is to purchase new icebreakers and build supporting infrastructure along the coastline.

However, at present there is limited military capacity in the Arctic, in particular along the Northwest Passage. Both Canada and the United States have insufficient number of icebreakers to monitor and protect its Arctic areas. Therefore the Arctic region would benefit from increased collaboration between the Coast Guards of the Arctic coastal states to execute their mandate to put in force banning of vessel, ship inspections and border security (Barrett et al. 2011). Furthermore, attending each other's military exercises as observers, organize joint search and rescue operations and implement joint training of special-forces for Arctic operations would contribute to the effectiveness of circumpolar environmental pollution response capacity. Additionally such operations would lower tensions and potentially build a sense of shared mandate to protect the Arctic region (ibid.).

There already exist a number of structures for military partnership among Arctic states. The most common constructs are joint military exercises, such as the 2009 Canadian-Danish-American Northern Deployment and NATOs Cold Response in 2010. There are also well-established mutual defense organizations such as the North American Aerospace Defense

Command (NORAD) where the U.S. and Canada have joined forces to provide aerospace warning, air sovereignty, and defense for both countries. NORAD has been suggested to be used as a standard for an overall model for Arctic military cooperation. There are also a number of collaborate ad hoc arrangements, for instance between Norway and the United States in the planning of joint training of the two national navies in the Norwegian Arctic waters (Smith 2011).
Although the Arctic coastal states intend to establish and maintain a military presence in the Arctic as well as partaking in military partnership with other Arctic nations, there is still a need for a unifying mechanism or construct to facilitate cooperation and joint operations in the Arctic in an all-inclusive multilateral basis (ibid.).

AMSA has recommended the Arctic coastal states to consider forming a Circumpolar Environmental Response Capacity through circumpolar or bilateral capacity agreement(s) (Brigham & Sfraga 2009). The North Atlantic and North Pacific Coast Guard Forums are multilateral organizations that have been generally successful in supporting information sharing and promoting maritime cooperation on several maritime issues (e.g. training exercises) (Smith 2011). These forums could be a potential model for similar cooperation in the Arctic region, including circumpolar environmental and emergency response capacity (Corn 2008; Smith 2011).

Another Coast Guard initiative that also may provide as a model for a more broad-based cooperative effort is the "Shiprider" agreement between the U.S. and Canada (also known as Integrated Cross-border Maritime Law Enforcement Operations, *ICMLEO*).
A Shiprider agreement means that the Coast Guard patrol vessels are jointly crewed by specially trained Canadian and U.S. law enforcement officers who are authorized to enforce the law in both host and partner nation waters. Working together, Canadian and U.S. law enforcement officers are able to transit back and forth across the border to help detecting, monitoring and potentially boarding vessels in either Canadian or American waters. The Canada-U.S. Shiprider initiative removes the international maritime boundary as a barrier to law enforcement and represents a truly cooperative approach on enforcement and ensuring compliance across the border, facilitating cross-border surveillance and interdiction, and enhancing the force of rule enforcement (Smith 2011).
Smith (2011:123) envisages that;

> … building on a model similar to the "Shiprider" program, [multilateral Arctic cooperation] may expand mission sets commensurate with perceived regional needs and the desires of member nations to include rule of law enforcement on the high seas, resource protection, and antipiracy/antiterrorism.

Smith (2011) suggests using SAR as a mean for expanding Arctic cooperation since it is considered a benign and apolitical coordination issue of interest to all Arctic states as well as non-Arctic users and therefore would be a good starting point for developing military partnership and multilateral cooperation in the Arctic.

In sum, models available in existing military partnership structures (i.e. North Atlantic Coast Guard Forum, Shiprider agreements) and emerging opportunities in the political arena (i.e. SAR) seem to be opportune to promote more broad-based military partnership among Arctic states to enhance environmental monitoring in the High North.

7.4.2 Verification and Compliance review

International treaties often provide a secretariat, international institution or organization with the mandate to conduct compliance reviews. In many cases they can make national reports public on their website which implies a risk of being exposed as *laggards* in implementation or *violators* of commitments (Andersen & Skjærseth 1999).
In the case of shipping, the IACS requires member societies to provide monthly reports on ships in class and their compliance with the IACS Requirements. This information is collected directly by the independent and non-profit making organization *Equasis* and published in an international database available for the public on the website of both Equasis and the IACS (IACS 2011). Equasis is a tool aimed at reducing substandard shipping and mandated by IACS and European Commission to provide and disseminate safety-related information on ships (ibid.). Although systems for regular compliance reviews are absent, the Equasis' international database is easily obtainable for conducting compliance reviews concerning CDEM standards and Polar Class. However, it only covers reports of ships in class as sent by individual IACS members (ibid.). Another weakness of such reporting is that if the requested data uncover unpleasant information about the level of compliance, the shipping industry may prove reluctant in providing adequate information (Andersen & Skjærseth 1999).

In some cases, international requirements to report are adequate to determine the level of compliance. However, when the validity of official reports is questionable, another alternative is to empower private actors like firms or NGOs to serve as "watchdogs" and report on compliance (Abbott & Snidal 2000). Currently, environmental NGOs (e.g. WWF and Greenpeace) are engaged in monitoring of Arctic waters, but only concerning issues such as fisheries and living marine mammals.
In most areas of environmental regulation of Arctic shipping, NGOs and public interest groups are increasingly active during the policymaking process, but have been generally inactive during the implementation process. Thus, it suggests that they do not yet have the competence and resources to perform enforcement functions and compliance reviews concerning environmental regulation of Arctic shipping (Victor et al. 1998).

In general, reporting and compliance reviews of Arctic vessels' obedience to discharge standards in Arctic waters are very limited. Given that most Arctic nations have made strong commitments to improve monitoring systems and stationing enforcement vessels in the region, it is likely that the availability of data on compliance with discharge standards will be enhanced in the foreseeable future.
Conducting compliance reviews of CDEM standards is somewhat an easier task considering that violations are easier to detect with port inspection and mandatory reporting through the

IACS. But as of now, data on Arctic vessels' compliance with environmental standards is scarce and fragmented.

7.4.3 Administration of inspection and sanctioning

There are several obstacles in administering inspection and sanctioning of environmental standards, in particular concerning discharge standards.
The coastal states' authority to regulate foreign ships is limited to international rules and standards (GAIRAS) aimed at pollution prevention (AMSA 2009; Stokke 2010a).[78]
Moreover, their enforcement powers within the EEZ are restricted to physical inspection of a foreign ship causing or threaten to cause substantial pollution of the marine environment (AMSA 2009).[79] If violations are detected, actual arrest and detention of a foreign ship is only allowed if a violation causes major damage or poses a major threat to the coastline and living resources in the EEZ of the coastal state.[80] In such situations, the only sanction available to coastal states are imposing monetary penalties (ibid.).
Furthermore, there is a lack of international rules for the possible liability of states for damage related to marine invasive species and there is no requirement of remedies for victims of environmental damage. Certainly, there are conventions[81] that cover liability and compensation for vessel-source pollution damage, but these only apply to spills of persistent cargo and fuel (bunker) oil from vessels (IMO 2011).

Given the limited capacity of coastal states to sanction ships causing marine pollution, the shaming method could provide added value to enhance compliance and cause reputational costs to violators. Publicity on deficiency and violation of regulation that gives bad reputation to a shipping company can cause difficulty in getting insurance and contracts (Tan 2006). The international database of vessels compliance with CDEM standards is open for the public and thus provides some form of reputational costs for owners of substandard ships.
Other than that, there is no other persistent use of the shaming method concerning Arctic shipping.

I. Port state administration of inspection and sanctioning

All Arctic states except from the United States are parties of the Paris MOU. The MOU parties draw their authority from the port state jurisdiction provided in UNCLOS and are relevant for enforcing IMO instruments covering maritime safety and the prevention of pollution, including both SOLAS 74, MARPOL 73/78 and the BWM Convention (when it enters into force).
Three major types of enforcement provisions are commonly adopted by IMO conventions and based on port state jurisdiction granted by the UNCLOS; 1) Port states can conduct inspection

[78] Law of the Sea Convention, Part III, Arts. 42 and 45.
[79] Law of the Sea Convention, Part XII, Art. 211, para 5.
[80] Law of the Sea Convention, Part V, Art. 73, para 1.
[81] The 1992 Civil Liability Convention, the 1992 Fund Convention and the 2001 International Convention on Civil Liability for Bunker Oil Pollution Damage.

of ships in port for compliance with certification requirements. 2) If violation is detected, the port state is allowed to detain ships, prosecute violations, impose fines or deny ships entry into port. 3) The port state can publish reports on compliance (a so-called "shaming and warning" measure) that implicates reputational costs (Tan 2006).

Port state enforcement is optional rather than mandatory which means that a port does not necessarily consent to coastal state's request to investigate discharge violations (Tan 2006: 220). For this reason port state control remains relatively uneven throughout the world. The incentive structure of port states are often more differentiated than for coastal states which explains why few port states have adopted the extended authority granted them by provisions in the UNCLOS (Article 210, 218, 234) in prosecuting pollution violations. For instance, port states have been cautious about prosecuting discharge violations if they occur beyond their own waters given the inherently difficult task of linking such violations to a particular ship (ibid.). This is especially challenging in the Arctic due to the remoteness of marine areas and few available monitoring and verification measures. Since ship-owners are entitled to compensation if they consider the port state action as "unlawfully excessive", port states have been reluctant to running the risk of enforcing discharge standards because of the limited proofing (ibid.). This is why the ballast water exchange method (BWE) has proven widely ineffective to enforce, and by contrast justifies the preference for CDEM standards. The resources of active port state control administrations (MOU) are usually channeled toward inspecting for CDEM deficiencies, which typically "stay" with the ship as it enters a port.

We should however take note of the socioeconomic incentive inherent in port state activity that makes a port want to avoid reputation of being a particularly strict enforcer of pollution standards. Furthermore, if the pollution standards additionally are perceived as too strict, international shipping companies would probably prefer other shipping routes and thereby hamper the growth of trans-Arctic traffic (Tan 2006).

There is currently no regional approach by Arctic states specifically aimed at ensuring compliance with international rules and standards and national regulations (Molenaar 2009). Given that the important ports in the Arctic belongs to influential coastal states (Canada, the Russian Federation and Norway) with strong incentives to protect their water, there is significant potential for effective port state enforcement in the Arctic. Also, due to the expanded coastal state jurisdiction (Article 234), the Arctic-specific pollution regime is less troubled by the general flag state primacy that is hassling pollution prevention in other marine areas (Tan 2006).

The enforcement of a future Polar Code will largely depend on the emerging importance of port state control and jurisdiction (Jensen 2008). Several scholars and policy-makers suggest that Arctic coastal states coordinate port state control by negotiating an Arctic MOU or adjusting the existing Paris MOUs to encompass the whole Arctic Ocean (Molenaar and Correll 2009; Stokke 2010a). However, the existing Paris MOU covers only legally binding commitments, which means that the establishment of an Arctic-MOU would presumably only be possible if the ongoing negotiation of a mandatory Polar Code is successfully adopted and

Paris MOU proves not effective in verifying, reviewing, and responding to non-compliance with the Polar Code (Stokke 2010a). Another option would be a coordinated, optimized use of port state jurisdiction through the application of Article 218 of the UNCLOS and designate clear national responsibilities for pollution control and management.

Regionally coordinated inspection activity would improve synergy by assuring better inspection coverage and avoiding duplication of work (e.g. by avoiding repeated inspection of the same ship through sharing of information). Arctic port states have both the incitement and opportunity to control compliance with international regulations given the long-distance voyages in Arctic waters (Jensen 2006). Since there are few ports along the Arctic routes coastal states would benefit from collaboration on vessel inspection and information sharing to reduce the violation of CDEM standards. Due to the long distances of remote marine areas and the few ports along the way, the services of existing Arctic ports are of crucial importance for vessels operating in Arctic waters. This means that denial of port entry is perceived as a very costly and can be an effective sanctioning measure. Thus the remoteness of the Arctic can to a certain extent strengthen port state authority in enforcing CDEM standards, but have the opposite effect in the case of vessel discharges pollutants into the sea, such as the current BWE. The remoteness of the Arctic area makes such violation difficult to monitor and the lack of "sufficient evidence" lower the incentives to investigate and the basis for sanctioning. Thus in the current ballast water regime there are severe obstacles to control and sanctioning even when crucial security and economic interests are at stake.

7.4.4 Legitimacy

Despite divergent interests, there is broad international acceptance of the jurisdictional principles in the UNCLOS providing flag, coastal and port states with differentiated levels of enforcement jurisdiction over vessels causing marine pollution or do not comply with international CDEM standards. This does not mean that all aspects of UNCLOS are considered legitimate or adequate (Tan 2006). It becomes evident when Article 234 and 218 are enacted in Arctic affairs, expanding coastal state right to prescribe and enforce stricter pollution control measures than GAIRAS (including CDEM standards in exceptionally vulnerable areas) and port state authority to enforce it beyond territorial waters. In effect, the lack of flag state incentives has less compelling influence on the Arctic pollution regime due to the extended rights of coastal and port states granted them by Article 234 and 218 in the UNCLOS supported by the argument that pollution may have exceptional adverse effects on a particularly vulnerable ecosystem like the Arctic Ocean (ibid.).

Presently, the Arctic shipping regime is regarded legitimate by most actors. But naturally flag states have raised questions concerning the legitimacy of the stricter pollution control that inhibits their right of free navigation. However, no flag state has yet made any formal complaints on the basis of deficient legitimacy although it has certainly influenced state positions in the negotiation of the Polar Shipping Guidelines and the ongoing drafting of a mandatory Polar Code. It also explains the United States reluctance to establish the Arctic Shipping Guidelines as a mandatory instrument – in which they succeeded. But in practice

flag states have largely consented to the stricter pollution standards in the Arctic. But the prospect of growing commercial shipping and more flag state actors in the Arctic, there need to be some form of harmonization of permissible legislation on pollution control. The Arctic states' legislation needs to be coordinated in order to avoid a pollution regime where ships have to adhere to different discharge and CDEM standards whilst traversing the waters of different states – in particular problematic if the coastal states adopt differing constructional or equipment standards for ships (Tan 2006). This is the general concern of flag states and marine industry operating in the Arctic that could reduce the legitimacy of the Arctic shipping regime in the future. Thus the call for extended participation of flag states and non-Arctic actors in the Arctic Council can be seen as a valid suggestion to increase the legitimacy of the Council in dealing with Arctic shipping issues. As Jentoft (1989:139) argues that "the more directly involved the affected actors are in forming and enforcing the regulation, the more the regulation will be accepted as legitimate."

7.4.5 CONCLUSION

The UNCLOS provisions on flag, coastal and port state jurisdiction provide them with divergent incentives to enforce or comply with marine pollution regulations. Accordingly, the compliance system of the IMO is decentralized and leaves much of the responsibility for verification, review, and non-compliance response to its member states due to the resistance among many flag states towards mandatory review procedures. The IMO member states often rely on regional cooperation to improve the level of implementation, for instance through regional port state control agreements like Paris MOU (Stokke 2010a). But national implementation of international commitment has proven to be a complicated task (Andersen & Skjærseth 1999).

At present, the interim measure of open water ballast water exchange method (BWE) is generally characterized by low rates of compliance and low degree of effectiveness. The rule enforcement capacity has been very limited due to few monitoring and control measures. Each vessel is required to have a ballast water management plan, record book and certification on board that are available for inspection by coastal or port state. But due to insufficient monitoring at sea it is nearly impossible to control the validity of a vessel's management plan and record book for ballast water exchange. Thus, insufficient proof of violation has deterred the ability to sanction BWE violations and thereby rule enforcement has not been effective within the ballast water regime. Moreover, the current ballast water management regime easily becomes victim of *free riding*. The consensual nature of international law make free riding clearly beneficial in that a state can only be obliged to a rule of international law if it has consented to that rule (Molenaar 2009).

The rule enforcement capacity is expected to improve with the new requirement of ballast water treatment equipment which is a type of CDEM standard that is much easier to monitor. But when the BWM Convention enters into force – possible within the year – vessels still have deadline until 2016 to ensure compliance with the new requirement to install ballast

water treatment equipment. So there is not much sense in assessing compliance with the "new" ballast water regime.

Compliance with CDEM standards is easier and less controversial to monitor and enforce through port state control. It is nevertheless uncertain to what extent the voluntary region-specific provisions in the IMO Polar Shipping Guidelines and the IACS Unified Requirements concerning Polar Class are complied with by states, ship-owners and operators, crew and IACS members since these guidelines lack requirements for compliance review (Molenaar 2009). And because there is no binding requirement to implement the IACS Unified Requirements and IMO Polar Shipping Guidelines concerning polar class ships, consequently construction standards for polar vessels are unevenly applied (AMSA 2009). Compliance with discharge regulations must be ensured through surveillance and monitoring, either coordinated at sea, aerial and/or with satellite, and coupled with effective sanctions toward violations by port state action (Hansen et al. 2003). Currently there are few systems to monitor and control the shipping activities in the Arctic (MarSafe North 2011). The needs for rule enforcement go beyond the present capability of Arctic ports and would require more cooperation between the Arctic states. Yet Arctic institutions have the potential for taking on the task of rule enforcement if – or when – formal rules are in place. In the context of the Arctic, the best way to improve national implementation and compliance is to build domestic capacity, strengthen port state control, and enhance regional collaboration on enforcement and monitoring.

Furthermore, regional collaboration between the Arctic states on extending port-state enforcement measures would contribute to strengthening the Arctic shipping regime. However the establishment of an Arctic MOU would probably depend on binding region-specific rules such as the IMO Polar Code (Stokke 2010a). In the meantime designating clear national responsibilities for pollution control and management and encouraging all Arctic states to build capacity in monitoring would be a good starts towards a more effective rule enforcement of regulation concerning marine pollution.

8.0 THE WAY FORWARD FOR ARCTIC SHIPPING GOVERNANCE

Over recent years questions have been raised whether the existing regime is sufficient to protect the Arctic marine environment or whether a new regime is required in the face of impacts from climate change and increasing human activity.
I will conclude this paper by a discussing the prospects of each of the three future scenarios as the way forward for Arctic shipping governance. I will incorporate the findings from the assessment of the current Arctic shipping regime in Part 7.0 into a strategic dialogue about the critical uncertainties and indications of expected development of environmental governance in the High North.
Based on the Arctic scenario models of Schofield & Potts (2008:42-44), I will portrayed three possible futures for Arctic governance;

8.1 Future Scenario A

This is the most likely scenario and closest to the current regime context. In this scenario, the Arctic nations are still unlikely to accept diminished sovereignty in the area. The dominant governance regime is therefore centered on state sovereignty and each of the Arctic nations is "guarding their patch" (Schofield & Potts 2008). International commitments (e.g. UNCLOS) will continue to influence state actions and the Arctic Council will become the main regional instrument for cooperation and perceived as "moderately" successful. Still, the governance regime will be characterized by general lack of binding targets and timetables and collective action will recurrently be haunted by the "lowest common denominator" approach (ibid.).

Article 234 of UNCLOS sets the framework for environmental protection in the Arctic, but it was not formed with the Arctic in mind – and therefore by many recognized as inadequate by itself to protect the Arctic marine environment (Hubert & Yeager 2008).
Nevertheless, most of the environmental protection framework is mainly provided by domestic laws. Thus the norm building within the Arctic shipping regime is largely dependent on the Arctic states taking the lead in implementing normative commitments domestically. Most of the national regulations are in fact developed in accordance to international norms and treaties such as UNCLOS, but their inherent flexibility leaves much open for often deviant interpretation. This limits its norm building capacity since the Arctic states differ, sometimes strongly, in their material interests and political preferences on several issues. Nevertheless, the Arctic states are well positioned (as well as willing and able) to cooperate on several issues, as illustrated by the bilateral fisheries agreement between Norway and Russia in the Barents Sea, the bilateral LME management pilot project in the Beaufort Sea between Canada and the United States, and the regional SAR agreement between all the Arctic coastal states.

These observations suggest that UNCLOS could serve as a foundation for further soft law development. This is consistent with the view of the Arctic states, the EU, and several researchers (Young 2002a; Stokke 2007) arguing that it's better to customize the current institutional framework by combining UNCLOS with additional soft law arrangements, because a legally binding regime would probably prove difficult to implement and enforce domestically due to the sensitive sovereignty issue. Despite the growing collaborative environment that has emerged in Arctic politic during the last two decades, there is probably a long way to go before the Arctic states are willing to enter stronger hard law agreements on several issues (Young 2000a).

Even though the UNCLOS and IMO Conventions provides a solid foundation on which to build on – and even though cooperative efforts and soft law arrangements have potential to address many issues – it is probably not enough to meet all the changes and the challenges Arctic will be facing in the coming decades. There is reason to believe that region-wide cooperation in the circumpolar north will continue to rely on soft law and more informal arrangements during the foreseeable future, but it might gradually need to open for

combination of more hard law instruments. In spite of the overall preference for *Future Scenario A* by Arctic states, development towards *Future Scenario B* might become necessary

8.2 Future Scenario B

Schofield & Potts (2008) describe one of the future Arctic scenarios as the "mixed reform regime" characterized by a flexible approach to norm building within existing frameworks. It involves reforming the existing governance approach by addressing inefficiencies and gaps in a systematic way and focus on the need to improve regime effectiveness and move forward on difficult issues. Also, international commitments and obligations are strengthened and although national sovereignty is preserved the Arctic states keep moving ahead on an "issue by issue" basis (ibid.).

Given the political hesitance towards a comprehensive legal treaty for the Arctic, the divergence of interests and priorities of Arctic states on key issues such as navigation, security and resource management, and the fact that existing global or regional treaties already covers many of the Arctic issues – Future Scenario B gradually gains support.
Summing up the weaknesses of the current regime and making comparison to the potential governance demands that lies ahead bring up questions about the likelihood that Future Scenario A will provide sufficient problem-solving capacity. The Arctic shipping regime might need to develop a flexible approach to norm-building that seeks productive interplay with existing institutions (Stokke 2007:10) and systematically address the weaknesses of the current regime (Schofield & Potts 2008).

Future Scenario B is many ways equivalent to the institutional theory of adaptive capacity. This theory underpins the ecosystem-based management approach and has its origin in resilience-theory. It focuses on the *adaptive capacity* of a regime as an indicator of the capacities of a system to adapt to change (Keskitalo 2009).

The case of ballast water management has illustrated the importance of a regulatory framework that allows regulation to develop and improve over time (Galil & Hülsmann 2001), for instance to incorporate new technological solutions or setting new CDEM standards. An important feature for norm building in the Arctic context is flexibility to adapt to a dynamic environment and future scenarios of increasing marine activities with uncertain impacts. We have seen that both UNCLOS and IMO provide a quite flexible framework for regional management regimes in special marine areas. The cost of flexibility is loss of determinacy. Focusing on flexible solutions can sometimes be at the expense of determinacy.

At present, a flexible regime using UNCLOS as a framework is likely to be more effective in dealing with environmental issues characterized by uncertainty and rapid growth of marine activities. Creating a new legal regime and waiting for the world of nations to adapt to it would most certainly take many years and be more costly, and there would be no guarantee that it would be more effective. As long as the Arctic states are reluctant to give away some of

their sovereignty, imposing stricter regulations would probably not serve to enhance the functioning of the current regime mechanisms. Stokke suggests that because of the political complications of forming a legal regime in the Arctic region ”the best answer would seem to be a flexible approach to norm-building that seeks productive interplay with exisiting institutions” (Stokke 2007:10).

It would seem that many of the building blocks for an effective regional approach are in place. However, the prerequisites for formalizing such region-wide cooperation are in short supply, such as regional cooperation, inclusion of non-Arctic States in shipping governance, and a uniform set of rules and standards for ship safety and marine environmental protection (Chircop 2009).

8.3 Future Scenario C

This is the most unlikely scenario where a legally binding framework convention for the whole Arctic is established – potentially covering territorial issues, environment protection, shipping and industry regulation, etc. (Schofield & Potts 2008).

Several environmental NGOs (e.g. Greenpeace, WWF) are of the opinion that UNCLOS and the IMO treaties do not go far enough in protecting Arctic waters (Iglebæk 2010). For instance, the Polar Shipping Guidelines tend to be very general and have been criticized for various deficiencies (Keskitalo et al. 2009). There are also concerns about whether the instrumental character of a mandatory Polar Code is a satisfactory substitute for treaty law (Jensen 2008).
The potential benefits of a comprehensive Arctic treaty are often referred to as;

1) *Broader international cooperation*

The need to establish a broader international forum for Arctic affairs is a viewpoint shared by many other non-Arctic states. The main reason is that shipping is both by definition and function essentially a global issue (i.e. commercial trade and transport of minerals, oil and gas) (Stokke 2010a). They underline the importance of building common understanding among all the Arctic shipping stakeholders, and thereby enhancing the potential for further international cooperation (Stokke 2010a).

2) *Reducing the fear of unilateral action*

Another motivation for an Arctic treaty, in particular within the IMO, is the fears of unilateral action in cases of deadlocked global negotiations (Stokke 2010). One example of such unilateral action is the US Oil Pollution Act of 1990 that was adopted shortly after the catastrophic grounding of the oil tanker *Exxon Valdez* outside Alaska. The US Oil Pollution Act adopted provision concerning double-hull requirements for oil tankers that was much stricter than those already existing in the global shipping regime (Stokke 2010a).
The marine transport industry is generally skeptical towards unilateral and regional action because coastal states can use their sovereign right to impose port access conditions involving

stricter standards than those agreed globally (La Fayette 2001). This means costly refitting or replacement of ships – or costly sanctioning. Therefore, maritime industry typically sees it in their interest that environmental regulation of shipping is negotiated within the IMO or UNCLOS where their participation is well established (Stokke 2010a).

3) More serious obligations

The complex and soft law character of the existing regime enhances the likelihood of freeriding and "intentional" failure to implement recommended measures. It has also resulted in weak monitoring and enforcement capabilities of environmental regulations, in particular in areas beyond national maritime zones (Keskitalo et al. 2009).

As Arctic cooperation deepens, the need for more serious obligations and more enforceable targets, timetables, and scheduled dues may be necessary (Huebert & Yeager 2008; Victor et al. 1998). On higher stake issues (e.g. fisheries, continental shelf delimitation) there is need for stronger policy actions than the current voluntary guidelines and strategy plans that are now being pursued in the Arctic Council (Keskitalo et al. 2009).

4) Enhanced determinacy of rules

One of the main arguments of legalization is that it supposedly increases the determinacy of a regime. The vague or non-binding norms characterizing Arctic institutional output is certainly a drawback when it comes to determinacy, which means that the norm is not communicating clearly what is expected of those addressed by it which in turn hampers the compellingness of the norm (Franck 1990). Vague and non-binding norms often spur differing interpretations by actors and constrain their ability to direct behavior unequivocally. This is particularly evident in controversial norms that seek to constrain economic interests or sovereignty in the name of environmental concern. The lack of determinacy in Article 234 of the UNCLOS have created controversial disagreements on its meaning with Canada and the Russian Federation on one side and the United States, the EU and other flag states on the other side. The problem is that the UNCLOS gives no direction as to whether the regime of transit passage trumps the regime of Article 234 or vice versa (Molenaar 2009) or any guidance to the specific criteria needed for the Arctic to be defined as "exceptionally vulnerable" and thereby legitimate extended coastal state jurisdiction.

The indeterminacy in terms of open texture language inherited in Article 234 has led to disagreement on the applicability of Article 234 to legitimate stricter CDEM standards in the Arctic. This may in turn be taken to justify non-compliance (Franck 1990).

5) More coherent governance system (Opportunity costs)

What has emerged in the High North is a range of separate institutional initiatives that for the most part is uncoordinated. The subsequent concern associated with some of these institutional arrangements is that their objectives and activities will collide or overlap and thereby working at cross purposes (i.e. obstructive institutional interplay) (Young 2002a). Therefore, regional arrangements are likely to gain strength by becoming subset members of a overarching regime. This would probably increase the time, energy, and material resources devoted to a more limited portfolio of institutional arrangements (Young 2002a).

6) Better conditions for ecosystem-based management

Perhaps the most important benefit of forming an Arctic treaty would be to strengthen the Arctic states' capacity for a more consistent and holistic management of the Arctic Ocean (i.e. ecosystem-based management) (Hasanat 2009). Since the Arctic Ocean is considered a global common, and since shipping activities – as well as stakeholders – transcends national boundaries, an Arctic treaty might be perceived as a more legitimate approach and thereby ensure compliance by non-Arctic actors (Huebert & Yeager 2008).

However, since most of the Arctic region lies within the territory of powerful states there is limited prospect for a coherent international regime that could protect the Arctic as a whole (Schützenmeister & Crawford 2010). The five Arctic coastal states emphasize in the Ilulissat Declaration (2008) that the current international Law of the Sea applies to the entire marine Arctic and "therefore see no need to develop a new comprehensive international legal regime to govern the Arctic Ocean."

The European Parliament in its resolution of January 2011 also accepts the existing regime as a sufficient basis for further development acknowledging that there is no point in wasting time on futile and lengthy negotiations on an Arctic treaty proposal in which the Arctic states do not support (Sander & Winther 2011). That does not mean that the European Parliament has laid to rest its environmental ambitions. Instead they want to find a balance between use and protection, and request high-level standards for Arctic marine safety and marine environment. The European Parliament acknowledges the Arctic states' sovereign rights to exploit its resources, but emphasize that the UNCLOS also gives other member states the right of innocent passage and thereby should be granted a greater voice in Arctic affairs (Sander & Winther 2011).

As long as the Arctic Council, its member states, and the indigenous peoples of the region are not in favor of a comprehensive Arctic treaty, it is highly unlikely that Future Scenario C becomes a reality. Creating a comprehensive legal regime for the Arctic similar to the ATS would most defiantly take many years to form and would not be an easy project. However, with increasing Arctic shipping and subsequent concern for environmental challenges, the cooperation between Arctic coastal states will have to grow stronger (Keskitalo et al. 2009). Fortunately, the existing framework, centered on UNCLOS and other IMO convention, appears to have sufficient adaptive capacity to meet the growing demand for environmental regulations in the far North (Franckx 2009; Young 2002a). The 2008 Ilulissat Declaration affirmed the Arctic Council's intent to cooperate on several areas, including working through IMO to prevent and mitigate vessel-source pollution, strengthening search and rescue capabilities, sharing of information, and pursuing ecosystem-based ocean management (Keskitalo et al. 2009).

The aspiration for a global framework approach does not need to be dismissed entirely, but rather be seen as a visionary end point than a realistic starting point for the development of Arctic governance (Hasanat 2009). As Young (2000a:8) points out;

> … it would surely be a mistake to allow efforts to solve Arctic problems on a piecemeal basis to be crippled by the dictates of a grand but generally unrealistic vision of a comprehensive, region-wide governance system for the circumpolar world.

9.0 CONCLUSION

Since most of the norms and regulation within the Arctic Shipping Regime are in the early stages of implementation and there is generally a lack of evaluation reports and compliance reviews available, the descriptive component of this paper outweighs the analytical. While recognizing that this analysis is fragmentary I still believe it signals the fruitfulness of using the analytical framework of governance tasks for assessing the effectiveness of complex international environmental regimes. It generates a broad, yet orderly, perspective on the regimes effectiveness by relating in to different stages of the policymaking process.

Overall, I found that the current regulatory and governance regime for protection of the Arctic marine environment is not sufficiently tailored to deal with the prospects of increasing shipping – although the anticipated future scenarios of commercial shipping seem to be exaggerated. For instance, there is no convention or protocol that addresses pollution damages to the high seas beyond national jurisdiction and the BWM Convention has still not entered into force.

However, the global legal framework provides solutions for many Arctic environmental issues with a potential for to be further improved and there are promising developments towards regulatory strengthening (e.g. Polar Code, BWM Convention, Arctic MOU). Furthermore, the Arctic states and stakeholders generally recognizes the legitimacy of the existing legal framework and have common interests in the urgent need to protect the Arctic environmental from increasing human activity in the High North. Thus, the building blocks for providing adequate protection of the Arctic marine environment from shipping activities are largely present. For instance, the regional leeway within the global shipping regime gives rise to governance niches for regional arrangements such as the Arctic Council. Parallel with the increasing relevance of global governance to the Arctic, new modes of Arctic-specific governance systems are emerging involving subnational units of government, non-state actors, and distinctive forms of interstate cooperation. And while there is no multilateral political organization with the power to regulate activities or to take legally binding decisions, there is a cooperative mechanism in the several regional arrangements in the Arctic, such as the Arctic Council. Thus, one way of strengthening the Arctic shipping regime would be to strengthen the role of the Arctic institutions and organizations, particularly the Arctic Council.

At present, the focus of Arctic institutions rests on the task of knowledge building where they are largely successful despite of the obstacles of scientific uncertainty and high costs of data collection and research. The most important role of the Council has revolved around

knowledge building and raising awareness. The High North is increasingly profiled as a distinct region of global importance, and major actors devote time and energy to the work of the Arctic Council as the main forum for Arctic affairs. Thus, an important role of the Council lies in strengthening the voice of the Arctic in international forums – and emphasize that human actions occurring outside the region in fact have far-reaching consequences for the Arctic region (Young 2000a).
The Council is influencing international discourse and agenda-setting using its competence in producing influential assessments and reports on the state of the Arctic environment. The Arctic Council should make more use of their knowledge-building capacity to influence agenda-setting of Arctic issues in global forums.
But in order to be able to effectively address the environmental issues in the Arctic, the Arctic Council should develop beyond their mainly knowledge-building task and enhance their legitimacy by broaden their membership base.

All the Arctic institutions have limited legal authority and thus their norm building capacity is focused on soft-norm promulgation. Although it is difficult to assess the effect of soft law arrangements, the existing guidelines, strategy plans and codes of conduct seem to be widely acknowledges and influential in the political discourse. It seems that scientific-technological capabilities constitute valuable assets for the effectiveness of norm-building within the Arctic shipping regime.

While considerable work remains before the Arctic Council is capable of triggering regulatory strengthening within the IMO, it seems that the Arctic states will be able to propose more ambitious informal regulation through the Council (Stokke 2010a), even in areas where they basically are no lead states. But it is unlikely that the Arctic States themselves will propose self-regulating policy on their own activity in the High North through the cooperative mechanism of the Arctic Council. Although the Council will succeed in strengthening its weaknesses, it must be recognized that the Council will continue to depend on effective implementation by national governments (Huebert & Yeager 2008).

Yet, the Arctic institutions, particularly the Arctic Council, facilitate the capacity of Arctic states to implement existing commitments by forming practical guidelines, action plans, expert groups and task forces which identifies programmatic priorities and mobilize the resources needed to address these concerns within member countries. That way the Arctic Council contributes to some extent to capacity enhancement within the Arctic shipping regime, but there are a limited amount of models, cooperative commitment and funding available for them to be sufficiently fulfill the task of capacity building. Even though some cooperative efforts exist, the Arctic states still need to go one step further to organize and consolidate their cooperative efforts, in particular to succeed in implementing a region-wide EBM approach. Overall, regime ineffectiveness within the Arctic shipping regime is the result of the lack of cooperative efforts in capacity building and the dominance of national managerial perspectives instead of an Arctic-wide regional approach. Thus, in the foreseeable future, the

Council will also continue to lack the force of law that would enhance its role in capacity building and rule enforcement.
Young (2000a:14) points out that "it seems more appropriate to treat the Council as a forerunner intended to play a role in a continuing process of regime formation in contrast to an entity designed to administer the provisions of a regime that is already in place".

When it comes to rule enforcement, the Arctic shipping regime is haunted by the same challenges that relates to global ocean management; the lack of capacity for monitoring and sanctioning. In the context of the Arctic, the best way to improve national implementation and compliance is to build domestic capacity, strengthen port state control, and enhance regional collaboration on enforcement and monitoring. There is promising developments towards establishing an Arctic MOU and stricter port state control, and this will contribute to the enhancement of rule enforcement. But as for now, the rule enforcement capacity within the Arctic shipping regime remains weak and fragmented.

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