Law, Climate Change and the Arctic

legal governance of climate change induced risks in the Arctic ecosystems

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Legal Governance of Climate Change Induced Risks in the Arctic Ecosystems

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Abstract

Climate change is the cause of a variety of new environmental risks, which profoundly affect the Earth's ecosystems. Maintaining fragile regions, such as the Arctic and protecting them against threats is in this context of utmost importance, as their ecosystems provide many valuable goods and services human well-being depends upon.

This thesis offers a definition of climate change induced risks and outlines how they are being governed under existing international, regional and domestic law pertaining to the Arctic. Based on these findings it furthermore tries to propose ways and means to enhance the existing legal regime in order to warrant an effective governance of climate change induced risks in the circumpolar North.

The special character of climate change induced risks requires a risk governance approach that is capable of adequately addressing the high degree of uncertainty, complexity and ambiguity intrinsic to them, as well as the trans-boundary scope and the long-lasting and often irreversible impacts upon ecosystems such risks may entail. Traditional risk governance approaches, such as the cost-benefit analysis in general fail to address these issues appropriately. Consequently, the emergence of new environmental risk, such as climate change induced risks, requires an equally as novel governance approach towards them. In this context the adoption of a more cautious, as reflected in the precautionary principle, and holistic methodology, as envisaged by the ecosystem approach, is advocated in this thesis.

While effectively implementing the ecosystem approach (and through it the precautionary principle, which forms an integral part thereof) would aid in maintaining Arctic ecosystem functions and services, that are responsible for sustaining human well-being within and beyond the Arctic and as such would adequately address climate change induced Arctic risks, the current legal regime is lacking a universal and legally binding definition of this approach, that would provide for guidance in its development and application across the Arctic.

As a consequence, if at all, the approach is not applied comprehensively within the circumpolar North, but instead its establishment and implementation is characterized by fragmentation and sectoral advancements in this regard, that lack the necessary cooperative action. Adequate governance of

climate change induced Arctic risks therefore requires the establishment of legal rules and regulations capable of addressing these shortcomings.

Following such conclusions, this thesis proposes the development of a legally binding Framework Agreement on the Establishment of an Ecosystem Approach to Governing Climate Change Induced Arctic Risks, which is – as a framework agreement – aimed at providing the necessary legal background to the eight Arctic States and other parties interested in governing climate change induced Arctic risks when establishing and implementing the ecosystem approach across the circumpolar North.

To the Arctic and in loving memory of my father – my personal North Star.

Contents

Bibliography

Note that many of the legal documents listed subsequently in the *e-documents* section should in consideration of their legal form be listed in the *legal materials* section of this bibliography, instead. However, for clarity reasons all references to internet documents can be found in the *e-documents* section, except for multilateral agreements and conventions as well as domestic acts and statutes, which for quick reference contain a web-link, but are nevertheless listed in the *laws* section of this bibliography. Resolutions, declarations, decisions, recommendations, guidelines and other legal documents of international or regional organizations as well as official state records, are accordingly listed in the *e-documents* section given they contain a web-link reference. The same holds true for journals. As regards laws, where an official abbreviation exists, reference to them is made in the acronyms and abbreviations index to this thesis; the additional listing of laws within this bibliography is hence aimed at providing an overview over existing legal rules and regulations relevant to the topic of this thesis and at making them easier accessible. The subsequent bibliography contains media, that were available by August 2014. All documents are listed in alphabetical order.

Furthermore note that the books, articles and documents listed within this bibliography are generally cited in reference to the author's last name as well as the page number and/or paragraph/section pertaining to the specific citation. Where several publications of the same author or organization exist additional notes are provided for clarification. A reference on how such publications may be cited (*"cited as:"*) can be found alongside the publication. Where no clear reference to an author or organization can be made, the title of the publication will be cited instead, in accordance with its listing within the following bibliography.

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United Nations Convention on the Law of the Sea, Dec. 10, 1982, 1833 U.N.T.S. 3 [hereinafter UNCLOS].

United Nations Framework Convention on Climate Change, May 9, 1992, 1771 U.N.T.S. 107 [hereinafter UNFCCC].

Vienna Convention on the Law of the Treaties, May 23, 1969, 1155 U.N.T.S. 331 [hereinafter VCLT].

Acronyms and Abbreviations

AAC	Arctic Athabaskan Council
AAU	Assigned amount Units
ABA	Arctic Biodiversity Assessment
ACAP	Arctic Council Action Plan to Eliminate Pollution of the Arctic/Arctic Contaminants Action Plan
accord.	Accordingly
ACIA	Arctic Climate Impact Assessment
ACPB	Agreement on the Conservation of Polar Bears, Nov. 15, 1973
AEC	Arctic Economic Council
AEPS	Arctic Environmental Protection Strategy
AIA	Aleut International Association
AMAP	Arctic Monitoring and Assessment Programme
AMSA	Arctic Marine Shipping Assessment
AMSP	Arctic Marine Strategic Plan
AOR	Arctic Ocean Review Project
art.	article
arts.	Articles
AWPPA	Arctic Waters Pollution Prevention Act (consolidated text as of Jan. 2, 2010), 1985, R.S. 1985 A-12
BEAC	Barents Euro-Arctic Council
BePOMAR	Best Practices in Ecosystem-Based Oceans Management in the Arctic BSP Beaufort Sea Partnership
CAFF	Conservation of Arctic Flora and Fauna
CBD	United Nations Convention on Biological Diversity, June 5, 1992, 1760 U.N.T.S. 79
CBMP	Circumpolar Biodiversity Monitoring Programme
CCAMLR	Convention for the Conservation of Antarctic Marine Living Resources, May 20, 1980, 1329 U.N.T.S. 47
CCU	Circumpolar Conservation Union
CEQ	Council on Environmental Quality
CER	Certified emission reduction
cf.	confer
CFC	Chlorofluorocarbon
Ch.	Chapter
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora, March 3, 1973, 993 U.N.T.S. 243
CLA	Catch Limit Algorithm
CMS	Convention on the Conservation of Migratory Species of Wild Animals, June 23, 1979, 1651 U.N.T.S. 333
COP	Conference of the Parties
CPAN	Circumpolar Protected Areas Network
DOPA	Digital Observatory for Protected Areas
e.g.	exempli gratia

EAF	Ecosystem Approach to Fisheries
EBM	Ecosystem-based management
EC	European Community
ECORA	Integrated ecosystem management approach to conserve biodiversity and minimise habitat fragmentation in the Russian Arctic
EEZ	Exclusive Economic Zone
EFTA	European Free Trade Association
EIA	Environmental Impact Assessment
EPA	US Environmental Protection Agency
EPPR	Emergency Prevention, Preparedness and Response
ERU	Emission reduction units
ESA	Endangered Species Act, 1973, 16 U.S.C. 1531
esp.	especially
et al.	et alii/et aliae
et seq.	et sequens/et sequentia
EU	European Union
FAO	UN Food and Agriculture Organization
fig.	figure
fn	footnote
GCI	Gwich'in Council International
GEMS	Global Environmental Monitoring System
GHG	Greenhouse Gases
GPA	Global Programme for Action for the Protection of the Marine Environment from Land-based Activities
HFC	Hydrofluorcarbon
i.a.	inter alia
i.c.	in casu
i.e.	id est
IAEA	International Atomic Agency
ibid.	ibidem
ICC	Inuit Circumpolar Council
ICCAT	International Commission for the Conservation of Atlantic Tunas
ICE	Centre for Ice, Climate & Ecosystems
ICEL	International Council of Environmental Law
ICES	International Council for the Exploration of the Sea
ICJ	International Court of Justice
ICNT	Informal Composite Negotiating Text
IEM	Integrated ecosystem management
ILA	International Law Association
IMCO	Inter-Governmental Maritime Consultative Organization
IMO	International Maritime Organization
IMS	Initial Management Stock
IPBES	Intergovernmental Platform on Biodiversity and Ecosystem Services
IPCC	Intergovernmental Panel on Climate Change

IPS	Arctic Council Indigenous Peoples Secretariat
ISA	International Seabed Authority
ISNT	Informal Single Negotiating Text
IUCN	International Union for the Conservation of Nature and Natural Resources / World Conservation Union
IWC	International Whaling Commission
LME	Large Marine Ecosystem
LOMA	Large Ocean Management Area
LRTAP	Convention on Long-Range Transboundary Air Pollution, Nov. 13, 1979, 1302 U.N.T.S. 217
MAB	Man and the Biosphere
MARPOL/	International Convention of Pollution MARPOL 1973/1978 from Ships (as amended MARPOL 1973/1978 by its Protocol of 1978 relating to the International Convention for the Prevention of Pollution from Ships, 1973/1978, 1340 U.N.T.S. 61)
MEPC	Marine Environment Protection Committee
MMPA	Marine Mammal Protection Act, 1972, 16 U.S.C. 1361
MOP/CMP	Meeting of the Parties/Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol
MoU	Memorandum of Understanding
MPA	Marine Protected Area
MSFCMA	Magnuson-Stevens Fishery Conservation and Management Act, To provide for the conservation and management of the fisheries, and for other purposes, 1976 (As amended by the Magnuson-Stevens Fishery Conservation and Management Reauthorization Act (P.L. 109-479) of 2006), 16 U.S.C. 1801
MSFD	Directive 2008/56/EC of the European Parliament and of the Council of 17 June 2008 establishing a framework for community action in the field of marine environmental policy (Marine Strategy Framework Directive), June 18, 2008, 25.6.2008 O.J. (L 164) 19
MSY	Maximum Sustainable Yield
NAFO	Northwest Atlantic Fisheries Organization
NAMMCO	North Atlantic Mammal Commission
NASCO	North Atlantic Salmon Conservation Organization
NBSAP	National Biodiversity Strategies and Action Plan
NEAFC	North Atlantic Fisheries Commission
NEPA	National Environmental Policy Act of 1969 (as amended on Dec. 31, 2000), 42 U.S.C. 4321
NF	Northern Forum
NGO	Non-governmental Organization
NOAA	National Oceanic and Atmospheric Administration
NOC	National Ocean Council
NPAFC	North Pacific Anadromous Fish Commission
NSR	Northern Sea Route
NWP	Northwest Passage

OAP	Canada's Oceans Action Plan
OILPOL	International Convention for the Prevention of Pollution of the Sea by Oil, 1954, 327 U.N.T.S. 3
OSPAR	Convention for the Protection of the marine Environment of the North-East Atlantic, Sept. 22, 1992, 2354 U.N.T.S. 67
PAME	Protection of the Arctic Marine Environment
para.	paragraph
paras.	Paragraphs
PBSG	Polar Bear Specialist Group
POPs	Persistent organic pollutants
PoWPA	Programme of Work on Protected Areas
prov.	provision
provs.	Provisions
PS	Protection Stock
PSSA	Particularly Sensitive Sea Areas
RAIPON	Russian Association of Indigenous Peoples of the North, Siberia and Far East
RCC	Regional Coordination Committee
Res.	Resolution
RFMO	Regional Fisheries Management Organization
RMP	Revised Management Procedure
RMS	Revised Management Scheme
RMU	Removal Units
RPA	Regional Programme of Action on marine pollution from land based activities
RSNT	Revised Single Negotiating Text
SAO	Senior Arctic Officials
SBSTTA	Subsidiary Body on Scientific, Technical and Technological Advice
SC	Saami Council
SDAP	Sustainable Development Action Plan
SDP	Sustainable Development Programme
SDWG	Sustainable Development Working Group
SEA	Strategic Environmental Assessment
sec./secs.	section/sections
SIOS	Svalbard Integrated Arctic Earth Observing System
SMS	Sustained Management Stock
SOHO	Self-organizing hierarchical open
SOLAS	International Convention for the Safety of Life at Sea, 1974, 1184 U.N.T.S. 277
So_x	Sulphur Oxides
SVG	Strassenverkehrsgesetz, Dec. 19, 1958, SR 741.01
TEK	Traditional Environmental Knowledge
TSPP	Tanker Safety and Pollution Prevention
U.S.	United States of America
UN	United Nations

UNCLOS	United Nations Convention on the Law of the Sea, Dec. 10, 1982, 1833 U.N.T.S. 3
UNECE	United Nations Economic Commission for Europe
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNFCCC	United Nations Framework Convention on Climate Change, May 9, 1992, 1771 U.N.T.S. 107
UNGA	United Nations General Assembly
USSR	Union of Soviet Socialist Republics
v.	versus
VCLT	Vienna Convention on the Law of the Treaties, May 23, 1969, 1155 U.N.T.S. 331
WCPFC	Western Central Pacific Fisheries Commission
WGEAFM	Working Group on Ecosystem Approach to Fisheries Management
WWF	World Wildlife Fund

"After all if we protect the Arctic we will save the world."

~ Sheila Watt-Cloutier at COP 9 to the UNFCCC, 2003

Preface

In August 2007 a titanium flag was planted on the bottom of the Arctic Ocean by two Russian mini-submarines. The Russian act received immediate media coverage: Some of the print media spoke of this act to foreshadow further disputes in the North; the New York Times even headlined their August 8, 2007 press release with the words *"an ice cold war"*.[1]

The Arctic, which since the cold war between the former Soviet Union and the United States of America had not received any significant attention far beyond the circumpolar North, all of a sudden seemed to become a diplomatic focal point again. While the Russian flag planting had much less political power than proclaimed by some journalists[2], it nevertheless was a symbolic act for the unresolved sovereignty issues pertaining to the delimitation of the Arctic Ocean.

With the Arctic being covered by ice and snow for most of the year, providing a rather inhospitable climate, these issues had been dormant for many years. A global environmental phenomenon, known as climate change or global warming, in this context brought about a change in perspective, however: Previously unattainable resources assumed within the Arctic Ocean, by the melting of sea ice now were no longer deemed a benefit of a far distant future. To resolve pending maritime delimitation issues regarding the Arctic Ocean thus received a new impetus.

At the same time the forth assessment report on climate change of the Intergovernmental Panel on Climate Change (IPCC) was released in 2007,[3] providing detailed scientific insight on climate change and as such defined the Arctic as the world's early warning system on this still developing environ-

1 Borgerson and see e.g. Sale & Potapov, at 192, Macho, at 41, Gramling, Halpin, Spiegel Online, BBC News, Blomfield.

2 See ibid. and Regeringskansliet (Government Offices of Sweden), at 19, La Fayett, at 532.

3 See Intergovernmental Panel on Climate Change; work on the next report of the IPCC is currently in progress and is to be due by October 2014; see for details on the Panel's current work (including the latest reports of Working Group I and II) <http://www.ipcc.ch/> (last visited: 04.04.2014).

mental threat. The Arctic in this context no longer could be seen as being of solitary concern to the eight Arctic States, but rather received attention from all over the planet, also from a legal point of view.

Law, however, usually was and still is predominantly concerned with the Arctic sovereignty issues to be resolved and therefore answers to Arctic legal questions are often sought in the law of the sea. Yet, as this thesis will show, Arctic legal issues are not at all – neither from an exclusive Arctic nor a universal perspective – limited to maritime matters. Instead, climate change is responsible for the emergence of new risks, that are both natural as well as anthropogenic in character and may – if not adequately attended to – profoundly impact upon the Arctic and regions far beyond the circumpolar North. While risk assessment and management are of course not primarily a legal matter, responsible and effective governance of risks, such as those affecting the Arctic, necessitates legal guidance.

As a consequence, it is the aim of this thesis to provide a potential solution to the problem of climate change induced risks, by showing ways and means to assess and manage such risks in the most appropriate and feasible way, as well as by providing the legal background to do so.[4]

In a first part the thesis will refer to the complex of the problem, by briefly outlining the relevant information needed on risk assessment and management, climate change and the Arctic as well as addressing the legal principles underlying risk governance. The aim of this part is to provide the necessary base, upon which a solution for the effective legal governance of climate change induced risks in the Arctic ought to be sought. Consequently, part I of this thesis will not delve into any legal solutions to Arctic risk assessment and management. Rather based upon the (in most parts scientific) information provided on risk assessment and management, climate change and the Arctic in chapters 1 to 3, chapter 4 will reflect on legal risk governance tools in general and provide an answer to what approach may be most feasible in the context of assessing and managing climate change induced risks in the Arctic.

As a consequence the purpose of the first part of this thesis is to establish the necessary scientific and legal background in order to analyze in a second part, what answers to risk governance within the Arctic region may be pro-

4 For an overview of the most important findings of the present thesis see Meyenhofer, as well as *infra* in 9.

vided by international and regional (including domestic) law. Additionally in the second part of this thesis, the risk governance principles detected in international and regional legal initiatives will be valued in reference to the approach deemed according to part I most feasible to govern climate change induced risks within the Arctic. Therefore the question that will have to be answered in part II of this thesis is if and if so in what way existing legal initiatives applicable to the governance of climate change induced risks within the Arctic ecosystems follow such an approach.

Finally, reflecting on the existing legal regime as provided in part II, in a third part, the thesis will draw conclusions for the effective assessment and management of climate change induced risks within the Arctic, provide a proposal on a legal solution to the problem and refer to the potential benefit of such an Arctic legal initiative for the rest of the world.

Part I: Theoretical Background to the Legal Governance of Climate Change Induced Risks in the Arctic Ecosystems

The aim of the following chapters is to provide a theoretical approach towards the assessment and management of climate change induced risks within the Arctic ecosystems. Part I of this thesis in this context outlines the scientific and legal background necessary to analyze if and if so in what way new environmental threats such as climate change induced risks are legally governed in the Arctic and how the existing legal regime may be enhanced in order to address such risks more effectively where needed.

As the legal governance of climate change induced risks within the Arctic ecosystems requires basic knowledge on risk governance, climate change and the Arctic, chapters 1 to 3 of part I provide the necessary scientific background on these topics in order to, in a subsequent chapter, analyze how law may effectively govern such risks. To this aim chapter 4 tends to principles of risk governance applicable to new environmental risks such as those resulting from climate change.

1. Risk Assessment and Management

1.1. Introduction

In our lives we all are confronted by risks. Some concern us personally or the people close to us. For example if we think about investing into a business project the result of such an investment can be either of great financial gain or loss. The outcome – positive or negative – affects us and the people dependent on our monetary situation.

Other risks, however, concern inhabitants of a certain region or even mankind as a whole. They are for that matter much wider in scope. Coming back to the above mentioned example, the business project we plan to invest in could e.g. involve the construction of oil and gas drilling platforms in the Arctic. While the investment implies a financial risk, because we are not able to see the full extent of the benefit (or loss for that matter) before the platform takes up its work, the construction itself bears risks for indigenous populations and animals, since it can lead to oil spills or other ecologically dangerous results, that will affect the ecosystems within the region.[5]

What is enlightening, even from this plain example, is the fact that the perception of risks is greatly dependent on who they might concern. The construction of a drilling platform poses a risk for its investors, but also for the ecosystems within which the platform is being built. While the activity implying a risk is essentially the same – namely the construction of the platform – the substance of the outcome varies greatly depending on what perspective the risk is being perceived from. Negative ecological consequences might affect the investors of the drilling platform, but a financial loss will be much more pressing to them. On the other hand, the financial benefit or loss of a certain investor will not be of great concern to indigenous populations depending on intact ecosystems.

5 The latest example of the damaging effects the malfunction of an oil drilling platform can have on ecosystems is the Deepwater Horizon oil spill in the Gulf of Mexico of April 2010, which was titled one of the biggest environmental disasters in the history of the United States.

From this it is easy to understand that dealing with risks is a difficult task to master. The management of risks generally entails diverse interests. The more stakeholders involved, the more interests there are. Effective risk management therefore calls for a decision, that will balance the different interests and lead to an outcome, satisfying all parties. To find such a balance is, however, not easy. And it is complicated further by risk-inducing events, such as climate change, that concern every living being on our planet and encompass a widespread range of consequences. In this context, guidance for decision-makers is needed, not least in a legal form. And such guidance is even more timely for regions, like the Arctic, where the impacts of climate change are felt much more severely compared to other parts of the world[6]. In this respect, the aim of this thesis is to outline the relationship between risks and law drawing on the example of the circumpolar North. The core questions are how law is currently responding to climate change induced risks within the Arctic ecosystems and how their management might be legally improved. However, as an effective legal management requires knowledge about *what* and *how* it ought to be managed, before addressing any legal issues, it is necessary to provide some background on the science of risk – mainly from a sociological perspective – and its main terms.[7]

1.2. Risks

Etymologically the term risk is inconclusive.[8] The word generally refers to the exposure to an adverse or negative situation, linked to the possibility of the expected negative event not manifesting itself after all.[9] In that sense

6 See for details *infra* in 2.3. and 3.

7 What shall be provided is a very brief, mainly theoretical and by no means exhaustive overview. Details and a more practical approach on the topic, especially in legal terms, can be found *infra* in 4. For a summary on the different perspectives of the science of risk see AVEN & RENN, at 21–48.

8 See HOAD (tracing it back to the French word risque and the Italian risco (modern: rischio) and deriving it from the expression risicare, which is translated by 'to run into danger'), WILKINSON, at 15 and 17 (mentioning the Arabic word risq (good fortune), the Greek expression rhiza (cliff) and the Latin term resegare (to cut off short) pointing to the fact that the notion risk did not always have a negative connotation), GLOEDE, at 34, BRECKLING & MÜLLER, at 2 (referring to the Latin expression risicare, which is translated by 'Klippen umschiffen'), accord. AVEN & RENN, at 5.

9 Studying social scientific theories makes clear that the term risk did not always have a negative connotation. In fact depending on the theory applied, the notion can be regarded as neutral and simply referring to probabilities of a bad *or* good outcome. To simplify matters, however, this thesis only focuses on the more commonly used (negative) meaning of the term. On the different risk theories see e.g. ZINN, at 3–7, LUPTON, at 17–34.

risks are connected to uncertainty and thus probability assumptions. In respect to its etymological background[10] the notion risk does not, however, indicate a passive and almost stoic resignation to the uncertainty of danger, harm or loss, but rather demands a certain degree of action. It is in that context, that the wording *to risk something* needs to be understood. By taking a risk, people expose what they value (e.g. their lives, families, money) to a dangerous situation, without knowing what the consequences might be. Thus, very often *to risk something* or *to take a risk* is colloquially equated with the term *to dare*. While a collation of the verbs *to risk* and *to dare* is first and foremost based on people's common understanding of what risks are and how they are being displayed in reality, such a comparison nevertheless helps to enlighten another important aspect of the concept of risk: The existence of options and hence of choice.

Because risks are affiliated with uncertainty, there exist always several options to choose from. It is in this context that the concept of risk unfolds its main purpose: Thinking about risks helps people to choose between several options. Risks are in that sense mental constructs that refer to the probability of an undesirable state of reality, i.e. an adverse effect, occurring as a result of natural events or human activities.[11] They do not convey what *is*, but what people think there *could be* in negative terms.

In many cases in which a decision is being demanded, choosing between several options is complicated by the existence of uncertainty, complexity and ambiguity.[12] By using the mental construct of risk it becomes possible to evaluate the different options and based on that evaluation decide upon the most feasible and beneficial course of action.[13] In short, risk, understood as a mental concept in the above mentioned way, helps to provide some guidance in complex, ambiguous and uncertain situations, because people are likely to select the most certain and most rewarding out of several options.

10 See *supra* fn 8 (part I).

11 By referring to risks as mental constructs, this thesis is following the *subjective* risk approach. On the definition of risk see Renn, at 1, Weichselgartner, at 11, 24-25 and 44, Böhm, et al., at 21 and 25, Burgman, at 1, Wilkinson, at 38, cf. Rifkin & Bouwer, at 217, Pine, at 12 and 109, Perry, at 190, Gloede, at 36–37, Seiler (2000), at 37, Seiler (1995), at 2, Seiler (1997), at 41 and (on the subjective risk approach) 43 (referring to the fact that the notion *"risk"* is not a traditional legal term).

12 The topic of uncertainty, complexity and ambiguity is one of the main focal points in risk assessment and management and therefore deserves much greater attention. In order to keep this introduction to the science of risk as brief and simple as possible, details on this topic shall be provided *infra* in 4. within the context of environmental risk governance.

13 See accord. Renn, at 1.

However, not all risks provide for such a clear cut evaluation between several courses of action. Depending on the degree of uncertainty, complexity and ambiguity inherent in a certain situation, it becomes much harder to analyze how values can be allocated best. Environmental hazards e.g. often remain unnoticed for a long period of time and their consequences are very difficult to assess, which makes a profound risk-based decision problematic. Furthermore such events do not cover the same range of options to choose from and base a decision on, as activities that are purely of anthropogenic origin. The concept of risk is founded in the idea that a causal connection can be drawn between an initiating activity or event and its outcome.[14] Thus, logically, by altering the preliminary stages of an action (i.e. the outset), the outcome will be altered too. Deciding against an activity encompassing a risk will therefore in general prevent any negative consequences from occurring. What if, however, there is no room for such a decision? What if the initiating activity or event at hand is independent of human activities for the most part? In these cases the initiating event (e.g. natural hazard, environmental disaster) cannot be modified by the means of human initiatives. Risk management in that context will not have to focus on preventing the initiating event, but on mitigating its impacts, unless of course human activities are significantly enhancing the said natural event, which would provide for outcome-focused mitigation *and* outset-oriented decision making.

Climate change induced risks – as they are to be understood for this thesis – fall within this category, because they demand a risk governance aimed at the outset as well as the outcome of the natural events. The reason why is related to the nature of climate change induced risks. Climate change is a natural phenomenon that has impacts on ecosystems throughout our planet, some of which can be observed already, while others still are mere predictions.[15] In recent years debate has arisen regarding the influence of human activities on Earth's climate system[16], with the consequence that clear impact assessments are complicated further. It is these probable impacts of both, natural as well as anthropogenic origin, that climate change induced risks pertain to. Or in other words from an ecological point of view climate change induced risks refer to those risks stemming from alterations in climate as a natural phenomenon (e.g. droughts, floods and other extreme

14 See Renn, at 1–2, Ohl, at 26, Weichselgartner, at 25.
15 See for details *infra* in 2.
16 See for details *infra* in 2.2.3.

weather phenomena),[17] while from an anthropogenic focus climate change induced risks entail risks emerging due to human activities linked to climate change, either because climate change is supporting said conduct (e.g. an increase in shipping due to the melting of sea ice) or because human activities enhance the natural phenomenon of climate change through their action (e.g. further release of greenhouse gases that results in an increase in temperature[18]).

Uncertainty in the context of climate change exists, because of the complexities that are intrinsic to the global climate system.[19] Since the system does not follow a linear approach, influences by natural processes as well as human activities might alter the outcome. In this respect, thinking about climate change induced risks helps to cope with the uncertainties involving Earth's climate system. In regards to climate change and its natural ramifications risk managers will have to focus predominantly on outcome-based risk management. The reversal of the initiating event (i.e. global climate change) is impossible. However an outset-based risk management is reasonable pertaining to human activities that might enhance or modify the initiating natural event. In that sense the management of climate change induced risks needs to be both outset and outcome oriented.

Considering what has been stated above, the term risk – as it shall be understood for this thesis – can briefly be defined as a mental concept that refers to the probability of a negative outcome that is causally connected to a certain initiating activity or event. Without a causal connection developing scenarios of probable impacts would be rendered impossible. Furthermore, the concept of risk only keeps its meaning in the light of uncertainty. If the future were predetermined probability assumptions would become obsolete altogether.

1.3. Assessing Risks

Before managing a risk becomes feasible, information on the initiating activity or event needs to be collected and its outcome predicted by the means of model simulations and scenario constructions. Thus, the term *risk assessment* generally comprises the following steps: gathering scientific data, as-

17 See for details on Arctic risks resulting from climate change *infra* in 2.3. and 3.2.2.1.
18 See for details *infra* in 2.2.
19 See for details *infra* in 2.

sessing the relevant information and evaluating the risk based on the data that was collected.[20]

In order to undertake risk assessment projects, however, the risk at hand needs to be of general acceptance first. In other words a majority of people has to connect one or several negative results to a certain initiating activity or event in order for the latter to even encompass a risk. Because risks are mental constructs they are selective and therefore dependent on what kind of activity or event people perceive to entail a risk. Thus, prior to any risk assessment the risk will have to be framed.[21] In that context e.g. monitoring initiatives[22] become significant, because they might be able to give insight into newly developing hazards and therefore help to frame and define new risks. The empirical analysis of those risks, however, is part of the actual risk assessment process. Consequently risk framing only suggests that there might be a hazard and hence a need for action.

Once consensus exists regarding the risk that shall be tackled the main work of risk assessment can be initiated. The first step, *gathering of scientific data*, is a scientific undertaking. The data collected is invaluable for risk managers, since only if there is enough knowledge about a certain risk, an effective management thereof will be feasible. What information and how it is acquired, however, is dependent on the scientific communities, assigned to the assessment process and their respective methods. Consequently the gathering of scientific data is determined by selection criteria, as much as the framing of the risk in an earlier stage. Nevertheless good scientific data

20 See e.g. Hansson, at 21, accord. Rifkin & Bouwer, at 43, Jaeckel, at 7, c.f. Köck, at 71 and <http://epa.gov/riskassessment/basicinformation.htm#arisk> (last visited: 18.05.2014), but see Seiler (1997), at 31 (detaching risk evaluation, i.e. *"normative Risikobewertung"*, from risk assessment, i.e. *"deskriptiv-analytische Risiko-Analyse"*).

21 See accord. Renn, at 47 and Aven & Renn, at 57, 67 and 70 (intelligibly detaching risk framing from risk assessment and designating the former as *pre-assessment*), cf. Farrell, et al., at 15 (in relation to the whole risk assessment process) and in respect to ecological risk assessment see <http://www.epa.gov/ncea/risk/planning-ecorisk.htm> and <http://www.epa.gov/ncea/risk/eco-problem-formulation.htm> (last visited: 18.05.2014) respectively and for an overview National Research Council (Science and decisions), at 73 et seq. (the framing process is here referred to as *planning and scoping* as well as *problem formulation*).

22 See e.g. Renn, at 49 (additionally using the term *early warning*; Renn continues to state that pre-assessment initiatives also often will have to include *risk screening*, which refers to setting out rules regarding the prioritization, assessment and management of risks and *scientific conventions,* that determine the main assumptions and parameters of scientific modeling and evaluating processes; Renn, at 50–51; see on similar notes EPA Guidelines *supra* in fn 21 (part I)), Seibold, at 8, Aven & Renn, at 57, 68 and 70 and for specific Arctic monitoring initiatives see *inter alia infra* in 6.2.2.2. and 6.2.2.3.

gathering will aspire to be broad in selecting the methods and parameters and follow an interdisciplinary approach[23] by including natural or technical sciences as well as social sciences in the information acquiring process.

In a next step the information that was gathered is being analyzed. The purpose of *risk assessment* in the narrow sense of the word (i.e. information assessment) is to draw connections between the scientific data that was gathered in order to gain an overall perspective of the risk. To that end the information assessment stage is generally divided into the following categories: Hazard identification, exposure assessment, dose-response evaluation (vulnerability assessment) and risk characterization/estimation:[24]

a) Before thinking about how to manage a risk, an initiating activity or event entailing a probability of danger, harm or loss needs to be identified. Not every activity or event will likely lead to adverse effects. Thus not every activity or event will be classified as a hazard or a threat. The empirical *identification of hazards* is therefore decisive on whether or not a certain activity or event can be classified as being risky.[25] Also it is difficult to tackle negative consequences if there exists no knowledge about their source.[26] Using the gathered scientific data to ascertain a hazard (i.e. the initiating activity or event) has for that reason to be the initial step when governing risks.

b) Once a hazard is identified, it needs to be analyzed further, by asking about its current and anticipated range. In that context the gathered scientific data provide for information regarding what area is or possibly will be exposed to and hence affected by the hazardous activity or event. In other words, the *exposure assessment* draws a connection between the initiating activity or event and its negative effects in relation to a certain group or area. It answers the question who

23 See accord. Renn, at 65, Linkov, et al., at 16.

24 See Renn, at 69, Rifkin & Bouwer, at 46–50, Guehlstorf, at 47–48, Fehr, et al., at 85–88, United States Environmental Protection Agency (1998), at 2 et seq., Bartell, at 1039–1044, Anjaneyulu & Manickam, at 287, 294–295 and very detailed Paustenbach, at 85–366, Pine, at 29–50 (on hazard identification) cf. Aven (Risk Analysis), at 39 (dividing the information assessment stage into *identification of initiating events*, *cause analysis*, *consequence analysis* and *risk description*, while essentially referring to the same topic).

25 Although hazard identification might seem at first glance equal to monitoring initiatives taken up during risk framing the two concepts are not the same. Risk framing relies on several separate experiences in reality that suggest a further and more thorough investigation. At this stage it is not certain, if a hazard even exists. Only the empirical evidence gathered will therefore lead to the actual identification or denial of a hazard. See also *supra* in 1.3.

26 See accord. Aven (Risk Analysis), at 39.

and/or what area is or will be prone to the exposure and how the latter will manifest itself[27].

c) Additionally to determining who or what area is or could be affected by a certain hazard, the gained scientific data offers information on its actual impact. Because the division into the above mentioned categories originated[28] from environmental or medical risk assessments related to contaminants, the wording *dose-response assessment* might be a bit misleading in that context, however. More fitting in accordance with RENN is the term *vulnerability assessment*, since it provides for a broader approach by including all environmental hazards.[29] The main purpose of the vulnerability assessment is to develop an understanding of the relationship between a certain hazard and the incidence of an adverse effect stemming thereof. The question asked therefore is not who or what area is or will be affected (this is part of the exposure assessment), but *how severely* they are or will be affected. Naturally the outcome of the vulnerability assessment is pivotal in if or how risks related to a specific hazard are being perceived.

d) While hazard identification, exposure and vulnerability assessment are based on empirical data and thus form the core of risk assessment as a scientific undertaking, the last category, *risk characterization/estimation* is mainly founded on probability assumptions. Its purpose is to combine the knowledge gathered from exposure and vulnerability assessment and by doing so estimate the likelihood of adverse effects occurring within a certain group and/or area (*quantitative* risk estimation[30]) and determine possible scenario constructions (*qualitative* risk estimation[31]). Consequently risk characterization/estimation is not so much an empirical, but – by referring to

27 E.g. in regards to contaminants, the exposure assessment will provide data on the routes of exposure, such as ingestion or air. See RIFKIN & BOUWER, at 50, in great detail SUTER, at 197-294 and 552-553 and additionally *infra* in 3.2.2.2. and fn 109-110 (part I) concerning persistent organic pollutants in the Arctic.

28 See implicitly THEODORE & THEODORE, at 407 and 411, NATIONAL RESEARCH COUNCIL (SCIENCE AND DECISIONS), at 135, FISCHHOFF & KADVANY, at 46, BARTELL, at 1041, and <http://epa.gov/riskassessment/basicinformation.htm#arisk> (last visited: 18.05.2014).

29 Accord. PINE, at 10 (talking of vulnerability analysis) but PATT, ET AL., at 8 (using the same term but in a more holistic context). In that context the most neutral choice of words is provided by AVEN (RISK ANALYSIS), at 39 (using the term *consequence analysis*).

30 RENN, at 73, cf. PINE, at 110.

31 Ibid.

> the mental construct of risk – a cognitive process that is often defined by uncertainty, complexity and ambiguity.[32] Of course risk characterization/estimation makes use of mathematical calculations, model simulations and statistics and is in that sense empirical too. Yet there exist no general parameters and guidelines, which would make the risk characterization/estimation methodology an exact science, free of subjective choices and moral concepts.[33]

After assessing the relevant information, the risk will be evaluated. The objective of the final stage of risk assessment, *risk evaluation*, is to draw conclusions in respect to the risk management process, based on the gathered scientific data and their assessment. The knowledge derived from risk characterization/estimation, helps to gain an overall perspective of the risk and allows cognitive deductions on its pertinence. Only if the outcome of risk evaluation deems risk managing efforts necessary, risk management will take place. Risk evaluation is therefore aimed at comparing risks in terms of their magnitude, commonly by classifying them according to their acceptability and tolerability.[34] A risk is *acceptable* if the probability of adverse effects is very low. *Tolerable* risks on the other hand, imply a certain probability of negative consequences, yet it is not so high as to render the initiating activity or event *intolerable*. In case of the latter the probability of adverse effects manifesting themselves is very high, which makes risk management processes indispensable or even calls for banning the risk altogether (by taking action against the initiating activity or event in such manner that will eliminate all possible negative consequences). Compared to this, acceptable risks usually demand no risk managing efforts and tolerable risks only to an extent considered necessary and economically feasible.

At any rate, classifying a certain risk as acceptable, tolerable or intolerable contributes to deciding upon whether or not initiating any risk management activities is to be deemed invaluable or – contrarily – negligible. Furthermore risk evaluation helps to answer the question if a certain initiating activity or event shall be banned altogether, because no risk management actions would sufficiently decrease adverse effects. For apparent reasons however, such a classification is not congruous with purely environmental haz-

32 See in detail Renn, at 75–78 and *infra* in 4.

33 See accord. Guehlstorf, at 40, cf. Renn, at 69–70 (referring to the various analytical risk assessment methods).

34 See Renn, at 149, Suter, at 511, Pine, at 127 and 129, Aven & Renn, at 107 and 112 (providing a list of information to be gathered in order to make risk characterization and ultimately a judgment on the risks' tolerability and acceptability feasible) and c.f. Köck, at 71.

ards due to their inevitability.[35] Natural events cannot be banned, only their outcome can be mitigated.[36]

In spite of the above mentioned division of risk assessment into gathering of scientific data, assessing the relevant information and evaluating the risk, in practice those stages often overlap and are thus inseparably connected. The outcome of risk assessment processes are integrative reports[37] that touch on every objective of risk assessment by providing the scientific data, their empirical assessment and suggestions on the relevancy of the hazard.

1.4. Managing Risks

The purpose of risk assessment is to provide enough knowledge about a certain risk in order to take action against this risk if necessary. The term *risk management* refers to this action-taking by involving all measures and activities carried out to manage risk. Its objective is to strike a balance between the probability of negative outcomes on the one hand and the probability of opportunities or benefits on the other.[38] Thus, risk management is contrarily to risk assessment not a scientific undertaking, but a value-based decision making process aimed at finding the best economically and morally feasible way to handle risk.

Since successful risk management is in need of good information – preferably the best available scientific evidence – it is determined by the results of risk assessment, especially of risk evaluation. Consequently there exist three types of situations in which thoughts about risk management become viable: Acceptable, tolerable and intolerable situations.

While acceptable risks generally do not make any risk management efforts necessary and tolerable risks allow such measures only to an extent consid-

35 Cf. Renn, at 149 (going even further by stating, that the terms acceptable and intolerable appear at first glance to be meaningless for purely natural hazards, since humans have no choice in tolerating or accepting these events and since the terms only become functional in the context of human contributions); While it is certainly true that humans cannot decide upon the incidence of a certain environmental hazard, they can in the opinion of the present author nevertheless categorize the event as severe and thus as intolerable or as not so severe, hence perceiving it as acceptable or at least tolerable, no matter if human activities are enhancing the initiating event or not.

36 See *supra* in 1.2.

37 E.g. in the context of climate change and the Arctic ACIA (2004), ACIA (2005), Intergovernmental Panel on Climate Change.

38 See Aven (Risk Analysis), at 6, cf. Knorr & Scholze, at 38 (referring to Head & Herman).

ered economically reasonable, intolerable risks demand an effective risk source or (if impossible as in the case of natural hazards[39]) vulnerability oriented risk management.[40]

The above mentioned distinction does, however, only answer the question if any risk management activities shall be initiated and if so to what extent. The actual *modus operandi* of risk management is subject to the respective risk that needs to be tackled. Because of the uncertainty, complexity and ambiguity inherent in the science of risk, risk management generally enables a multitude of options, which will have to be defined, assessed, evaluated and eventually selected and implemented, by deciding in favor of the most feasible and beneficial course of action.[41] Risk management options range from risk avoidance (i.e. eliminating the risk or banning the risk entailing initiating activity) to risk reducing efforts, which give way to a wide array of alternatives, such as educating/informing affected communities about what steps to take in order to avoid or reduce risks, prescribing standards and duties by law or voluntary agreements as well as setting incentives through markets or developing mitigation initiatives.[42] To sift through these options and decide upon the most feasible, beneficial and economically, socially and morally reasonable course of action is the aim of risk management. Evidently subjective opinions and views of decision-makers (such as politicians and stakeholders) play an important role in selecting and implementing management strategies – risk management is therefore no value-free process and not solely based on the scientific findings of risk assessment.[43] Thus it is especially here that legal guidance becomes important.

39 Risk source management is only possible if the risk source allows a human intervention. As stated *supra* in 1.2 natural hazards are initiating events that are for the most part independent of human activities, thus making effective action against the initiating event improbable.

40 See Renn, at 174, Aven (Quantitative Risk Assessment), at 8, Aven & Renn, at 121, Köck, at 71 cf. Burgman, at 165–166, United States Environmental Protection Agency (2000), at D-7, note 1.2 and The Presidential/Congressional Commission on Risk Assessment and Risk Management (Volume 2), at iii (referring to the difficulties stemming from the differing perceptions people have of what is a negligible risk and what is an unacceptable risk).

41 See Frantzen & Ackerman, at 9, The Presidential/Congressional Commission on Risk Assessment and Risk Management (Volume 1), at 1, Seiler (1997), at 35 and for details Renn, at 174–176, Aven & Renn, at 123–125 cf. Suter, at 556, Pine, at 199 figure 8.1.

42 See for details e.g. Renn, at 174, Aven & Renn, at 122, The Presidential/Congressional Commission on Risk Assessment and Risk Management (Volume 1), at 29–31.

43 Accord. Lister, at 98, cf. Seiler (1995), at 11 and 24.

1.5. Conclusion: A Proposal for Integrated Risk Governance

In consideration of the aforementioned facts on the science of risk one aspect is exceedingly perceivable and hence requires further thought: Whenever risks are involved, selection processes become pertinent. If an initiating activity or event will be perceived as entailing a risk, is dependent on people's experiences and the conclusions they draw therefrom.[44] Because risks are mental constructs and not empirically tangible, they are contingent upon personal selection criteria. Of course, since over time, it is likely that many different people encounter the same negative consequences in relation to a certain activity or event, it is also conceivable that those people will eventually decide for themselves that said activity or event implies a risk. The personal, single selection becomes a general, public selection by which many people agree upon a specific risk. At this point empirical knowledge is being sought in order to deal with the initiating activity or event that is perceived as being risky and its negative consequences. What scientific community will be assigned to the risk assessment process is, however, again subject to selection criteria.

Furthermore, while the gathering of scientific data itself is empirical, the decision upon which methods and parameters to apply is not. In that sense risk assessment is not entirely value-free, which is most perceptible in the context of risk evaluation. Ultimately the selection process concludes in the decision-making process referred to as risk management.

Consequently, from the framing of risks to risk assessment and risk management every stage requires one or several decisions, that make the task of risk governance by and large selective. Handling risks is therefore not only determined by uncertainty, complexity and ambiguity, but also by various selection procedures, resulting in a lack of transparency. Communicating the approaches, methods and selection criteria applied to at least all stakeholders involved[45] as well as developing best practices and (legal) standards to

44 See on the perception of risk and its psychological background Sunstein (Worst-case scenarios), at 22 and 278, Sunstein (Laws of Fear), at 64-88 and 93, Renn, at 93 and cf. Weichselgartner, at 92 and Theodore & Theodore, at 425 (on the role of the media in risk perception).

45 It is in this context that the importance of risk communication ought to be seen. The US National Research Council sees risk communication as a special form of democratic dialogue within the risk management process and consequently has defined risk communication as *"an interactive process of exchange of information and opinion among individuals, groups*

reduce selection and generalize the methodology and parameters are in that context to be deemed imperative. Of course risks such as climate change induced risks that do not follow any linear approaches, make such an undertaking difficult, because many different criteria need to be considered when dealing with them. Yet ideas and concepts of multi-criteria or integrated risk analysis and management tools exist[46] and it is only timely to test them within and transfer them to a legal context by the means of governing climate change induced risks within the Arctic ecosystems.

and institutions" pertaining *inter alia* to risks. Such an exchange of information and opinion can naturally occur by means of a multitude of actions, such as informal and formal meetings, reports and through media, e.g. press releases; see National Research Council (Risk Communication), at 15, 21 and 143-144 and additionally Aven & Renn, at 159.

46 See Linkov & Ramadan, Kasperson, et al., at 39–43, Emerton, et al., at 265, Burgman, at 401 et seq.

2. Climate Change

2.1. Introduction

Global warming is an issue, which in the most recent decades has become one of the driving forces not only in science but also in economics, politics and the media. While the precise extent of global climate change is scientifically still unclear, a change in average temperature and implications stemming thereof (such as melting sea ice) can certainly be observed. As the second decade of the new millennium is moving forward, world's societies and the global community as a whole are facing a multitude of hazards of both, natural as well as anthropogenic origin. If global warming is a fact and the Earth's temperature continues to rise, the emergence of risks is bound to increase, leaving politicians from all over the world with the difficult task to find ways and means to deal with them. While the management of risks is first and foremost a political process, which involves high-level decision-making, guidance needs to be sought in law. Law, however, is a science that takes time to respond to a new problem.[47] Even more so, if many parties are involved when addressing the issues at hand. In this respect it is not surprising that, although global climate change has been a topic on political agendas for a quite a while, binding legal responses addressing those issues have remained comparatively rare. The possibility of further change in the Earth's climate system and the prospective impact, which such a change can have on its ecosystems, however, undoubtedly require a profound analysis of how law is responding to risks related to climate change in order to enhance the decision-making process by providing tools and guidelines to govern risks and prevent adverse effects, before they become inevitable. Especially, if, as in the case of the Arctic, the depletion of various ecosystems is at stake. Managing climate change induced risks, however, demands scientific knowledge on the matter or in other words an assessment of the risks. Therefore, prior to addressing any legal issues, a brief scientific background on climate change and its impact on the Arctic shall be provided subsequently.

47 Accord. *Report of the World Commission on Environment and Development*, Aug. 4, 1987 (A/42/427) [hereinafter Brundtland Report] in chapter 12, section II, sub-section 5, para. 80; see on the Brundtland Report furthermore *infra* in fn 31 (part II).

2.2. What is Climate Change?

First and foremost *climate* needs to be distinguished from *weather*. Climate generally refers to the average weather in terms of a certain period of time in a certain area. Weather on the other hand describes the condition of the atmosphere in a very short time-span.[48] Consequently a change in the climate system is always directly interlinked to a change of weather. Rapid and extreme weather changes can therefore indicate a change in average weather, or in other words, exceptional weather changes can ultimately result in climate change. Such changes are by no means uncommon. The Earth's geological and meteorological composition has undergone several transformations over many millions of years, interchanging glacial and (warmer) interglacial stages.[49] Causes are various and strongly dependent on complex meteorological phenomena, of which an in depth examination shall be refrained from. To help understand the current warming trend, however, some basic rules regarding the Earth's atmosphere will have to be pointed out.

2.2.1. Solar Radiation

About half the solar energy entering the atmosphere consists of visible light,[50] which for the most part reaches the Earth's surface. The rest – including most of infrared radiation and ultraviolet – is either instantly reflected back to space or absorbed in the atmosphere, ultimately warming it.[51] The same applies to the incident radiation that eventually reaches the ground, depending on the reflectivity (the so called *albedo*) of the surface it falls on. While e.g. snow and ice have a high albedo, water has a very low albedo,[52] thus absorbing most of the incoming solar energy. The absorption

48 See e.g. Rohli & Vega, at 4, Seinfeld & Pandis, at 4, Aguado & Burt, at 4, Archer, at 25 and cf. Vardavas & Taylor, at 1 note 1.1, Burroughs, at 2 note 1.1 (stating that weather is what we get, climate is what we expect).

49 See e.g. Thomas, et al., at 284 note 10.1, Aguado & Burt, at 499–505, Desonie, at x–xi and more detailed Archer, at 57–68, Rapp, at 11–32, accord. United Nations Environment Programme (GEO 4), at 59 and cf. Johansen, at 13 (stating that all planets' ecosystems change over time).

50 See e.g. Thomas, et al., at 2 note 1.2.1, Vardavas & Taylor, at 2 note 1.2.

51 See Taylor, at 5, Thomas, et al., at 2 note 1.2.1, Mastrandrea & Schneider (2010), at 21, Burroughs, at 16 and 26 note 2.1.2 and 2.1.4, Aguado & Burt, at 60 and accord. Desonie, at 7 (providing an easily understandable graphic).

52 See Thomas, et al., at 4 note 1.2.2, Archer, at 23, Rohli & Vega, at 144, Aguado & Burt, at 520 and generally Burroughs, at 28 note 2.1.4 Table 2.1 (providing a detailed table of the

then leads to warming of the given surface. In the case of lakes and oceans, the liquid water starts to evaporate, generating so called *latent heat*. This heat originates because a great amount of energy is being needed for the phase change from liquid to vapor.[53] Once the hot air rises to higher and at the same time cooler altitudes it eventually condensates and releases the stored latent heat.[54] The condensation leads to cloud formation, which in time will result in precipitation, cooling the Earth's surface.[55] If on the other hand neither surface water nor vegetation are present, the solar energy reaching the ground can't be absorbed. Instead the incident radiation turns into so called *sensible heat*[56], which results in a temperature rise. Therefore the surface the radiation falls upon determines the net temperature of the planet: The higher the albedo the more energy is emitted back to space in the form of infrared. Additionally the larger the absorption capacity of a certain surface the less energy will prevail as sensible heat.

2.2.2. Greenhouse Effect

Physically every object loses energy to its surroundings in the form of radiation.[57] As pointed out this physical rule is also valid for the Earth: The planet loses some of the incoming solar energy to outer space by releasing infrared, or thermal, radiation. Under general physical conditions a given object would lose as much energy as had been taken in, thus causing an *energy balance*.[58] If the Earth, while trying to establish the mentioned equilibrium, were constantly losing all the absorbed solar energy to outer space in the form of thermal energy, the planet would, however, be much cooler than it actually is.[59] The decisive element in making Earth's temperature less hostile

albedo of different surfaces), Desonie, at 11, Lemke, at 46-47. Furthermore regarding the albedo of the Arctic Ocean in the context of climate change see Hecht and *infra* in 2.3.

53 See Rohli & Vega, at 40, Aguado & Burt, at 72, Bridgman & Oliver, at 6, Pierrehumbert.

54 See Burroughs, at 27 note 2.1.4 Fig. 2.7, Seinfeld & Pandis, at 103 Fig. 4.4, Taylor, at 58, Bridgman & Oliver, at 6–7.

55 See Rohli & Vega, at 41, Legates, at 608.

56 See Rohli & Vega, at 40, Oke, at 391 and cf. Desonie, at 35 (describing the problem without mentioning the terminology), Aguado & Burt, at 70–71 (describing the physics behind the terminology).

57 See Burroughs, at 12 note 2.1.1, Desonie, at 5, Aguado & Burt, at 38, Mastrandrea & Schneider (2009), accord. Thomas, et al., at 296 note 10.4.

58 See on Earth's energy balance Archer, at 17, Desonie, at 11, Burroughs, at 23-31 note 2.1.4, Mastrandrea & Schneider (2010), at 21–22 and Rapp, at 213 as well as Rohli & Vega, at 101 (both providing physical equations).

59 See Thomas, et al., at 8 note 1.2.3, Rohli & Vega, at 17, Mastrandrea & Schneider (2010), at 22, Mastrandrea & Schneider (2009) and Archer, at 16.

is the greenhouse effect.[60] While the atmosphere is broadly permeable to the incoming short wave solar radiation, it is partially impermeable to the outgoing long wave terrestrial radiation.[61] Clouds, water vapor and atmospheric gases (the so called greenhouse gases, or GHG), such as carbon dioxide (CO_2), nitrous oxide (N_2O), methane (CH_4), ozone (O_3), hydrofluorcarbons (HFCs), perfluorcarbons (PFCs) and sulphur hexafluoride (SF_6), trap some of the outgoing thermal energy, rising the temperature by about 30-40°C.[62] Again the Earth continues to achieve an energy balance. Therefore the terrestrial radiation rate continues to rise until the outgoing thermal energy is in balance with the incoming solar energy, thus creating a warmer temperature. Especially water plays a significant role in keeping the planet's temperature at a stable level by reducing the surface temperature through evaporation and precipitation and at the same time by serving as an important greenhouse gas in the form of water vapor.

2.2.3. Radiative Forcing

While under normal conditions the physical rule of energy balance together with the natural greenhouse effect make the Earth a comfortable place to live on, there are several causes that can alter that equilibrium, such as changing solar radiation, changes in the composition of landmasses (especially regarding albedo) and alterations in the atmosphere.[63] This so called radiative forcing[64], can, if strong enough, lead to changes in the climate system in the form of either cooling or warming.

While radiative forcing certainly is of natural origin, human activities can have an influence, too. The industrial revolution some 250 years ago and mankind's activities up until now, predominantly by the use of fossil fuel, led to an increasing emission of greenhouse gases, which alters the atmo-

60 See e.g. JOHANSEN, at 1, ROHLI & VEGA, at 17.
61 See KEMP and TAYLOR, at 104.
62 See e.g. THOMAS, ET AL., at 296 note 10.4, VARDAVAS & TAYLOR, at 4 note 1.3, TAYLOR, at 106, MASTRANDREA & SCHNEIDER (2010), at 23 and cf. *Kyoto Protocol to the United Nations Framework Convention on Climate Change*, Dec. 11, 1997, 2303 U.N.T.S. 148 [hereinafter Kyoto Protocol] (explicitly restricting the emission of these greenhouse gases according to art. 3 para. 1 in conjunction with Annex A; note that the Doha Amendments to the Kyoto Protocol in 2012 added another gas to this list: Nitrogen trifluoride (NF3); see *infra* in fn 152 (part II).
63 See INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, at 37, ARCHER, at 37, ACIA (2004), at 23 and generally GOUDIE.
64 See INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, at 37, VARDAVAS & TAYLOR, at 9 note 1.5.

spheric transparency. As greenhouse gases are one of the main contributors to the greenhouse effect a higher greenhouse gas occurrence in the atmosphere leads to a more extensive trapping of thermal radiation, hence promoting a rise in temperature. The impact of such an enhanced greenhouse effect on climate change is highly debated. While some scientists[65] see today's warming tendency predominantly in the expansion of greenhouse gases due to human activities, others[66] argue that, while mankind's influence can't be denied, it is questionable whether all (or most) of global warming is caused by human greenhouse gas emission. Since predictions of how the atmosphere will respond to radiative forcing are, due to the complexity of the matter, difficult, the net impact of human activities on climate change can't be determined with absolute certainty. Yet, because climatic conditions can change rapidly and in unforeseen ways, any destabilization no matter how big or small can make change more likely.[67] Therefore mankind's activities should be taken into account when addressing the global warming issue.

2.3. Conclusion: Climate Change and the Arctic

The consequences of a rising temperature are widespread and effect diverse regions of the world in different ways. Snow and ice regions, such as the Arctic, are sensitive to relatively small changes in the global temperature.[68] Melting glaciers, reductions in extent and thickness of sea ice and thawing permafrost provide strong evidence of a warming trend in the Arctic.[69] Global models expect a temperature rise of up to 6-7°C in annual and up to 10°C in winter temperature by the end of the 21st century[70], which could result in complete sea ice loss during the summer months by 2070[71]. Sea ice retreat

65 See e.g. Intergovernmental Panel on Climate Change, at 36–41, Johansen, at xi, Archer, at 91, Dessler & Parson, at 73-76 notes 3.2.6 and 3.2.7, Mastrandrea & Schneider (2010), at 7 and 25, Ismer, at 29 and 486 and specifically on Arctic climate change Overland, at 22.

66 See e.g. Spencer, at 6, Lindzen, at 87–98.

67 Accord. Thomas, et al., at 284 note 10.1.

68 See Meltofte, et al., at 15, Nuttall (2002), at 2 and ACIA (2005), at 23.

69 See Hassol, at 14, Mastrandrea & Schneider (2010), at 43, Overland, at 16 and with graphical display Bollinger, at 9, AMAP (Climate Update), at 2-3 and 5.

70 See Hassol, at 34, Meltofte, et al., at 14, Chestney and cf. Nuttall (2002), at 2 as well as ACIA (2005), at 470.

71 See Intergovernmental Panel on Climate Change, at 46, Johansen, at 41, Meltofte, et al., at 39, Lemke, at 49 but see Archer, at 36, Berkman (Environmental Security), at 18, Stroeve, Bollinger, at 9 (stating, that latest researches point to the Arctic Ocean being ice free by 2030), Morello (2010) (proclaiming that many scientists now predict that sea-ice free summers within the Arctic could become reality by 2040), The Economist (assuming an ice free Arctic Ocean during summer months to become reality between 2020 and 2050), Roach

changes the albedo feedback, because water – contrarily to snow – is highly absorbent of the incident radiation. The result is an increase in water vapor, which encourages the greenhouse effect, thus promoting a further rise in temperature. Additionally latent heat is being generated when sea ice, glaciers and ice caps begin to melt.[72] In a different context the melting of ice caps and glaciers, which both store significant amounts of water on land, changes the mass of the ocean, thus causing the sea level to rise.[73]

A continuous warming trend also leads to permafrost thaw, which is an additional contributor to the greenhouse effect. Permafrost can be defined as frozen ground, in which temperatures do not rise above 0°C for at least two consecutive years.[74] It is considered *"one of the most vulnerable carbon pools of the Earth system"*[75]. Thawing of permafrost could therefore release large quantities of soil carbon, adding to the carbon dioxide and methane deposits in the atmosphere.[76]

As a consequence changes in the Arctic may have widespread impacts not only within the region but also beyond: As just has been shown alterations in albedo-feedback and permafrost thaw significantly enhance the green-

(stating that some climate scientists now predict, that the Arctic could be ice free during the summer within the next decade) and PAME (AMSA), at 4 (mentioning the possibility of an ice-fee Arctic Ocean for a short period in summer perhaps as early as 2015, but qualifying this statement at 25 and 28), Harrabin (confirming the assumption of an ice-free Arctic Ocean to become reality during summer by 2015 or 2016) and see also generally on the topic of sea ice retreat: Stephens & VanderZwaag, at 2 and <http://nsidc.org/arcticseaicenews/> (last visited: 28.06.2014).

72 See *supra* in 2.2.1.

73 In summer 2010 alone giant parts of Greenland's glaciers and of ice shelves on Canada's Ellesmere Island have been calving off; see e.g. CNN, CBC News (Aug. 2010) and more general on Greenland's ice sheet AMAP (Greenland Ice Sheet); furthermore latest data show that the mass loss of the Greenland ice sheet has doubled in comparison to data collected in 2009; see Amos and McKie. Note that unlike general assumptions, the melting of sea ice does not cause the sea level to rise, because the sea ice sheets displace the volume of the ocean water equivalent to their mass. See ACIA (2005), at 231. There are other contributors to sea level rise such as thermal expansion of ocean water due to warming and a change in salinity. See for details: ACIA (2005), at 230–235, AMAP (Climate Update), at 5, Lochte, at 178.

74 See Sale (2008), at 61-63 and 256, ACIA (2004), at 87, ACIA (2005), at 209, Henry, at 5, CAFF (Arctic Flora and Fauna), at 131, Thomas, et al., at 62 note 3.2.4, United Nations Environment Programme/GRID Arendal, at 8, Slaymaker & Kelly, at 49, Dyer, et al., at 145, Osterkamp, at 2902 (further distinguishing between *"ice-bonded"*, *"ice-bearing"*, *"ice-rich"*, *"frozen"* and *"thawed"* permafrost and esp. referring to *sub-sea permafrost* in comparison to *onshore permafrost*).

75 Wagner & Liebner, at 219, accord. on sub-sea permafrost Osterkamp, at 2902.

76 See e.g. Wagner & Liebner, at 219, Johansen, at 44, ACIA (2004), at 38, ACIA (2005), at 215, AMAP (Climate Update), at 11–12 and Archer, at 128–129, but ACIA (2005), at 392 and regarding the Arctic carbon cycle in general: AMAP (Climate Update), at 9–12.

house effect, causing a rise in temperature, which e.g. may lead to drought in other regions of the world. Additionally the melting of ice caps and glaciers causes the sea level to rise, ultimately threatening low lying states such as the Maldives.[77] Regarding climate change governance in respect to the Arctic as merely a regional issue would thus go amiss, as changes within this region may significantly alter the appearance of states and regions situated well outside of the Arctic Circle. Yet, since the climate system is dependent on various complex meteorological processes, the exact impact of climate change on the Arctic as well as the implied effect on the rest of the world cannot be predicted with absolute certainty. It is precisely this uncertainty, that makes the governance of risks related to climate change a difficult task and legal guidance all the more important.

77 See on the threat climate change represents for the Maldives e.g. Ministry of Environment esp. at 13-14 and 19 as regards sea level rise.

3. The Arctic

The present thesis focuses on the the legal governance of climate change induced risks within the Arctic ecosystems. As has been shown *supra* in 2.3. the Arctic is threatened by climate change which calls for an adequate legal governance of risks related thereto (so called climate change induced risks) for the sake of the Arctic itself and – as will be shown subsequently[78] – for the rest of the world. However, analyzing existing as well as – if needed – finding new legal solutions to this problem requires the establishment of the base of the examination first. Consequently the following chapters are aimed at providing the necessary data on the Arctic and the ecosystems it is composed of, in order to ultimately analyze appropriate legal responses to climate change induced risks within these ecosystems.

3.1. Arctic Boundaries

The present thesis focuses on the Arctic region. This term, however, is far from being of general and uncontroversial nature. In fact there is no clear definition of the Arctic. Since there exists – unlike in the case of Antarctica[79] – no treaty that would offer a generally accepted legal definition of the region, it is necessary to rely upon data provided by other sciences.

Based on climatic conditions the Arctic is often referred to as the region beyond the 10°C July isotherm line.[80] This line joins all Arctic locations where the average temperature of the warmest month is 10°C. Whatever region experiences colder temperatures during summer months is therefore considered to belong to the Arctic. For obvious reasons the 10°C July isotherm line does not produce a very stable definition of the Arctic region. Especially in times of global climate change a variation in the isotherm line during summer is more than likely. The reference to climatic conditions is therefore not satisfactory when establishing a base for the present study. Another much relied upon natural boundary is of biological nature: The tree-line.[81] Most of

78 See *inter alia infra* in 3.2.2.2. , 6.2.2.3. b. and fn 940 (part II).

79 See *infra* in fn 901 (part II).

80 See e.g. Sale (2008), at 18–19, Vidas, at 5, Rothwell (1996), at 23, Knapp, at 459, Kriwoken, at 45 and United Nations Environment Programme/GRID Arendal, at 6 (providing a detailed graphic of the Arctic boundaries).

81 See e.g. Sale (2008), at 18, Vidas, at 5, Rothwell (1996), at 23, Knapp, at 459, Kriwoken, at 45 and United Nations Environment Programme/GRID Arendal, at 6 (providing a detailed

the High Arctic is tundra, where vegetation is very scarce and permafrost predominates. The tree-line indicates the boundary to the Subarctic, a region where tree growth, due to warmer temperatures is still possible. While the biological criterion of vegetation distribution can be applied rather easily in order to find a suitable definition of the Arctic, it does, however, not include territories that should, due to their geographical, social or political pertinence, be considered as well when governing climate change induced risks.

In a geographical context the Arctic is defined in terms of the Arctic Circle[82], designating 66° North longitude. In contrast to the above mentioned criteria the Arctic Circle provides a firm base for an Arctic boundary line. Not all areas, that in view of their social denotation (especially in terms of indigenous population) and political importance to the northern hemisphere should be regarded as belonging to the Arctic, do lie within the Arctic Circle, however. In this respect a broader context seems appropriate for the present study. The polar region hereinafter referred to as the Arctic[83] therefore not only indicates the High Arctic or the Arctic Ocean, but also the Subarctic territories of the eight Arctic States (Canada, Denmark (Greenland), Finland, Iceland, Norway, Russia, Sweden and the USA).

3.2. Arctic Ecosystems

With the limitation of the Arctic region in 3.1. in order to set a base for the present examination, not much is said about the main topic of this thesis, yet: The legal governance of climate change induced risks within the Arctic *ecosystems*. Consequently in order to provide an adequate knowledge base to answer the question in what way climate change induced risks within the Arctic ecosystems are governed best from a legal perspective, a more profound analysis of what these ecosystems entail is required. The aim of the following chapters therefore is to offer an analysis of the term *ecosystem* in general and its meaning in relation to the Arctic region respectively, mainly from a natural scientific perspective.

graphic of the Arctic boundaries).

82 See e.g. Sale (2008), at 15, Vidas, at 5, Knapp, at 459, Kriwoken, at 44 and United Nations Environment Programme/GRID Arendal, at 6 (providing a detailed graphic of the Arctic boundaries).

83 Note that throughout this thesis the term Arctic is interchangeably used with terms such as the *"circumpolar North"* or *"high North"*.

3.2.1. Definition

The term ecosystem can most generally be understood as an interacting community of organisms and their physical environment.[84] The notion originally derives from *ecological system*, with ecology being the biological study of relationships of organisms to their environment and to each other.[85] A legal definition can be found in the Convention on Biological Diversity, which states in Article 2, that ecosystem *"means a dynamic complex of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit"*[86]. According to those definitions, the term ecosystem comprises the following concepts: a) organism, b) environment and c) interaction.

a) The term *organism* differs in its meaning, depending on the science dealing with the concept.[87] In a most abbreviated fashion an organism as it is to be understood for the present study, can be described as an *individual life form*, while the emphasis lies on the word life. Etymologically the term stems from the Greek word *orgánon*, which means work.[88] A working – or in a broader sense: a living – body therefore is referred to as an organism. Both, single cell entities (so called micro-organisms) as well as groups of differentiated but interdependent cells are organisms. Essential is the autopoietic, or in other words, the self creating character of the system[89], irrespective of whether a single cell species or a group of interacting cells is concerned. In that sense the term organism refers to a widespread range from the simplest to the most complex living beings on Earth: Viruses, bacteria, fungi, plants, animals and humans are all autopoietic systems and for that reason organisms.

84 See *Philip's World Encyclopedia*, WITTIG & STREIT, at 103, TARLOCK, at 576 and cf. BICK, at 23, CAFF (ARCTIC FLORA AND FAUNA), at 39 and 42.

85 See *Philip's World Encyclopedia*, WITTIG & STREIT, at 10, BROOKER, ET AL., at 1147 and PARK as well as cf. BICK, at 8.

86 *United Nations Convention on Biological Diversity*, June 5, 1992, 1760 U.N.T.S. 79 [hereinafter CBD].

87 See for different, but related definitions of the term *Philip's World Encyclopedia*, SOANES & STEVENSON, COLMAN, MARTIN (2007), MARTIN (2008) and PARK.

88 See KLEIN, at 1093, cf. BARNHART & STEINMETZ, at 735 (deriving *organism* from the term *organize*, which is deduced from the word organ, stemming from the Greek *órganon*).

89 While the term eco*system* would provide for the application of system theory an in depth examination of this topic shall be refrained from. Thoughts of system theory, thus, might only – where feasible and necessary for the better understanding – be applied in connection to the ecosystem approach, as referred to *infra* in 4.5. and fn 358 (part I). For further details on system thinking see e.g. in WALTNER-TOEWS, esp. KAY & BOYLE.

b) In a most fragmented way, the term *environment* is to be understood as the surroundings or conditions an organism lives in. The word originates from the French term *environ*, which means close to or around.[90] The surroundings of an organism are both, of living (biotic) and non-living (abiotic) nature.[91] Biotic surroundings are other organisms, especially plants and micro-organisms. Abiotic factors are e.g. soil, temperature, atmosphere and radiation. Both factors are decisive in establishing the habitat and the biome[92] respectively, a certain organism dwells in. While the habitat is influenced by its biotic and abiotic surroundings, the biome is by large determined by climatic conditions and therefore abiotic factors. An equation of the term environment to habitat or biome would therefore be inaccurate.[93] Yet a certain environment, meaning a specific distribution of living and non-living factors, makes a habitat and a particular occurrence of abiotic conditions in an extensive community of organisms a biome. In the end both terms are mainly of significance to scientific (especially biological) classification processes. While the term environment itself does not provide a very detailed description of an organism's surroundings, the notions habitat and biome allow a preciser definition. In any case it is important to distinguish the term *environment* from the notion *ecosystem*, as the environment makes up only a part of an ecosystem, namely its surroundings that allow for interactions between organisms to be established.

c) Every ecosystem is based on the *interactions* between its organisms and the environment surrounding them. In fact, the interdependent and reciprocal actions are what link the individual ecological processes to a complex and dynamic system. The change in a certain environment therefore ultimately provokes a need for adaption or change in the organisms, living in the specific environment. The depletion of a certain animal's habitat e.g. will cause the animal to ei-

90 See Hoad and Philippopoulos-Mihalopoulos, at 22.

91 See *Philip's World Encyclopedia*, Wittig & Streit, at 22, Begon, et al., at x, Bick, at 8–10, Brooker, et al., at 1147.

92 Biomes are terrestrial or aquatic life zones that are defined by a distinct climate. There exist several biomes on the planet, one of which is the Arctic tundra. See Henry, at 1, Wittig & Streit, at 162, Begon, et al., at 28, Park and detailed Brooker, et al., at 1160 and 1164-1174.

93 The same holds true for the term ecosystem. Ecosystems do not necessarily correspond to biomes or habitats, but they rather refer to any interaction between organisms and their surroundings within any spatial scale. See e.g. United Nations Educational Scientific and Cultural Organization (Ecosystem Approach), at 3.

ther adapt to the changes, migrate to a new habitat or die. The same holds true in the case of a modified biome. Especially in the case of the latter severe abiotic changes such as global warming have a significant impact on the organisms dwelling in a certain environment. Migration of fish stock e.g. has become much more common in recent years due to the rising temperatures of the oceans.[94] Not less important are biotic forces, however. The ecosystem does not only depend on interactions between organisms and their non-living surroundings but also on processes occurring between different organisms. In a worst case scenario the dominance of one species can cause the extinction of the other. However, most interactions between different organisms have not such a profound effect. Yet the influence, which one organism has on the other cannot be denied. While some species have managed to adapt to a symbiotic lifestyle, the mutual influence of other can have an adverse effect. In that context anthropogenic supremacy needs to be mentioned. Most definitions of the term ecosystem, such as the one featured in Article 2 of the Convention on Biological Diversity, do not deal with the human race. Yet mankind's actions and interactions with other organisms within a certain environment do need to be considered as well, when addressing ecosystems. Because environment and organisms are directly interlinked every change in living and non-living factors no matter the extent will ultimately have an influence on a specific ecosystem as a whole.

94 See Distefano, at 13, Sale (2008), at 303, Molenaar (Climate Change), Bluemink, Cheung, et al., at 171, CAFF (Biodiversity Trends), at 13 and cf. ACIA (2005), at 496, 520 and 545. Similar movements can be assumed for Arctic plant species: Crawford & Jeffree, at 91–95, University of Nebraska-Lincoln, ACIA (2004), at 46, ACIA (2005), at 256-257 and 259, CAFF (Biodiversity Trends), at 12.

3.2.2. Arctic Ecosystems

3.2.2.1. Arctic Environment

While every ecosystem is prone to change, the Arctic is especially fragile.[95] To a large extent this can be traced to the Arctic's distinctive environment. The region north of 66° N longitude is predominately covered by ice and snow and is mainly defined by an ocean[96], almost entirely encircled by landmasses of the eight Arctic States. The harsh climatic conditions, with mean temperatures varying between -30°C in winter and up to 10°C in summer,[97] make the Arctic the largest remaining wilderness area in the northern hemisphere[98]. Yet the Arctic environment serves as habitat for various species, including humans. Many unique marine and terrestrial animals, such as narwhals, polar bears, arctic fox, reindeer and caribou as well as migratory birds and marine mammals[99] have been able to adapt to the special abiotic factors within the polar environment and chose to make the Arctic their home.

Territories where ice and snow does not prevail plant growth, are dominated by scarce vegetation in the form of dwarf shrubs, herbs, mosses and lichens,[100] making the Arctic tundra one of the largest biomes in the North. Further south, where snow and ice are not as prominent, taiga forests of pine, spruce, larch, birch and poplar can be found.[101] Most of the Arctic, however, is underlain by permafrost, which can reach a thickness of up to 1000 meters and has a decisive effect on its overlying habitats, since it prevents drainage and cannot be penetrated by plant roots.[102] The composition

95 See Timtchenko, at 247, Nowlan, at 1, Rothwell & Joyner, at 7, Rothwell (1995), at 283, Joyner (Arctic Ocean), at 244.

96 See *infra* in 3.2.2.2.

97 See Weller, at 146–147, Thomas, et al., at 18 note 1.3.2, Tarnocai Charles, at 5 and detailed Sale (2008), at 75–77, ACIA (2005), at 10.

98 See Nowlan, at 2, United Nations Environment Programme/GRID Arendal, at 6, ACIA (2005), at 655, Bastmeijer, at 73.

99 See Nowlan, at 3, Rothwell (1996), at 29, Djoghlaf and very detailed Sale (2008), at 309–513, Soper, at 19–133, Sale (2006) and ACIA (2005), at 484–490.

100 See Tarnocai, at 5, Bliss & Matveyeva, at 64-70 and 72-73, Serreze & Barry, at 34, ACIA (2005), at 246, Aguado & Burt, at 491, Kriwoken, at 46, cf. CAFF (Arctic Flora and Fauna), at 111, 131 and 139.

101 See Sale (2008), at 281–284, CAFF (Arctic Flora and Fauna), at 111, ACIA (2005), at 784, United Nations Environment Programme/GRID Arendal, at 9 (providing a detailed graphic of the Arctic vegetation distribution).

102 See Aguado & Burt, at 492 and generally on permafrost *supra* in 2.3. and cf. Tarnocai, at 5 (stating that permafrost thickness can reach 100-500 meters in North America and over 500

of the Arctic tundra therefore is highly dependent on permafrost soils. Additionally permafrost has served as a carbon sink for thousands of years, in storing high amounts of organic carbon.[103] Arctic soils are also rich of mineral and energy resources, such as oil, gas, coal, gold, diamonds, nickel, copper, platinum, iron, lead and zinc,[104] which especially in recent years has led to an increasing exploitation of the region.[105]

3.2.2.2. Arctic Ocean

Most prominent within the Arctic environment is the presence of an ice covered ocean. The Arctic Ocean is the smallest of the world's oceans.[106] It is almost entirely surrounded by national territories of the eight Arctic States, which has in the past as well as in the present caused various political and legal disputes over marine sovereignty.[107] The uniqueness of the polar marine environment, especially in terms of climatic conditions, has not only fostered the livelihood of various species, such as seals, whales, walrus, polar bear and arctic fox, some of which can only be found in the Arctic, it has also helped to preserve some of the last barely touched ecosystems on Earth. Because it is covered with ice for most of the year, navigation and exploitation of natural resources are limited within the Arctic Ocean. Yet, the predominance of ice makes the Arctic marine environment much more vulnerable to change from within and outside of the circumpolar North, especially regarding pollutants. Oil and other pollutants are persistent in ice covered areas and the harsh climatic conditions and the remoteness of the region make clean-up activities difficult.[108] Many of the persistent organic pollu-

meters in Siberia).

103 See *supra* in fn 75 and 76 (part I).

104 See Caufield, at 489, Thomas, et al., at 316-320 note 11.8, Kovalev & Butler, at 178, Rothwell (1996), at 39, Rothwell & Joyner, at 9, Seelmann, at 23 and detailed Sale (2008), at 294–601.

105 See *infra* in 3.2.2.3. and Sale & Potapov, at 163–177 (regarding past and present natural resource exploitation within the Arctic) and Chapin, et al., at 729 (stating that by 2050 some 50-80% of the Arctic is projected to be disturbed by economic and infrastructure development).

106 See Prescott & Schofield, at 519, Davis, at 97, Berkman (Environmental Security), at 10–11; As in the case of the Arctic, there is no clear definition of the Arctic Ocean (accord. Serreze & Barry, at 19). It's size therefore varies depending on where the boundary is drawn and extends from 9.5 to 14 million km². See Rothwell & Joyner, at 5, PAME (AMSA), at 16, ACIA (2005), at 10 and different at 26, Koivurova & Duyck, at 180.

107 See *infra* in 3.2.2.3.

108 See Vidas, at 11, Nuttall (2002), at 1, Goodman, at 7, Palmer, at 114, McCarthy (referring to the consequences an oil spill incident such as the one in the Gulf of Mexico would have within the Arctic) and on a detailed description of the physics, underlying the persistence of pe-

tants (POPs), toxins and heavy metals stem from industrial emissions hundreds of kilometers off the Arctic Ocean and are transported by air, ocean currents or river discharge into the Arctic region where they are deposited in sea ice.[109] There they are able to remain for a long period of time, thus having an impact on the Arctic environment long after they have been released from industrial sites. Also pollutants have a tendency to accumulate in the fatty tissue of organism, causing the contamination of the food chain.[110] This does not only affect biodiversity within the Arctic ecosystems but also the health of indigenous peoples, living at the circumpolar North, whose diet consists predominantly in raw fish and other marine mammals.

Next to providing the basic food resource to the population living at the borders of the ice covered ocean, the Arctic Ocean has a decisive impact on Earth's climate. Global climate is reliant on establishing an energy balance, which is partially supported by ocean movements, due to wind and water density. Energy is being transported by oceanic currents back and forth between various locations, thus causing an equilibrium.[111] One of the driving forces within that system, next to wind, is the *thermohaline circulation*, also known as the global conveyor belt.[112] This system is based on ocean water density, which is a result of differing ocean temperatures and salinity. Warmer water expands and is therefore less dense. Colder and highly saline waters on the other hand increase in density, which makes those waters

troleum and crude oil in permafrost see BARNES & CHUVILIN, at 263.

109 See Preamble of the Stockholm Convention (as cited *infra* in 5.2.2.), THOMAS, ET AL., at 321 note 11.9, SALE (2008), at 601, CHAPIN, ET AL., at 730, AMAP (POLLUTION), at 3, 26, 28 and 37, ACIA (2004), at 107 and ACIA (2005), at 426 Fig. 8.21, 890, 891 and 954 Fig. 17.3 and cf. AMAP (POLLUTION), at 4 (pointing out that *"climate change may also make contaminants less likely to remain in the Arctic (...) because less sea ice can result in more re-emissions of contaminants"*). See also generally on Arctic pollution AMAP (POLLUTION).

110 NUTTALL (2002), at 2, SALE (2008), at 601–603, SALE & POTAPOV, at 179–180, REIERSEN & WILSON, at 23, AMAP (Pollution), at 5, 30-32, 37, 39 and 41, ACIA (2004), at 107, ACIA (2005), at 565 and 890, PAME (AMSA), at 135-136 and 138, but WING GABRIELSEN, at 380 (stating that the Arctic environment is among the least polluted ecosystems in the world) and AMAP (Pollution), at 28, 44 (noting declines in some contaminants).

111 See *supra* in 2.2.2. and 2.2.3. and VARDAVAS & TAYLOR, at 10 note 1.6, TAYLOR, at 68, SALE (2008), at 73, ACIA (2005), at 459 and REIERSEN & WILSON, at 18.

112 For a detailed description of the biological, physical and chemical processes behind the thermohaline circulation see DAVIS, at 99, SALE (2008), at 74–75, THOMAS, ET AL., at 22 note 1.4, TOGGWEILER & KEY, ACIA (2005), at 461–465, LOCHTE, at 178-180, FAHRBACH, ET AL., at 21, MANN (addressing new scientific findings that are complicating the oceanic conveyor belt model) and generally on oceanic circulation VARDAVAS & TAYLOR, at 13 note 1.7.1, TAYLOR, at 9-12 and 68-86. There are other important oscillation patterns, which, however, shall not be addressed in this thesis. See e.g. THOMAS, ET AL., at 23- 26 note 1.5 and 1.6, VARDAVAS & TAYLOR, at 15-18 note 1.7.2 and 1.7.3 for further information.

sink. Warm water of the Gulf Stream reaches the North Atlantic and is being transported further North, eventually reaching the Arctic Ocean mainly through the Fram Strait between Greenland and Svalbard.[113] There the warmer, diluted water is being cooled and sea ice begins to form, which causes the expulsion of highly saline brine. The outcome is not only cooler, but also more saline water, both of which increase its density. As a result the denser water starts to sink and forms North Atlantic deep water. This water then flows South, where it starts to warm and raise to the surface, until it reaches the colder waters of Antarctica, where it starts to sink again and therefore eventually is being transported to the South Indian and Pacific Oceans. In those warmer waters the cold Antarctic currents warm again and eventually reach the Atlantic Ocean, consequently closing the conveyor belt.

In recent years the thermohaline circulation has mainly caused attention in the context of global climate change. Because sea ice is in large parts responsible for the deep ocean convection, the melting of sea ice raises concerns regarding the maintenance of the conveyor belt. A retreat and thinning of sea ice, or an eventual stop of sea ice formation altogether, could cause the thermohaline circulation to slow or even shut down completely, which would have a tremendous impact on Earth's climate.[114] Because of the complexity of the global climate system[115] and sea ice dynamics[116], however, such scenarios cannot be predicted with certainty. Although the extent is unknown a general influence of sea ice on Earth's climate is undisputed, however, since ice and snow are responsible for reflecting most of the incoming solar radiation back to space, thus acting as a cooling system, and at the same time serve as an insulating layer, preventing heat loss into the atmosphere.[117] Regarding the additional effect sea ice has on the thermohaline circulation, the Arctic Ocean is undoubtedly one of the main contributors to balancing Earth's temperature and climate and as such requires protection.

113 See Cisewski, at 1, Wadhams, at 2–3, Schauer, et al., at 65, Fahrbach, et al., at 21 and (with graphical display) 23, ACIA (2005), at 454 and for a graphic on Arctic Ocean circulation in general see Berkman (Environmental Security), at 23.

114 On the global effects resulting in a slowing or shut-down of the thermohaline circulation: See *supra* in fn 112 (part I) and ACIA (2004), at 37 as well as Harvey.

115 See *supra* in 2.2.3.

116 See on sea ice dynamics and their importance to the global climate system Davis, at 103–113, Wadhams, at 284-297 note 8.3, esp. at 292 note 8.3.4, Koenigk, et al., at 171, Chapin, et al., at 721–722.

117 See *supra* in 2.2.1. and 2.3. and Davis, at 99, Chapin, et al., at 721 cf. Wadhams, at 141 (stating, that thickness distribution determines ocean-atmosphere heat exchange, since heat flux is much greater through thin ice than thick).

As has been shown *supra* in 2.3. alterations in the Arctic due to climate change may cause an enhancement of the greenhouse effect due to changes in the albedo-feedback and permafrost thaw, as well as the sea level to rise. Consequently, in combination with changes in the thermohaline circulation due to global climate change, a changing Arctic may have a significant impact upon the surface of this planet. Seeking legal guidance in how to effectively protect the Arctic, especially the Arctic Ocean, against climate change induced risks is thus of concern not only to the eight Arctic Nations, but also to states and regions beyond the Arctic Circle.

3.2.2.3. Human Relationships to the Circumpolar North

While most of the Arctic ecosystems are still barely touched, mankind's influence on the North has been steadily growing in the past couple of centuries. Today about four million people live in the Arctic.[118] Yet the fascination for the North has long been present and humans have been continuously living in and from the Arctic since at least the last ice age about 12,000 years ago[119]. Nomads and indigenous peoples were able to adapt to the harsh climatic conditions in the North long before the first nation states, bordering the Arctic, showed interest in the land within the circumpolar North and over time they acquired the necessary knowledge to live from the natural resources provided by the Arctic ecosystems. As herders, hunters and gatherers the indigenous peoples of the Arctic developed their own lifestyles, which were by large determined by their relationship to the Arctic environment.[120] Instead of exploiting what land and water provided, the indigenous populations learned to conduct sustainable economic activities, thus maintaining the ecological balance within the Arctic ecosystems. This specific lifestyle designated the cultural and traditional value and identity of most of the peoples living within the circumpolar North. Although the different populations[121] vary in regards to their languages, as well as their cultures and

118 See United Nations Environment Programme/GRID Arendal, at 14, Berkman (Environmental Security), at 13, ACIA (2004), at 6, ACIA (2005), at 13, Chapin, et al., at 720.

119 See Sale (2008), at 95, ACIA (2005), at 13 and in great detail Sale & Potapov, at 11–29. Also see cf. ACIA (2004), at 6, Hoffecker, at 96 and 101 (stating, that the initial colonization of the Arctic zone seems to have taken place at some point after 10,000 years ago).

120 See United Nations Environment Programme/GRID Arendal, at 14, ACIA (2004), at 92, Nuttall (2000), at 377, ACIA (2005), at 15, 650 and 654-655, Sale & Potapov, at 105, Freeman, at xi and xv, CAFF (Arctic Flora and Fauna), at 67, Kriwoken, at 47 and 73-75, Chapin, et al., at 728.

121 See Nuttall (2000), at 377, Sale (2008), at 234–235, Heinämäki, at 229, ACIA (2005), at

traditions, they share the dependence on the Arctic resources for their economic, social and spiritual benefit and the deeper understanding of living in harmony with the Arctic environment. Their traditions and culture and the intrinsic knowledge of how to preserve the ecological balance within the Arctic ecosystems, however, were affected by the colonization of the Arctic and the exploitation of its resources in the 17th and especially in the 19th and early 20th centuries.[122] The promise of whale oil, ivory and baleen led explorers, whalers and traders to the Arctic, who brought with them new technologies and economic growth, but also diseases, drugs and an unbridled need for renewable resources.[123] Over-exploitation, a decrease in marine biodiversity and a health deterioration in indigenous populations were some of the results, the early economic developments in the Arctic entailed.

Unlike Antarctica, which can be described as landmasses surrounded by an ocean, the Arctic is an ocean surrounded by landmasses. The actions of the eight Arctic States therefore significantly influenced, and continue to influence, the circumpolar North. While the worst impacts of colonialism in the Arctic have subsided, the late 20th and the beginning of the 21st century brought new challenges to the Arctic and the human-environment relationship: Claims to territorial and marine sovereignty in the Arctic go back a long time in history, have, however, in the context of climate change encountered a new dynamic. Most territorial claims have abated by 1945,[124] mandating the majority of the Arctic territories to undisputed sovereignty of one of the eight Arctic States. One exception is Hans Island, a small rock, situated between Canada's Ellesmere Island and Denmark's Greenland, which occasionally still causes turmoil, especially in the media.[125]

652 and Freeman as well as Nuttall (2000), at 380–390 for a more detailed description of the different indigenous groups. See also Knapp, at 459–483 (providing population data for the period 1900-1990) and United Nations Environment Programme/GRID Arendal, at 16 (providing a detailed graphic, which shows the distribution of the different Arctic indigenous groups).

122 See Nuttall (2000), at 377, Soper, at 11–13, Sale (2002), at 25–26, PAME (AMSA), at 39, Jacobsson, at 233–234 and detailed on whaling, fur and ivory trade and early mineral exploitation: Vaughan, at 78-97, 118-143, 170 and 247-266, Sale & Potapov, at 106–129.

123 See Caufield, at 488–489, Nuttall (2000), at 377.

124 On Arctic territorial sovereignty see: Rothwell (1996), at 161–170, Oude Elferink & Rothwell, at 338, La Fayett, at 536.

125 See Loukacheva, at 3, Stevenson, Dufresne, at 5–6 and Carnaghan & Goody, at 5.

The more pressing sovereignty issues, however, are related to the Third United Nations Conference on the Law of the Sea, taking place from 1973 to 1982,[126] which resulted in a new agreement: The Law of the Sea Convention (hereinafter UNCLOS[127]). UNCLOS as it is in effect today, provides to coastal states legal instruments[128] in order to claim large marine territories and make use of the living and mineral resources within. While the Convention is also applicable to the Arctic Ocean, the year round presence of sea ice complicates its implementation. Navigation as well as resource exploitation within the Arctic Ocean has due to its special climate for a long time been of rather subordinated interest to Arctic Nations. In most cases the expenses by far (even to this point) outweigh the profit. It is only now, with climate change presenting a possible long lasting warming trend, which reduces the sea ice cover and makes economic activities in the Arctic more beneficial, that Arctic Nations have found a post Cold War interest in the Arctic Ocean. Four of the five Arctic coastal states, Canada, Denmark, Norway and Russia, have ratified UNCLOS. The United States' ratification is still pending. Nevertheless the Convention has in large parts become international customary law, making most of its rules also applicable to the United States of America.[129]

126 The conference was convened in accordance with *Resolution 3067 (XXVIII) of the General Assembly of the United Nations* (A/RES/3067(XXVIII)). Also see *3rd United Nations Conference on the Law of the Sea* (Vols. I-XVII, A/CONF.62) and furthermore *infra* in 5.3.1.

127 *United Nations Convention on the Law of the Sea*, Dec. 10, 1982, 1833 U.N.T.S. 3 [hereinafter UNCLOS]; A detailed analysis of the convention, especially in relation to the Arctic, can be found *infra* in 5.3.1.

128 Part II of UNCLOS stipulates rules regarding the territorial sea and contiguous zone, part IV holds special provisions for archipelagic states, part V lays down rules concerning the Exclusive Economic Zone (EEZ) and part VI deals with the continental shelf. Each part provides specific regulations for the delimitation of the territorial sea (arts. 3-16 and 47-48, regarding archipelagic states), the EEZ (arts. 57 and 74) or the continental shelf (art. 76), respectively. See also 5.3.1.

129 See on the United States' perspective YEAGER, at 82, TAKSØE-JENSEN, at 148, BERKMAN (INTEGRATED ARCTIC OCEAN GOVERNANCE), at 189, KOIVUROVA & MOLENAAR (2010), at 48, BIRNIE, ET AL., at 382, MOLENAAR (FISHERIES), at 436, BRUBAKER (NAVIGATIONAL ISSUES), at 63 and LARKIN, at 313; It is in this context important to note that the provisions concerning the Area (part XI of UNCLOS) as well as art. 76 of UNCLOS that refers to the delimitation of the continental shelves and the dispute settlement mechanisms of Part XV of UNCLOS are not considered to be customary international law, which complicates the designation of both the national outer continental shelves and the Area, because the United States is not bound by these provisions. See *infra* fn 274 (part II) and VYLEGZHANIN, at 219–220, KOIVUROVA & MOLENAAR (2010), at 9 and 48.

Although climate change evokes new legal challenges[130] regarding marine sovereignty in the Arctic, most of these challenges can in the opinion of the present author be settled by a stringent implementation of UNCLOS. It is therefore political will, rather than the need of new regulations regarding Arctic sovereignty, that is required to resolve these disputes. In a wider context pending sovereignty claims can of course, give rise to new risks to the Arctic and therefore influence the stability of the ecosystems. Yet they shall not be the topic of this thesis, especially since dealing with overlapping sovereignty claims is predominately dependent on politics[131] and scientific findings in regards to bathymetry. Where, however, marine sovereignty is directly linked to risk assessment and management in the Arctic, a more precise analysis remains appropriate.

The melting of sea ice and snow does not only bring forth disputes over marine sovereignty, but also yields economic interests of Arctic Nations and countries around the globe in regards to mineral and energy resources, new shipping routes and Arctic tourism in areas, where sovereignty is uncontested. Those increasing interests as well as climate change itself, however, put the Arctic ecosystems and traditional and cultural values of northern indigenous peoples under pressure. At the same time globalization and consequential industrial development and economic growth in the Arctic offer new possibilities to the population living within the circumpolar North. What therefore seems necessary is to find a balance between economic interests and traditional and cultural values, in order to establish a human-en-

130 As has been stated earlier, the melting of sea ice leads to a growing interest in previously unattainable resources and new shipping routes. In cases where marine territory has not clearly been mandated to sovereignty of one of the five Arctic littoral states, claims are put forth in order to gain access over the disputed marine region. Core of the debates is the delimitation of the continental shelves, as dealt with in arts. 76-85 of UNCLOS. See for details e.g.: Churchill, Oude Elferink (Outer Continental Shelf), Oude Elferink (Polar Continental Shelf), Prescott & Schofield, at 523–529, Gunitskiy, Holmes, Coston, ACIA (2004), at 84, Heidar, at 158–160, Hossain, at 143–153, Macnab, Wolfrum, at 41–42, Huebert (Power Politics), at 71, very detailed Seelmann, at 35–116 and Funk (providing insight into a Canadian sovereignty operation).

131 A proof of the fact that debates on maritime delimitation can be settled appropriately if political will exists, provides the recent *treaty on maritime delimitation and cooperation in the Barents Sea and the Arctic Ocean* between Norway and Russia, which was signed by both parties on September 15, 2010 and entered into force on July 7, 2011; see *Treaty between the Kingdom of Norway and the Russian Federation concerning Maritime Delimitation and Cooperation in the Barents Sea and the Arctic Ocean*, 2010 and Vasiliev, at 31, Hønneland, at 31 et seq. esp. 36, Byers, at 39-46, Neumann, at 244-256, Nilsen (Maritime Delimitation Agreement), as well as for an analysis of the treaty Henriksen & Ulfstein, at 7–10 and Seelmann, at 43–44.

vironment relationship that respects the fragility of the Arctic ecosystems, without ignoring the needs of indigenous and non-indigenous peoples living in the North. Effective risk governance can therefore not solely focus on environmental protection, but needs to take all stakeholder's interests into account.

3.3. Conclusion: Opportunities and Challenges in the North

As has been shown the stability and operation of ecosystems is dependent on complex dynamics between various factors. Organism–environment interrelations are central to every ecosystem. While most interactions manifest in symbiotic lifestyles, others can cause adverse effects on ecosystems, from minor challenges to a gradual environmental depletion. Moreover changes within the non-living environment can add stress to ecosystems, prompting further problems to emerge. In many cases, however, ecosystems are able to adapt to change. The question therefore is not so much *if* but *how* a certain ecosystem will adjust.

When focusing on the Arctic and analyzing legal implications climate change might has or could have on risk governance within the Arctic ecosystems in the future, the above mentioned issues need to be borne in mind. In this respect two points shall specifically be addressed:

1. The Arctic is a biome unlike any other. While Antarctica is in terms of climate and ice occurrence certainly similar, the two polar regions differ greatly in their general composition. Antarctica, a continent surrounded by an ocean, does not have an indigenous population. The Arctic on the other hand is on ocean surrounded by landmasses, which have been populated for a long period of time.[132] The human–environment interaction has therefore always been of much bigger importance to the circumpolar North than it has been to the South. Yet, compared to other regions of the world where mankind's relationship to the environment are equally as important, the Arctic poses special risks as well as opportunities. The harsh climatic conditions make maintaining a western way of life around the North Pole rather difficult. Still the past couple of decades have brought an eco-

132 See for details *supra* in 3.2.2.3.

nomic development to the region that in light of climate change and dwindling resources all over the planet, is only meant to grow. Large fields of energy and mineral resources, new shipping routes and an increasing interest in Arctic tourism offer new opportunities to indigenous peoples and inhabitants of the eight Arctic Nations. At the same time the fragility of the Arctic ecosystems is being tested, as oil spills and persistent organic pollutants – just to mention two results of the economic growth within and outside of the Arctic – bring change to the polar environment.

2. Climate change is an abiotic factor, of which the precise implications on ecosystems is uncertain, mostly because the extent of climate change itself is unknown to this point. There certainly is a warming trend, that has implications on the polar region.[133] Whether or not this warming trend will continue and (as some scientists assume) even increase, however, is due to the complexity of inherent meteorological dynamics unpredictable. Just as little consensus exists in terms of how ecosystems will adjust to climate change. On a large scale scientific findings point to the conclusion, that the Arctic sea ice will continue to melt, affecting biodiversity, since many northern mammals are dependent on the Arctic Ocean being covered by ice and snow. Furthermore an ice-free ocean will allow more solar radiation to be absorbed and a halt in sea ice formation might have a tremendous effect on weather patterns all over the planet.[134] What about the adaptation of the ecosystems on a smaller scale, though?

   Every ecosystem is reliant on complex interrelations between biotic and abiotic factors. Every change within those factors causes the ecosystem to adapt. While changes on a large scale are uncertain, those that happen on a smaller scale are bound to be unknown. Even more so if, as in the case of the Arctic, harsh climatic conditions have for a long time hampered scientific research and very little is known about the region of which there is not one alike. Much more scientific research will therefore have to be performed in the future to understand the complex processes within the Arctic ecosystems.

133 See *supra* in 2.3.
134 The importance of sea ice regarding the thermohaline circulation, which has a decisive effect on weather patterns, was shown *supra* in 3.2.2.2.

To sum up, a couple of realizations are important when dealing with the Arctic ecosystems as a legal matter: The Arctic ecosystems are special, in the sense that there exists not any region alike to the circumpolar North. Drawing conclusions from legal solutions applicable to other ecosystems therefore needs to be done with caution.

Moreover the human relationship to the North deserves exceptional attention, because the fragile ecosystems are much more prone to human induced change. Also the economic development of the Arctic is still in an early stage. For that reason, rules and regulations that might be applicable to the highly developed regions of the eight Arctic Nations cannot thoroughly pertain to the North as a whole.

Furthermore when dealing with climate change induced risks in the Arctic region, attention needs to be drawn to the gaps, doubts and uncertainties coming with the subject. Climate change is not a linear process of which the final outcome can be assessed with an absolute certainty. When trying to find legal solutions to problems linked to climate change it is thus vital to keep the benefit of the doubt in mind. As a result legal responses to risks provoked by climate change should not be too narrow in scope in order to leave room to deal with unexpected ramifications.[135]

135 More details on this matter *infra* in 4.2.

4. Principles of Risk Governance

4.1. Introduction

As has previously been shown, the Arctic ecosystems are currently facing various threats[136]: Changing biotic factors in the form of global warming are forcing the Arctic ecosystems to either adapt or to withstand extinction. Adaptation, however, is difficult, because many Arctic species lack the capacity to respond to rapid changes.[137] Some animals and plants migrate further North in order to settle in a new habitat with climatic conditions similar to the ones they previously experienced.[138] Others contrarily benefit from the more hospitable climate and are expanding their living grounds. That said, expansion as well as migration is limited by predominance of local species and the geographic boundaries drawn by the Arctic Ocean.

Animal and plant species are, however, not the only ones to find ways and means to adapt to the changing Arctic environment. Arctic people are gradually expanding to the North as well, some in the hope to maintain their distinctive northern lifestyles, others in the prospects of economic benefit related to industrial growth and exploitation of the Arctic region.

Ultimately the core question is, what impact the above mentioned changes – be they induced by climate change itself or variations in biodiversity and human activities derived therefrom – eventually will have on the northern ecosystems. This question cannot be answered easily, because the functionality of the Arctic is dependent on a variety of biotic and abiotic factors, some of which are entailing various uncertainties. The complexity of the climate system and of the linkages[139] between Arctic species (humans included) and the Arctic ecosystems as a whole, as well as a lack of scientific knowledge in this context, make clear assessments of how the Arctic will

136 See *supra* in 2.3. and 3.2.
137 See ACIA (2005), at 555.
138 See *supra* in fn 94 (part I) and Struzik (pointing out that the migration of southern species further North could lead to cross-breeding, which would influence the gene pool of Arctic species that has helped them to adapt to the harsh environment within the circumpolar North).
139 See for details on many of the linkages between Arctic organisms to each other and to their environment as well as on the interrelations between different ecosystems: ACIA (2005) esp. at 244-596 and Klein & Magomedova.

cope with change impossible at this point. Fact is, however, that the Arctic, because of its cold climatic conditions, is in parts responsible for sustaining the global energy balance.[140] Temperatures and weather patterns as we know them, as well as the stability of the sea level are dependent on the functionality of the Arctic ecosystems. Every change in the Arctic, no matter how big or small, could due to the uncertainties, complexities and ambiguities of the matter, lead the region to a tipping point, where impacts could be felt far beyond Arctic boundaries. To say it in the words of the Arctic Climate Impact Assessment of 2005: *"Perhaps the only certainty in the assessment of impacts of changes in climate (…) is that there will be surprises"*[141]. The question is how and if mankind will be able to cope with these surprises.

Considering what has been said *supra*[142], it must seem clear that protecting the Arctic ecosystems is not only of regional concern to the Arctic Nations, in order to preserve Arctic biodiversity, secure the cultural heritage of indigenous peoples and provide a foundation for social and economic development in the region. A changing Arctic and the protection of its ecosystems contrarily affect mankind as a whole.[143] The assessment of Arctic risks and their management, is therefore not only regionally but also globally of utmost importance.

Furthermore is the handling of risks to Arctic ecosystems dependent on various actions and by no means only relies on legal initiatives. Political and individual will, as well as profound scientific knowledge and available technologies are certainly as important. Yet, effective risk governance in order to protect and conserve ecosystems in a region as widespread as the Arctic cannot take place, without rules and regulations setting standards, coordinating different measures and providing a guideline for all parties concerned. As obvious the general assumption of the Arctic as the largest remaining wilderness in the northern hemisphere not being in need of legal guidance might be, the opposite is really true. Preservation of this wilderness is only possible if law provides a firm base that considers all interests involved. Contrarily to general assumptions the Arctic therefore is not at all a law free zone.[144]

140 See *supra* in 3.2.2.2.
141 ACIA (2005), at 331.
142 See *supra* in 2.3, 3.2.2. and 3.3.
143 Accord. Chapin, et al., at 736, Borg Joe, at 16, Hacquebord, at 202.
144 Accord. Wolfrum, at 47, Jacobsson, at 233, European Parliament (2009/2214(INI)), at 12 para. 42.

In that context the aim of the following chapters is to find out how risk assessment and management tools are integrated in law and if they are capable of protecting the Arctic ecosystems adequately,[145] without neglecting their importance at both a regional and at an international level. In doing so, chapter 4 of part I of this thesis, will focus on general principles of law and their relationship to risk, while the aim of the subsequent chapters 5 and 6 in part II of this thesis is to address specific rules and regulations pertinent to the Arctic region and their significance for risk assessment and management within the northern ecosystems.

Before analyzing any legal principles and norms, however, it is necessary to elaborate on a sociological topic that is not only one of the main focal points of risk assessment and management but also – as has been shown – of any analytical reference to the climate system, especially in relation to the Arctic:[146] The question of uncertainty, complexity and ambiguity. Only if these terms and their implications are properly understood, it is possible to deduce any conditions for risk assessment and management in order to be effective. Thus, for legal initiatives meant to integrate risks into law, thoughts on uncertainty, complexity and ambiguity are paramount. Even more so in the context of governing climate change induced risk, as tending to these issues is due to the complexity of the climate system and the uncertainties as well as ambiguities this entails, especially relevant to an adequate assessment and management of such risks.[147]

In order to seek an answer to the question what legal principles and norms are most suitable in addressing climate change induced risks, it is therefore necessary to first evaluate the specific characteristics of these risks. While chapter 1 and 2 provided general information on risks and the climate system the following paragraph will thus be concerned with elaborating on the meaning of uncertainty, complexity and ambiguity intrinsic to climate change induced risks, so as to in a next step[148] seek legal approaches capable of effectively addressing these issues and hence adequately governing such risks.

145 See also *supra* in 3.3.
146 See *supra* in 1 and 2, esp. 1.2. and 2.3. as well as 4.1.
147 See in this context also *supra* in 1.2. and 2.3.
148 See for details *infra* in 4.3.-4.5.

4.2. Uncertainty, Complexity and Ambiguity

As has been shown *supra* in 1.2. risks are mental constructs that do not pertain to what is, but to what could be in negative terms. They help people to evaluate different options and eventually choose the most favorable path to follow. Or in other words risks provide for assumptions regarding the probability of an undesirable state of reality and thus allow for decision-making in uncertain, complex and ambiguous situations. If the future were predetermined (i.e. certain) the notion of probability and hence of risk would become obsolete.

Nevertheless some initiating events result in rather linear outcomes, which leads to clear cut probability assumptions and low uncertainty. E.g. consequences of driving a car under the influence of narcotics (such as drugs or alcohol) are of common knowledge. Depending on the drug intake car accidents become more or less likely. Of course uncertainties also exist in such situations, because, as has been mentioned, the future is not certain. A deer crossing the road e.g. could disproportionately increase the chance of the negative outcome (i.e. a car accident). Yet, the general knowledge of what impact narcotics have on driving abilities reduces such uncertainties, since no matter if there is an external factor influencing the process (e.g. a deer crossing the road) the probability of an adverse effect happening is predominantly dependent on the amount of narcotics involved. The higher the drug intake the more likely the car accident. To minimize the risk, incentives can be set for people to omit taking drugs or drinking alcohol when driving. Consequently, the legal responses to driving under the influence of narcotics (e.g. deprivation of the driving permit, penance)[149] are risk management tools in order to reduce risks in relation to car accidents.

Such strong legal responses are, however, only possible due to the minor uncertainties involved in the matter. A provision in the above mentioned sense will not lead to any unexpected ramifications. As has been shown in 2., one of the core elements within the concept of climate change, however, is uncertainty, which is being enhanced by the complexities in connection with the climate system and the ambiguities resulting from contradictory scientific findings on the matter. Legal responses to climate change induced risks must thus be distinct from rules referring to risks in which uncertainties,

149 E.g. Swiss road traffic regulations, *Strassenverkehrsgesetz*, Dec. 19, 1958, SR 741.01 [hereinafter SVG], arts. 16a para. 1 sub-para. b, 16b para. 1 sub-para. b and 16c para. 1 sub-para. b and c of the SVG.

complexities and ambiguities do not play as an important role.

4.2.1. Uncertainty

The notion *uncertainty* generally refers to *"the state or the condition of not being able to know or predict something accurately"*.[150] Knowledge of mankind is incomplete and selective, due to the unpredictability of the future and the variability of perception. How people perceive reality and what significance such perception might have on the gathering of knowledge is, however, a psychological and – in relation to the theory of cognition – a philosophical question, which shall not be addressed further. Nevertheless it is important to understand that uncertainty is connected to the quantity and quality of knowledge. The more and the more accurate knowledge about a certain state of reality exists the less uncertainty prevails. It is thus comprehensible that effective risk assessment and management is dependent on the quantity and quality of the gathered scientific information.

Accurate probability assumptions rely on sufficient knowledge. If there exists not enough data on a certain initiating action or event (i.e. if there is too much uncertainty) providing assessments of likelihoods will become difficult. *Absolute* uncertainty therefore exists when *"even the probabilities associated with the possible outcomes are unknown or cannot be meaningfully estimated"*.[151]

Since risks are mental constructs referring to probabilities, they cannot, considering the above, be equaled to uncertainty. It is true that thoughts about risks and hence probabilities demand a particular degree of uncertainty. Predetermination and complete knowledge would render probability assumptions obsolete. Yet, the less uncertainty exists, the easier it will be to accurately assess likelihoods and thus provide for effective risk management. The term uncertainty as it is used in this thesis, therefore never stands for *absolute* uncertainty.

As has been mentioned, uncertainty related to risk can originate from the absence of knowledge or in other words from ignorance.[152] Furthermore it can stem from errors when applying model simulations and parameters dur-

150 Colman (on uncertainty, para 1).
151 Colman (on uncertainty, para. 2), cf. Sunstein (Worst-case scenarios), at 147 and 162 (talking of genuine uncertainty) and Moyle, at 161 (referring to pure uncertainty).
152 See Suter, at 69–70, Renn, at 76.

ing the risk assessment stage, that might be leading to ambiguities, as well as from system-immanent boundaries, such as insuperable complexities.[153] While gathering additional knowledge and reviewing the simulations and specific parameters applied help decrease uncertainty, system-immanent boundaries are hard to overcome. Professionals assessing and managing risks have to take these peculiarities into account by collecting as much data as possible and base their decision thereon, by constantly monitoring model simulations and revising them, as well as the applied parameters if necessary and by communicating system-immanent boundaries in order to render the decision-making process more transparent. How to deal with uncertainties will thus have to play a major role in rules and regulations helping to guide and enhance the decision-making procedures, especially in relation to climate change induced risks, because the complexity of the climate system significantly contributes to the uncertainty in the matter.

4.2.2. Complexity

As stated above, uncertainty is connected to complexity. The term *"complexity refers to the difficulty of identifying and quantifying causal links between a multitude of potential causal agents and specific observed effects"*.[154] Complexities within a system thus decisively contribute to uncertainties existing in regard to a specific matter. The climate system e.g. is due to its intricate meteorological dynamics and their variability[155] very hard to assess. As a result accurate predictions on the development of climate change remain difficult, which leads to increasing uncertainty. This holds especially true in relation to the Arctic ecosystems, because the impacts of climate change are due to the very special ecology of the region to this date not very well understood.[156] As long, however, as the relationship between different agents and their variability remain uncertain (either due to the complexity of the system or a lack of knowledge), risk assessment and management procedures are hard to undertake. To overcome the system-imma-

153 See accord. but more complex RENN, at 76, AVEN & RENN, at 12–13, cf. LERCHE & GLAESSER, at 279–280, SUTER, at 69–70; Regarding uncertainties during the risk assessment stage see RIFKIN & BOUWER, at 53–70.

154 RENN, at 75, accord. AVEN & RENN, at 12.

155 See on variability BURGMAN, at 30 and in general terms SUTER, at 69–70. One important variable within the climate system are clouds. Their role in climate change is still subject to much scientific debate due to the uncertainties existing in respect to cloud feedback. See e.g. TSELIOUDIS, at 173.

156 See *supra* in 3.3.

nent boundary of complexity, more data will have to be gathered in the hope to better understand the system, multi-criteria model simulations should be applied and integrated management tools developed.

Furthermore communicating the complexities and the uncertainties resulting therefrom is paramount in order to render the decision-making process transparent and thus acceptable for the public.[157]

4.2.3. Ambiguity

The term *ambiguity* refers to uncertainty in meaning. Risk assessment results can be ambiguous if they are *"open to more than one interpretation"*.[158] In that sense ambiguity is linked to subjective values and the individual perception of risk. Changing biotic factors within the Arctic ecosystems e.g. do not solely result in damaging effects, but also provide for opportunities. While many Arctic species lack the capacity to respond to rapid changes resulting from global climate change, others benefit from the more hospitable climate and are expanding their living grounds.[159] Furthermore, indigenous populations see their traditional and cultural values endangered, due to the changing Arctic environment, but at the same time profit from the economic growth within the circumpolar North, as a result of the more hospitable climate.[160] Ambiguities are thus constitutive in climate change induced risks and their assessment and management. While ambiguities related to errors in model simulations or calculations made during risk assessment might be resolvable by repeating the simulation or calculation in the context of new parameters and variables, ambiguities pertaining to risk perception or the question of how values can be allocated best are much harder to settle. Finding the 'right' decision will be dependent on balancing the interests of all stakeholders involved. In this context support might be effectively lent by law.

157 Accord. Kay (Complex World), at 80 (stating that decision making under conditions of complexity must be broadly participatory), but Sunstein (Laws of Fear), at 122–124 (stating that risk disclosure would increase fear and distress and therefore is not in all cases advisable).

158 Soanes & Stevenson, Burgman, at 36 (providing a general understanding of the word), Renn, at 77 (using the term in relation to risk).

159 See *supra* in 4.1.

160 See *supra* in 3.2.2.3. and Barley (referring to a new study that claims that global warming could have an impact on Arctic hurricanes, making the region more hospitable and thus potentially easier exploitable for resources).

4.2.4. Conclusion

The concept of risk is seldom defined by linear processes. On the contrary often multi-faceted initiating activities or events stand in relation to not any less multi-dimensional outcomes, while the connection between the two is not always clear. Most risks are therefore characterized by a mixture of uncertainty, complexity and ambiguity.[161] While the gathering of scientific data will in many cases help to decrease uncertainty and might provide for a better understanding regarding linkages within a certain system and thus reduce complexity, resolving ambiguities remains a difficult task to master, because they most often do not refer to the collected scientific data but to the subjective valuation of such.

Irrespective of these immanent differences between uncertainty, complexity and ambiguity they are in essence connected and have a decisive impact on how risks are being assessed and eventually managed. The higher the uncertainties, complexities and ambiguities, the better scientific information, sophisticated model-simulations and integrated decision-making tools are needed.

Risk management in relation to the Arctic ecosystems is prone to uncertainty, complexity and ambiguity, because not only still very little is known about the circumpolar North but also Arctic ecosystems are complex entities, that result in various uncertainties and ambiguities in how to adequately address adverse effects endangering them. Legal responses to climate change induced risks within the Arctic will therefore more than anything have to take these peculiarities into account. In this context the following chapters will outline some of the existing principles of law, relevant to risk governance and in doing so, will try to seek the most feasible way to address climate change induced risks from a legal perspective, with all the uncertainties, complexities and ambiguities such risks entail.

4.3. The Cost-Benefit Analysis

The origin of cost-benefit analysis lies not in risk governance, but rather in economics, as a monetary valuation of consequences is one of its main purposes.[162] Risks, however, are as has been presented above, mental constructs

161 See Renn, at 77.

162 See Nyborg, at 14, Randall, at 46, Park and on the use of the cost-benefit analysis in eco-

that refer to the probability of an undesirable state of reality, i.e. an adverse effect, occurring as a result of natural events or human activities.[163] It is thus, consequences of such events and activities, risk governance ought to focus on. When it becomes feasible to allocate a certain monetary value to these consequences, cost-benefit analysis therefore might help in deciding whether or not and if so to what extent a specific risk shall be governed. Yet uncertainty plays a significant role within the two stages of risk governance – risk assessment and risk management – because probability assumptions only make sense if uncertainties prevail.[164] Allocating monetary values in the light of uncertainties, however, may proof difficult, because often the linkages between a specific initiating activity or event and a certain negative outcome are not clear, making it hard if not to say impossible to assess the monetary value of such consequences against any initiating activities or events.

Many risks regulators have to deal with are rather clear cut, though, i.e. there is sufficient scientific evidence to proof the linkages between a certain initiating activity or event and a specific negative outcome. Or *e contrario* no adequate scientific data is available that would indicate any negative results, hence making risk governance uncalled for.[165] Such situations, in which enough scientific evidence exists, are not too difficult to master, because they simply demand a profound analysis of whether the expected adverse result is of such a significance that it justifies regulation. The obvious answer to this question is then traditional risk assessment and management and in this context cost-benefit analysis:[166] Valuating the expected negative outcome on the one hand, and the expected costs to manage the said outcome on the other, will help decision-makers to decide if and if so in what way, a certain risk shall be managed.

As a consequence, whether cost-benefit analysis is the effective tool to govern climate change induced risks, is ultimately dependent upon the question if sufficient scientific data can be gathered, to make adequate assumptions (and hence monetary valuations) about the effects of an expected negative outcome as well as the efforts that ought to be taken in order to manage it.

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nomic terms e.g. Brent, at 3, Mishan & Quah, at 3, Hanusch, at 1.

163 See *supra* in 1.2.

164 Ibid.

165 See for details ibid.

166 See on traditional risk assessment and management furthermore *supra* in 1 and *infra* in 4.4.4.

Accordingly as long as no or no substantial scientific information exists on a given threat, the cost-benefit analysis does not require any regulation thereof:[167] The identification of a natural hazard calls for carrying out risk assessment procedures. Until, however, scientifically verified evidence emerges to demonstrate the causal connection between the hazard and any negative outcomes, no thoughts are given to risk management.[168] In application of the cost-benefit analysis it is scientific certainty that makes allocating monetary values to risks, and thus their management, feasible. If there is no or not enough information on a certain initiating activity or event and/or their outcomes, monetary values are impossible to be assigned. As a consequence, as long as there is not enough scientific proof to link a certain natural event or human activity induced by climate change to a specific negative outcome, following a traditional risk assessment and management approach (i.e. in application of the cost-benefit analysis), no risk management efforts will be undertaken to govern climate change induced risks.

As has been shown *supra* in 4.2., however, climate change induced risks rarely provide for clear cut assumptions. Rather they are governed by uncertainties, complexities and ambiguities, which make it difficult or often impossible to draw clear linkages between a certain initiating natural event or human activity and a specific negative outcome.[169] To assign monetary values in this context becomes questionable, as it is difficult to foresee what – if at all – the impact of a specific natural event or human activity may be. As a consequence, regarding the uncertainties, complexities and ambiguities inherent to climate change and the risks it entails, a certain initiating event or activity may lead to a minor change within the Arctic ecosystems or it might as well lead the region to a tipping point. While taking costly efforts would under the cost-benefit analysis not be justified in the first instance, they certainly would be in the latter. As long as not enough information can be gathered that would point to either one or the other outcome, however, the cost-benefit analysis would in consideration of such risks remain inoperative, because no monetary values can be assigned to the initiating natural events or

167 See *supra* in 1.3., esp. on the notion of *hazard identification* and Carolan, at 6, 8 and 9 (referring to the fact that traditional risk assessment follows an *"innocent until proven guilty"* approach, which essentially presumes a certain initiating activity or event to be safe (and hence not calling for any governance) until it is proven harmful. See in this context also on the reversal of the burden of proof under the precautionary principle *infra* in fn 177 (part I).

168 The reason why is described by Whiteside, who states that *"Fallaciously, regulators have been known to interpret the absence of proof of harm as the proof of the absence of harm"*; Whiteside, at 58; see furthermore *supra* in 1.3.

169 See for details *supra* in 4.2.

human activities and their negative ramifications. As a consequence, this classical approach to risk governance may provide for helpful guidance for decision-makers when risks are linear and lead to measurable consequences, that can be valued in monetary terms. The cost-benefit analysis remains impracticable, however, where risks – such as in the case of new environmental risks, like climate change induced risks – lack such linearity and may cause unexpected ramifications to which no monetary valuation can be assigned in the moment of deciding if any risk management activity is required. In general, the cost-benefit analysis is thus not the appropriate tool to govern climate change induced risks and hence shall not be addressed here any further.[170]

4.4. The Precautionary Principle

4.4.1. Introduction

In every day language people often use the term *better safe than sorry* and by doing so refer to uncertain situations that demand a decision in conduct. If we do not know with absolute certainty what will await us, we usually choose a more cautious path. One of the reasons why is that people generally are loss averse, which means that they tend to be more attuned to the potential loss than the benefit of a certain probability.[171]

Consequently, whenever the outcome of a certain initiating activity or event is unsure, or in other words, whenever probabilities cannot be assigned properly, people tend – due to intrinsic psychological reasons[172] – to be cautious. It is in this context that the precautionary principle needs to be understood. While the exact meaning of the principle is debated[173] and its wording

170 Note that some qualification to this notion is necessary and will be provided subsequently in 4.4.4.

171 See Sunstein (Laws of Fear), at 42 (stating that *"people will be closely attuned to the losses produced by any newly introduced risk, or by any aggravation of existing risks, but far less concerned with the benefits that are foregone as a result of regulation"*) and Seiler (1995), at 86.

172 See ibid. in regards to loss aversion. Other psychological reasons for people being cautious in uncertain situations exist. To focus on these is, however, not the aim of this thesis. For a more detailed background see Sunstein (Laws of Fear), at 35–49, Hassenzahl, at 247 and Lofstedt, at 39 et seq.

173 More immediately *infra* in 4.4.3.

unclear[174] the different formulations essentially bear the same message: The absence of clear evidence should not hamper taking action to avert a certain negative outcome. In the light of being *better safe than sorry* the existence of risks entailing high uncertainties thus should trigger precautionary measures aimed at preventing any probable negative results.[175] Or as TROUWBORST puts it in relation to the natural environment: "*Applying the principle means giving the benefit of doubt to the environment: in dubio pro natura.*"[176]

Consequently, from a legal perspective the precautionary principle indicates furthermore, that the burden of proof will be placed on those actors planning to undertake an activity entailing risks under uncertainty, to show that the planned conduct is not causing serious harm to the environment or that adequate mitigation measures to cope with any damaging effects are in place.[177]

4.4.2. Terminology

The terminology pertaining to precautionary measures in relation to risk is not unanimous. Debate has arisen among scholars and practitioners as to whether precaution in managing risks should be labeled principle as opposed to approach.[178] The notion *principle* is generally understood as a rule or belief governing a certain behavior, or in other words a general rule or law.[179] The term *approach* on the other hand is rather referring to a way of

174 More immediately *infra* in 4.4.2.

175 Accord. AVEN & RENN, at 128, but see PATERSON, at 87 (who states *"that decisions under risk do not require the application of the precautionary principle"*. According to Paterson the precautionary principle is only feasible in cases where no probabilities can be assigned, i.e. in cases of absolute uncertainty, or as he calls it ignorance. In the opinion of the present author such a limitation of the precautionary principle is too extensive, however. Granted, the notion of risk requires a certain degree of uncertainty (and additionally complexity and ambiguity). Predetermination renders risks governance obsolete. But absolute uncertainty would make risk management unfeasible. It is true that in such situations the application of the precautionary principle – in the light of being better safe than sorry – would be highly appropriate. Yet, it would also lead – as will be shown in greater detail *infra* in 4.4.3.1. to a paralyzing situation, as under absolute uncertainty no action, not even precautionary action may be taken. See for details *supra* in 4.2. and *infra* in 4.4.3.1.; also accord. ARNDT, at 112 (stating in relying upon European case law that the precautionary principle is not applicable to hypothetical risks, i.e. situations of ignorance or absolute uncertainty).

176 TROUWBORST (2009), at 27; accord. KOGAN, at 26.

177 See e.g. WEISS, at 319, RANDALL, at 9 and 93, CAROLAN, at 6 and *infra* fn 190 (part I).

178 See SADELEER (PRECAUTIONARY PRINCIPLE), at 3, COONEY, at 5.

179 See SOANES & STEVENSON, HOAD, BURTON, at 408, STATSKY, at 601, para 1.

dealing with a certain situation and thus has in every day language a much more flexible connotation.[180] As a consequence the wording precautionary principle could be understood as a strict mandate, while a precautionary approach would leave room for more adaptive precautionary measures in governing risk.

Yet, in law, principles of law are generally not understood as having the same binding effect as rules of law.[181] While the latter provide for clear and strict obligations and rights set out in international treaties or national regulations, the former are less stringent and should rather be seen as a general guideline for action. If the precautionary principle is understood in such a context, the distinction between principle and approach becomes insignificant. By referring to flexible, context-specific guidance within a certain situation, the terms can thus be used synonymously. Hereinafter the notion precautionary *principle* will be applied, as it is in academics the more commonly used form.

4.4.3. The Precautionary Principle in Law

Terminological inconsistencies aside, the precautionary principle lacks a single definition. Due to its multidisciplinary character, the principle has found recognition, among others, in economics, natural science and law.[182] While it is in essence in all disciplines understood to be a way of acting in the light of uncertainty, the specific content of the precautionary principle varies, depending on the dogmatic context it is being addressed in.[183] In a legal frame of reference a commonly used version of the principle can be found in article 15 of the Rio Declaration on Environment and Development[184], which states, 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*

180 See e.g. BURTON, at 30, STATSKY, at 58, para. 5.
181 See Sands, at 188–189, BEYERLIN & MARAUHN, at 37, REYNAERS KINI, at 137 (citing *inter alia* SANDS) and SCHIELE, at 109-112 (analyzing the distinction of rules and principles made in legal theory).
182 See MOYLE, at 160.
183 Accord. DORMAN, at 169, KUNTZ-DURISETI, at 291 and in a legal context ARNDT, at 2.
184 *Rio Declaration on Environment and Development*, Jun. 3-14, 1992, United Nations publication, Sales No. E.73.II.A.14 [hereinafter Rio Declaration].

> *used as a reason for postponing cost-effective measures to prevent environmental degradation."*[185]

A similar approach is used within the context of taking action against global climate change. The United Nations Framework Convention on Climate Change (hereinafter UNFCCC[186]) defines in its article 3 the principles applicable in order to achieve the objective of the Convention, which is the "*stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system".*[187] Article 3 paragraph 3 of the UNFCCC refers to the precautionary principle by stating that

> *"The Parties should take precautionary measures to anticipate, prevent or minimize the causes of climate change and mitigate its adverse effects. Where there are threats of serious or irreversible damage, lack of full scientific certainty should not be used as a reason for postponing such measures, taking into account that policies and measures to deal with climate change should be cost-effective so as to ensure global benefits at the lowest possible cost. (...)"*

The reference to cost-effectiveness in article 15 of the Rio Declaration and article 3 paragraph 3 of the UNFCCC highlights the relationship of the precautionary principle and economics; passages that are not being employed likely, since research and analysis of economists in relation to risk and uncertainty have a long history[188] and thus provide fundamental insight in this respect. It is insofar not surprising that legal scholars, e.g. Sunstein, derive their main thoughts on the precautionary principle from economic interpretations of such.

185 This version of the precautionary principle has also been endorsed by other legal initiatives, such as the Cartagena Protocol on Biosafety that explicitly refers to the Rio Declaration, See the preamble and art. 1 of the *Cartagena Protocol on Biosafety to the Convention on Biological Diversity*, Jan. 29, 2000, 2226 U.N.T.S. 208.

186 *United Nations Framework Convention on Climate Change*, May 9, 1992, 1771 U.N.T.S. 107 [hereinafter UNFCCC].

187 Art. 2 of the UNFCCC.

188 See Moyle, at 160 and Carrel, at 3.

4.4.3.1. Economic Interpretation of the Precautionary Principle

SUNSTEIN argues, that the precautionary principle – seriously taken – is paralyzing, because it forbids the action it requires.[189] Precautionary action taken in order to prevent one specific risk, might lead to the emergence of another. Because most processes in life are not linear (and that is even more appropriate for natural events), it is impossible to foresee all ramifications of a certain action, even be it precautionary. SUNSTEIN thus comes to the conclusion, that a weaker form of the precautionary principle is most generally in place.[190] According to SUNSTEIN only by ignoring the subset of risks involved in precautionary measures, the principle becomes feasible.[191] A holistic approach, i.e. a precautionary principle that aims to regulate all potential risks, is thus unfeasible, because the future is not predetermined and we cannot foresee all possible outcomes of a certain activity, including precautionary measures.

By trying to resolve this problematic, SUNSTEIN continues to argue for two weaker versions of the precautionary principle that he calls *Catastrophic Harm Precautionary Principle* and *Irreversible Harm Precautionary Principle*. Both versions refer to values, while the latter includes the notion of irreversibility. The Catastrophic Harm Precautionary Principle calls for an evaluation of magnitude and probability of harm and hence for attention to expected values.[192] In short the principle focuses on evaluating under which precautionary initiative the risk will be managed best and in a least burdensome way, while losses that might emerge from precautionary measures itself are included in the decision-making process.[193]

189 See SUNSTEIN (WORST-CASE SCENARIOS), at 125–126, accord. WIENER, at 609 cf. MORRIS, at 129.

190 SUNSTEIN stands by no means alone with this assumption: See also CAROLAN, at 9, and cf. WEISS, at 318–319 (referring to the "weak" formulation of the precautionary principle, as a principle "*that asserts that the absence of rigorous proof of danger does not justify inaction*", while the "strong" formulation of the principle, by contrast, "*declares that the absence of rigorous proof does require precautionary action to be taken, and that the burden of proof lies with the proponent of an action to show that it does not pose a danger of environmental harm*".)

191 See SUNSTEIN (WORST-CASE SCENARIOS), at 131 et seq.

192 See SUNSTEIN (WORST-CASE SCENARIOS), at 279.

193 The exact formulation of the the final version of SUNSTEIN's Catastrophic Harm Precautionary Principle is: *In deciding whether to eliminate a worst case scenario under circumstances of uncertainty, regulators should consider the losses imposed by eliminating that scenario, and the size of the difference between the worst-case scenario under one course of action and the worst-case scenario under alternative courses of action. If the worst-case scenario under one course of action is much worse than the worst-case scenario under another course of action, and if it is not extraordinarily burdensome to take the course of action that eliminates the worst case scenario, regulators should take that course of action. But if*

The Irreversible Harm Precautionary Principle tries to include those cases in which a certain outcome might be irreversible. In order to maintain flexibility for the future it makes in that context sense to apply a highly precautionary approach.[194] Yet also in the case of irreversible harm the magnitude of the outcome needs to be kept in mind, according to SUNSTEIN. Risks with a high probability of irreversible outcomes only justify profound precautionary measures, if the expected irreversible changes are of a certain magnitude. Also in that context, SUNSTEIN applies a value evaluation.[195] A minor irreversible change in the Arctic environment e.g., that would demand highly (and thus expensive) precautionary measures of the Arctic States, would under the Irreversible Harm Precautionary Principle fail to trigger any precautionary initiatives.

Very briefly put SUNSTEIN's versions of the precautionary principle demand attention to both what is gained and what is lost by precautions.[196] And it is in that sense that the Catastrophic Harm Precautionary Principle and the Irreversible Harm Precautionary Principle do not differ very much from the economic version of the precautionary principle. A valuation of gain and loss is what is in economical terms called a cost-benefit analysis.[197] Although SUNSTEIN explicitly departs from that notion, by emphasizing on welfare instead of monetary equivalents[198], the body of thought is in essence similar: The precautionary principle understood as a guideline that is based on favoring the most beneficial course of action, or in other words, a guideline that answers the question in what way values are allocated best, is not so incompatible to the general risk management approach or cost-benefit analysis[199], with the biggest difference consisting in the latter having to deal with less uncertainty.

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the worst-case scenario under one course of action is not much worse than the worst-case scenario under another course of action and if it is extraordinarily burdensome to take the course of action that eliminates the worst-case scenario, regulators should not take that course of action. See SUNSTEIN (WORST-CASE SCENARIOS), at 167.

194 See SUNSTEIN (WORST-CASE SCENARIOS), at 179, DOLZER & KREUTER-KIRCHHOF, at 105.

195 SUNSTEIN refers to this as *option value*, by stating that *"regulators (...) should be willing to pay a sum – the option value – in order to maintain flexibility for the future"*. See SUNSTEIN (WORST-CASE SCENARIOS), at 179.

196 See SUNSTEIN (WORST-CASE SCENARIOS), at 281.

197 See on the cost-benefit analysis *supra* in 4.3.

198 See SUNSTEIN (WORST-CASE SCENARIOS), at 174 and in detail 198 et seq.

199 See *supra* in 1.4. and 4.3.

4.4.3.2. Cost-Benefit Analysis v. Precautionary Principle

While the economic precautionary principle and also the versions suggested by SUNSTEIN certainly make sense and allow for transparent and stringent decision-making processes, thoughts on cost-benefit (even if differently put and not understood in a monetary domain) should in the light of high uncertainty, according to what has been said in 4.3., be handled cautiously. A minor expected change in the Arctic ecosystems (be it irreversible or not), that would involve highly precautionary measures and thus call for expensive regulation, would in the context of evaluating the gain and loss of precaution, not result in any (or at least not in any major) precautionary action. What if, however, that minor change, due to the existence of uncertainty related to complexity within the matter, lead to a more severe (and might even irreversible) change within the Arctic ecosystems eventually? Would it then not be more advisable to take costly precautionary measure in advance, albeit out of proportion to the specific risk it is related to? Certainly SUNSTEIN, and any economist would in the context of taking precautionary measures agree on this. The problem therefore lies in the difficulty to combine cost-effectiveness, as it is understood in terms of cost-benefit analysis, and precaution. Real precaution should not be dependent on cost-effectiveness, because it could result in neglecting risks, as made clear in the example above. On the other hand for the precautionary principle to work, it is impossible to take all risks into account. A strict precautionary principle would thus not provide for any guidance. Instead it would be impracticable and paralyzing. Thoughts on cost-benefit can help to overcome this rigidity by associating risks with values.

It is due to the difficulty to resolve the above mentioned ambiguity, that the precautionary principle has caused a lot of debate concerning its applicability, especially within the United States and Europe.[200] In short while the U.S. is in regards to climate change induced risks in principle reluctant to make use of the precautionary principle and applies pure cost-benefit analysis instead, most European countries are accepting the precautionary principle and by doing so attempt to build a margin of safety into their decision making processes.[201] In essence the United States generally follows a strict science based risk management, which allows for action as long as there exist no conclusive scientific findings that point to any adverse effects stemming

200 More details on this *infra* in 4.4.4.

201 See SUNSTEIN (LAWS OF FEAR), at 13–14, WHITESIDE, at 62–64, ISMER, at 2; on U.S. views see ASHFORD, at 352 et seq.

from said action. On the other hand most European countries would manage such activity (which could even result in banning it) for the sake of being *"better safe than sorry"*. For obvious reasons, those differing approaches can in relation to high uncertainty, as in the case of climate change induced risks, lead to completely opposite results as far as managing risks is concerned. In the context of a most strict version of cost-benefit analysis, the U.S. would completely refrain from taking any action against climate change or from regulating or banning any action that would enhance it, simply because such costly measures cannot be justified as long as not enough scientific data exists to irrefutably proof the causal connections between certain man made activities and alterations in climate, as well as the existence of climate change itself. The application of a very strict precautionary principle within European states on the other hand, would lead to taking all measures possible no matter the cost in order to fight global climate change and banning any activity that would result in possibly enhancing it.

In reality such strong views are impracticable. As much as no European nation is precautionary in general and ignorant to cost-benefit analysis, it would be inaccurate to say that the U.S. is strictly opposed to precaution.[202] Yet Europe's relationship to the precautionary principle seems to be of a stronger foundation in comparison to the principle's history within the United States.

4.4.3.3. The Precautionary Principle in European Law

The precautionary principle has its origins in German law[203], in the so called *Vorsorgeprinzip* and has also found its way into European environmental law. Article 191 paragraph 2 of the EC Treaty[204] states that,

202 See Sunstein (Worst-case scenarios), at 129, Whiteside, at 69, Lofstedt, at 41.

203 See Woolley, et al., at 98 in 3.18, Koechlin, at 13, Morris, at 128, Carolan, at 7, deFur & Kaszuba, at 155, Lofstedt, at 37, LaFranchi, at 681, Wiener, at 599, Bhat, at 380, Arndt, at 1 and 13-41 on the development and meaning of the principle in German law; Harremoës (Introduction), at 4, Freestone & Salman, at 348, Fischhoff & Kadvany, at 147. Furthermore one of the first uses of a general precautionary principle can be traced back to the Swedish Environmental Protection Act of 1969, which has now been consolidated in the Swedish Environmental Code of 1999. The precautionary principle is in accordance with chapter 2, section 3 of the Code the basis for all other provisions within the Environmental Code. See *Swedish Environmental Code*, Jan. 1, 1999, Ds 2000:61 and Wiener, at 599, Beyerlin & Marauhn, at 7 (stating, that the precautionary principle (or as Beyerlin & Marauhn call it – precautionary action) originated in Swedish law), Arndt, at 42-49 on the development and meaning of the principle in Swedish Law and Sunstein (Laws of Fear), at 16.

204 *Consolidated version of the Treaty on the Functioning of the European Union*, 26.10.2012

> *Union policy on the environment shall aim at a high level of protection taking into account the diversity of situations in the various regions of the Union. It shall be based on the* ***precautionary principle*** *and on the principles that preventive action should be taken, that environmental damage should as a priority be rectified at source and that the polluter should pay.*

Due to the lack of a clear definition, however, the true meaning of the precautionary principle within the European Union is open to interpretation. Article 191 paragraph 2 of the EC Treaty does not stipulate how and under what circumstances the principle shall be applicable, but rather refers to it as one of the principles that Union policy on the environment shall be based upon.

To avoid debate and misconception, in February 2000 the Commission of the European Communities disclosed a communication on the precautionary principle[205] in order to harmonize the use of the principle within the EU member states. The aim of the communication was fourfold: *"*[To] *outline the Commission's approach to using the precautionary principle,* [to] *establish (...) guidelines for applying it, to build a common understanding of how to assess, appraise, manage and communicate risks* [in the absence of scientific data and to] *avoid unwarranted recourse to the precautionary principle, as a disguised form of protectionism."*[206]

According to the communication, the precautionary principle is, although in the EC Treaty only prescribed once – to protect the environment, much wider in scope, *"specifically where preliminary objective scientific evaluation, indicates that there are reasonable grounds for concern that the potentially dangerous effects on the environment, human, animal or plant health may be inconsistent with the high level of protection chosen for the Community".*[207]

The Commission refers to the precautionary principle as a risk management tool based upon which measures shall be taken that are *inter alia* propor-

O.J. (C 326) 47 [hereinafter EC Treaty].

205 Commission of the European Communities (COM (2000) 1 final).

206 Commission of the European Communities (COM (2000) 1 final), at 2.

207 Commission of the European Communities (COM (2000) 1 final), at 2 note 3; the scope of the principle as it is understood within the European Union will be further defined *infra* in respect to the *Pfizer* case.

tional, non-discriminatory and consistent to other measures already taken, while being cost-effective and paying attention to the emergence of new scientific data so as to review precautionary measures and – due to the decreasing uncertainty – replace them if needed with other risk management options.[208]

While the Commission's communication certainly reflects the general assumptions regarding the precautionary principle, it is however, from a legal perspective only of minor influence, since communications are typically soft law instruments, i.e. not legally binding.[209] Nevertheless they provide for assistance when judicial bodies face the task to apply EU treaty law in a specific case.

4.4.3.4. Pfizer Animal Health SA v. Council of the European Union

Within the European Union the precautionary principle and the views expressed by the Commission's communication have become part of case law.[210] In the *Pfizer* decision in 2002[211] the Court of First Instance (since 2009 the General Court), which is part of the European Court of Justice prominently set out the scope of the precautionary principle, broadly following the Commission's communication.

208 Commission of the European Communities (COM (2000) 1 final), at 3-4 and 17-20; The fact that the emergence of new scientific data requires a review of precautionary measures taken, makes the precautionary principle an adaptive management approach; see on adaptive management in greater detail *infra* in 4.5.

209 See Sadeleer (Precautionary Principle in European Community Law), at 12. Although not legally binding, soft law possesses a political and moral obligation as regards the rules and regulations set within a given soft law document. In contrast to soft law, norms that are legally binding and hence are directly enforceable, are referred to as hard law. See Murphy, at 22, Hunter, et al., at 344–345, Fritz, at 116, Law & Martin, at 515, Bhat, at 373, Beyerlin & Marauhn, at 290 and furthermore *infra* in 6 and fn 771 and 772 (part II).

210 See *inter alia T-177/02, Malagutti-Vezinhet SA v. Commission of the European Communities, 2004 E.C.R. II-830*, para. 54, *T-147/00, Laboratoires Servier v Commission, 2003 E.C.R. II-88*, para. 52, *T-392/02, Solvay Pharmaceuticals v. Council, 2003 E.C.R. II-4559*, paras. 121-122, *T-74/00, Artegodan and Others v. Commission, 2002 E.C.R. II-4948*, paras. 183-185; newer cases (i.a. *C-379/08 and C-380/08, ERG and others,* paras. 70, 75, 83, 85 and 92; *T-334/07, Denka International v. Commission,* paras. 116 and 180) do refer to the precautionary principle, do not, however, provide any new insight in respect of its application or scope.

211 *T-13/99, Pfizer Animal Health SA v. Council of the European Union, 2002 E.C.R. II-3318*; see also *Alpharma Inc. v Council of the European Union* in which the Court ruled on the same matter: *T-70/99, Alpharma Inc. v Council of the European Union, 2002 E.C.R. II-3506*, i.a. paras. 155 et seq.

In the *Pfizer case* the *Pfizer Animal Health SA*, a producer of animal feeding additives, such as the antibiotic *virginiamycin*, contested an allegedly wrongful application of the precautionary principle, due to a Community regulation that withdrew the authorization of the said antibiotic as an additive in animal feedings.[212] The withdrawal was based upon a scientific study of live laboratory rats, carried out in Denmark, that provided evidence on the possibility to transfer resistance of *virginiamycin* from animals to humans, with the consequence of the potential emergence of public health problems in case this particular antibiotic should be used for treatment of human infections in the future.[213] The study, however, was contested. As was the above-mentioned Directive regulation.

Based on these grounds the Court examined if the withdrawal of *virginiamycin* was unjustified, because it was allegedly based *"on conclusion of a risk assessment that was not properly conducted"*, which led to the faulty assumption that the antibiotic *"constituted a risk to human health"*. Furthermore the Court had to assess if there had been an error in the management of risk.[214]

The Court begins its examination by outlining the scope of the precautionary principle in its preliminary remarks.[215] In accordance with the Commission's communication of 2000 the Court finds that *"Community policy on the environment is to pursue the objective inter alia of protecting human health, that the policy, which aims at a high level of protection, is based in particular on the precautionary principle and that the requirements of the policy must be integrated into the definition and implementation of other Community policies"*[216]. The scope of the precautionary principle is thus not solely limited to environmental protection.[217] A point of view that was confirmed in the *Artegodan case* of 2002 in which the Court held that *"*[s]*ince the Community institutions are responsible, in all their spheres of activity, for the protection of public health, safety and the environment, the precautionary principle can be regarded as an autonomous principle stemming from the (...)* [EC] *Treaty provisions"*[218].

212 See *T-13/99, Pfizer Animal Health SA v. Council of the European Union, 2002 E.C.R. II-3318*, paras. 42, 59 and 108.
213 See ibid., paras. 35-36 and 54.
214 See ibid., para. 110.
215 See ibid., paras. 113 et seq.
216 Ibid., paras. 114.
217 Accord. *T-74/00, Artegodan and Others v. Commission, 2002 E.C.R. II-4948*, para. 183.
218 Ibid., para. 184.

In regards to the legitimacy of the conducted risk assessment the Court further holds in the *Pfizer case*, that *"in a situation in which the precautionary principle is applied, which by definition coincides with a situation in which there is scientific uncertainty, a risk assessment cannot be required to provide the Community institutions with conclusive scientific evidence of the reality of the risk and the seriousness of the potential adverse effects were that risk to become reality. (...) However, it is also clear (...) that a preventive measure cannot properly be based on a purely hypothetical approach to the risk, founded on mere conjecture which has not been scientifically verified. (...) Rather, it follows (...) that a preventive measure may be taken only if the risk, although the reality and extent thereof have not been 'fully' demonstrated by conclusive scientific evidence, appears nevertheless to be adequately backed up by the scientific data available at the time when the measure was taken."*[219]

It follows a lengthy examination of the risk assessment carried out in regards to the antibiotic *virginiamycin*, which ends in the conclusion that, because Community institutions decided *"on the basis of the scientific knowledge available at the time"* of withdrawing the authorization of the antibiotic, no error was made in respect to assessing the risk to human health stemming from the specific additive to animal feed.[220]

In respect to the question if there had been an inaccuracy in managing the risk, the Court finds that *"[t]he institutions cannot be criticised for having chosen to withdraw provisionally the authorisation of virginiamycin as an additive in feedingstuffs, in order to prevent the risk from becoming a reality, and, at the same time, to continue with the research that was already under way. Such an approach, moreover, was consonant with the precautionary principle, by reason of which a public authority can be required to act even before any adverse effects have become apparent."*[221] The Court thus comes to the conclusion that also in relation to risk management there had been no breach of the precautionary principle.[222]

While the findings of the *Pfizer* case do, in respect to what has been stated above, not provide any new insight to the scope and application of the precautionary principle, they nevertheless clarify what the European Union,

219 *T-13/99, Pfizer Animal Health SA v. Council of the European Union, 2002 E.C.R. II-3318*, paras. 142-144.
220 See ibid., paras. 149-163; concluding remarks in 401-404.
221 Ibid., para. 444.
222 See ibid., para. 491.

and thus many European nations – at least in applying Community law[223], understand by the precautionary principle: The focus does not so much lie on the discrepancies between cost-benefit and precaution, but on the influence science has on risk assessment and management. In essence the precautionary principle does not differ so much from general risk assessment and management. The need for the principle, rather derived from the desire to effectively govern risks, even if a full risk assessment is due to a lack of scientific data impossible. How much science is enough in order to trigger precautionary action and at what point other risk management options, such as initiatives based on cost-benefit analysis, provide for a more justifiable way in risk governance, are the real questions that ought to be answered in the context of the precautionary principle.[224] Because there is a lack of a general definition of the principle, however, this task is hard to master. The economic precautionary principle provides a starting point, by combining thoughts on cost-benefit and precaution, which results in higher applicability and transparency. Yet, as stated above such an approach also bears threats, in cases where thoughts on cost-benefit should, for the sake of small, but nevertheless potentially significant risks, be left out of consideration. In its *Artegodan case* the Court of First Instance explicitly focused on the relationship between precaution and economics by stating that *"the precautionary principle can be defined as a general principle of Community law requiring the competent authorities to take appropriate measures to prevent specific potential risks to public health, safety and the environment, by giving precedence to the requirements related to the protection of those interests over economic interests."* [225]

4.4.3.5. Conclusion

In the context of the above analysis, the term cost-effectiveness, as it is used in various legal documents such as the Rio Declaration and the UNFCCC, should not be understood as a way to apply cost-benefit analysis in situations demanding precautionary measures. Rather it should be viewed as a tool helping to choose between several courses of action that are equally ef-

223 Member states are under no obligation to apply the precautionary principle outside the context of Community law; yet because the EC law explicitly refers to the principle, member states are given the opportunity to invoke precautionary measures within their own realms of competence. See Sadeleer (Precautionary Principle in European Community Law), at 14 and 16.

224 Further questions are being risen by Sunstein (Worst-case scenarios), at 203.

225 *T-74/00, Artegodan and Others v. Commission, 2002 E.C.R. II-4948*, para. 184.

fective in managing the risk but not equally costly.[226] If cost-effectiveness is understood in such a way, however, very little guidance comes from it in regards to deciding if or if not a precautionary measure should be taken in the first place.[227] Such a precautionary principle would in fact not differ very much from a strict 'ecological' precautionary principle, that solely aims at protecting the environment and therefore leaves economic reasoning out of consideration. If applied in a very strict way, this principle would become unemployable, though, because no matter what path decision-makers would choose in order to tackle one specific risk, there is always a potential danger of another risk being attached to the action, albeit precautionary.[228]

Within this ambiguity the question emerges what effect the precautionary principle under those conditions as a principle of law, really has or will have in the future. While it incontestably has found its place within a certain legal framework of public international law (such as the Rio Declaration or the UNFCCC), as well as on a regional basis (especially within the European Union), these legal documents, due to a lack of a clear definition of the principle, do not provide for real consistency in respect to its application[229]. Even more so, since the European Union initiatives such as the Commission's communication on the precautionary principle are not legally binding and the applicability of both the Rio Declaration and the UNFCCC are dependent on the states' willingness to ratify and correctly implement the said documents. If and in what way the precautionary principle is applied around the globe is thus very much determined by the nations' views and perspectives towards the principle.

Some academics argue, however, that the precautionary principle has become customary international law.[230] For customary international law to emerge two conditions must be met: A constant and uniform *practice of*

226 Accord. Sunstein (Laws of Fear), at 115, Nyborg, at 15 and 17.
227 See on a possible solution to this problem *infra* in 4.4.4.
228 See *supra* in 4.4.3.1.
229 Accord. Whiteside, at 70 (stating that *"a closer look at European risk management would reveal that its precautionary measures are not really principled either"*).
230 See Sadeleer (EU and Nordic Legal Regimes), at 383, Trouwborst (2006), at 7–9, Bhat, at 381 and in detail Trouwborst (2002) (concluding that "*since the precautionary state practice is of such uniformity and generality, and the evidence of opinio juris sive necessitatis accompanying it of such persuasiveness, (...) contemporary customary international law also requires states to apply the precautionary principle*"; at 286), but Santo & Jones, at 344, Beyerlin & Marauhn, at 55, Reynaers Kini, at 155 (concluding that "*the precautionary principle has not acquired the status of a rule of [customary international law]*").

states and the existence of *opinio iuris*.[231] The first is an objective criterion referring to the necessity of a similar behavior of all (global customary international law) or at least a few states (regional customary international law) within a certain context. For the practice of states to be constant and uniform states have for some period of time to work towards or against a certain goal until their actions become sufficiently widespread and representative. However it is not necessary that all states follow suit for customary international law to emerge. It is enough if there exists no clear objection from several nations against a certain states' practice. Unanimity is thus not required.

The subjective criterion, the *opinio iuris sive necessitatis*, is more difficult to assess. It refers to a general acceptance and recognition of the states' practice. Such an acceptance is certainly given if an – through states' practice – established rule is being recognized.

Once customary international law has been formed it becomes legally binding upon all states within the range of the particular states' practice, excluding the so-called *persistent objectors*. States that have been objecting the rule during its process of developing might not be significant enough in order to prevent the rule from emerging. Nevertheless they can, due to their objection, exclude themselves from the scope of the rule once it comes into being.[232] All other states, however, even if they do not unanimously share all views regarding the rule, are bound by it and thus will have to respect it.

While the precautionary principle has been successfully established as a general principle of environmental policy within the European Union and is being supported by international treaties as well as soft law documents, its application is not universal in all accounts. The United State's tendency to follow the cost-benefit analysis instead of the precautionary principle substantiates this assumption. If – at all – the precautionary principle has thus become regional customary international law.[233] This does however, not say anything, on *how* the principle should be applied. While there might be rep-

231 See *Statute of the International Court of Justice*, June 26, 1945, 1 U.N.T.S. 993 [hereinafter ICJ Statute], art. 38, para. 1, sub-para. b of the ICJ Statute and in detail e.g. Crawford, at 23 et seq., Harrison, at 13, Beyerlin & Marauhn, at 282–283, Lepard, at 6 (but see Lepard, at 9–10 for practical problems of customary international law); the many disputes in respect to customary international law shall not be addressed here. Instead this thesis will follow the traditional understanding of customary international law.

232 See e.g. Kälin, et al., at 69, Crawford, at 28.

233 See Sadeleer (EU and Nordic Legal Regimes), at 383.

resentative states' practice on taking recourse to the principle in uncertain situations demanding a management of risks, there generally still lacks a clear definition of the principle. What therefore could be argued is that the precautionary principle has in fact become regional customary international law, but only insofar as its general application – i.e. *when* the principle needs to be evoked – is concerned. The precise meaning of the principle, especially in regards to cost-effectiveness, is nevertheless lacking sufficient consent in order for the principle's substance to become customary international law as well. If or if not the precautionary principle has in fact become regional customary international law for some of the Arctic Nations is, however, not a question that shall be addressed here any further. Specific Arctic legal initiatives and thus the practice of Arctic States as well as their reasoning behind it shall be substantiated *infra* in 6.

To summarize, the relationship between the precautionary principle and law is somewhat ambiguous. While the principle is certainly no longer a sole economic theory, but has been reflected in law through international treaties and soft law documents, its exact content remains unclear, which complicates its applicability. A very strong version of the precautionary principle would suggest to forbid all action against a certain risk, even precautionary measures, for they could provoke a subset of risks to emerge. Weaker forms of the precautionary principle try to enclose economic reasoning by referring to cost-effectiveness. While thoughts on cost-effectiveness themselves are helpful in avoiding a paralyzation when applying the principle, because they help to categorize risks and how they should be managed, too strong a reliance on cost-benefit evaluations tend to single out high value risks, while smaller risks, that eventually could become more significant remain unmanaged, because their triviality at the point of managing the risk does not justify any costly precautionary action. Or as SUNSTEIN puts it *"cost-benefit analysis does not come close to telling regulators all they need to know – but without it, they will know far too little."* [234]

The above mentioned discrepancies between thoughts on cost-benefit and the precautionary principle require some clarification. Some further remarks shall thus be presented in the subsequent paragraph.

234 SUNSTEIN (WORST-CASE SCENARIOS), at 243.

4.4.4. The Precautionary Principle and the Traditional Approach to Risk Governance

As has been pointed out above[235], where sufficient scientific information exists about certain risks and where such risks follow a linear logic, cost benefit analysis may be a feasible risk governance tool, as evaluating the expected negative outcome on the one hand, and the expected costs to manage the said result on the other will help decision-makers to decide if and if so in what way, a certain risk shall be tackled. This traditional approach to risk governance stands in sheer contrast to the strong version of the precautionary principle, however. The principle's objective is to provide guidance when governing risks involving a high degree of uncertainty. A lack of scientific data or uncontested scientific evidence to proof the linkages between a certain initiating activity or event should thus not be hampering any action-taking in case a negative outcome can be imagined. Precautionary measures in the sense of a most strict version of the principle do not need any monetary evaluation to be justified, but are grounded on the notion to be *better safe than sorry*.

Consequently while a strict cost-benefit analysis would allow for any action that could possibly trigger a negative result, unless there exists sufficient scientific data to proof the causal connection between the said action and an adverse outcome, a strong version of the precautionary principle would forbid such action, until there is enough evidence to deny any connection between the initiating activity and the negative event. It is in this context that the cost-benefit analysis and the precautionary principle are most conflicting.

4.4.4.1. Application of the Cost-Benefit Analysis and the Precautionary Principle to Climate Change Induced Risks

In terms of climate change induced risks the preference for one or the other principle, can lead to opposing regulations and/or action-taking. Since up to this date there exists no uncontested scientific evidence on the impacts of human behavior on the global climate system, states following a strict cost-benefit analysis would argue that e.g. taking costly measures to reduce greenhouse gas emissions or forbidding any action that might be capable to enhance a change in climate, which would result in a financial loss, cannot

235 See *supra* in 4.3. and 4.4.3.

be justified. On the other hand nations complying with the strong version of the precautionary principle would not deter from taking any such measures in the hope to successfully manage climate change induced risks. Ultimately the strong versions of both the cost-benefit analysis and the precautionary principle find their counterparts in two altering human perspectives: industrialism (i.e. economic interests) on the one hand, and idealism (i.e. ecological interests) on the other.

As has been stated above[236] such strong views are impracticable. Nevertheless contradicting perspectives in governing risks do exist not only in theory. The debate[237] between the U.S. – in regards to climate change induced risks generally a defender of the cost-benefit analysis, and the EU – broadly supporting the precautionary principle, underpins this assumption. The debate's underlying arguments derive from contradictory perspectives of science and what role it plays within risk assessment and management. Of course the precautionary principle is reliant on scientific evidence, its core objective, however, is to guide policy-makers even if precise and uncontested scientific data is absent. The cost-benefit analysis on the other hand is a science-based risk management tool, that only functions properly if enough scientific information is available.

The differing perspectives on the cost-benefit analysis and the precautionary principle in the United States and Europe, thus are being reflected in their approaches towards science and what it can and has to do for risk assessment and management.[238]

236 See *supra* in 4.4.3.2.

237 A thorough discussion of this debate as to how the different opinions developed and changed over time within the United States and the EU shall not be focused on any further in this thesis. The main aim here is to show that there exist conflicting methodologies in regards to managing climate change induced risks not only globally but also regionally within the Arctic ecosystems, which will ultimately have an effect on regulations governing climate change induced risks within the Arctic. For a more detailed description of the debate see e.g. Whiteside, at 61 et seq., Sunstein (Worst-case scenarios), at 85–86, Lofstedt, LaFranchi, at 680–681, Wiener, at 600-601 and 611 and very detailed Vogel esp. at 1-42 and 252-278, but Harremoës (Lessons), at 185 (stating the the precautionary debate should not be characterized as battle between the EU and North America, but rather as one of different degrees of acceptance of the need for precaution within different institutions in both North America and Europe).

238 Accord. Dorman, at 170–172. In regards to the use of science in risk assessment and management it is important to keep in mind that the gathering of scientific data is not a genuinely objective process, but one that is dependent on various influences, such as what criteria are subjectively chosen by the scientists assigned to a specific assessment. See *supra* in 1.3. and Gerrard & Petts, at 2–3.

4.4.4.2. The Role of Science

The cost-benefit analysis is based on the premise that as long as no or no substantiated scientific data exists any regulation is redundant.[239] This has consequences on the role of science and the management of risks when the cost-benefit analysis is applied: Once a natural hazard is identified, risk assessment procedures are to be conducted. As long as no scientifically verified evidence exists to demonstrate the causal connection between the hazard and any negative outcomes, no thoughts are given to risk management, however.[240] Risk management activities are in application of the cost-benefit analysis only initiated, if scientific certainty exists, that makes allocating values to risks feasible. Consequently unless there is enough information on a certain initiating activity or event and/or their outcomes, values are impossible to be assigned.

The precautionary principle on the other hand, is not – as could be assumed – ignorant of scientific evidence, but applies a different perspective on science: Often situations demanding precautionary action distinguish from others by a high amount of uncertainty, complexity and ambiguity. Consequently it is *more* science that is called for – and *multidisciplinary* at that.[241] In this context the precautionary principle is as much science-based as the traditional approach to risk governance, i.e. the cost-benefit analysis. It is only that precautionary measures are not contingent on scientific proof.

4.4.4.3. Cost-Benefit Analysis or Precautionary Principle?

Whether to favor cost-benefit analysis or the precautionary principle, is ultimately a decision dependent on the risks that have to be addressed. For well understood risks entailing a small amount of uncertainty, that values can be assigned to without much difficulty cost-benefit analysis is certainly adequate. Some risks, however, decisively differ from the fore-mentioned, insofar as they are of a certain magnitude and significance, imply a high amount of uncertainty, are characterized by either irreversibility or long-lastedness and often are mentally unavailable[242] at the time management options are to

239 See *supra* in 4.3.
240 See *supra* in 4.3. and fn 168 (part I).
241 Accord. Whiteside, at 30 and 58, cf. Allen, at 37; see also *supra* in 4.2.4.
242 So called *availability heuristic*, referring to the fact that people tend to be more attuned to a certain risk, if they can rely on a personal experience involving it. See Sunstein (Worst-case scenarios), at 54 and 278, Fischhoff & Kadvany, at 99 and 101 and less specific Whiteside, at 35.

be chosen.[243] Climate change induced risks provide a good example of such new environmental risks. Because climate change is a global phenomenon, risks induced by an altering climate are of global significance and a certain *magnitude* as well. Their impacts are hard if not to say impossible to assess, which makes the assignment of values impracticable: That climate change induced risks are or can become of a certain magnitude is due to their global scope uncontested. Yet it is unfeasible to allocate precise monetary values to e.g. the destruction of ecosystems.[244]

Furthermore climate change is a complex and rather slow process, which means that its impacts are not felt immediately. This has two consequences for the characteristics of climate change induced risks: First they are *long-lasting* risks, whose effects can last for generations.[245] Second, because many impacts of global climate change are not felt immediately, it can take years and centuries for new environmental risks to even become evident, which makes those risks less *available* – and thus less pressing to management.[246] A psychological effect that is only enhanced by the *uncertainties* and complexities intrinsic to global climate change. Unawareness and ignorance of either the risks themselves or their clear consequences, due to their long-lastedness and implied uncertainties and complexities, render monetary evaluations of the said risks impracticable.

Finally some consequences of climate change induced risks are linked to *irreversibility*. E.g. polar bears are due to melting sea ice within the Arctic Ocean facing a variety of threads that they cannot easily cope with.[247] In a worst case a swift decline in populations could lead to their extinction, irreversibly altering the Arctic ecosystems. Such a change cannot possibly be equated to monetary values.

243 See in great detail Whiteside, at 30 et seq. and furthermore Dolzer & Kreuter-Kirchhof, at 95 and 105.

244 But see Hardisty, at 12 and 76 (arguing that because ecosystems provide goods and services that have a measurable economic value, cost-benefit analysis is applicable also in relation to ecosystem protection. See on ecosystem services *infra* in 4.5.2.2. d. and 8.2.1.3.).

245 Accord. Whiteside, at 32, Dolzer & Kreuter-Kirchhof, at 95.

246 See Whiteside, at 32 and 35 and *supra* in fn 242 (part I).

247 See IUCN (Polar Bears 2006), at 61, Platt and CAFF (Biodiversity Trends), at 26–28 as well as Klomegah; polar bears are, however, not the only species showing difficulties in adapting to the changing polar climate. See in general CAFF (Biodiversity Trends), at 13 and 17-19, 30-31, 36-37 and more specific Morello (2010) (stating that in recent years the shifting of sea ice patterns has also become a threat to walrus populations within the Arctic) and Gray (adding *inter alia* arctic fox, whales and musk oxen to the list of species endangered by global climate change).

It is for the above-mentioned reasons that cost-benefit analysis seems inappropriate to handle (most) climate change induced risks. Where sufficient knowledge exists and monetary values can be assigned there is, however, no reason to oppose of cost-benefit analysis. Ultimately, while generally precautionary actions are more plausible in managing climate change induced risks, applying cost-benefit analysis in particular cases can be nevertheless beneficial.

In this context neither a strict cost-benefit nor a strict precautionary approach (because it would result in banning every action) can adequately protect global ecosystems facing threads from climate change. Multidisciplinary solutions do not solely call for enhanced precautionary action, but for taking all possible solutions into account, including cost-benefit analysis.[248] Yet, due to the new environmental risks climate change induced risks present, the precautionary principle should be the guiding principle when managing such risks, simply because the cost-benefit analysis does not seem to be capable to adequately address those new risks. Compared to cost-benefit analysis there is one specific surplus that the precautionary principle provides, which is it keeps options open.[249] And those options for the future are needed, when managing risks stemming from such a complex, uncertain and long-lasting event such as global climate change. Or as WHITESIDE puts it: *"(...) [I]f an ecosystem begins to show evidence of being as fragile as feared, we can still reverse course and return to something close to the situation that existed before we allowed the risk to spread. In contrast, when non-precautionary policymakers give the green light to an irreversible course of action with potential world-altering consequences, we simply have to hope for the best."*[250]

In defense of the cost-benefit analysis, however, the precautionary principle should be taking thoughts of cost-effectiveness into account in order for it to be not only theoretically but also in reality practicable.[251] Such thoughts can e.g. be included when assessing what risk management options – out of several equally effective precautionary measures – should be chosen.[252] They however should not be applied when risks themselves are being assessed and characterized, because for most climate change induced risks no mone-

248 Accord. CHAPMAN, at 944.
249 cf. CAROLAN, at 7.
250 WHITESIDE, at 58.
251 See *supra* in 4.4.3. and accord. WHITESIDE, at 80.
252 See also *supra* in 4.4.3.5.

tary values can be properly assigned.[253] In order to overcome the difficulty to find an answer to the question if precautionary measures should be taken in the first place, guidance must thus be sought in the characteristics of the risk itself (e.g. magnitude, irreversibility) and not in an evaluation of cost-effectiveness.[254]

4.4.5. The Precautionary Principle and the Arctic Ecosystems

If and if so in what way the precautionary principle is applied within the Arctic through the legal framework that is pertinent to it, will be addressed *infra* in 5. and 6. Nevertheless briefly pointing out the connection between the principle and the Arctic ecosystems seems appropriate at this point.

The Arctic is one of the regions of the world, that global climate change has a profound effect on.[255] Abiotic changes, such as a rise in temperature, have altered its ecosystems within the past couple of centuries: Melting of sea ice, thawing of permafrost and a decline in some as well as an increase in other mammal and plant species are some indications of the effect climate change has on the high North.[256]

Yet, still very little is known about the Arctic and the linkages between its various ecosystems, which impedes impact-assessments of global climate change in relation to the far North many times over. Uncertainties, complexities and ambiguities that are intrinsic to climate change induced risks are thus even more prominent in climate change induced *Arctic* risks. For assessing and managing such risks not only more and more multi-faceted science is needed, but also an approach towards risks that departs from traditional and linear science-based risk assessment and management, i.e. cost benefit-analysis.[257] The precautionary principle is in accordance with what has been said *supra* in 4.4. more suitable to handle such new environmental

253 Herein can also the difference to the Irreversible Harm Precautionary Principle be seen, that Sunstein suggests. While essentially the aim is the same – to keep options open for the future – the principle tries to allocate values to different kinds of risks. While this is certainly feasible for some risks – as much as the cost-benefit analysis is an adequate tool for the management of particular risks – it is not, however, for risks that entail a high amount of uncertainty and complexity such as most climate change induced risks.
254 See on this problem *supra* in 4.4.3.
255 See *supra* in 2.3.
256 Additionally *supra* in 2.3. and 4.1.
257 See more detailed *supra* in 4.3. and 4.4.4.

risks, which is why it should play a significant role in addressing climate change induced Arctic risks.

4.4.6. Conclusion

New complex environmental risks demand new multi-faceted ways in management. While the cost-benefit analysis is due to its transparent decision-making processes still a useful and commonly applied risk management tool, it comes up short where risk assessments are difficult and not enough scientific data can be procured in order for cost evaluations to be feasible.[258] The precautionary principle – if applied correctly and not in too strict a way – takes these uncertainties and complexities into account and provides for a more multi-faceted approach in managing risks, while at the same time keeping options open for the future. Yet, ultimately the precautionary principle is not much more than a guideline, rather than a clear principle, because it lacks a consonant definition. A strict confinement to the precautionary principle is thus, in the opinion of the present author, not the best way to tackle climate change induced Arctic risks. Rather risk management should become more multidisciplinary in the sense of taking all possible risk management tools into account instead of retreating to one single approach, be it cost-benefit analysis or the precautionary principle. Ecosystems do not consists of one single species, but are multi-dimensional and so should be the ways and means to protect them against threats. The precautionary principle provides a starting point in such protection, because it incorporates the complexities and uncertainties entailed in ecosystems. Yet a more multi-faceted way to handle ecosystems and the risks deriving from changes within them (especially one that includes economic reasoning when addressing ecological issues), ought to be sought if climate change induced risks are to be handled adequately.

258 See for details *supra* in 4.3.

4.5. The Ecosystem Approach

4.5.1. Introduction

In seeking an answer to the question in what way climate change induced risks are addressed best from a legal perspective, not only their uncertainties, complexities and ambiguities ought to be reflected on, but also also the fact that such risks are transboundary in scope and are not only of ecological but also of social and economic concern and hence call for a more multi-faceted way to their governance.[259]

While the precautionary principle as addressed *supra* in 4.4. tends to uncertainties, complexities and ambiguities intrinsic to climate change induced risks, it is predominantly a principle that is applied *in dubio pro natura*[260] – i.e. its focal point is primarily of ecological nature. Socio-economic interests are on the other hand addressed more adequately by applying the cost-benefit analysis.[261] This principle, however, lacks the inclusion of a margin of safety that is in light of uncertainties, complexities and ambiguities paramount if climate change induced risks are to be handled appropriately. It is hence a more holistic approach to governing such risks that is required. In this context the ecosystem approach deserves exceptional attention.

As with the precautionary principle the understanding of the ecosystem approach and what it entails is not unanimously shared within the international community.[262] Consequently the terminology is not uniform either; next to the common term *ecosystem approach*, notions such as *ecosystem management*, *ecosystem-based management*, *ecosystem-based approach* or *ecosystem approach to management* are being employed.[263] Among these ambiguities some core elements nevertheless exist: The ecosystem approach – as it shall be referred to hereinafter – is a holistic approach to managing human activities by addressing human needs in a way that does take the ecosystem as a whole into account, based on the best available knowledge on

259 See *supra* in 3.3., 4.1., 4.4.4.3. and 4.4.6.
260 See *supra* in fn 176 (part I).
261 See for details *supra* in 4.3.
262 See Trouwborst (2009), at 28, Bianchi, at 24.
263 See e.g. Kroepelien, Barnes & McFadden, Siron, et al., Kaplan, Trouwborst (2009), at 28, Layzer, at 20 and Conference of the Parties to the Convention on Biological Diversity, at 3, section I, para. 5.

its components, structure and dynamics.[264] The approach thus combines thoughts on ecology, economy and sociology.[265]

As a legal principle the ecosystem approach is acknowledged in the 1992 Rio Declaration, as it recognizes *"the integral and interdependent nature of the Earth"*[266] and urges states to *"cooperate in a spirit of global partnership to conserve, protect and restore the health and integrity of the Earth's ecosystem"*[267]. Unlike the precautionary principle, however, the ecosystem approach is not explicitly mentioned within the Declaration. In fact, to this date, there exists no binding legal definition of the approach. Nevertheless it is featured (at least implicitly) within a variety of legal documents[268], of which the most prominent would be the Convention on Biological Diversity (hereinafter CBD[269]).

As a consequence in order to understand the ecosystem approach and its aspects, it is necessary to address the meaning of this approach as it was adopted within the framework of the CBD in greater detail subsequently. Yet, in the following paragraphs a more general approach to the Convention on Biological Diversity will be chosen, while the Convention's role in assessing and managing climate change induced risks affecting the Arctic will be of further issue *infra* in 5.4.1.

Additionally aspects of the ecosystem approach that have emerged in the context of legal agreements and initiatives outside of the scope of the CBD will be addressed in greater detail *infra* in 5 and 6 in reference to specific rules and regulations pertaining to the governance of climate change in-

264 See Trouwborst (2009), at 28, cf. Fabra, at 568, Bianchi, at 24, Shepherd, at 4.

265 Accord. Smith & Maltby, at 17, Layzer, at 22. The ecosystem approach is in this context closely linked to the idea of sustainable development; see Barstow Magraw & Hawke, at 617, 620, 628 and 636, Rayfuse (Biological Resources), at 373 and Hardisty, at 62-64 and 66-76 (arguing for the implementation of an *environmental and economic sustainability assessment*, which is in essence incorporated in the ecosystem approach by addressing ecosystem goods and services and their importance for human (and thus consequently economic) well-being; see furthermore *infra* in 4.5.2.2. d. and e. and 8.2.1.3.), Kay & Boyle, at 67 and 71 (referring to SOHO models (see *infra* in fn 358 (part I)), but essentially meaning the same: *"The point is to encourage people to think about their relationship between the natural and human-constructed world and how human activities can affect the organization of the natural world feeding back and cascading through to affect the context for society."*) and in respect to fisheries Bianchi, at 37 (stating, that the ecosystem approach to fisheries is the framework that enables sustainable development to become operational in fisheries).

266 Preamble para. 5 of the Rio Declaration, as cited *supra* in fn 184 (part I).

267 Art. 7 of the Rio Declaration.

268 See for further details *infra* in 5. and 6.

269 As cited *supra* in fn 86 (part I).

duced Arctic risks. Therefore the following paragraphs are predominantly concerned with providing an outline to the principle as it was developed within the framework of the Convention on Biological Diversity.

4.5.2. The Ecosystem Approach within the Framework of the Convention on Biological Diversity

4.5.2.1. Description of the Ecosystem Approach through Conference of the Parties Decisions

The Convention on Biological Diversity itself does not refer to the ecosystem approach, it was however developed through the continuous work of the CBD's governing body, the *Conference of the Parties (COP)*, whose main objective lies in advancing the implementation of the Convention.[270] To that end regular meetings are convened which result in decisions issued by the Conference of the Parties. In 2000 at its Fifth Ordinary Meeting in Nairobi, Kenya the Conference of the Parties explicitly addressed the ecosystem approach and ultimately adopted a definition and laid out the basic principles in Decision V/6.[271] According to section A paragraph 1 of the COP 5 Decision V/6 the ecosystem approach is to be understood as *"a strategy for the integrated management of land, water and living resources that promotes conservation and sustainable use in an equitable way.* As such the ecosystem approach addresses the main objectives of the CBD, laid out in Art. 1 of the Convention, which are *"the conservation of biological diversity, the sustainable use of its components and the fair and equitable sharing of the benefits arising out of the utilization of genetic resources".*[272] This perspective was incorporated into the COP 7 decision VII/11[273], as a result of the Seventh Ordinary Meeting of the Conference of the Parties in 2002 in The

270 Art. 23 para. 4 of the CBD; on details of the development of the ecosystem approach see SMITH & MALTBY, at 9.

271 Available at <http://www.cbd.int/decision/cop/?id=7148> (last visited: 23.06.2014).

272 The Convention's objective of sharing the benefits arising from the utilization of genetic resources (e.g. for pharmaceutical reasons) is supported by its Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization (*Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization to the Convention on Biological Diversity*, Oct. 29, 2010, UNEP/CBD/COP/DEC/X/1), which was adopted on October 19, 2010 and will enter into force on October 12, 2014. See for details <http://www.cbd.int/doc/press/2014/pr-2014-07-14-Nagoya-Protocol-en.pdf> (last visited: 15.07.2014).

273 Available at <http://www.cbd.int/decision/cop/?id=7748> (last visited: 23.06.2014).

Hague. In Annex I section A, paragraph 3 the Conference of the Parties decision holds that *"the ecosystem approach provides an integrating framework for implementation of objectives of the Convention on Biological Diversity"*. The ecosystem approach can thus be regarded as one of the main tools in implementing the Convention on Biological Diversity.

Furthermore the approach takes into account the holistic characteristics of ecosystems, also referred to in article 2 of the Convention: According to this article the term *" 'ecosystem' means a dynamic complex of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit"*. In respect to what has been stated *supra*[274], humans need to be included in this definition. The ecosystem approach as it is understood by the Conference of the Parties accordingly "*recognizes that humans, with their cultural diversity, are an integral component of many ecosystems"*[275]. It is thus not a set of guidelines to manage ecosystems but rather a framework for holistic decision-making and action.[276]

In paragraph 4 of the COP 5 Decision V/6 the Conference of the Parties refers to another integral attribute of the ecosystem approach – one that it has in common with the precautionary principle: Absence of complete knowledge. According to the Conference of the Parties description of the ecosystem approach, such an *"approach requires adaptive management to deal with the complex and dynamic nature of ecosystems and the absence of complete knowledge or understanding of their functioning. Ecosystems are often non-linear, and the outcome of such processes often shows time-lags. The result is discontinuities, leading to surprise and uncertainty. Management must be adaptive in order to be able to respond to such uncertainties and contain elements of "learning-by-doing" or research feedback. Measures may need to be taken even when some cause-and-effect relationships are not yet fully established scientifically"*. This paragraph is essential in defining and ultimately implementing the CBD's ecosystem approach, because it allows for reference to the precautionary principle. The two principles do in that respect not differ very much in substance. They both deal with uncertainties, complexities and ambiguities. The holistic approach the precautionary principle lacks,[277] is however, the main focal point

274 See *supra* in 3.2.2.
275 COP 5 Decision V/6, section A para. 2, cf. KAY & BOYLE, at 66 (referring to the relationship between societal systems and ecological systems).
276 See SMITH & MALTBY, at 5 and 17.
277 See *supra* in 4.4.6.

of the ecosystem approach as it was defined at the COP 5 meeting. Integrating all possible approaches and methodologies to deal with complex situations is one of the core elements of the ecosystem approach, because it respects that *"there is no single way (...) for delivering the objectives of the Convention [on Biological Diversity] in practice"*[278]. While being an independent approach to risk governance, the precautionary principle consequently must be viewed as forming an integral part of the ecosystem approach.[279]

As a holistic guideline in addressing human activities, the ecosystem approach seems tailor made for managing climate change induced risks, because such risks demand integrative management solutions that take ecosystems as a whole into account. Reference to the CBD is in that context certainly favorable, since the Convention's scope is rather broad and – if humans are not singled out of the ecosystem definition – it is a feasible tool in conserving pristine regions such as the Arctic, while at the same time respecting human needs. The description of the ecosystem approach as it was laid down by the Conference of the Parties at the Kenya meeting in 2000, does not, however, provide any insight on how the ecosystem approach shall be applied in practice. Some apprehension on its scope can be derived from the COP 7 decision VII/11, which addresses the ecosystem approach in relation to the implementation of the CBD's objectives by stating that "[t]*he approach incorporates three important considerations:*

(a) Management of living components is considered alongside economic and social considerations at the ecosystem level of organization, not simply a focus on managing species and habitats;

(b) If management of land, water and living resources in equitable ways is to be sustainable, it must be integrated and work within the natural limits and utilize the natural functioning of ecosystems;

(c) Ecosystem management is a social process. There are many interested communities, which must be involved through the development of efficient and effective structures and processes for decision-making and management."[280]

278 COP 5 Decision V/6, section A para. 5, cf. Kay (System Thinking), at 11 and furthermore *infra* in fn 358 (part I).

279 See in this context also *infra* in 4.5.2.4., and with special focus on to the law of the sea fn 295 (part II) and 5.3.1.2.

280 COP 7 Decision VII/11, Annex I, section A, para. 3.

Again the holistic concept of the ecosystem approach and the importance to include humans in ecosystem thinking is pointed out by this decision. Nevertheless precise information on how the ecosystem approach shall be applied for it to be feasible in practice cannot be found in the descriptions of the ecosystem approach made in the COP decisions. To that end the Conference of Parties developed twelve principles – which were first recommended for use within all member countries at its Fifth Ordinary Meeting in 2000[281] – addressing characteristics of and questions on implementation of the ecosystem approach within the CBD framework. Those twelve principles shall be analyzed subsequently.

4.5.2.2. The Malawi Principles

While the adoption of a description as well as a recommendation for use of the twelve principles of the ecosystem approach took place at the COP Nairobi meeting in 2000, the initiating debates can be traced back to 1995 to the Second Ordinary Meeting of the Conference of the Parties held in Jakarta, Indonesia, where the Conference of the Parties held that *"the ecosystem approach should be the primary framework of action to be taken under the Convention"*[282]. Within the next years discussions continued,[283] culminating in a CBD-workshop on the ecosystem approach in 1998 in Lilongwe, Malawi, which was initiated by the CBD-Secretariat in order to advance the debate on the ecosystem approach.[284] During the three-day workshop, the participants discussed the characteristic features of an ecosystem approach and why such an approach was deemed suitable to effectively implement the Convention on Biological Diversity. Furthermore the question arose what the principles of an ecosystem approach should entail.[285] The findings of the CBD-workshop on the ecosystem approach were taken into

281 See COP 5 Decision V/6, section B.

282 COP 2 Decision II/8, para. 1, available at <http://www.cbd.int/decision/cop/?id=7081> (last visited: 23.06.2014).

283 Especially within the CBD's *Subsidiary Body for Scientific, Technical and Technological Advice (SBSTTA)*, whose objective is *"to provide the Conference of the Parties and, as appropriate, its other subsidiary bodies with timely advice relating to the implementation of this Convention"*; Art. 25 para. 1 CBD, CONFERENCE OF THE PARTIES TO THE CONVENTION ON BIOLOGICAL DIVERSITY, at 2, section I, para. 5.

284 See CONFERENCE OF THE PARTIES TO THE CONVENTION ON BIOLOGICAL DIVERSITY, esp. at 3, section I, para .7.

285 See ibid., at 3, section I, para. 7 and in detail: On the definition of an ecosystem approach, at 3-5, section II, para. 1; on the question why to take an ecosystem approach, at 6-7, section II, para. 2 and on the principles of an ecosystem approach, at 7-10, section II, para. 3.

account at the Fourth Ordinary Meeting of the Conference of the Parties, held in 1998 in Bratislava, Slovakia. In decision IV/1, the Conference of the Parties requested of *"the Subsidiary Body on Scientific, Technical and Technological Advice* [SBSTTA] *to develop principles and other guidance on the ecosystem approach, taking into consideration (...) the results of the Malawi workshop, and to report thereon to the Conference of the Parties at its fifth meeting"*[286].

Following this request, twelve principles, the so called Malawi principles, were adopted during the Fifth Ordinary Meeting of the Conference of Parties in 2000. Additionally, in order to make the implementation of these twelve principles feasible, the Conference of the Parties set out the rationale for each principle in its COP 5 and 7 Decisions V/6 and VII/11, which shall – along with the principles themselves – be provided subsequently.[287] Within this context it is important to keep in mind that, although the principles and their rationale are for clarity being addressed separately they are in practice not to be regarded as independent from each other, but are in fact complementary and interlinked in order to take the holistic feature of the ecosystem approach into account.[288]

a. Principle 1: Societal Choice

> *"The objectives of management of land, water and living resources are a matter of societal choice."*

As a holistic principle the ecosystem approach does take ecosystems as a whole into account, which means that humans need to be recognized as an

286 COP 4 decision IV/1, section B, available at <http://www.cbd.int/decision/cop/?id=7124> (last visited: 23.06.2014).

287 The following remarks on each principle, thus predominantly express the rationales set out by the COP in its Decisions V/6 and VII/11. A more critical review of these rationales shall be provided *infra* in 4.5.2.3. Note that an in depth examination of each principle shall be refrained from at this point. Where appropriate they will be addressed more thoroughly within the context of Arctic risk assessment and management *infra* in 5. and 6.

288 See COP 5 Decision V/6, section B, para. 6; for the following analysis short titles for the 12 principles are being chosen that in the opinion of the present author reflect the respective principles' rationale best. The principles will be addressed following the order set out in Decision V/6. Nevertheless it needs to be acknowledged that there exist different ways to group the principles. The IUCN's Commission on Ecosystem Management, e.g., to simplify their use, groups them in five steps: A. Key stakeholders and area, B. Ecosystem structure, function and management, C. Economic issues, D. Adaptive management over space and E. Adaptive management over time; see Shepherd, at 5.

integral part of many ecosystems.[289] Within that context rights and interests of stakeholders (especially of indigenous peoples and local communities) need to be focused on when managing land, water and living resources.[290] Since different sectors of society view ecosystems according to their own specific economic, cultural and societal needs,[291] ecosystem management is dependent on societal choice. Consequently while a society or a group within it, that has a strong relationship with the natural world, ensures a cautious management of resources, other societies or groups within them are – because their focus lies elsewhere (e.g. on economic benefits) – less inclined to take equally cautious measures. As much as the perception of risks is dependent on varying societal views, the perception of ecosystems and how they should be managed is influenced by specific economic, cultural and societal interests and needs. By applying a holistic perspective the ecosystem approach needs to take all these differing interests and needs into account, which means that all relevant sectors of society (including future generations) need to have their interests equitably treated through negotiations and trade-offs.[292] This implies integrated decision making processes, involving all interested stakeholders, as well as transparency within the decision making process by communicating relevant data and information to all parties involved.[293]

b. Principle 2: Decentralization of Management

> *"Management should be decentralized to the lowest appropriate level."*

The objective of principle 1, including societal choice within decision making processes, only becomes feasible if the most suitable management body is chosen for managing land, water and living resources. Integrated and transparent decision making will not result in efficient and equitable management of resources if the assigned body lacks the knowledge and/or capacity to effectively implement the decision. According to the COP decision VII/11, management *decisions* should thus be made by those who represent the appropriate communities of interest (e.g. indigenous peoples), while *management* should be undertaken by those with the capacity to implement the de-

289 See *supra* in 4.5.2.1., fn 275 (part I).
290 See COP 5 Decision V/6, section B, para. 6 and cf. Barstow Magraw & Hawke, at 629.
291 See COP 5 Decision V/6, section B, para. 6.
292 See COP 7 Decision VII/11, Annex I, section B, Table 1, principle 1.
293 See ibid.; furthermore *supra* in 1.5., esp. fn 45 (part I), cf. Smith & Maltby, at 27.

cisions.[294] Most often the closer the management is to the ecosystem, the greater are the responsibility, participation and use of local knowledge. Decentralized management systems thus may lead to greater efficiency, effectiveness and equity as a result of the management process.[295] However, since local resource management bodies are often influenced by subordinated environmental, social, economic and political processes, coordinating the various management procedures is paramount.[296] Ultimately cooperation between different regional and/or national management bodies is needed.

c. Principle 3: Management Implications for Other Ecosystems

> *"Ecosystem managers should consider the effects (actual or potential) of their activities on adjacent and other ecosystems."*

Because most processes in life are not linear (and that is even more appropriate for natural events) and because the future is not predetermined it is impossible to foresee all ramifications of a certain action, even if it is aimed at protecting an ecosystem. What has been said above[297] in respect to the precautionary principle thus also holds true for the ecosystem approach: Management actions taken in order to prevent one specific risk, might lead to the emergence of another. Or in other words: Because ecosystems are not closed but interlinked systems to which uncertainties and complexities are intrinsic, managing land, water and living resources of one specific ecosystem in a holistic way, might lead to unexpected ramifications within another ecosystem.[298] While managing resources in light of a strict version of the precautionary principle, would forbid all action, even precautionary action, if it were to induce potential negative results for the specific, an adjacent or otherwise connected ecosystem, the ecosystem approach can – as a holistic principle that takes *all* interests into account, including those of stakeholders pursuing pure financial benefits – never go that far. Yet – quite similar to a weak version of the precautionary principle – the ecosystem approach demands that negative ramifications to other ecosystems are being taken

294 See COP 7 Decision VII/11, Annex I, section B, Table 1, principle 2.
295 Ibid. and in the same context Reese (Herausforderungen), at 16.
296 See COP 7 Decision VII/11, Annex I, section B, Table 1, principle 2. and cf. Smith & Maltby, at 31 (mentioning further difficulties when applying decentralized management).
297 See *supra* in 4.4.3.1.
298 Accord. COP 7 Decision VII/11, Annex I, section B, Table 1, principle 3.

into account whenever management interventions are being considered.[299] Within this context the ecosystem approach adds new depth to rules of international environmental law, such as the ones adopted in the *Trail Smelter Arbitration*[300] of 1938 and 1941 respectively.

The case, which dealt with harmful emissions caused by a Canadian smelter resulting in environmental damages within U.S. grounds, prominently held that *"no State has the right to use or permit the use of its territory in such a manner as to cause injury by fumes in or to the territory of another or the properties or persons therein, when the case is of serious consequence and the injury is established by clear and convincing evidence"*[301]. The ecosystem approach adds to these findings by expanding the scope of the extraterritoriality rule to negative ramifications from one to another ecosystem. In this light states do not only have the obligation to deter from any action likely resulting in adverse effects within the territory of another state or the properties or persons therein, but also from any activity – even if it is taken in order to conserve and protect an ecosystem – that could lead to negative ramifications within adjacent and other ecosystems.

d. Principle 4: Ecosystem Services and their Economic Values

> *"Recognizing potential gains from management, there is usually a need to understand and manage the ecosystem in an economic context. Any such ecosystem-management programme should:*
>
> *(a) Reduce those market distortions that adversely affect biological diversity;*
>
> *(b) Align incentives to promote biodiversity conservation and sustainable use;*

299 See ibid.; Yet in practice principle 3 is found to be the least relevant: See SMITH & MALTBY, at 39.

300 *Trail Smelter Case (United States v. Canada), Reports of International Arbitral Awards, Volume III pp. 1905-1982 (2006).*

301 Ibid., at 1965; these ideas were later included into legal texts such as the Stockholm Declaration (as cited *infra* in fn 3 (part II), the Rio Declaration and the Convention on Biological Diversity; see principle 21 of the Stockholm Declaration, which holds that states have *"the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other States or areas beyond the limits of national jurisdiction";* accord. principle 2 of the Rio Declaration, art. 3 of the CBD and preamble of the London Convention. See for further details on these legal texts *infra* in 5.1.1., 5.1.5., 5.3.2.2. and 5.4.1.

(c) Internalize costs and benefits in the given ecosystem to the extent feasible."

As a holistic principle the ecosystem approach is incorporating human rights and needs when managing land, water and living resources. This includes above all economic interests of stakeholders. Because many ecosystems provide economically valuable goods and services[302] such as food and freshwater as well as recreational values, very often management interventions are being taken in the light of effectively producing short term economic gain[303] and financially equitable solutions, rather than out of ecological reasoning. Because humans form an integral part of ecosystems, it is thus necessary to understand and manage ecosystems in an economic context.[304] Economic systems, however, often undervalue ecosystem goods and services or they are being regarded as *"public goods"*, which makes it difficult to incorporate them into markets.[305] Furthermore, often stakeholders that are interested in sustainable use of land, water and living resources, and thus have an interest in maintaining natural ecosystems and processes, have limited political and economic influence, while those who actually control the ecosystem's goods and services use resources in an unsustainable way, because this will lead to a greater benefit in short term.[306] To overcome such discrepancies, economic systems will ultimately have to be redesigned in order to adequately accommodate environmental management objectives.[307] It is in this context important to understand, that economic benefits are not necessarily inconsistent with biodiversity conservation and sustain-

302 On estimates of the monetary value of such goods and services see e.g. GROOT, ET AL., at 372-384 (for marine ecosystems), 386-395 (for terrestrial ecosystems) and 396-398 (specifically on polar and high mountain ecosystems).

303 Accord. WHITE, ET AL., at 131.

304 See COP 7 Decision VII/11, Annex I, section B, Table 1, principle 4, cf. HARDISTY, at 12–14, KAY & BOYLE, at 66 (stating, that the physical environment is a prerequisite for our economy and livelihoods.)

305 See SHEPHERD, at 12, TEEB (EXECUTIVE SUMMARY), at 7, HARDISTY, at 50, BEAUCHEMIN (on Canada's stance in respect to ecosystem goods and services) and on the definition of public goods in general see BHAT, at 16–17.

306 COP 7 Decision VII/11, Annex I, section B, Table 1, principle 4, cf. SMITH & MALTBY, at 34, HARDISTY, at 7 and 9.

307 See COP 7 Decision VII/11, Annex I, section B, Table 1, principle 4 and for details on how biodiversity and ecosystem services can be integrated into economic systems HARDISTY, at 51, 83-84 and 291 and TEEB (EXECUTIVE SUMMARY), at 13–14 (suggesting to businesses to thoroughly assess their impacts and dependencies on biodiversity and ecosystem services as well as their risks and opportunities stemming therefrom, in order to minimize or mitigate those risks and grasp newly emerging opportunities) and BARRINGTON, ET AL., at 173–191 (defining new markets for biodiversity and ecosystem services as well as tools to support them); and see furthermore *infra* in 8.2.1.3.

ability.[308] In fact, in recent years many corporations have become aware of the value of ecosystem services and the economic gain that can be derived from sustainable products such as renewable energy sources or other 'green' commodities, as well as of the potential economic risks posed by biodiversity loss and ecosystem degradation.[309]

Some additional remarks seem necessary in this context: In consideration of the discrepancies between economic and ecological interests when addressing environmental risks as pointed out *supra* in relation to the cost-benefit analysis and the precautionary principle,[310] it must seem clear that economic and ecological issues ought to be reflected upon mutually if environmental risks are to be governed appropriately. Especially in their strongest version, both the cost-benefit analysis as well as the precautionary principle come short in this perspective, as their focus predominantly lies with either economic or ecological interests, respectively.[311] The ecosystem approach is more holistic in this context and as such tends to both ecological as well as economic concerns when addressing environmental issues.[312] As a consequence ecosystem services and their economic valuation, as referred to in principle 4 of the Malawi Principles, are vital aspects of the ecosystem approach and consequently ought to be considered as regards climate change induced risks when such an approach is to be applied to their governance. The economic element of the ecosystem approach will thus be a recurring topic throughout this thesis and will be addressed in greater detail *infra*, especially in 8.2.1.3.

308 COP 7 Decision VII/11, Annex I, section B, Table 1, principle 4, Smith & Maltby, at 38, Hardisty, at 6 (pointing out the benefits of sustainability to industry), TEEB (Executive Summary), at 4, 10 and 13 (stating that *"all business depend on biodiversity and ecosystem services, directly or indirectly. (...) Businesses that fail to assess their impacts and dependence on biodiversity and ecosystem services carry undefined risks and may neglect profitable opportunities (...)"* as *"biodiversity or ecosystem services can be the basis for new businesses"*. Furthermore TEEB argues *"that companies that understand and manage risks presented by biodiversity loss and ecosystem decline, that establish operational models that are flexible and resilient to these pressures and that move quickly to seize business opportunities, are more likely to thrive"*.).

309 See for details White, at 16–21, Harrison, et al., at 57–59, Barrington, et al., at 162–164, Hardisty, at 36–37.

310 See for details *supra* in 4.3. and 4.4.

311 Ibid., esp. 4.4.1.

312 See inter alia *supra* in 4.5.1. and 4.5.2.1. as well as *infra* in 4.5.4.

e. Principle 5: Conservation of Ecosystem Structure and Functioning

> *"Conservation of ecosystem structure and functioning, in order to maintain ecosystem services, should be a priority target of the ecosystem approach."*

According to the CBD the term *ecosystem* is being defined as *"a dynamic complex of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit"*[313]. Consequently the functioning and resilience of ecosystems is based on the interactions between its organisms and their biotic and abiotic surroundings.[314] The interdependent and reciprocal actions are what link the individual ecological processes to a complex and dynamic system, which can only function properly (and hence provide ecosystem goods and services such as food and freshwater we all depend upon) if these interactions are being maintained. As a result, to meet the Convention's objective – the conservation of biological diversity – the ecosystem approach demands a wider scope than simply protecting one or several specific species. The conservation and – if needed – restoration of intrinsic interactions and processes within an ecosystem needs to be the focal point of preserving biological diversity.[315] In relation to ecosystem management, monitoring activities become important in order to detect changes within specific interactions in a timely manner, so as to decide at the earliest stage possible on initiating management procedures based on the best available scientific information. Complete knowledge of ecosystem functioning thus cannot be a prerequisite for taking management initiatives.[316]

f. Principle 6: Ecosystem Limits

> *"Ecosystems must be managed within the limits of their functioning."*

313 Art. 2 of the CBD.
314 See also *supra* in 3.2.2.
315 See COP 7 Decision VII/11, Annex I, section B, Table 1, principle 5.
316 Uncertainties, complexities and ambiguities are intrinsic in ecosystems. As with the precautionary principle the ecosystem approach cannot be implemented if complete knowledge were to be made a prerequisite. See also *supra* in 4.2. and COP 7 Decision VII/11, Annex I, section B, Table 1, principle 5, as well as SMITH & MALTBY, at 37.

As a strategy for the integrated management of land, water and living resources that promotes conservation and sustainable use in an equitable way, the ecosystem approach needs to recognize ecosystem limits. While ecosystems can provide goods and services on a long or even infinite temporal scale, they are nevertheless limited to the demand that can be placed on them, in order to maintain the capacity to produce any goods and preserve its integrity.[317] Attention should thus be given to the environmental conditions that limit natural productivity, ecosystem structure, functioning or diversity.[318] Over-exploitation or external factors such as changes in abiotic systems (e.g. climate change) can influence ecosystem limits in an unforeseen way not only in short but also in long term. As a result, ecosystem management needs to consider the fact that ecosystem functioning can never be completely understood and by doing so be appropriately cautious when deciding on management options. Consequently, if plant, animal and human well-being are to be secured for the long term, a reflective use of resources (i.e. sustainable use) is required, that takes characteristics of ecosystems and their intrinsic boundaries into account by applying precautionary practices in order to keep options open for the future and recognize the system immanent uncertainties.[319]

g. Principle 7: Spatial and Temporal Scale

> *"The ecosystem approach should be undertaken at the appropriate spatial and temporal scales."*

Ecosystems are complex systems that change over space and time. Human activities and natural events can have an impact on how ecosystems evolve spatially. E.g. climate change has had an influence on polar bear populations; a species that at a certain moment in time used to be relatively regularly and continuously distributed, but now, due to the many threads it is facing, has significantly lost in number.[320] Furthermore, due to the intrinsic uncertainties and complexities within ecosystem processes, it is difficult to assess how ecosystems will change over time. Consequences of initiating activities and events thus might not be felt immediately but much further in

317 See COP 7 Decision VII/11, Annex I, section B, Table 1, principle 6.
318 See ibid. and COP 5 Decision V/6, section B, para. 6, principle 6.
319 See COP 7 Decision VII/11, Annex I, section B, Table 1, principle 6.
320 See IUCN (Polar Bears 2006), at 61, Platt, CAFF (Biodiversity Trends), at 26–28 and *supra* in fn 94 (part I), for other species, such as fish, that try to adapt to the changing abiotic factors.

time. Ecosystem management should be capable to respond to these peculiarities by transcending spatial and temporal scales.[321] In practice, however, managers and policymakers often have to decide upon management initiatives within shorter time frames or more limited spatial scales, which will not accurately address the processes within an ecosystem over time and space.[322] The wider the spatial and temporal scale within which management options are to be decided upon, planned and initiated, the more adequate will be the results in terms of maintaining ecosystem functioning and resilience.

h. Principle 8: Long Term Management

> *"Recognizing the varying temporal scales and lag-effects that characterize ecosystem processes, objectives for ecosystem management should be set for the long term."*

As already stated in respect to principle 7, recognizing that ecosystems change over time and that ecosystem processes are often designated by long-lastedness, requires ecosystem management to be set for the long term. In practice however, policy-makers and managers are often limited by a short time frame within which management options shall be applied. A lack of awareness in respect to long term ecosystem processes, the prospect of short term economic benefit and the difficulty to effectively develop long term management plans are some of the reasons why principle 8 of the Malawi Principles is in practice often not accurately accounted for.[323]

i. Principle 9: Inevitability of Change

> *"Management must recognize that change is inevitable."*

Ecosystems change. Internal and external biotic and abiotic factors influence how ecosystems evolve and consequently lead to changes within the system; some of which – because they happen on a regular basis – are hardly detectable, while others (i.e. climate change) have a more profound im-

321 See COP 7 Decision VII/11, Annex I, section B, Table 1, principle 7.
322 Ibid.
323 See *supra* in 4.4.4.1., 4.5.2.2. d. and COP 7 Decision VII/11, Annex I, section B, Table 1, principle 8, Hardisty, at 5, Smith & Maltby, at 34 (providing ideas on how to at least partially overcome the limitations of short-term projects, e.g. by developing a strategy that provides for continuity of activities).

pact on ecosystems. Because uncertainties and complexities are inherent in ecological systems, it is difficult or often impossible to assess how and within what temporal scale change will happen and what its impact on the ecosystem might be.[324] Management thus should adapt to changes by maintaining flexibility for the future in utilizing precautionary measures and adaptive management approaches, that will be able to include new scientific knowledge into regulations and management plans.[325] This is in light of principle 8 especially appropriate, since management initiatives should according to this principle be taken within a long term time frame, that makes change all the more inevitable.

j. Principle 10: Biological Diversity

> *"The ecosystem approach should seek the appropriate balance between, and integration of, conservation and use of biological diversity."*

Biological diversity is an intrinsic factor of ecosystems. Human, animal and plant well-being all depend upon biodiversity, because it is the connections and interactions between organisms and their biotic and abiotic surroundings that link the individual ecological processes to a complex and dynamic system, which provides goods and services we all depend upon.[326] As with all change, alterations in biodiversity (e.g. the extinction of a certain species) can have a profound impact on the ecosystem as a whole. As a strategy to implement the objectives set out in the Convention on Biological Diversity (*"conservation of biological diversity, the sustainable use of its components and the fair and equitable sharing of the benefits arising out of the utilization of genetic resources"*[327]), the ecosystem approach is designed to support the conservation of biodiversity, which makes management initiatives aimed at preserving and restoring the development of species one of the key factors under the Convention.

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324 Changes within ecosystems are inevitable and so are surprises in complex and dynamic systems. In the words of ACIA: "*Perhaps the only certainty in the assessment of impacts of changes in climate (…) is that there will be surprises."* See *supra* in fn 141 (part I), COP 7 Decision VII/11, Annex I, section B, Table 1, principle 9.

325 See COP 7 Decision VII/11, Annex I, section B, Table 1, principle 9, Shepherd, at 4, Lister, at 103, Weiss, at 323, Tarlock, at 581, United Nations Educational Scientific and Cultural Organization (Ecosystem Approach), at 5, c.f. Jaeckel, at 17.

326 See *supra* in 3.2.2., 4.5.2.2. e., and COP 7 Decision VII/11, Annex I, section B, Table 1, principle 10 as well as Hardisty, at 12.

327 Art. 1 of the CBD.

k. Principle 11: Relevant Information

> *"The ecosystem approach should consider all forms of relevant information, including scientific and indigenous and local knowledge, innovations and practices."*

Effective, efficient and equitable ecosystem management is dependent upon scientific data, addressing the myriad of ecological processes and by doing so, forming a better understanding of what role human activities play within a specific ecosystem. Because societal choice causes ambiguities within different societies and groups in respect to ecosystem characteristics and values, information from all relevant stakeholders and sectors needs to be gathered before deciding upon or carrying out any management initiatives.[328] Only an integrated (i.e. incorporating information and knowledge from the highest to the lowest level of societies) approach to managing ecosystems will result in a comprehensive and acceptable solution for all parties involved.

l. Principle 12: Integrated Management

> *"The ecosystem approach should involve all relevant sectors of society and scientific disciplines."*

As set out by principles 1, 2 and 11, the ecosystem approach – as a holistic approach – demands integrated management of land, water and living resources, because views of ecosystems differ within societies and groups therein and only the gathering of a wide array of information within various national or international sectors will be capable to most comprehensively provide scientific data and indigenous or local knowledge on ecosystem processes. The objectives of the Convention on Biological Diversity can thus only be achieved if all stakeholders and interested sectors (even those that traditionally have not been involved in biodiversity conservation or management), provide their information, capacities and skills and cooperate in attaining the common targets set out by the CBD and the ecosystem approach.[329] As such principle 12 combines the previous principles 1, 2 and 11.

328 See *supra* in 4.5.2.2. a. and COP 7 Decision VII/11, Annex I, section B, Table 1, principle 11; in practice the accessibility and management of information has proven to be difficult, however: See Smith & Maltby, at 41–42, Shepherd, at 10-11 and 14-15.

329 See COP 7 Decision VII/11, Annex I, section B, Table 1, principle 12.

4.5.2.3. Implementation of the Ecosystem Approach within the CBD Framework

In order to facilitate the implementation of the ecosystem approach based on the 12 principles, the Conference of the Parties, additionally to establishing a description and the main principles on an ecosystem approach, during the Nairobi meeting proposed five points as *operational guidance* for application of the ecosystem approach within the CBD framework.[330] Each guideline combines several of the 12 principles of an ecosystem approach. The five points suggested as an operational guidance and what principles and rationale[331] they entail will be addressed in detail subsequently.

1. Focus on functional relationships and processes within ecosystems: Conservation of biodiversity is one of the critical factors addressed by the ecosystem approach. Only functional relationships and processes within an ecosystem will guarantee its functioning and thus the existence of biodiversity, which provides many goods and services human, animal and plant well-being depend upon (*principles 4, 5 and 10*). In order to conserve biological diversity a lot of knowledge on the dynamic and complex processes within ecosystems is required. Yet, while gaining new knowledge needs to be paramount *(principles 11 and 12)*, a lack thereof shall not be hampering any measures taken in the light of ecosystem management, especially where ramifications for other ecosystems are likely. (*principles 3, 5, and 6*).

2. Enhance benefit-sharing: Ecosystems provide benefits in the form of land, water and living resources which are responsible for mankind's environmental security and viability. The ecosystem approach's objective is to secure these benefits by maintaining or restoring discontinuous and defective ecosystem functions and processes and managing resources in a sustainable way (*principles 5, 6 and 10*). Because the ecosystem approach is to be applied in a holistic manner, human rights and needs ought to be incorporated into ecosystem thinking. Maintenance and restoration of ecosystem functions and processes will only be vital to humans if stakeholders responsible for their production and management are the ones to primarily benefit therefrom. According to the Conference of the Parties this requires *inter alia*, capacity building[332], especially at the level of local and indigenous com-

330 See COP 5 Decision V/6, section C, paras. 7-12.

331 The following definitions predominantly express the views shared by the Conference of Parties as reproduced in its COP 5 Decision. See COP 5 Decision V/6, section C, paras. 7-12.

332 Capacity building is defined by Agenda 21 as encompassing *"the country's human, scientific, technological, organizational, institutional and resource capabilities".* See section IV, chap-

munities and the proper valuation of ecosystem goods and services (*principles 2, 4 and 12*).

3. Use adaptive-management practices: Ecosystems are complex and dynamic systems, consisting of various individual ecological processes on which often no comprehensive knowledge exists. Ecosystem functioning and processes are thus defined by a high degree of uncertainty. Consequently, managing ecosystems must incorporate this peculiarity by applying adaptive methodologies, that are capable of addressing new knowledge and change within the system (*principles 6 and 9*). This requires that management initiatives are focusing on long term, flexible ecosystem management and take societal choices into account in order to make management feasible (*principles 1, 7 and 8*). Monitoring bodies become in that context especially important (*principle 5*).

4. Carry out management actions at the scale appropriate for the issue being addressed, with decentralization to lowest level, as appropriate: Ecosystems are functioning units, that combine individual ecological processes at different scales. Ecosystem management will thus have to be carried out at the level relevant for the specific problem or issue that needs to be addressed. Often this implies decentralization to the level of local and/or indigenous communities (*principle 2*). Decentralization will only be effective, however, if stakeholders have the opportunity (also through policy and legislative frameworks) and are in terms of their capacity capable to carry out appropriate management action (*principle 12*). Furthermore, where many stakeholders are involved cooperation and coordination of action at a national as well as a regional or global level is advisable (*principle 2*).

5. Ensure intersectoral cooperation: Effective implementation of the ecosystem approach is only feasible if sectors responsible for carrying out ecosystem management combine their efforts by cooperating and coordinating their management plans. While conservation of a specific species will in parts ensure biodiversity and ultimately acknowledge the ecosystem ap-

ter 37, para. 37.1 of Agenda 21, available at <http://sustainabledevelopment.un.org/content/documents/Agenda21.pdf> (last visited: 23.06.2014); also for further details on Agenda 21 see *infra* in 5.1.5. See additionally ASH, ET AL., at 15 (defining capacity building as *"a continuous process aimed at strengthening or developing long-term relevant human resources, institutions, and organizational structures to carry out ecosystem assessments of relevance to decision makers and to act on the findings"*).

proach, it is only the protection of a multitude of species and their relationships with their biotic and abiotic surroundings that will maintain the ecosystem's functionality. Information gathered and practices adopted by different sectors (e.g. agriculture, fisheries, forestry) should thus be shared in order for management to become holistic (*principle 11*). The ecosystem approach thus calls for multidisciplinary strategies and action plans that involve all stakeholders, including those that are not primarily responsible for ecosystem conservation (e.g. economic sectors) (*principle 1*).

6. Cross-cutting issues related to operational guidance: In 2002 at the Seventh Ordinary Meeting in The Hague, the Conference of the Parties reflected on the operational guidance of the ecosystem approach and referred to five cross-cutting issues in need to be considered:[333] Initiating the approach (1), capacity-building and collegiate will (2), information, research and development (3), monitoring and review (4) and good governance (5).

In terms of the *first* cross-cutting issue the Conference of the Parties held that *"when initiating the ecosystem approach, the first task is to define the problem that is being addressed. In doing so the scope of the problem and the task to be undertaken has to be well specified. The strategy to be followed to promote the ecosystem approach has to be clearly defined with contingencies for unforeseen situations incorporated into the strategy. The approach should consider all principles as a package but depending upon the task at hand emphasis on particular principles may be warranted. (...) Collectively developing the overarching goals, objectives, targets for the exercise is important before applying the ecosystem approach"*[334].

Once the base on which the ecosystem approach is to be applied is framed, *"it is critical to investigate what resources and sponsorship are required to undertake the exercise"*[335]. According to the *second* cross-cutting issue, the success of the ecosystem approach is dependent upon formation of collegiate will and capacity-building. Only if stakeholders, political institutions, sponsors and donors share a common interest and are thus willing to work towards the goals, objectives and targets set out when initiating the ecosystem approach, as well as when implementing it, ecosystem management will

333 See COP 7 Decision VII/11, Annex I, section B, paras. 11-19; the same cross-cutting issues are also referred to in the Beginners Guide to use the Ecosystem Approach and the Ecosystem Approach Advanced User Guide, which are both available at <http://www.cbd.int/ecosystem/sourcebook/> (last visited: 23.06.2014).

334 COP 7 Decision VII/11, Annex I, section B, para. 12.

335 COP 7 Decision VII/11, Annex I, section B, para. 13.

be successful.[336] All the best interests are not sufficient, however, if there is a lack of capacity (in terms of financial support and appropriate infrastructure) to implement the ecosystem approach. Capacity-building is thus equally as important for the success of the ecosystem approach.[337]

Furthermore, according to the *third* cross-cutting issue, effective ecosystem management is dependent on sufficient information on biophysical, social and economic processes and issues related to the functioning of the ecosystem as a whole.[338] The ecosystem approach thus supports research and information gathering as well as communication between all stakeholders involved. In this context *"[c]onsideration should be given to enhancing the access of stakeholders to information because the more transparent the decision-making is, based on information at hand"*[339], the more favorable will the resulting decisions be for partners, stakeholders and sponsors.

Because ecosystems are not constant units, but change over space and time they are in need of adaptive management. Hence, the *forth* cross-cutting issue addresses monitoring and review as crucial components in implementing the ecosystem approach.[340] Depending upon the findings from monitoring, strategies, practices and processes may need to be reviewed and modified in order for them to adapt to the changes within ecosystems.[341]

As the final, *fifth* cross-cutting issue, the Conference of the Parties mentions good governance as an essential tool for successful application of the ecosystem approach: *"Good governance at all levels is fundamental for achieving sustainable use and conservation of biodiversity"*[342]. On the question what good governance entails, the Conference of the Parties elaborates: "*Good governance includes sound environmental, resource and economic policies and administrative institutions that are responsive to the needs of the people. (...) Decision-making should* [thus] *account for societal choices, be transparent and [integrative]."*[343]

While these five cross-cutting issues help to clarify the five points proposed as an operational guidance when applying the 12 principles of an ecosystem

336 See COP 7 Decision VII/11, Annex I, section B, para. 14, Shepherd, at 20.
337 See COP 7 Decision VII/11, Annex I, section B, para. 15.
338 See COP 7 Decision VII/11, Annex I, section B, para. 16, Shepherd, at 20.
339 COP 7 Decision VII/11, Annex I, section B, para. 16.
340 See COP 7 Decision VII/11, Annex I, section B, para. 17.
341 Ibid.
342 COP 7 Decision VII/11, Annex I, section B, para. 19.
343 COP 7 Decision VII/11, Annex I, section B, para. 18.

approach laid out in the COP 5 Decision V/6, the concrete implementation of the Malawi principles still remains a difficult task, because it demands a lot of expertise, cross-sectoral and trans-national/regional communication and cooperation as well as financial and technological capacity. In order to advance the implementation of the ecosystem approach within member states, a web-based Ecosystem Approach Sourcebook[344] was developed within the CBD framework. Next to a beginners and advanced user guide[345] on the ecosystem approach, which further defines the approach and how it should be applied and implemented, the Sourcebook also contains a trial version of a case study database[346] open to the public, which is a growing collection of studies carried out in different countries on a variety of topics relevant to ecosystem conservation and management (e.g. climate change and biodiversity, access to genetic resources and benefit-sharing, economics, trade and incentive measures or the ecosystem approach itself). While the establishment of such a database is certainly beneficial, because – drawing from the experience other countries or sectors have made – it might be able to advise managers, decision-makers and regulators on how to implement the ecosystem approach in an effective and efficient way, it is still in the early stages of development.[347]

From a critical point of view, implementation of the ecosystem approach in respect to biodiversity conservation is still either lacking completely (e.g. due to a lack of financial and technological capacity or because stakeholders are unaware of what the ecosystem approach is and/or what it could do for ecosystem management[348]) or in efficiency (e.g. due to insufficient knowledge on relevant ecological processes or a lack of cooperation between sec-

344 The Sourcebook was created in response to COP 7 Decision VII/11 which requested of "*the Executive Secretary, in collaboration with Parties and relevant international and regional organizations to" inter alia* collect "*case-studies at national, sub-regional, regional and international level on the implementation of the ecosystem approach, and develop (…) a database of case-studies [which should be made] widely available to Parties through the development of a web-based "sourcebook" for the ecosystem approach"*; See COP 7 Decision VII/11, para. 9, sub-paras. c and d.

345 See *supra* in fn 333 (part I).

346 Available at <http://www.cbd.int/ecosystem/sourcebook/search> (last visited: 23.06.2014).

347 As of June 2014 studies submitted, specifically referring to the ecosystem approach do predominantly deal with one specific or a limited number of sectors (e.g. fisheries, or agriculture), region or ecosystem process and/or entity. In light of the holistic view the ecosystem approach represents, further cross-linking is certainly advisable. Furthermore studies on polar biomes in respect to biological diversity are yet to be carried out and submitted.
See <http://www.cbd.int/ecosystem/sourcebook/search> (last visited: 23.06.2014).

348 See Smith & Maltby, at 18, 28-29 (providing ideas on how to improve awareness and understanding of the ecosystem approach).

tors or stakeholders[349]). While there is experience in applying the ecosystem approach, yet a much broader integrative scope is needed to fully implement it. Raising awareness within and including all levels and all relevant sectors and stakeholders is paramount.[350] In spite of all these difficulties, advancements are nevertheless – especially through the work of the CBD bodies – continuously made to promote the ecosystem approach and ensure its application within the framework of biodiversity conservation.[351]

4.5.2.4. The Ecosystem Approach and Risk Governance

The ecosystem approach as developed within the CBD framework is *per definitionem* a strategy for the integrated management of land, water and living resources, that promotes conservation and sustainable use in an equitable way.[352] It is as such not primarily a risk management tool.

Designed with the objective to properly implement the Convention on Biological Diversity, the ecosystem approach needs to be seen within the context of environmental conservation, rather than as a principle applicable to decision-making processes involving risk. Not all risks, after all, do refer to the probability of negative environmental impacts, endangering ecosystem health or integrity. Nevertheless, because the ecosystem approach endorses a holism, mainly designed to govern human activities[353] so as to prevent ecological disturbances that might arise from unsustainable use of resources, it can be an applicable risk management tool, whenever initiating human activities are likely to have negative ramifications for the environment. As far as initiating natural events are concerned, the ecosystem approach is, according to the description set out by the Conference of the Parties, not *per se* a tool to govern such events. Yet, as stated in principle 9[354], the ecosystem

349 See e.g. Fee, et al., at 14, cf. Smith & Maltby, at 42 (stating that only few people have the multi-disciplinary expertise required to make informed decisions under the ecosystem approach).

350 See COP 9 Decision IX/7, para. (d), Smith & Maltby, at 18–19 (reflecting on ideas on how to better communicate the ecosystem approach).

351 The CBD Secretariat e.g. until the end of 2009 quarterly published an e-Newsletter on the Ecosystem Approach to facilitate sharing of information on the application of the ecosystem approach and promote the use and voluntary update of the Ecosystem Approach Sourcebook; available at <http://www.cbd.int/ecosystem/ea-newsletters/> (last visited: 23.06.2014); additionally on the CBD's role as regards developing and implementing the ecosystem approach see *infra* in 5.4.1.

352 See *supra* in 4.5.2.1.

353 Accord. Trouwborst (2009), at 28.

354 See *supra* in 4.5.2.2. i.

approach needs to be responsive to change and recognize it as an inevitable process within ecosystem functioning. Consequently, natural events, that are able to change ecosystem processes and by doing so disturb ecosystem functioning and resilience, call – in effectively applying the ecosystem approach – for management interventions, because maintaining ecosystem interactions and processes that promote biological diversity is the pivotal objective of the Convention on Biological Diversity.[355] Or in other words, any event – be it naturally or anthropogenically induced – that endangers ecosystem interactions and processes (or in other words: ecosystem integrity and health) needs to be adequately managed, in order to maintain or restore the natural balance within the ecosystem and as a consequence make it less vulnerable to threats; this holds even more true for activities and events that are of a certain magnitude and are likely to be irreversible, such as climate change induced risks.[356] To limit the scope of the ecosystem approach to the CBD and retain it from risk management, would thus be inappropriate, especially in light of the Convention's objective.

Furthermore the ecosystem approach developed within the CBD framework, is not the only way to deal with complex circumstances. Its holistic approach, however, is appealing – not only for biodiversity conservation, but any management situation – because it is capable to integrate not only different social and cultural views and values but also ways and means to deal with the specific situation.[357] In this context the Conference of the Parties stated within their COP 5 V/6 Decision, that *"the ecosystem approach does not preclude other management and conservation approaches, such as biosphere reserves, protected areas, and single-species conservation programmes, as well as other approaches carried out under existing national policy and legislative frameworks, but could, rather, integrate all these approaches and other methodologies to deal with complex situations"*[358].

355 See supra in 4.5.2.2. e.

356 See e.g. IUCN (PROGRAMME 2009-2012), at 13 and 28 and *infra* in 5.4., 5.4.1., 5.4.4. and 8.

357 Accord. VIERROS, at 40, 45, SMITH & MALTBY, at 16.

358 COP 5 Decision V/6, section A, para. 5, accord. KAY (SYSTEM THINKING), at 11–12 (stating that *"complex systems go beyond interdisciplinary to transdisciplinary, which invokes emergence between the disciplines over merely working between them."* According to KAY the new approach remains participatory but goes on to be adaptive and multiscale in its focus. *"At its heart is the portrayal of ecological systems as self-organizing"* which has accordingly coined the neologism of *self-organizing hierarchical open (SOHO) systems*.) This terminology shall, however, not be applied here any further; see for details: KAY & BOYLE.

It is this integrative capacity, which makes the ecosystem approach a multidisciplinary and multidimensional tool for managing not only conservation issues but any other situation demanding flexible and adaptive management. Other legal initiatives referring to an ecosystem approach or setting out standards to manage specific complex situations or risks (e.g. the precautionary principle or cost-benefit analysis) need to be seen within this context as individual parts of the whole; A whole which can be defined as an integrative approach to govern ecosystem management in order to maintain ecosystem integrity and health responsible for the well-being of all humans, animals and plant species. The ecosystem approach is ultimately almost endless in scope, because ecosystems are connected and are part of even bigger ecosystems.[359] While this broadness makes the ecosystem approach appealing, its practical value and implication remain questionable, especially within developing countries where unawareness or the lack of financial and technological capacities hamper an effective and efficient implementation of an ecosystem approach.[360]

4.5.3. The Ecosystem Approach and the Arctic Ecosystems

From what has been stated above it must seem clear that the ecosystem approach can be seen as an important tool in managing Arctic ecosystems. As a still developing region, that is characterized by a distinct fragility, appropriate human action within the Arctic needs to consider managing land, water and living resources in a sustainable way. The ecosystem approach, as it was established within the CBD framework, can in this context provide a helpful guideline. The importance of maintaining ecological processes and functions for human well-being within the Arctic were recognized as early as 1991 in the *Arctic Environmental Protection Strategy (AEPS)*, which held that *"[t]he health of Arctic flora and fauna is a key concern of the Arctic countries. These flora and fauna assume special significance in this region since they are an essential factor helping to define the culture and survival of the people living there"*[361].

359 Small natural reserves, such as biotopes e.g. are parts of larger biomes; where the boundaries are set is essentially a decision made out of practical reasons by researchers addressing specific ecosystem interactions and processes.

360 See *supra* in 4.5.2.3. f.

361 *Arctic Environmental Protection Strategy*, June 14, 1991 [hereinafter AEPS].

While the question if and if so in what way the ecosystem approach is defined and applied within the Arctic shall not be elaborated any further here, but will instead be in detail examined *infra* in part II of this thesis, it must seem clear from the above statement of the AEPS, that ecosystem health is one of the main concerns of the circumpolar North. Human activities or natural events, capable of disturbing Arctic ecosystem functioning and resilience thus need to be handled appropriately. More than in any other region, due to the special biotic and abiotic circumstances, which in the face of climate change have been altered, and the existence of an indigenous population, integrative and adaptive management options are required. The ecosystem approach should thus certainly be given a significant role when managing climate change induced Arctic risks.

4.5.4. Conclusion

While to this date there exists no universal and legally binding definition of the ecosystem approach, this holistic management tool, although still comparatively new, has experienced a lot of advancements within the past decades, especially within the framework of the Convention on Biological Diversity. Because it is integrative, adaptive and takes social, economic and environmental issues into account, the ecosystem approach has a global appeal, not only for resource but also for risk management. The Malawi principles do not specifically refer to risk, but they focus on topics that are pivotal to risk management as well: Due to their nature as a mental construct, risks are as much a product of society as are decisions in regards to resource management. Incorporating societal choice[362] and developing management options that include all stakeholders at all levels and sectors[363] is thus vital to risk governance, in order to provide for scientifically supported and transparent risk assessment and management. Furthermore, new environmental risks, such as climate change induced risks, that are broad in scope and often have long lasting effects, entailing many uncertainties and complexities, require long term, flexible and adaptive management options, that are precautionary in substance and take the ecosystem as a whole, as well as adjacent or otherwise connected ecosystems into account. The ecosystem approach, as it was elaborated within the CBD framework, combines all that.[364]

362 See principle 1 of the Malawi Principles.
363 See principles 2, 11 and 12 of the Malawi Principles.
364 See principles 3, 5, 6, 7, 8 and 9 of the Malawi Principles.

Yet, the comparatively biggest achievement of the ecosystem approach in relation to risk management is that it is, unlike the precautionary principle or the cost-benefit analysis, capable to combine economics and environmental protection with unequaled simplicity, by calling out for sustainability and addressing the importance of ecosystem health and integrity to human well-being and thus economic interests.[365] Because of this holistic character, applying the ecosystem approach to risk management within the Arctic – where human interests and needs in terms of economic development and ecological sustainability, due to the fragility of the region can clash – seems unquestionably appropriate.

Yet, although the ecosystem approach has tremendous benefits, its downfall is that there is no universally accepted definition and to this point no legally binding document explicitly referring to the approach exists. Consequently what it is and if or how it is applied is predominantly dependent on the states' view of the principle. At least on an international, theoretical scale the CBD Conference of the Parties (and other related bodies) managed to advance the ecosystem approach and questions on its implementation within the past decades. Nevertheless a lot more awareness raising on a global, regional, national and local level as well as within different sectors (especially those that are not primarily entrusted with resource and/or risk management) is needed for a successful application of the ecosystem approach.

If this approach – no matter its appeal – will be capable to enhance Arctic risk management in practice, or if it is of purely theoretical matter, will thus be examined *infra* in 5. and 6.

4.6. Conclusion: Assessing and Managing New Environmental Risks

The assessment and management of risks are defined by decision-making processes by policymakers and stakeholders involved. While certain risks allow for rather clear cut decisions, because their initiating activities or events follow linear logic, which makes the possibility of negative outcomes well predictable, other risks, such as climate change induced risks – and even more so climate change induced *Arctic* risks – do not follow such logic.[366]

365 See principles 4 and 10 of the Malawi Principles and Kay & Boyle, at 72, *supra* in 4.5.2.2. d. and *infra* in 8.2.1.3.

366 See for details, also on the following, *supra* in 1.2.

These are risks that have an anthropogenic as well as an ecological connotation, and as such refer to risks that are directly linked to climate change (e.g. droughts, floods and other extreme weather phenomena, which are a result of climate change) or such that are of anthropogenic origin, i.e. damages caused by human activities, which either are connected to the changes in climate (e.g. increase of shipping within the Arctic due to the melting of sea ice) or enhance the initiating natural event i.e. climate change itself or any natural phenomenon caused by it (e.g. the release of greenhouse gases that further advances climate change). Because of the uncertainties, complexities and ambiguities inherent in such risks, initiating activities or events can result in a variety of possible outcomes; some of which might not be imaginable at the time the initiating activity or event is being noticed first. Uncertainties and surprises are thus features decision-makers have to focus on when handling such new environmental risks.

As a consequence, while environmental risks can be addressed by means of a variety of risk governance tools, it is necessary to keep the special characteristic of such risks in mind.[367] The risk governance approaches referred to above[368] in this context need to be seen as specific means by which climate change induced risks may be assessed and managed. While they may all provide useful in the governance of certain risks related to climate change, they are, as has been shown, nevertheless, not equally as effective in doing so: Traditional risk assessment and management, i.e. risk governance in application of the cost-benefit analysis, e.g. does little in advising politicians and stakeholders in making decisions that take complexities, uncertainties and ambiguities into account. Risk assessors and managers thus will have to turn to newly developed (and still developing) decision-making tools such as the precautionary principle or the ecosystem approach. The precautionary principle, if applied correctly and not in too strict a way, can help decision-makers to choose the ecologically and economically most feasible out of several options to handle a specific risk. Yet, when deciding if any risk assessment or management options shall be initiated at all, the precautionary principle often clashes with traditional risk assessment and management (i.e. cost-benefit analysis) because of its difficulty to combine economic interests and ecological values. Very often in practice economic interests do outweigh ecological reasoning, and thus hamper the management of benign (but ecologically still important) environmental risks. This shortcoming is

367 See for details *supra* in fn 259 (part I).
368 See *supra* in 4.3-4.5.

one of the reasons for the ongoing debate between governments following the traditional risk assessment and management approach (i.e. cost benefit-analysis) and those favoring the precautionary principle.[369]

The ecosystem approach, although not essentially developed for risk assessment or management, can help risk assessors and managers to overcome these shortcomings.[370] Its holistic approach is capable to combine social, economic and ecological values when assessing and managing risks and seems thus to be the most feasible way in managing climate change induced Arctic risks. Nevertheless, because the ecosystem approach has only started to become of global interest very recently and was to this point implemented mostly within specific sectors, its practical value – especially in regards to enhancing Arctic risk assessment and management – remains questionable. The following, more practical, part of this thesis for that matter aims to analyze the existing regime on environmental law applicable to the Arctic as regards its value for the establishment and implementation of the precautionary principle and the ecosystem approach within the circumpolar North in order to adequately govern climate change induced Arctic risks.

369 See for details *supra* in 4.4., esp. in 4.4.4.3. and 4.4.6.
370 See for details, also on the following, *supra* in 4.5., esp. in 4.5.2.4. and 4.5.4.

Part II: Legal Governance of Climate Change Induced Risks in Practice

While the first part of this thesis outlined and analyzed the scientific and legal background to the assessment and management of climate change induced risks within the Arctic ecosystems and as such followed a more theoretical approach, the second part focuses on a more practical side of the issue and in doing so, seeks to answer the question if and if so in what way existing global, regional and domestic law may aid in governing climate change induced risks across the Arctic. The risk governance principles detected in international and regional (including domestic) legal initiatives will in this context have to be valued in reference to the precautionary principle and the ecosystem approach, which are according to part I deemed most feasible in governing climate change induced Arctic risks.[1] Therefore the question that will have to be answered in the subsequent chapters is if and if so to what extent existing international and regional (including domestic) law follows these principles.

As a consequence, part II first analyzes the existing international legal regime pertinent to the governance of climate change induced risks and in doing so focuses on the relevant fields of international environmental law applicable in this context, such as the legal regime on climate and atmosphere, the law of the sea and biodiversity conservation. Subsequently part II addresses existing regional hard and soft law initiatives relevant to the governance of climate change induced risks within the Arctic ecosystems, both from a transnational, pan-Arctic as well as a domestic stance.

1 See for details *supra* in 4.4., 4.5. and 4.6.

5. The International Legal Regime Applicable to the Governance of Climate Change Induced Arctic Risks

As has been pointed out *supra* in 2. and 3. climate change is affecting the Arctic ecosystems on various levels; its implications bringing chances as well as challenges to the region. Legal governance of climate change induced Arctic risks in the light of the ecosystem approach, which is according to part I of this thesis, deemed the most feasible way to govern such risks, will thus have to address the different components of Arctic ecosystems as well as their linkages to each other. The core element of every ecosystem is an intact environment. Species can only thrive if their surroundings are capable to sustain their livelihood. Effective management of climate change induced Arctic risks is for that reason ultimately dependent on initiatives taken to conserve the Arctic environment. The aim of the following chapters is therefore to analyze the international legal regime on environmental protection applicable to the Arctic and its implications (if any) for assessing and managing climate change induced Arctic risks. In doing so focus shall be given to answering the question of what approach as regards risk governance underlies the respective international environmental treaties relevant for assessing and managing climate change induced risks.

5.1. The Emergence of International Environmental Law

In trying to find an answer to the question in what way the international legal regime on environmental protection addresses risk governance and what approach underlies the specific treaties, it must be kept in mind that the international environmental regulations applicable to the Arctic have developed against different backgrounds. International environmental law has not emerged within a specific moment in time, but rather its development has been and still is an ongoing process. With the gathering of new environmental knowledge and the emergence of new environmental threats focus in international environmental law changed and with it the treaties addressing specific environmental issues and threats. Consequently, similarly environ-

mental risk governance has evolved too, as new environmental risks began to emerge and required international legal action. Thus, in order to better understand the international environmental regime applicable to the Arctic and its significance for risk governance a short review of the history of international environmental law shall be provided subsequently.

5.1.1. The Stockholm Declaration of 1972

As rules pertaining to the environment are often linked to the management of natural resources, environmental law was traditionally viewed as either an issue subject to a nation state's *domaine réservé*, i.e. its territorial sovereignty, or subject to the global commons, such as the high seas.[2] The United Nations Conference on the Human Environment, which took place from June 5 to 16, 1972 in Stockholm and the legal document adopted thereon – the Stockholm Declaration of 1972[3] – marked a paradigm shift in this perspective. The modern era of environmental law, which is understood to be the time between the Stockholm Conference and the Rio Conference of 1992, acknowledged the fact that often environmental problems do not make halt at borders and that for this reason many environmental issues ought to be handled on an international scale.[4] Consequently a variety of international environmental regulations were developed based on specific environmental risks experienced (such as the adoption of the International Convention for the Prevention of Pollution From Ships in the light of the Torrey Canyon incident[5]).[6]

The Stockholm Declaration recognizes the importance of protecting and improving the human environment to ensure *"the well-being of peoples and economic development throughout the world"*[7]. In this respect principle 2 of the Declaration holds that *"natural resources of the earth, including the air, water, land, flora and fauna and especially representative samples of natural ecosystems, must be safeguarded for the benefit of present and future generations through careful planning or management, as appropriate"*. Principle 13 elaborates on such management by stating that *"[i]n order to*

2 See for details SAND, at 31–33.
3 *Declaration of the United Nations Conference on the Human Environment*, June 5-16, 1972 [hereinafter Stockholm Declaration].
4 See for details SAND, at 33–39, LAUSCHE, at 161 note 1, LOUKA, at 38.
5 See *infra* in fn 324 (part II).
6 See SAND, at 35, SANDS, at 22.
7 See paras. 1, 2 and 6 of the Preamble of the Stockholm Declaration.

achieve a more rational management of resources and thus to improve the environment, States should adopt an integrated and coordinated approach to their development planning so as to ensure that development is compatible with the need to protect and improve the environment for the benefit of their population"[8].

While not explicitly mentioned these principles indicate the application of the ecosystem approach and it is especially in principle 13 that the close connection between the ideas of sustainable development and the ecosystem approach becomes obvious, as both principles acknowledge the necessity to combine economic, social and ecological views when addressing environmental problems and development issues.[9] Compared to the ecosystem approach, the idea of sustainable development is, however, more anthropocentric as it is primarily concerned with ecologically sound development, and thus includes issues such as poverty, food security or overpopulation, while the ecosystem approach is a tool within the framework of sustainable development to adequately manage a specific ecosystem and its resources.[10] In any case the Stockholm Declaration, which initiated the mentioned change in perspective in environmental law, lay the foundation for the establishment of modern risk governance tools, such as the precautionary principle and the ecosystem approach.

Furthermore in terms of risk assessment the Stockholm Declaration points out the importance of science to identify, avoid and control environmental risks and thus stresses the need to promote scientific research and development in the context of environmental problems both on a national and multinational scale.[11]

As a soft law instrument the Stockholm Declaration does of course not oblige states to act in a specific manner in respect to environmental risks. Yet it is worthy of noticing, since it shows that states started to acknowledge the linkages between mankind and the environment – a setting against which many of the binding regulations resulted during the Stockholm to Rio period from 1972 to 1992.

8 See in regards to integrated management also para. 7 of the Preamble of the Stockholm Declaration.
9 See for details *supra* in fn 265 (part I).
10 Ibid. and for details on the ecosystem approach see *supra* in 4.5.
11 See principles 18 and 20 of the Stockholm Declaration.

This view was reaffirmed during the following years, *inter alia* by the World Conservation Strategy of 1980[12] and the World Charter for Nature of 1982[13].

5.1.2. The World Conservation Strategy of 1980

The World Conservation Strategy was developed by IUCN in collaboration with UNEP and WWF and is aimed at providing *"an intellectual framework and practical guidance for the conservation actions necessary" "to ensure Earth's capacity to sustain development and to support all life"*.[14] In doing so, the Strategy *"explains the contribution of living resource conservation to human survival and to sustainable development"*, *"identifies the priority conservation issues and the main requirements for dealing with them"* and *"proposes effective ways for achieving the Strategy's aim"* to support *"sustainable development through the conservation of living resources"*.[15] In this context the Strategy identifies three main objectives of living resource conservation, which are *"to maintain essential ecological processes and life-support systems"*, *"preserve genetic diversity"* and *"ensure the sustainable utilization of species and ecosystems"*.[16]

By trying to achieve these aims the World Conservation Strategy follows a holistic approach, which focuses on entire ecosystems and such adjacent thereto, rather than being limited on a sectoral scale.[17] Consequently national legislative action taken based on the Strategy should be comprehensive in scope, by *"providing for both the sustainable utilization and the protection of living resources and of their support systems"* and by requiring ecosystem evaluations to be taken and integrated into environmental policy making.[18] Additionally the Strategy acknowledges the necessity to *"anticipate significant economic, social and ecological events rather than simply"* reacting to them and hence requires national policies to consider conservation and environmental issues at the earliest stage possible in decision-making processes.[19] It is in that respect precautionary in scope. As regards such deci-

12 IUCN (World Conservation Strategy).
13 *World Charter for Nature,* Oct. 28, 1982 (A/RES/37/7) [hereinafter World Charter for Nature].
14 IUCN (World Conservation Strategy), at I.
15 Ibid., at IV.
16 Ibid., at 19 and for details at 23 to 27, chapters 2 to 4.
17 See ibid., e.g. at 33, chapter 7 para. 2, at 36, chapter 8, para. 6 and at 39, chapter 9, para. 8, as well as accord. Fritz, at 122.
18 IUCN (World Conservation Strategy) at 42 to 43, chapter 11, para 8.
19 See ibid., at 38, chapter 9 para. 6 and at 41, chapter 10 para. 7; while not explicitly mentioned

sion-making the World Conservation Strategy furthermore refers to rights of citizens in elaborating environmental policies and in obtaining the necessary environmental information for effective participation in decision-making.[20] As such the Strategy already sets valuable (albeit non-binding) standards in environmental protection and for the development of new principles such as the ecosystem approach or the precautionary principle. Additionally on an international scale, the Strategy stresses the need to strengthen existing international conservation law as well as to support the development of new environmental treaties.[21] Many of the treaties developed in subsequent years and elaborated on more detailed *infra*[22], e.g. the Convention on Biological Diversity, ought to be seen against this backdrop.

5.1.3. The World Charter for Nature of 1982

The connection between human well-being[23] and environmental conservation, i.e. the need for sustainable development, was not only stressed in the World Conservation Strategy, however, but also in the World Charter for Nature of 1982. The Charter recognizes that *"life depends on the uninterrupted functioning of natural systems which ensure the supply of energy and nutrients"*[24] and that such *"lasting benefits from nature depend upon the maintenance of essential ecological processes and life support systems and upon the diversity of life forms"*[25]. Consequently the Charter holds that *"man must acquire the knowledge to maintain and enhance his ability to use natural resources in a manner which ensures the preservation of the species and ecosystems for the benefit of present and future generations"*[26] (...) while special protection ought to be given *"to unique areas (...) and to*

this requirement can be seen as a reference to the conduct of strategic environmental assessment (SEA) and environmental impact assessment (EIA), which will be referred to more detailed *infra* in 5.5.2.

20 See ibid., at 43, chapter 11, para. 8, at 46, chapter 13 paras. 4 and 5; in this context the Strategy also refers to the need for environmental eduction in order to raise awareness as regards the benefits of resource conservation to human well-being; see for details ibid., at 46, chapter 13, paras. 1, 2, 10 and 14.

21 See ibid., at 52-53, chapter 15, paras. 3 and 10.

22 See *inter alia infra* in 5.2.2., 5.2.3., 5.2.4. and 5.4.1.

23 Human well-being was defined by the Millennium Ecosystem Assessment in regards to the availability of five dimensions: Access to basic material for a good life (e.g. food, water, shelter), freedom and choice, health, good social relations and security; see for details Levy, et al., at 125–127 and furthermore *infra* in 8.2.1.3.

24 Para. 1 sub-para. (a) of the Preamble to the World Charter for Nature.

25 Para. 3 sub-para. (a) of the Preamble to the World Charter for Nature.

26 Para. 3 sub-para. (c) of the Preamble to the World Charter for Nature.

the habitats of rare or endangered species"[27]. Decision-making must according to principle 6 of the Charter thus take into account the functioning of natural systems, which implies that activities *"likely to cause irreversible damage to nature shall be avoided"* and such that *"are likely to pose a significant risk to nature shall be preceded by exhaustive examination"*, which – being reflective of the precautionary principle – demands the gathering of scientific data (i.e. conducting environmental impact assessment) as well as carrying out monitoring initiatives.[28]

5.1.4. The Brundtland Report of 1987

Five years later, in 1987 a report on current environmental and global problems as well as on strategies to achieve sustainable development to manage these problems adequately by the year 2000 and beyond, was issued by the World Commission on Environment and Development[29] and presented for consideration and adoption to the General Assembly.[30] The Report, titled *"Our Common Future",* also known as the Brundtland Report[31], discloses a multitude of interlinked environmental, social and economic issues, which pose challenges that require comprehensive approaches – away from fragmented, sectoral initiatives – profound and collaborative assessments of risks emerging from global changes and public participation in the decision-making processes.[32] In this context the Report *inter alia* acknowledges the value of biodiversity *"for the normal functioning of ecosystems and the biosphere as a whole"* and that protecting and conserving living natural re-

27 Principle 3 of the World Charter for Nature.

28 See principle 11 paras. (a) and (b), as well as principles 18 and 19 of the World Charter for Nature.

29 The World Commission on Environment and Development was established in response to General Assembly Resolution 38/161 of December 19 1983 and was appointed with the task to draft a report *"on environment and the global problématique to the year 2000 and beyond, including proposed strategies for sustainable development (...)"*; see *Process of preparation of the Environmental Perspective to the Year 2000 and Beyond*, Dec. 19, 1983 (A/RES/38/161), paras. 4, 5, 8 and 10.

30 The General Assembly welcomed the Report and considered its findings at its 96th plenary meeting on December 11, 1987; see *Report of the World Commission on Environment and Development*, Dec. 11, 1987 (A/RES/42/187).

31 See for the text of the Report: *Report of the World Commission on Environment and Development*, Aug. 4, 1987 (A/42/427) [hereinafter the Brundtland Report], at 3 et seq .

32 See From one Earth to the one World, an Overview by the World Commission on Environment and Development paras. 11, 31, 32, 94 and 96, chapter 2, section 7, paras. 72-74 and chapter 12, section I, sub-section 1 para. 10, and section II, sub-sections 2.2.2. para. 49 and 3 paras. 58 and 59 of the Brundtland Report.

sources as well as *"the vital life processes carried out by nature"* (e.g. climate) are pivotal for development.[33] Consequently the Report requests greater protection of species and ecosystems e.g. by expanding protected areas and by developing the appropriate legal obligations to support such a protection.[34] The Brundtland Report thus lay the pathway for new legal responses to species and ecosystem protection and conservation such as the Convention on Biological Diversity.

Furthermore in respect to marine resources the Report holds that *"[a]n international ecosystem approach is required for the management of [such] resources for sustainable use"*, which as a result demands close international cooperation between states, as living marine resources such as fisheries do not make halt at jurisdictional boundaries set by the law of the sea.[35]

Finally chapter 12 of the Brundtland Report recommends proposals for institutional and legal change and in this context requires the drafting of a *"Universal Declaration and a Convention on Environmental Protection and Sustainable Development"*[36]. To this end the Brundtland Report lists in Annexe 1 a summary of 22 principles, to be considered as guidelines when drafting such a convention. These principles *inter alia* require states to *"maintain ecosystems and ecological processes (...) and preserve biological diversity"*, to carry out environmental impact assessments prior to conducting any activity, to inform and involve all persons likely to be significantly affected by a planned activity into the decision-making process, and to *"take all reasonable precautionary measures to limit the risk when carrying out*

33 See From one Earth to the one World, an Overview by the World Commission on Environment and Development paras. 53 and chapter 6 paras. 1 and 2 of the Brundtland Report.

34 See From one Earth to the one World, an Overview by the World Commission on Environment and Development paras. 56 and 57, chapter 6 paras. 58 and 71 and chapter 12, section II, sub-section 5.3 para. 87 of the Brundtland Report. Protected areas are according to art. 2 of the Convention on Biological Diversity, understood to be *"geographically defined area[s] which [are] designated or regulated and managed to achieve specific conservation objectives"*. In respect to establishing protected areas the IUCN has developed guidelines pertaining to the definition and categorization of protected areas; see for details IUCN (Protected Areas). According to a recent report on marine and terrestrial protected areas compiled under the auspices of the UNEP World Conservation Monitoring Center and the IUCN World Commission on Protected Areas, as of 2012 about 1.6 % of the world's oceans and about 12.7 % of the world's terrestrial areas are designated protected area status; see furthermore Bertzky, et al., at 6 and accord. Louka, at 290, Oral, at 85, Lalonde, at 132–133, Gillespie, at 111, *Protected areas in environmental law,* at 1, and for an updated graphical display and search engine regarding protected areas see <http://www.protectedplanet.net/> (23.06.2014). For further details see also *infra* in 5.3.2.4., 5.4.1., 5.4.3., 6.2.2.3. and 6.2.3.

35 See chapter 10, section 2, para. 18 of the Brundtland Report and for details *infra* in 5.3.

36 Chapter 12, section II, sub-section 5.2, paras. 85 and 86 of the Brundtland Report.

or permitting certain dangerous but beneficial activities".[37] Many of these ideas are today mirrored in a variety of international conventions and declarations.[38]

While the adoption of a legally binding Universal Convention on Environmental Protection and Sustainable Development, as suggested by the World Commission on Environment and Development was so far not successful, efforts were in this respect undertaken under the auspices of the International Union for the Conservation of Nature and Natural Resources (IUCN) in cooperation with the International Council of Environmental Law (ICEL): In 1995 the IUCN issued a Draft Covenant on Environment and Development[39], which is designed as a blueprint for an international framework agreement related to the environment and development, aimed at *"achieving environmental conservation, an indispensable foundation for sustainable development"*.[40] The Draft Covenant was amended three times since its launch and in its latest form, as amended on September 22, 2010[41], holds 79 articles.

These articles, *inter alia* establish precaution as a duty and thus promote the application of the precautionary principle[42], allow for access to environmental information and encourage public participation (especially of indigenous peoples, local communities and other vulnerable persons) in decision-making processes[43]. Additionally the Covenant provides obligations for states to conduct monitoring initiatives and environmental impact assessments to prevent or minimize the risk of harm to the environment from human activities[44] and acknowledges the value of biological diversity and ecosystem functions and services for sustainable development[45] and hence

37 See Annexe 1, principles 3, 4, 5, 6 and 11 of the Brundtland Report.
38 See *infra* e.g. Convention on Biological Diversity, Aarhus Convention and Espoo Convention as referred to in 5.4.1. and 5.5.
39 IUCN (Draft Covenant).
40 See ibid., at xi and xiii and art. 1 of the Draft Covenant.
41 In the September amendment *inter alia* a new article 24, explicitly referring to the ecosystem approach was included into the text of the Draft Covenant.
42 See art. 7 of the Draft Covenant.
43 See art. 14 paras. 3, 4 and 6 of the Draft Covenant. In this context art. 15 furthermore gives an explicit collective right to indigenous peoples *"to protection of the environment, including their lands, territories and resources, as distinct peoples in accordance with their traditions and customs"*.
44 See arts. 37 para. (a), 42 and 44 of the Draft Covenant.
45 See arts. 23 and 25 of the Draft Covenant. Art. 23 para. (d) explicitly refers to the protection of the polar regions as they are *"essential to global environmental values and the global climate system"*.

urge states to be considerate of the ecosystem approach when fulfilling their obligations in respect to environmental conservation and sustainable development[46]. While not legally binding, the Draft Covenant has in practice served as a reference and checklist pertaining to international environmental law and development for legislators, civil servants and stakeholders when developing and amending policies and laws on environmental conservation and protection as well as on sustainable development.[47] Many of the principles just referred to are thus in more detail, but from a more fragmented, sectoral approach, addressed in a multitude of conventions, which will be referred to in greater detail subsequently.[48]

5.1.5. The Rio Declaration of 1992 and Beyond

At the United Nations Conference on Environment and Development (also known as Rio Earth Summit), which took place in Rio de Janeiro from June 3 to 14 in 1992, the Rio Declaration on Environment and Development took up the thoughts established in the World Charter for Nature and the Brundtland Report and – especially in respect to the precautionary principle[49] – defined them for the first time in a legal Declaration more clearly. Furthermore the Rio Declaration stressed the necessity to cooperate both, on a regional (which includes the participation in decision-making processes of all stakeholders involved and the recognition of indigenous knowledge) as well as on a global level, to adequately address environmental problems and to *"conserve, protect and restore the health and integrity of the Earth's ecosystems"*.[50] In this context the Rio Conference marked yet another paradigm shift in environmental law.

The post modern era[51] in environmental law, which is generally understood as the time after the Rio Conference, brought about a focus away from the

46 See arts. 24, 25 para. 2 and 39 of the Draft Covenant. Art. 24, which is titled *"ecosystem approach"* does in particular refer to the management of marine ecosystems, however the subsequent articles 25 para. 2 and 39 broaden this scope by pertaining to the conservation of habitats and species dependent thereon under application of the ecosystem approach. The ecosystem approach, as referred to in the Draft Covenant, is hence not limited to a specific sector, but rather mirrors the findings of the Conference of the Parties to the CBD; see *supra* in 4.5.2.

47 See IUCN (Draft Covenant), at xi and Lausche, at 381.

48 See *infra* 5.2, 5.3, 5.4. and 5.5.

49 See principle 15 of the Rio Declaration as cited *supra* in fn 184 (part I) and furthermore *supra* in 4.4.

50 See principles 7, 10 and 22 of the Rio Declaration.

51 See in detail Sand, at 41–42 and furthermore Birnie, et al., at 39.

traditional understanding of state responsibility in respect to environmental problems, towards a precautionary approach in response to human action as well as towards a more holistic view of the environment and its management (i.e. ecosystem thinking), that incorporates all stakeholders and hence bestows the civil society with a right to gain access to environmental risk information and to participate in decision-making processes based thereon.[52]

As has been shown *supra* in 4.5. the development of this new focus in environmental law, away from linear environmental processes towards a more holistic understanding that enlightens the dynamics in ecosystems and focuses on a precautionary approach when managing them, is an ongoing issue that in recent years, especially in the context of sustainable development, has gained momentum: The Rio Conference of 1992 set the development of a variety of legally non-binding instruments in motion, which focus on sustainable development and in doing so further elaborate on the ecosystem approach. An essential document adopted at the Rio Conference in this context is Agenda 21, which is a comprehensive action plan pertaining to sustainable development in the 21st century and is to be implemented globally, nationally and locally in every area in which humans impact on the environment.[53]

Furthermore from August 26 to September 4, 2002 the World Summit on Sustainable Development, a follow up to the 1992 Rio Conference, took place in Johannesburg, South Africa.[54] The objective of the World Summit was to bring together *"peoples and views in a constructive search for a common path towards a world that respects and implements the vision of sustainable development"*[55]. In respecting the importance to not only address economic and social development but also environmental protection in order to achieve sustainable development,[56] the World Summit also fo-

52 See principle 10 of the Rio Declaration.

53 Agenda 21 is divided into four sections: Section I: social and economic dimensions; section II: conservation and management of resources for development; section III: strengthening the role of major groups and section IV: means of implementation. See for details <http://www.unep.org/Documents.Multilingual/Default.asp?documentid=52> (last visited: 23.06.2014), Louka, at 35, Birnie, et al., at 608–609, Beyerlin & Marauhn, at 17.

54 See *Report of the World Summit on Sustainable Development*, Aug. 26 - Sept. 4, 2002 (A/CONF.199/20), at 2, para. 8 and for details Beyerlin & Marauhn, at 23–26.

55 *Report of the World Summit on Sustainable Development*, Aug. 26 - Sept. 4, 2002 (A/CONF.199/20), at 2, para. 10.

56 See Plan of Implementation of the World Summit on Sustainable Development (Johannesburg Plan of Implementation) in *Report of the World Summit on Sustainable Development*, Aug. 26 - Sept. 4, 2002 (A/CONF.199/20), section I, para 2.

cused on the ecosystem approach. In terms of protecting and managing the natural resource base of economic and social development the Johannesburg Plan of Implementation, which was adopted at the Summit, held that *"[h]uman activities are having an increasing impact on the integrity of ecosystems that provide essential resources and services for human well-being and economic activities. Managing the natural resources base in a sustainable and integrated manner is essential for sustainable development. In this regard, to reverse the current trend in natural resource degradation as soon as possible, it is necessary to implement strategies which should include targets adopted at the national and, where appropriate, regional levels to protect ecosystems and to achieve integrated management of land, water and living resources, while strengthening regional, national and local capacities"*[57].

In this context the application of an ecosystem approach, respectful of Decision V/6 of the Conference of the Parties to the Convention on Biological Diversity was encouraged for sustainable development of the oceans,[58] and biological diversity was being recognized as playing *"a critical role in overall sustainable development and poverty eradication"*[59] due to its essential influence on *"our planet, human well-being and (...) the livelihood and cultural integrity of people"*[60]. As a consequence an effective implementation of the Convention on Biological Diversity is paramount for sustainable development. Accordingly, promoting "*the wide implementation and further development of the ecosystem approach, as being elaborated in the ongoing work of the Convention* [on Biological Diversity]"[61], is seen by the Johannesburg Plan of Implementation as a vital step in achieving a more efficient and coherent implementation of the three main objectives of the CBD.[62] In this context it must be noted, that reducing biodiversity loss is furthermore one of the aims (in terms of ensuring environmental sustainability) of the Millennium Development Goals to be achieved by 2015.[63]

57 Ibid., section IV, para. 24.
58 Ibid., section IV, para. 30, sub-para. d. and para. 32, sub-para. c.
59 Ibid., section IV, para. 44.
60 Ibid.
61 Ibid., section IV, para. 44, sub-para. e.
62 Ibid., section IV, para. 44 and on the CBD's objectives and the Convention's role as regards the ecosystem approach see furthermore *supra* in 4.5.2.
63 See Barstow Magraw & Hawke, at 617 and <http://www.un.org/millenniumgoals/environ.shtml> (last visited: 23.06.2014), goal 7, target 2, cf. Shepherd, at 20.

Additionally to the mentioned soft law initiatives, such as Agenda 21 and the Johannesburg Plan for Implementation, other legally non-binding instruments as initiated by international organizations, non-governmental organizations and civil society have been developed on a post Rio basis (e.g. the Earth Charter[64], the Draft International Covenant on Environment and Development[65] or the ILA New Delhi Declaration of principles of international law relating to sustainable development[66]), making sustainable development, and related thereto, the ecosystem approach as well as the precautionary principle, an ongoing issue on international agendas.

In this context, from June 20 to 22, 2012 a follow up to 1992 Conference on Environment and Development, the United Nations Conference on Sustainable Development, took place in Rio.[67] The summit, also known as Rio +20, addressed the topic of the development of green economies and the institutional framework needed in order to effectively implement sustainable development. The outcome document of the conference, titled *"The future we want"*[68] is an aspirational text aimed at achieving this goal; concrete commitments in order to guarantee an effective implementation, however, are

64 The Earth Charter was initiated after the Rio Earth Summit in 1992 by two non-governmental organizations in order to develop an international declaration of fundamental ethical principles reflective of sustainable development for the 21st century and was eventually, after a decade long, worldwide and cross cultural dialogue launched as the people's charter in 2000 under the auspices of the independent Earth Charter Commission. See Earth Charter International Council and Secretariat, at 7, Lausche, at 382 note 28 and 384 note 35. As the Charter recognizes that *"[t]he resilience of the community of life and the well-being of humanity depend upon preserving a healthy biosphere with all its ecological systems (...)"* four of its principles are aimed at maintaining ecological integrity, which *inter alia* require to *"[e]stablish and safeguard viable nature and biosphere reserves"* as well as to *"[p]romote the recovery of endangered species and ecosystems"* and refer to the precautionary principle (*"Take action to avoid the possibility of serious or irreversible environmental harm even when scientific knowledge is incomplete or inconclusive"*) and the ecosystem approach (*"Ensure that decision making addresses the cumulative, long-term, indirect, long distance, and global consequences of human activities"*); see principle 5 paras. b. and c. and principle 6 paras. a. and c. of the *The Earth Charter*, 2000 [hereinafter Earth Charter].

65 See *supra* in fn 39 (part II).

66 Adopted at the 70th conference of the International Law Association (ILA), the New Delhi Declaration *inter alia* explicitly refers to the precautionary principle in relation to risk management, by holding in para. 4.3 that *"[d]ecision-making processes should always endorse a precautionary approach to risk management and in particular should include the adoption of appropriate precautionary measures"*; see *Letter dated 6 August 2002 from the Permanent Representative of Bangladesh to the United Nations and the Chargé d'affaires a.i. of the Permanent Mission of the Netherlands to the United Nations addressed to the Secretary-General of the United Nations*, Aug. 31, 2002 (A/57/329).

67 For detailed information on the Conference see <http://www.uncsd2012.org/> (last visited: 23.06.2014).

68 *The future we want*, June 19, 2012 (A/CONF.216/L.1).

lacking. Consequently if and if so in what way the legacy of the Rio Conferences will continue to influence global and regional action to ascertain sustainable development as well as maintain and – where lacking – restore ecosystem health and integrity that will make ecosystems more resilient against threats such as climate change,[69] is mainly dependent on the existing and yet to be developed legal framework supporting sustainability and environmental protection, including the international treaties that will be addressed more profoundly subsequently.

As sustainable development is closely linked to the ecosystem approach,[70] the Rio +20 outcome document is on several occasions reflective of important aspects of the ecosystem approach, such as maintaining ecosystems for the essential goods and services they provide, involving stakeholders into decision making (including indigenous peoples), the application of the precautionary principle and designating protected areas.[71]

In spite of the mentioned legal initiatives within the past decades, however, many insecurities to policy makers and stakeholders prevail, as to how to adequately address environmental risks, especially such that are transboundary in scope. The multilateral environmental agreements presented subsequently will have to be valued against this backdrop.

5.1.6. Conclusion

As has been shown[72] international environmental law has not developed in a specific moment in time. Rather its development has been and still is an ongoing process, influenced by the emergence of new environmental risks and more profound knowledge thereon.

Consequently the view of the environment and its conservation being of sole concern to either domestic legislation and jurisdiction or to being an issue of the global commons, changed throughout the years: The Stockholm Declaration in 1972 marked the first paradigm shift in this respect, as due to the transboundary character of environmental threats emerging at that time

69 See in this context *supra* in 4.5.2.2. e., 4.5.2.4. and *infra* in 5.4., 5.4.1., 5.4.4. and 8.

70 See *inter alia supra* in fn 265 (part I) and in 5.1.1.

71 See for details *The future we want*, June 19, 2012 (A/CONF.216/L.1), in relation to environmental protection and the ecosystem approach esp. at 7, para. 40, at 11 para. 63, at 17 section C, at 19-20 paras. 98-101, at 30 para. 158, at 33 para. 177 and at 38 paras. 197 and 201. See on the various aspects of the ecosystem approach also *supra* in 4.5.

72 See for details *supra* in 5.1.1.-5.1.5.

(such as oil spill accidents), consensus began to grow, that certain ecological problems ought to be dealt with on an international, rather than on a domestic scale.[73]

Following this impetus new principles began to develop, such as the precautionary principle and the principle of sustainable development, which culminated in the adoption of the Rio Declaration in 1992, that marked yet another paradigm shift in international environmental law:[74] A precautionary approach in response to environmental problems was transferred into a legal definition and traditional understandings of a piecemeal approach regarding the regulation of ecological issues, gave way to a more holistic view of the environment (i.e. in terms of ecosystems), the threats it is affected by and the means these have to be managed by (i.e. integrated management).[75] The conventions addressed in greater detail subsequently will have to be seen in the context of this historical setting.

5.2. Climate and Atmosphere

That conventions referring to the Earth's climate and atmosphere play an important role when addressing climate change induced risks is self-explanatory. Scientific data – and thus measures undertaken during risk assessment – are intrinsic when addressing risks pertaining to the climate and atmosphere, as to manage such risks in an appropriate way requires sound scientific knowledge on them.[76] Accordingly conventions dealing with air pollution do acknowledge the value of scientific information to the adequate management of climatic and atmospheric threats and consequently focus on the gathering and assessment of such data.[77] As an extensive elaboration thereon would go beyond the scope of this thesis, however, rather than referring to risk *assessment*, the subsequent paragraphs shall predominantly address in what way the existing climate legal regime tends to abiotic problems, especially atmospheric pollution in the context of *managing* such

73 See for details *supra* in 5.1.1.
74 See for details *supra* in 5.1.2.-5.1.5.
75 See *supra* in 5.1.5.
76 See in this context *supra* in 1.3.
77 See art. 4 para. 1 sub-para. (f), para. 2 sub-para. (c) and arts. 5 and 9 of the UNFCCC as cited *supra* in fn 186 (part I) as well as arts. 3, 4, 7, 8 and 9 of the LRTAP as cited *infra* in fn 78 (part II) and art. 2 para. 2 sub-para. (a), arts. 9 and 11, as well as Annex E of the Stockholm Convention as cited *infra* in fn 100 (part II) and art. 3 of the Vienna Convention as cited *infra* in fn 110 (part II).

risks. The core question thus is, how and to what extent states are obliged to take measures dealing with threats to the global climate system and the atmosphere, which ultimately are responsible for the emergence of climate change induced risks affecting the Arctic ecosystems.

5.2.1. Convention on Long-Range Transboundary Air Pollution (LRTAP)

One of the early conventions addressing atmospheric pollution is the 1979 Convention on Long-Range Transboundary Air Pollution (hereinafter LRTAP)[78]. The Convention is supplemented by its Protocols on sulphur emissions[79], nitrogen oxides[80], volatile organic compounds[81], heavy metals[82] and persistent organic pollutants[83]. LRTAP was ratified by all Arctic Nations. Additionally, with some exceptions for Canada, Iceland, Russia and the United States, the eight Arctic countries have ratified all the Protocols.[84]

78 *Convention on Long-Range Transboundary Air Pollution*, Nov. 13, 1979, 1302 U.N.T.S. 217 [hereinafter LRTAP].

79 *Protocol to the 1979 Convention on Long-Range Transboundary Air Pollution on the Reduction of Sulphur Emissions or their Transboundary Fluxes by at least 30 per cent*, July 8, 1985, 1480 U.N.T.S. 215 [hereinafter 1985 Sulphur Emissions Protocol] and *Protocol to the 1979 Convention on Long-Range Transboundary Air Pollution on Further Reduction of Sulphur Emissions*, June 14, 1994, 2030 U.N.T.S. 122 [hereinafter 1994 Sulphur Emissions Protocol], as well as *Protocol to the 1979 Convention on Long-range Transboundary Air Pollution to Abate Acidification, Eutrophication and Ground-level Ozone*, Nov. 20, 1999, Economic and Social Council EB.AIR/1999/1 [hereinafter Ozone Protocol].

80 *Protocol to the 1979 Convention on long-range transboundary air pollution concerning the control of emissions of nitrogen oxides or their transboundary fluxes*, Oct. 31, 1988, 1593 U.N.T.S. 287 [hereinafter Nitrogen Oxides Protocol], *Protocol to the 1979 Convention on Long-range Transboundary Air Pollution to Abate Acidification, Eutrophication and Ground-level Ozone*, Nov. 20, 1999, Economic and Social Council EB.AIR/1999/1 [hereinafter Ozone Protocol].

81 *Protocol to the 1979 Convention on Long-Range Transboundary Air Pollution concerning the Control of Emissions of Volatile Organic Compounds or their Transboundary Fluxes*, Nov. 18, 1991, 2001 U.N.T.S. 187 [hereinafter Volatile Organic Compounds Protocol], *Protocol to the 1979 Convention on Long-range Transboundary Air Pollution to Abate Acidification, Eutrophication and Ground-level Ozone*, Nov. 20, 1999, Economic and Social Council EB.AIR/1999/1 [hereinafter Ozone Protocol].

82 *Protocol to the 1979 Convention on Long-Range Transboundary Air Pollution on Heavy Metals*, June 24, 1998, 2237 U.N.T.S. 4 [hereinafter Heavy Metals Protocol].

83 *Protocol to the 1979 Convention on Long-Range Transboundary Air Pollution on Persistent Organic Pollutants*, June 24, 1998, 2230 U.N.T.S. 79 [hereinafter POP Protocol].

84 Canada has signed, but not yet ratified the Volatile Organic Compounds Protocol and the Ozone Protocol, Iceland has not signed any of the Protocols except for the Heavy Metals Protocol and the POP Protocol, which it also ratified in 2003, Russia has become party to the LRTAP Convention and the 1985 Sulphur Emissions Protocol as well as the Nitrogen Oxides Protocol and the United States' ratification is still pending on both Sulphur Emission Proto-

The objective of LRTAP is to limit and gradually reduce anthropogenic air pollution.[85] As such the Convention addresses any introduction of *"substances or energy into the air resulting in deleterious effects of such a nature as to endanger human health, harm living resources and ecosystems and material property (...)"*, no matter their range. However, special focus is given to long-range transboundary pollution, i.e. such that originates in areas outside of where adverse effects may be expected.[86] In this context the Convention translated the *"no harm"* rule into a legally binding form – i.e. the general prohibition to use state territory in such a manner as to negatively impact upon another state's territory, property or people. As a consequence the Convention set an example for agreements developed in subsequent years, as the "*no harm"* rule was previously elaborated only through case law and in a soft law context.[87]

In furthering its objective subject to article 2, the LRTAP obliges state parties to develop policies and strategies to combat the discharge of air pollutants, including such that may have an adverse effect upon areas under the jurisdiction of another state.[88] The policies and strategies adopted in this context shall be based on data gathered through research, consultation, monitoring programs and information exchange.[89]

Strictly speaking the LRTAP is not international in scope as it was developed with the intention to limit atmospheric pollution of the European region.[90] As long-range transboundary pollutants emitted in Europe, however, may have an impact on other regions across the globe – and the same holds true vice versa (which is the reason why some of the major polluter states e.g. Canada and the U.S. have ratified LRTAP) – the objectives of the Convention do not only serve European means but also protect areas beyond the

cols, the Volatile Organic Compound Protocol and the POP Protocol. See on the status of ratification:
<http://www.unece.org/env/lrtap/status/lrtap_s.html> (last visited: 23.06.2014).

85 See arts. 1 and 2 of the LRTAP.

86 See arts. 1 para. (b) and 2 of the LRTAP; long-range transboundary air pollution differs from other pollution as regards the spatial extent of the emitted pollutants. Individual emission contributions become due to the pollutants' broad range indistinguishable.

87 See *supra* in fn 300 (part I) on the Trail Smelter Arbitration and in 5.1.1. on the Stockholm Declaration, which adopted the no harm rule from case law into its art. 21 and furthermore see para. 5 to the preamble of the LRTAP.

88 See art. 1 para. (b), as well as arts. 2 and 3 of the LRTAP.

89 See for details arts. 3-5 and 7-9 of the LRTAP.

90 The Convention was developed under the auspices of the United Nations Economic Commission for Europe (UNECE). See for details <http://www.unece.org/env/lrtap/lrtap_h1.html> (last visited: 23.06.2014) and Beyerlin & Marauhn, at 146.

European region from dangerous atmospheric pollution.[91] In this context the protocols to LRTAP set emission targets and regulate ways and means to control and reduce the release of specific air pollutants into the atmosphere.[92] To this aim the LRTAP protocols, in accordance with the Convention,[93] *inter alia* require states to adopt strategies, policies, programs and measures to control and reduce the specific air pollutants concerned,[94] to facilitate exchange of information and technology in that context[95] and promote research and monitoring initiatives pertaining to the specific substances addressed by the protocols.[96]

Due to the long-range transboundary character of the pollutants covered by the LRTAP Convention and its protocols, these substances may affect biodiversity of Arctic ecosystems and human health within the circumpolar North and this also in a long-term perspective, as pollutants, which have been deposited in ice and snow for a long period of time may eventually be released due to the change in climate.[97] As a consequence the LRTAP regime ought to be seen as an important asset in addressing climate change induced Arctic risks. This proposition requires qualification, however, as the responsibility to develop strategies, policies and programs relating to the control and reduction of long-range transboundary air pollutants is left to state parties[98] and the Convention as well as its Protocols fail to oblige states to be reflective of the precautionary principle or the ecosystem approach when doing so.[99] Consequently, the Convention and its protocols set merely a base for

91 See accord. Birnie, et al., at 344.
92 See *supra* in fn 79-83 (part II).
93 See arts. 3-5 and 7-9 of the LRTAP.
94 See art. 6 of the 1985 Sulphur Emissions Protocol, art. 7 of the Nitrogen Oxides Protocol, art. 7 of the Volatile Organic Compounds Protocol, art. 4 of the 1994 Sulphur Emissions Protocol, art. 5 of the Heavy Metals Protocol, art. 7 of the POP Protocol and art. 6 of the Ozone Protocol.
95 See arts. 3 and 8 of the Nitrogen Oxides Protocol, art. 4 and 8 of the Volatile Organic Compounds Protocol, art. 3 of the 1994 Sulphur Emissions Protocol, art. 4 of the Heavy Metals Protocol, art. 5 of the POP Protocol and art. 4 of the Ozone Protocol.
96 See art. 6 of the Nitrogen Oxides Protocol, art. 5 of the Volatile Organic Compounds Protocol, art. 6 of the 1994 Sulphur Emissions Protocol, art. 6 of the Heavy Metals Protocol, art. 8 of the POP Protocol and art. 8 of the Ozone Protocol.
97 See in this context also *supra* in 3.2.2.2.
98 See e.g arts. 3 and 6 of the LRTAP, arts. 2 and 4 of the 1994 Sulphur Emissions Protocol, art. 7 of the Nitrogen Oxides Protocol, art. 7 of the Volatile Organic Compounds Protocol, art. 5 of the Heavy Metals Protocol and art. 7 of the POP Protocol.
99 Note, however, that the Ozone Protocol, the Heavy Metals Protocol, the POP Protocol and the 1994 Sulphur Emissions Protocol in their preamble refer to art. 15 of the Rio Declaration and the application of the precautionary principle. Yet no stringent duty to implement such an approach under the LRTAP regime can be derived therefrom.

the governance of risks stemming from the discharge of long-range transboundary air pollutants, rather than obliging states to take specific action against such pollution and to apply any precise principles and approaches to domestic monitoring and management schemes. Ultimately, within the fulfillment of the emission targets set in the Annexes of the Protocols, states are rather free in implementing the obligations set out by the Convention and its Protocols.

5.2.2. Stockholm Convention on Persistent Organic Pollutants

An improvement in this context was made by the adoption of the Stockholm Convention on Persistent Organic Pollutants[100] in 2001, which acknowledges *"that the Arctic ecosystems and indigenous communities are particularly at risk because of the biomagnification of persistent organic pollutants"*[101]. As a post Rio Convention, the Stockholm Convention is mindful of the principles set out in the Rio Declaration and Agenda 21 and thus focuses on protecting human health and the environment from persistent organic pollutants from a precautionary perspective.[102] As such it obliges state parties to prohibit and/or take the legal and administrative measures necessary to eliminate the production, use, import and export of chemicals listed in Annex A[103], to restrict the production and use of chemicals listed in Annex B[104], to reduce the release of chemicals listed in Annex C from unintentional production (e.g. by use of waste incinerators, fossil fuel-fired utilities and motor vehicles)[105] and to manage stockpiles of chemicals listed in Annex A, B or C in a manner protective of human health and the environment[106].

100 *Stockholm Convention on Persistent Organic Pollutants*, May 22, 2001, 2256 U.N.T.S. 119 [hereinafter Stockholm Convention].

101 Preamble of the Stockholm Convention. See additionally *supra* in 3.2.2.2.

102 See art. 1 of the Stockholm Convention; the precautionary principle is furthermore mentioned in art. 8 paras. 7 and 9 of the Convention in the context of submitting proposals for listing a chemical in Annex A, B or C. According to art. 8 para. 7 sub-para. (a) a lack of full scientific certainty that the proposed chemical will result in significant adverse human health and/or environmental effects shall not prevent a state's proposal from proceeding. See in this context also Annex E and F of the Stockholm Convention.

103 See art. 3 para. 1 sub-para. (a) of the Stockholm Convention.

104 See art. 3 para. 1 sub-para. (b) of the Stockholm Convention.

105 See art. 5 and Annex C para. (a) of Part II and paras. (d) and (h) of Part III of the Stockholm Convention.

106 See art. 6 of the Stockholm Convention.

In order to guarantee the Convention's effective implementation states are urged to develop and employ national implementation plans through cooperation and consultation with national stakeholders as well as share information, raise awareness among decision-makers and the public and undertake appropriate research and monitoring initiatives pertaining to persistent organic pollutants and their possible alternatives.[107] While all Arctic Nations have signed the Stockholm Convention, the United States has so far not ratified it and in the case of Denmark the Convention does not apply to the Faroe Islands and Greenland.[108]

5.2.3. Vienna Convention for the Protection of the Ozone Layer

Another pressing issue that emerged at the end of the 20th century during the modern era of environmental law, was the protection of the ozone layer against ozone depleting substances such as chloro- (CFCs) and hydrofluorcarbons (HFCs) in order to prevent dangerous levels of ultraviolet radiation from reaching the Earth's surface and having damaging effects on ecosystems.[109] In this context the Vienna Convention for the Protection of the Ozone Layer of 1985[110] and its 1987 Montreal Protocol on Substances that Deplete the Ozone Layer[111] were established. All Arctic Nations have become parties to the Convention and its Protocol.[112]

While the Protocol's main objective is to set emission limits for specific controlled substances as listed in Annex A, B, C and E, the Convention obliges member states to *"take appropriate measures (...) to protect human health and the environment against adverse effects resulting or likely to result from human activities which modify or are likely to modify the ozone lay-*

107 See art. 7 para. 1 sub-para. (a) and para. 2 as well as arts. 9, 10 and 11 of the Stockholm Convention.

108 See on the status of ratification: <http://chm.pops.int/Countries/StatusofRatification/tabid/252/language/en-US/Default.aspx> (last visited: 23.06.2014).

109 HFCs are not only considered having a damaging effect on the ozone layer but also contribute to the greenhouse effect; see *supra* in 2.2.2. And see furthermore Louka, at 344, cf. Birnie, et al., at 336.

110 *The Vienna Convention for the Protection of the Ozone Layer*, March 22, 1985, 1513 U.N.T.S. 293 [hereinafter Vienna Convention].

111 *Montreal Protocol on Substances that Deplete the Ozone Layer*, Sept. 16, 1987, 1522 U.N.T.S. 3 [hereinafter Montreal Protocol].

112 See on the status of ratification: <http://ozone.unep.org/new_site/en/treaty_ratification_status.php> (last visited: 23.06.2014).

er"[113]. The Convention defines adverse effects as any *"changes in the physical environment or biota, including changes in climate, which have significant deleterious effects on human health or on the composition, resilience and productivity of natural and managed ecosystems, or on materials useful to mankind"*[114]. Consequently the Vienna Convention recognizes the connection between ozone depletion and climate change and as it acknowledges the importance of ecosystem goods and services to mankind is also reflective of the ecosystem approach.[115]

In order to fulfill the commitments subject to article 2 paragraph 1 of the Convention, states are urged to initiate and cooperate in scientific research and conduct scientific assessments on the composition and physical and chemical processes in the ozone layer, the effects human activities have thereon and the possible negative ramifications for human health and the environment resulting from such activities, i.e. an anthropogenic modification of the ozone layer.[116] Interesting in this context is Annex I to the Vienna Convention, as it specifies the research initiatives and observations to be conducted under the Convention. Consequently this exemplary catalog does not only draw attention to the importance of scientific information in respect to managing the depletion of the ozone layer in general, but also urges states to gather scientific data on specific topics relevant to the protection of the ozone layer. This is in so far exemplary as risk assessment plays an important role in the management of environmental risks and often the role of science is not stressed appropriately.[117] In many cases policy and decision-makers lack the scientific information they need to adequately manage a specific environmental problem. Obliging states to conduct scientific research into specified fields is not only reflective of the precautionary principle[118] but also accelerates the gathering of scientific data and hence will provide valuable grounds for risk management in a timely fashion. Annex II of the Vienna Convention might in this context provide a starting point for integrating risk assessment policies into environmental regimes that will adequately address climate change induced Arctic risks.

113 Art. 2 para. 1 of the Vienna Convention.
114 Art. 1 para. 2 of the Vienna Convention.
115 Accord. Birnie, et al., at 351; and see also principle 5 of the Malawi Principles as referred to *supra* in 4.5.2.2.
116 See art. 2 para. 2, arts. 3 and 4 of the Vienna Convention.
117 See in this context *supra* in 1.3., 3.3. and 4.1.
118 Accord. Birnie, et al., at 341; see in this context also the preamble of the Vienna Convention and the Montreal Protocol.

In respect to the management of atmospheric pollutants, it shall be furthermore noted that initiatives to regulate mercury pollution on a global scale are underway and have in January 2013 lead to the stipulation of the Minamata Convention on Mercury, which was opened for signature in October 2013 and has since been signed by all Arctic Nations, except Iceland and Russia.[119] According to the AMAP 2011 mercury assessment report[120], this pollutant raises considerable concerns in respect to human health and the Arctic environment. Mercury is being released by human activities (e.g. coal combustion) in lower latitudes and transported by air and water currents to the Arctic, where it enters the food chain and consequently poses a significant threat to human health (especially of indigenous populations) and biodiversity within the Arctic. Hence, the steps towards the adoption and implementation of a global treaty on mercury currently taken are certainly favorable.

5.2.4. United Nations Framework Convention on Climate Change (UNFCCC)

While the above mentioned conventions play a fundamental role in protecting the atmosphere from adverse anthropogenic activities, i.e. atmospheric pollution, in respect to managing climate change induced Arctic risks the United Nations Framework Convention on Climate Change (hereinafter UNFCCC[121]) deserves exceptional attention, as it explicitly addresses climate change. In order to stabilize the greenhouse gas concentration at a level that would prevent any dangerous anthropogenic interference with the climate system the Convention obliges states to protect the system for the benefit of present and future generations on the basis of equity and following a so

119 See United Nations Environment Programme (Mercury Treaty), United Nations Environment Programme (Minamata Convention) and furthermore <http://www.mercuryconvention.org/> (last visited: 23.06.2014); The Arctic Council Ministers explicitly supported these negotiations by means of para. 5 of section 2 "Major Accomplishments and Future Work", sub-section 2 "Climate Change and Environmental Protection" of the Nuuk 2011 Declaration as cited *infra* in fn 981 (part II). Note that the United States has become the first party to the Convention to ratify it; see on the status of ratification: <http://www.mercuryconvention.org/Countries/tabid/3428/Default.aspx> (last visited: 23.06.2014).

120 See very detailed AMAP (Mercury), at 1-2, 9, 20, 113-138 and 159-169 and AMAP (Arctic Pollution 2011), at 2, 6, 8-9 and 24-28.

121 *United Nations Framework Convention on Climate Change*, May 9, 1992, 1771 U.N.T.S. 107 [hereinafter UNFCCC].

called *common but differentiated responsibility*.[122] According to this principle, all states share the responsibility to protect the environment against a given threat, while at the same time differing national circumstances are required to be taken into account when obliging states to pursue environmental protection.[123] As the main responsibility for the current environmental degradation is linked to the actions of developed countries, it would be inequitable to bind developing and developed countries equally. Yet as far as their capacities allow, all state parties are to take measures to protect the environment against climate change as a result of anthropogenic activities.

In doing so states are urged subject to article 3 paragraph 3 of the UNFCCC to follow the precautionary principle, which mirrors the fact that the UNFCCC is a post Rio convention.[124] The responsibility to take precautionary action when addressing climate change is furthermore enhanced by an obligation to promote sustainable development. In this context the UNFCCC follows a comprehensive approach that includes socio-economic thinking into the decision-making process of adopting policies and measures aimed at mitigating and adapting to climate change.[125] Yet, as BIRNIE, ET AL. point out, the legal effect of these provisions is questionable, since according to the first passage of article 3 of the UNFCCC the parties are not explicitly bound by the principles set out subsequently, but shall rather *"be guided"* by them.[126] Furthermore no clear reference to the ecosystem approach is made within the Convention, which was ratified by all Arctic Nations.[127]

The Convention is supplemented by the Kyoto Protocol[128], which was adopted in 1997 and whose main objective is to ensure the implementation of article 2 of the UNFCCC, i.e. to stabilize the greenhouse gas concentration in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system.[129] For that reason the Kyoto Protocol sets emission reduction targets on specific greenhouse gases[130] for developed

122 See art. 3 para. 1 of the UNFCCC and accord. principle 7 of the Rio Declaration as cited *supra* in fn 184 (part I) as well as art. 10 of the Kyoto Protocol as cited *supra* in fn 62 (part I) .
123 See LOUKA, at 33, FRITZ, at 103, BEYERLIN & MARAUHN, at 63, HUNTER, ET AL., at 464.
124 See *supra* in 4.4.3. and 5.1.5.
125 See arts. 2 and 3 paras. 3, 4 and 5 of the UNFCCC.
126 See BIRNIE, ET AL., at 359.
127 See on the status of ratification: <http://unfccc.int/essential_background/convention/status_of_ratification/items/2631.php> (last visited: 24.06.2014).
128 *Kyoto Protocol to the United Nations Framework Convention on Climate Change*, Dec. 11, 1997, 2303 U.N.T.S. 148 [hereinafter Kyoto Protocol].
129 See the preamble of the Kyoto Protocol.
130 See *supra* in fn 62 (part I).

countries,[131] primarily through domestic action and complementary by means of a complex system of mechanisms as proposed by the Protocol (emission trading, clean development and joint implementation).[132]

First, subject to article 4 paragraph 1 of the Kyoto Protocol, states listed in Annex I may fulfill their reduction commitments jointly, by means of an agreement. According to this provision developed countries that are party to such an agreement will be in compliance with the Kyoto Protocol, as long as the total of their greenhouse gas emissions does not exceed the total of their combined allowed emissions (i.e. assigned amounts).[133] In order to achieve their emission reduction commitments subject to Annex B of the Kyoto Protocol the countries listed in Annex I of the UNFCCC are under article 17 of the Protocol enabled to participate in *emission trading*. This mechanism allows Annex I countries to exchange the right to emit greenhouse gases in accordance with their commitments.[134] Or in other words, states that do not release as much greenhouse gases into the atmosphere during a given period as they would be allowed to while being in compliance with their obligation to reach their specific emission reduction targets (so called *assigned amount units* (AAU)[135]), may trade the "spare" emission units of their AAU. Consequently Annex I countries may by buying the spare emission units from other Annex I countries expand their emission permits, i.e. their AAU, without infringing their emission reduction commitments according to Article 3 and Annex B of the Kyoto Protocol.

131 See art. 3 para. 1 and on the specific emission reduction commitments Annex B of the Kyoto Protocol; the first commitment period of the Kyoto Protocol ended in 2012 and was followed by a second commitment period starting in 2013. The Protocol's emission reduction targets were in that context replaced by means of the Doha amendment, which has yet to enter into force; see for details *Doha amendment to the Kyoto Protocol*, Dec. 2012 [hereinafter Doha Amendments] and *infra* in 5.2.4., as well as on the status of the amendment: <http://unfccc.int/kyoto_protocol/doha_amendment/items/7362.php> (last visited: 24.06.2014).

132 See art. 6 para. 1 sub-para. (d) and art. 17 of the Kyoto Protocol as well as Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol (Decision 2/CMP.1), para. 1.

133 See accord. Rowlands, at 331 (stating that art. 4 of the Kyoto Protocol was mainly designed for the European Union).

134 See for details Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol (Decision 11/CMP.1), para. 1 sub-para. (c) and para. 2 of the Annex and Meinhard (2009), at 38, Pettersson, at 308–309 and Ismer, at 281-282 and on the significance of art. 17 of the Kyoto Protocol under its second commitment period, see at 534-535.

135 See Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol (Decision 11/CMP.1), para. 1 sub-para. (c) of the Annex and Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol (Decision 13/CMP.1), para. 3 of I.A and para. 5 of I.B.

Next to national measures and emission trading Annex I states may, pursuant to article 12 of the Kyoto Protocol, contribute to projects resulting in emission reduction (e.g. renewable energy sources)[136] to be established in developing countries. The purpose of the *clean development mechanism* is twofold: Developing countries will be assisted in achieving sustainable development by the means of investing into emission reduction projects, while developed countries benefit from such projects, as the greenhouse gas reduction gained therefrom (so called *certified emission reduction* (CER)[137]) is accountable to their commitments subject to Annex B of the Protocol.[138] As developing countries are not listed in Annex I of the UNFCCC and therefore are not obliged to meet any emission reduction targets according to Annex B of the Kyoto Protocol, their participation, as well as the contribution of developed countries in emission reduction projects under the clean development mechanism is voluntary.[139]

Finally, subject to article 6 of the Kyoto Protocol Annex I countries may transfer or acquire *emission reduction units* (ERU)[140] resulting from projects aimed at reducing anthropogenic greenhouse gas emissions. The so called *joint implementation* is in that sense a hybrid of emission trading and clean development mechanism. However, contrarily to the clean development mechanism, projects established under article 6 of the Protocol are set up in Annex I countries, that have an obligation to meet their emission reduction targets themselves, but may need assistance as their economies are in transition.[141]

While considering what has just been stated, the Kyoto Protocol is mainly aimed at reducing greenhouse gas concentration in the atmosphere by means of limiting anthropogenic greenhouse gas emissions, the Protocol also sets incentives to enhance the ability of soils, vegetation and forests to

136 See for details Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol (Decision 4/CMP.1), Annex II and Meinhard (2009), at 36.

137 See Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol (Decision 11/CMP.1), para. 1 sub-para. (b) of the Annex.

138 See art. 12 para. 2 of the Kyoto Protocol and Meinhard (2009), at 34, Birnie, et al., at 366, Pettersson, at 306, Bulkeley & Newell, at 24 and Ismer, at 298-299 and on the significance of art. 12 of the Kyoto Protocol under its second commitment period, see at 537.

139 See art. 12 para. 5 sub-para. (a) of the Kyoto Protocol and Meinhard (2009), at 35.

140 Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol (Decision 11/CMP.1), para. 1 sub-para. (a) of the Annex.

141 See art. 6 para. 1 of the Kyoto Protocol and Meinhard (2009), at 37, Pettersson, at 308 and Ismer, at 343.

serve as greenhouse gas sinks.[142] Furthermore the Protocol addresses not only mitigation processes (such as the ones just elaborated on), but also sets out adaptation principles and commitments, albeit on a limited scale. E.g. article 2 paragraph 3 of the Kyoto Protocol urges Annex I countries to *"implement policies and measures (...) in such a way as to minimize adverse effects, including the adverse effects of climate change, effects on national trade, and social, environmental and economic impacts on other [p]arties (...)".*[143]

With the 2012 deadline to meet emission targets coming to an end, it became obvious, however, that mitigation and adaptation efforts taken pursuant to the UNFCCC and the Kyoto Protocol are inadequate to effectively combat climate change. A new global climate agreement is required that is capable to establish new commitments for the period of 2012 and beyond. At it's fifteenth meeting from December 7 to 18, 2009 in Copenhagen, Denmark the Conference of the Parties to the UNFCCC (COP 15) and Conference of the Parties serving as the Meeting of the Parties to the Kyoto Protocol (COP 15/CMP 5) took up this task, but failed. The conference did not result in a binding agreement for long-term action, but rather culminated in a last minute political agreement, the so called Copenhagen Accord.[144] While the Accord recognizes the urgency to combat climate change and thus keep any increases in temperature below 2 degrees Celsius[145], it is not much more than a memorandum of understanding, hardly capable of addressing the problems related to climate change within the Arctic region appropriately. COP 16/CMP 6, which took place in Cancún, Mexico from November 29 to December 10 2010, did not bring about any significant advancements in this direction.[146]

142 See art. 4 para. 2 of the UNFCCC and art. 3 paras. 3 and 4 of the Kyoto Protocol, Meinhard (2009), at 39; for sink activities so called removal units (RMU) are issued; see Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol (Decision 11/CMP.1), para. 1 sub-para. (d) of the Annex and Louka, at 366.

143 Accord. art. 3 para. 14 and further art. 10 para. (b) of the Kyoto Protocol; see in this context also art. 4 para. 8 of the UNFCCC, which *inter alia* refers to activities to be taken subject to the Convention in relation to *"funding, insurance and the transfer of technology, to meet the specific needs and concerns of developing country Parties arising from the adverse effects of climate change and/or the impact of the implementation of response measures"*.

144 See Conference of the Parties to the United Nations Framework Convention on Climate Change, at 5–7.

145 See ibid., at 5, para. 1.

146 See for details and adopted decisions: <http://unfccc.int/meetings/cop_16/items/5571.php> (last visited: 24.06.2014) and Romano & Burleson as well as NZZ Online and for an assessment of the Cancún conference and beyond see Schiele, at 82-89 .

Consequently the task to decide upon the future of the climate change regime, especially as regards the Kyoto Protocol, was appointed to COP 17/CMP 7, held from November 28 to December 9, 2011 in Durban, South Africa. While a decision could be reached upon the continuation of the Kyoto Protocol for a second commitment period from January 1, 2013 to December 31, 2020,[147] two Arctic States changed their status within the Kyoto regime, as Canada withdrew from the Protocol and Russia declined on taking up new commitments.[148] With two major greenhouse gas contributors opting out of the protocol, and the United States refusing to take on any binding commitments,[149] the necessity for a new and more effective global climate change agreement became all the more evident. According to the Durban Platform for Enhanced Action[150], such a legally binding agreement under the UNFCCC is to be established by 2015 and shall enter into force by 2020.

The COP 18/CMP 8 Conference, which took place from November 26 to December 8, 2012 in Doha, Qatar reaffirmed these developments[151] and adopted amendments to the Kyoto Protocol for its second commitment period until 2020[152]. These amendments, however, do not bring about any remarkable novelties to the existing global climate regime, even more so considering the opting out of Russia and Canada from the Kyoto Protocol. In this context the Doha Conference, as well as it's follow up Conference COP 19/CMP 9 in Warsaw from November 11 to 23,[153] ought to be seen as steps on the road towards the establishment of a new global climate Convention by 2015. Yet, no

147 See *Outcome of the work of the Ad Hoc Working Group on Further Commitments for Annex I Parties under the Kyoto Protocol at its sixteenth session*, Dec. 14, 2011 (Decision 1/CMP.7), at 2, para. 1 and *Amendment to the Kyoto Protocol pursuant to its Article 3, paragraph 9 (the Doha Amendment)*, Dec. 8, 2012 (Decision 1/CMP.8), at 3, sec. 1, para. 4; At the Durban conference the end of the second commitment period was set to be either December 31, 2017 or December 31, 2020. The Ad Hoc Working Group on Further Commitments for Annex I Parties under the Kyoto Protocol ultimately agreed on the later date.

148 See for a revised list of the Annex I countries, *Outcome of the work of the Ad Hoc Working Group on Further Commitments for Annex I Parties under the Kyoto Protocol at its sixteenth session*, Dec. 14, 2011 (Decision 1/CMP.7).

149 See on the status of ratification: <http://unfccc.int/kyoto_protocol/status_of_ratification/items/2613.php> (last visited: 24.06.2014).

150 *Establishment of an Ad Hoc Working Group on the Durban Platform for Enhanced Action*, Dec. 12, 2011 (Draft decision 1/CP.17).

151 See *Advancing the Durban Platform*, Dec. 2012 (Decision 2/CP.18), at 19, para. 4.

152 See *Doha amendment to the Kyoto Protocol*, Dec. 2012 [hereinafter Doha Amendments].

153 See for details *inter alia Further advancing the Durban Platform*, Jan. 31, 2014 (Decision 1/CP.19), esp. at 3-4, paras. 1 and 2.

matter the benefits of such an agreement, the considerable time lag built into the development and implementation of this new regime should be cause for concern, especially considering the limited impact of the Kyoto Protocol in addressing global climate change.

5.2.5. Conclusion

Considering the legal initiatives taken in response to atmospheric pollution, ozone depletion and climate change, it is clear that a combined implementation is required to effectively protect the climate system and hence address climate change. In other words the management of climate change induced risks is by and large dependent upon the functioning of the current climate legal regime. As has been shown however, this regime is not comprehensive in scope, in most instances lacks the inclusion of important environmental principles such as the precautionary principle or the ecosystem approach and – especially in the case of the UNFCCC and the Kyoto Protocol – has proven inadequate to prevent irreversible harm to Arctic ecosystems and human populations dependent thereon.[154]

In this respect one of the main problems of the current climate legal regime is that the rules it is governed by are in most instances mere guidelines rather than stringent obligations. While the conventions and their respective protocols addressed above provide a base for the governance of climate change induced Arctic risks stemming from the discharge of air pollutants, in what way and how effective these risks are attended to, is very much dependent on the will of states to take the appropriate measures. This is further emphasized by the fact that while all Arctic Nations have become party to the UNFCCC, the United States is to date still lacking a ratification of the Kyoto Protocol[155], Canada withdrew from the Protocol and Russia refrained from taking up any new commitments at the end of the Protocol's first commitment period in 2012.[156] To address climate change induced Arctic risks solely from the perspective of the global climate regime is thus inappropriate. And this becomes even more accurate, when considering that climate change induced risks, as they are understood for this thesis, also refer to anthropogenic activities to which the climate legal regime is, due to their thematic scope, not applicable, as these activities are not directly linked to cli-

154 Accord. Meinhard (2009), at 47, cf. Birnie, et al., at 371.
155 See on the status of ratification *supra* in fn 127 and 149 (part II).
156 See *supra* in 5.2.4. and fn 148 (part II).

matic and atmospheric threats, but rather are supported by climate change and in this context may threaten the Arctic ecosystems (e.g. an increase in shipping as a result of sea ice loss, that may have adverse impacts upon the Arctic marine ecosystems).[157] As a result other multilateral environmental agreements, especially such that are more reflective of the precautionary principle and the ecosystem approach, will have to be considered subsequently in order to find an answer as to how to adequately assess and manage climate change induced Arctic risks.

5.3. The Law of the Sea

When studying the legal foundation of how risks are being assessed and managed within the Arctic it is to begin with important to bear in mind the special geography of the region. Rather than consisting of land, the Arctic is an ocean[158] enclosed by the landmasses of the eight Arctic Nations. Although Arctic risk management cannot be solely based on preserving the Arctic marine environment of course, the Arctic Ocean undoubtedly plays an important role in forming the region's ecosystems. It is habitat for many Arctic species and by large determines climatic conditions not only in the Arctic but also beyond.[159]

When addressing the international legal regime on environmental protection and its implications for Arctic risk assessment and management it is therefore paramount to analyze global rules and regulations governing the Arctic marine environment. This is made even more evident by the fact that unlike the Arctic territories, the Arctic Ocean is not in all parts subject to the jurisdiction of one of the five Arctic littoral states.[160] As a result protecting the Arctic marine environment and consequently managing climate change induced Arctic risks within the Arctic Ocean is not easily fulfilled and is dependent on the efficiency of the applicable rules as well as on the cooperation between all parties involved.

The following paragraphs shall provide an overview over the main global legal measures applicable to the Arctic marine environment, analyze their importance for the assessment and management of climate change induced Arctic risks and address the role of decision-making tools, such as the pre-

157 See *supra* in 1.2. and furthermore *infra* in 5.3.2.
158 See for details on the Arctic Ocean *supra* in 3.2.2.2.
159 Ibid.
160 See *supra* in 3.2.2.3.

cautionary principle and the ecosystem approach within the law of the sea regime.

5.3.1. The United Nations Law of the Sea Convention (UNCLOS)

While the seas had always been of great fascination to mankind, the knowledge about the seas as fragile ecosystems only came with new technologies and more extensive scientific research in the past couple of centuries. Up to the end of the 19th century the seas were regarded as an inexhaustible resource; except for a narrow belt of territorial seas a *laissez-faire* attitude governed the use of the world's oceans, continuously luring mankind into further exploitation of the marine environment.[161]

As the use of the seas developed knowledge began to grow, however, that natural resources such as offshore oil, gas and minerals were by no means inexhaustible and that fisheries would only continue to serve as a valuable nourishment if fish stocks were managed wisely by preventing overfishing. At the same time understanding grew of the damaging effect vessel source pollution, noise and extensive exploitation can have on the balance of the marine ecosystems.[162] It was due to these factors that over time the call within the international community for a change in the law of the sea became stronger. Yet, the forming of a comprehensive convention on the law of the sea was still decades away.

In the early stages of the development of the law of the sea it was mostly in the context of particular disputes that legal questions regarding the seas were addressed.[163] A constant practice and the believe that this practice was either required or allowed by international law (*opinio iuris*) given certain disputes, eventually led to the establishment of customary international law in regards to governing the oceans.[164] Following these developments, many attempts were, until the end of the 20th century, undertaken to codify the rules of customary international law regarding the law of the sea.[165] Most of

161 See Churchill & Lowe, at 2, Third Committee (4th meeting), at 193 note 16, cf. Birnie, et al., at 703, Hunter, et al., at 744.

162 See Churchill & Lowe, at 2, CBC News (Sept. 2010), International Maritime Organization (A.720(17)), at 8 and in respect to ship based and oil and gas activity impacts on Arctic ecosystems see PAME (AMSA), at 136–151 and AMAP (Oil and Gas), at 10, 18 and 24-25.

163 See Churchill & Lowe, at 4 and 7, Rothwell & Stephens, at 22, 470.

164 Accord. Lepard, at 5, Rothwell & Stephens, at 22.

165 See e.g. Churchill & Lowe, at 13, Rothwell & Joyner, at 10, Harrison, at 27.

these attempts[166] undoubtedly advanced the legal background in the matter, but failed to find acceptable solutions for all parties involved. It was not until the 1950s that the establishment of hard law rules regarding the law of the sea, i.e. such that are legally binding,[167] was at least in parts successful: The first United Nations Conference on the Law of the Sea (UNCLOS I[168]), held in Geneva in 1958 brought forward four conventions, dealing with matters related to governing the seas: The Convention on the Territorial Sea and the Contiguous Zone[169], the Convention on the High Seas[170], the Convention on the Continental Shelf[171] and the Convention on Fishing and Conservation of the Living Resources of the High Seas[172]. Nevertheless UNCLOS I was not able to deal with the question of the breadth of the territorial sea[173], which had been an ongoing dispute within the international community for centuries. Another Conference, the second United Nations Conference on the Law of the Sea (UNCLOS II[174]) was convened in 1960 in order to settle this dispute. It failed.[175] An agreement on the breadth of the territorial sea had yet to be found.

In 1973 began the work of the third Conference on the Law of the Sea (UNCLOS III[176]). It was not the unresolved question of the breadth of the territorial sea, that initiated this conference, but the establishment of the deep seabed lying beyond the limits of national jurisdiction as common heritage of mankind[177]. At the same time concerns regarding pollution and a call for further conservation of fisheries were increasing. In this context it seemed reasonable to review the whole law of the sea. When UNCLOS III concluded, the largest multilateral legal instrument to date, the Convention on the Law of the Sea (hereinafter UNCLOS), was adopted and opened for signature at

166 For details see Churchill & Lowe, at 13–15, Scovazzi (Law of the Sea Evolution), at 88, 90-93, Rothwell & Joyner, at 10, Rothwell & Stephens, at 4–6, Harrison, at 28–31.
167 See on the distinction between soft and hard law *supra* in fn 209 (part I) and furthermore infra in 6. and 6.1.
168 *1st United Nations Conference on the Law of the Sea* (Vol. I-VI, A/CONF.13).
169 *Convention on the Territorial Sea and the Contiguous Zone*, Apr. 29, 1958, 516 U.N.T.S. 205.
170 *Convention on the High Seas*, April 29, 1958, 450 U.N.T.S. 11.
171 *Convention on the Continental Shelf*, April 29, 1958, 499 U.N.T.S. 311.
172 *Convention on Fishing and Conservation of the Living Resources of the High Seas*, Apr. 29, 1958, 559 U.N.T.S. 285.
173 See Churchill & Lowe, at 15 and Rothwell & Joyner, at 12.
174 *2nd United Nations Conference on the Law of the Sea* (A/CONF.19).
175 See ibid., 14th plenary meeting (A/CONF.19/L.6) at note 48.
176 See *supra* in fn 126 (part I).
177 See Part XI, esp. art. 136 of UNCLOS and Rothwell & Stephens, at 10–11.

Montego Bay in Jamaica on December 10th 1982.[178] The Convention entered into force with the deposition of the sixtieth instrument of ratification on November 16th 1994.[179] All Arctic States, except the United States have become party to UNCLOS.[180]

While UNCLOS was able to set aside many outstanding issues and provide a comprehensive legal solution to matters regarding the seas, its large scope also hampers its effectiveness and implementation. With the exception of a few articles[181], UNCLOS is with its 320 articles and 9 annexes built as a framework convention. Interpretation and further development are left to state parties and other legal regimes, dealing more thoroughly (but less comprehensively) with questions regarding the law of the sea. In that sense UNCLOS provides a starting point to many legal issues arising within the marine ecosystems. More detailed legal answers to questions posed by the law of the sea need to be sought in specific conventions framed by international organizations such as the International Maritime Organization (IMO), e.g. the International Convention for the Prevention of Pollution from Ships[182].

Although the preservation of the Arctic marine environment and thus the governance of climate change induced Arctic risks can in this respect not solely be based on the 1982 Law of the Sea Convention, the implications UNCLOS has on the polar oceans needs to be analyzed before examining in detail how in the light of climate change, initiating activities or events adversely affecting the Arctic Ocean, i.e. climate change induced risks impinging upon the Arctic marine ecosystems, ought to be adequately governed by the law of the sea.

178 *United Nations Convention on the Law of the Sea*, Dec. 10, 1982, 1833 U.N.T.S. 3 [hereinafter UNCLOS]; see art. 305 para. 2 and 320 of UNCLOS.
179 See art. 308 para. 1 of UNCLOS.
180 See on the status of ratification: <http://www.un.org/Depts/los/reference_files/status2010.pdf> (last visited: 24.06.2014).
181 Meant are the ones that deal with the deep seabed in Part XI of UNCLOS.
182 *Protocol of 1978 relating to the International Convention for the prevention of pollution from ships*, 1973/1978, 1340 U.N.T.S. 61 [hereinafter MARPOL 1973/1978]; see for details *infra* in 5.3.2.1.

5.3.1.1. The Law of the Sea Convention and Climate Change Induced Risks

As a framework convention UNCLOS is applicable to all seas and oceans on the planet, including the Arctic Ocean.[183] The convention is not divided pertaining to the different marine regions of the world. Instead, in favor of a comprehensive legal regime to the governance of marine areas, specific references to certain seas and oceans are lacking in UNCLOS. Yet the question of its significance for the polar oceans has been discussed by legal scholars on more than one occasion.[184] The drawing of baselines according to articles 5 and 7 of UNCLOS e.g. is being complicated by the presence of ice along the borders of Antarctica.[185] The fact that ice, in all its manifestations, has not been dealt with in international law to this point makes an uncontroversial application of UNCLOS to the polar oceans certainly questionable. Yet, except for one occasion, UNCLOS fails to address the specific climatic conditions dominating the polar oceans. The mentioned occasion, the so called *Arctic exception*[186] will be discussed in greater detail *infra* in c.

a. General Provisions

As regards the governance of climate change induced risks within the Arctic ecosystems special attention ought to be drawn to Part XII of UNCLOS, which deals with the protection and preservation of the marine environment. In this context the first section of Part XII holds general provisions, which set the base for more specific environmental rules and regulations applicable to a variety of threats to the marine environment, including such

183 Accord. Franckx, at 127, Hakapää (Arctic Waters), at 67–68.

184 See e.g. Rothwell (1996), at 182–220, Rothwell & Joyner, at 13, Oude Elferink & Rothwell, at 338, 350 (*inter alia* raising the question, if the areas of the Arctic Ocean beyond national jurisdiction can really be regarded as high seas for the purposes of the law of the sea*)*.

185 See e.g. Rothwell (1996), at 269, Rothwell (2001), at 50 and 61-62, Prescott & Schofield, at 536–537. In contrast to Antarctica, the drawing of baselines according to the low-water mark subject to art. 5 of UNCLOS is not a major problem in the Arctic, as the Arctic coastlines are not permanently ice-covered. Yet only the United States has drawn baselines according to the low-water mark. Furthermore in respect to the drawing of straight baselines subject to art. 7 of UNCLOS, debate has arisen in respect to Canada's application of this rule to the Canadian Arctic Archipelago; see for details Rothwell (1996), at 185 and 272-273, Rothwell & Joyner, at 17, Scovazzi (Territorial Sea), at 69 and 76-81, Oude Elferink & Rothwell, at 339-340, 341, Proelss & Müller, at 658, Moore, at 24 (qualifying the notion of the Canadian baseline practice being an archipelagic claim).

186 See Bartenstein, at 23, Duruigbo, at 76, Wang, at 326, McDorman (2012), at 413 and McDorman (2014), at 260.

disturbing polar waters.[187] Article 192 of UNCLOS holds in this respect that *"States have the obligation to protect and preserve the marine environment"*. What this duty entails is made clear in the subsequent articles: States have to take all necessary measures (articles 194, 195 and 196 of UNCLOS) as well as adopt and enforce laws and regulations (articles 207 to 222 of UNCLOS) to prevent, reduce and control pollution of the marine environment. In practice the implementation of these articles relies primarily on flag states and – on a more limited scale – on coastal or port states to ensure, that vessels flying their flag or such located within their jurisdiction respectively, comply with Part XII of UNCLOS and international legal regulations addressing pollution of the marine environment, which were adopted based thereon.[188] Article 1 paragraph 1 sub-paragraph 4 of UNCLOS defines *"pollution of the marine environment"* 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 of use of sea water and reduction of amenities"*. The objective of Part XII of UNCLOS is to prevent any such pollution from occurring and to mitigate its consequences in case it already took place. In respect to climate change induced Arctic risks the question remains, if an obligation to manage marine pollution pursuant to articles 192 et seq. entails a duty of states to be respectful of the precautionary principle and/or the ecosystem approach when carrying out management activities.

In accordance with article 192 of UNCLOS, the duty of states does not end in refraining from carrying out activities that could result in environmental harm, but rather it encompasses a positive obligation to protect and pre-

187 See sections 5 and 6 of UNCLOS.

188 See in this respect the elaborations on the IMO legal regime *infra* in 5.3.2. and in regards to enforcement of Part XII of UNCLOS: arts. 213 to 222 of UNCLOS, esp. art. 217 para. 1 (referring to enforcement by flag states). In respect to coastal and port state control arts. 218 and 220 of UNCLOS are relevant: Art. 218 para. 1 allows for the investigation and prosecution of infringements to UNCLOS that took place beyond the jurisdiction of the coastal state (i.e. high seas), while art. 220 para. 1 bestows the same right upon coastal states for violations that occurred within their jurisdiction (i.e. internal waters, territorial sea and exclusive economic zone). However in both cases such a right only exists if a foreign vessel enters a port or off shore-terminal on a voluntary basis. See on this topic also Freestone & Salman, at 345, Birnie, et al., at 413, 414, 421, Koivurova & Molenaar (2010), at 27, Rothwell & Stephens, at 355-356, 358, cf. Birnie, et al., at 400–401 (referring to customary international law, by stating, that *"in customary law, only the flag state has jurisdiction to enforce regulations applicable to vessels on the high seas"*).

serve the marine environment. In the opinion of Birnie et al. one manifestation of this obligation is the precautionary principle.[189] Following such a rationale, the obligation of states to prevent harm to the marine environment at least partially consists of an obligation to manage initiating activities or events if their consequences for the marine environment are uncertain.[190] Measures as well as laws, regulations, standards and procedures developed in order to address marine pollution, as referred to in articles 194 to 196 and 207 to 222 of UNCLOS, would thus generally have to acknowledge the precautionary principle in order to adequately implement the obligation set out in article 192 of UNCLOS.

b. Provisions Pertaining to Specific Forms of Marine Pollution

While articles 194 to 196 require states to individually or jointly take "*all measures consistent with [UNCLOS] that are necessary to prevent, reduce and control pollution of the marine environment from any source (...)*"[191], articles 207 to 222 of UNCLOS are more specific and also more stringent, by obliging member states to adopt and enforce laws and regulations to prevent, reduce and control pollution of the marine environment. Articles 207 to 212 encourage states to adopt laws and regulations against land-based sources of pollution, pollution from seabed activities, pollution from activities in the Area, pollution by dumping, pollution from vessels and pollution from or through the atmosphere. The subsequent articles are concerned with the enforcement of the respective laws and regulations adopted.

i. Pollution from Vessels

Article 211 of UNCLOS sets the base for the establishment of *"international rules and standards to prevent, reduce and control pollution of the marine environment from vessels"*[192] and obliges flag states to address *"pollution of the marine environment from vessels flying their flag or of their registry"*[193]. Additionally the article gives coastal states the right to adopt, pertinent to their territorial seas *"laws and regulations for the prevention, reduction and control of marine pollution from foreign vessels"*[194] and in re-

189 See Birnie, et al., at 152–153, accord. Fritz, at 210 (in reference to art. 194 of UNCLOS).
190 See Rothwell (1996), at 361.
191 See articles 192 and 194 para. 1 of UNCLOS.
192 Art. 211 para. 1 of UNCLOS.
193 Art. 211 para. 2 of UNCLOS.
194 Art. 211 para. 4 of UNCLOS.

spect to their exclusive economic zone, *"adopt laws and regulations for the prevention, reduction and control of pollution from vessels conforming to and giving effect to generally accepted international rules and standards established"*[195] according to paragraph 1. Furthermore in respect to special circumstances, where *"the international rules and standards (...) are inadequate"*, coastal states have the right to establish *"laws and regulations for the prevention, reduction and control of pollution from vessels (...) for [such] special areas"*.[196] They however can only do so by seeking permission from the International Maritime Organization (IMO).[197] As this article is *lex generalis* to the article 234 of UNCLOS, the mentioned *Arctic exception*, the governance of risks pertaining to vessel-source pollution within the Arctic through UNCLOS, will be addressed in greater detail *infra* in c.

ii. Pollution from Land-Based Sources

In protecting the marine environment against harmful land-based activities articles 207 and 213 of UNCLOS oblige states to adopt and enforce "*laws and regulations to prevent, reduce and control pollution of the marine environment from land-based sources, including rivers, estuaries, pipelines and outfall structures, taking into account internationally agreed rules, standards and recommended practices and procedures"*[198]. Such *"[l]aws, regulations, measures, rules, standards and recommended practices and procedures (...) shall include those designed to minimize, to the fullest extent possible, the release of toxic, harmful or noxious substances, especially those which are persistent, into the marine environment"*[199]. While the Arctic itself is for most parts still a pristine region, because the existence of permafrost and ice and snow make activities within the region difficult, land-based activities carried out further south can have an effect on the Arctic Ocean too. Especially the discharge of persistent organic pollutants through rivers, ocean currents and air, stemming from industrial sites within Arctic and in other states can lead to a long-lasting pollution of the Arctic marine environment, because such pollutants are persistent in ice and snow.[200] Al-

195 Art. 211 para. 5 of UNCLOS; e.g. laws and regulations established under the IMO regime such as the International Convention for the Prevention of Pollution From Ships; see *infra* in 5.3.2. and Birnie, et al., at 413.
196 Art. 211 para. 6 sub-para. a of UNCLOS.
197 See art. 211 para. 6 sub-paras. a and c of UNCLOS.
198 Art. 207 para. 1 of UNCLOS.
199 Art. 207 para. 5 of UNCLOS.
200 See *supra* in 3.2.2.2.

though articles 207 and 213 of UNCLOS are not primarily directed at protecting the circumpolar North, the development and enforcement of laws and regulations as well as best practices and standards aimed at averting the release of harmful persistent substances are, thus, due to the special abiotic conditions within the region, paramount in protecting the Arctic marine environment. In their essence the articles lay down what has been developed in international environmental law through cases such as the *Trail Smelter Arbitration*, in which the Arbitral Tribunal treating the case, prohibited the use of a state's territory in a way that would *"cause injury by fumes in or to the territory of another [state] or the properties or persons therein, when the case is of serious consequence and the injury is established by clear and convincing evidence"*[201]. As such, articles 207 and 213 of UNCLOS reflect both, the precautionary principle – by demanding the necessary caution when carrying out land-based activities so as not to harm the marine environment – and the ecosystem approach – by taking the trans-boundary characteristic of toxic substances (such as persistent organic pollutants), albeit not explicitly, into account. Furthermore article 207 holds that rules, standards and recommended practices and procedures designed to protect the marine environment from land-based pollution, should acknowledge *"the economic capacity of developing States and their need for economic development"* and that they should *"be re-examined from time to time as necessary"*. This terminology is consistent with the ecosystem approach by focusing on environmental protection while at the same time acknowledging the need for economic growth and the necessity for rules and standards to be adaptive.[202] In any case, laws and regulations adopted and enforced against land-based sources of pollution according to articles 207 and 213 of UNCLOS ought not to conflict with precautionary measures or such taken in light of the ecosystem approach, because such action would, according to what has been just said, hardly be compatible with the articles' objectives.

iii. Pollution from Seabed Activities

Articles 208 and 209, as well as 214 and 215 of UNCLOS refer to activities carried out within the seabed. While 208 and 214 oblige coastal states to adopt and enforce *"laws and regulations to prevent, reduce and control pollution of the marine environment arising from or in connection with*

201 See *supra* in fn 300 and 301 (part I).
202 See for details on the ecosystem approach *supra* in 4.5.

seabed activities subject to their jurisdiction", articles 209 and 215 pertain to the seabed, outside of any state's territorial waters or exclusive economic zone – a region called the Area[203]. The international seabed is regarded as common heritage of mankind and is for that reason open to exploitation by all member states and is thus, to avoid the emergence of disputes, governed by the International Seabed Authority (ISA).[204] Consequently states wishing to extract resources lying within the Area do so *"for the benefit of mankind as a whole"*[205], in fostering the *"healthy development of the world economy and balanced growth of international trade, and [in promoting] international cooperation for the over-all development of all countries, especially developing States"*[206].

Because the Arctic Ocean is covered by ice and snow any activities pertaining to the seabed are difficult to conduct at this point. As global climate change, however, is likely to gradually make the Arctic a more hospitable region and drastically change the ice-coverage of the Arctic Ocean within the next couple of decades,[207] the construction of installations to obtain natural resources lying within the seabed is becoming more feasible. Hence, if exploration and exploitation of potential mineral resources in the Arctic seabed, both, within and outside of the Arctic coastal states' exclusive economic zones, become of greater economic benefit, the region will experience further industrial development in terms of mining installations and infrastructure. Increasing land-based pollution as well as pollution from activities carried out within the seabed are thus likely to further threaten the Arctic ecosystems in the future. Consequently, while articles 208 and 214, as well as 209 and 215 of UNCLOS do at this point only play a minor role in protecting the Arctic marine environment, they will – if the warming trend continuous as predicted – become much more important to the region in the decades to come.

As rules to govern climate change induced Arctic risks articles 208 and 214 oblige states to adopt and enforce *"laws and regulations to prevent, reduce and control pollution of the marine environment arising from or in connection with seabed activities subject to their jurisdiction and from artifi-*

203 The Area is defined in art. 1 of UNCLOS as *"the seabed and ocean floor and subsoil thereof, beyond the limits of national jurisdiction"*.

204 See arts. 136 and 156 et seq. of UNCLOS. And for further information on the ISA see <http://www.isa.org.jm/en/home> (last visited on: 24.06.2014).

205 Art. 140 para. 1 of UNCLOS.

206 Art. 150 of UNCLOS.

207 See *supra* in 2.3.

cial islands, installations and structures under their jurisdiction (...)"[208]. Such laws, regulation shall not be *"less effective than international rules, standards and recommended practices and procedures"*[209]. Accordingly this passage prevents states from evading internationally agreed upon rules, standards and practices by establishing less stringent laws and regulations within their internal and territorial seas, as well as their exclusive economic zone. Furthermore member states are encouraged to *"establish global and regional rules, standards and recommended practices and procedures to prevent, reduce and control pollution of the marine environment [through seabed activities, which] shall be re-examined (...) as necessary"*[210]. Again, similar to article 207 paragraph 4 of UNCLOS, the need for newly developed rules, standards, recommended practices and procedures to be adaptive is recognized in this passage. Furthermore article 208 paragraph 4 holds that *"states shall endeavour to harmonize their policies (...) at the appropriate regional level"*, which acknowledges the benefit of decentralized management and integrative norms, as referred to in principles 2 and 12 of the Malawi principles.[211] Other than that no clear reference to either the precautionary principle or the ecosystem approach can be detected from the choice of words in articles 208 and 214 of UNCLOS. Nevertheless the articles do on no account impede on member states deciding to develop precautionary laws, regulations, standards and best practices or such pursuant to the ecosystem approach.

In respect to the Area it is important to note that the Arctic Ocean is the smallest of the world's oceans and is underlain by extensive oceanic ridges that in most cases form part of the continental shelves of one of the five Arctic littoral states.[212] As has been pointed out *supra* in 3.2.2.3. the delimitation of continental shelves within the Arctic lies at the center of the ongoing geopolitical debates in the region. As long as these sovereignty disputes are not settled the extent of the Area in the region is not irrevocably defined. To date the high seas of the Arctic Ocean have pursuant to article 136 of UNCLOS been regarded as common heritage of mankind.[213] A possible enlargement of the national outer continental shelves will bring about a change in size to the Area, however. If that is the case it stands to reason that exploring

208 Art. 208 para. 1 of UNCLOS.
209 Art. 208 para. 3 of UNCLOS.
210 Art. 208 para. 5 of UNCLOS.
211 See on the Malawi Principles *supra* in 4.5.2.2.
212 See *supra* in fn 106 and 124 (part I) and Lodge, at 178.
213 See Gloser, at 12, Witschel, at 34.

and exploiting the Area within the Arctic will likely be of minor interest to any state, because, if at all, the Area will not be very extensive. Hence, once the continental shelve disputes are settled, the exploration and exploitation of the Arctic seabed will be mainly governed by articles 208 and 214 of UNCLOS. Where articles 209 and 215 are applicable they demand the establishment and enforcement of *"international rules, regulations and procedures (...) to prevent, reduce and control pollution of the marine environment from activities in the Area. Such rules, regulations and procedures shall be re-examined from time to time as necessary"*[214]. As a common heritage of mankind, governing the Area is thus not subject to national legislation but to international efforts to protect and preserve the international seabed. Yet, member states are obliged to *"adopt laws and regulations [no less effective than international rules, regulations and procedures] to prevent, reduce and control pollution of the marine environment from activities in the Area undertaken by vessels, installations, structures and other devices flying their flag or of their registry or operating under their authority (...)"*[215]. While paragraph 1 recognizes the need for international rules, regulations and procedures applicable to the Area to be adaptive, paragraph 2, which sets out direct obligations for member states, does not refer to the precautionary principle or the ecosystem approach at all. Considering, however, that member states are not hampered to take precautionary measures or such pursuant to the ecosystem approach when managing risks stemming from seabed activities subject to their jurisdiction, as carried out according to article 208 of UNCLOS, similar conclusions ought to be drawn for activities conducted in the Area.

This assumption is underlain by article 145 of UNCLOS, which refers to the protection of the marine environment in respect to the Area. According to the article *"necessary measures shall be taken (...) with respect to activities in the Area to ensure effective protection for the marine environment from harmful effects which may arise from such activities"*. The ISA to this end is obliged to *"adopt appropriate rules, regulations and procedures for (...) the prevention, reduction and control of pollution and other hazards to the marine environment (...) and of interference with the ecological balance of the marine environment (...) as well as the protection and conservation of the natural resources of the Area and the prevention of damage to flora*

214 Art. 209 para. 1 of UNCLOS.
215 Art. 209 para. 2 of UNCLOS.

and fauna of the marine environment"[216]. This terminology is clearly in line with the objectives of the Convention on Biological Diversity (CBD) subject to its article 1: *"The conservation of biological diversity, the sustainable use of its components and the fair and equitable sharing of the benefits arising out of the utilization of genetic resources".*

Consequently the application of the ecosystem approach when managing seabed activities within the Area is only reasonable, because as *"a strategy for the integrated management of land, water and living resources that promotes conservation and sustainable use in an equitable way"*[217], the ecosystem approach ensures the implementation of the CBD objectives and as such tries to prevent any negative interference with the ecological balance or disturbance of natural resources or damage to flora and fauna, as referred to in article 145 of UNCLOS.[218]

iv. Pollution by Dumping

Next to land-based activities or such carried out in the seabed, dumping is considered another source of pollution of the marine environment. Dumping can be understood as the deliberate disposal of waste at sea, which includes *inter alia* radioactive matter, military materials and industrial debris.[219] In order to prevent, reduce and control pollution by dumping articles 210 and 216 of UNCLOS require member states to adopt and enforce laws, regulations and measures against pollution of the marine environment by dumping. "*Such laws, regulations and measures shall ensure that dumping is not carried out without the permission of the competent authorities of States."*[220] Accordingly article 210 paragraph 5 of UNCLOS holds, that *"dumping within the territorial sea and the exclusive economic zone or onto the continental shelf shall not be carried out without the express prior approval of the coastal State, which has the right to permit, regulate and*

216 Art. 145 sub-paras. a and b of UNCLOS.
217 See *supra* in 4.5.2.1.
218 Further indications for applying the ecosystem approach in terms of activities carried out within the international seabed can be drawn from article 150 of UNCLOS, which states that *"[a]ctivities in the Area shall (...) be carried out in such a manner as to foster healthy development of the world economy and balanced growth of international trade, and to promote international cooperation for the over-all development of all countries, especially developing States (...)".* Articles 145 of UNCLOS and 150 of UNCLOS in combination address ecological, as well as economic and social components and thus indicate the application of the ecosystem approach.
219 See Art. 1 para. 5 sub-para. a of UNCLOS and Churchill & Lowe, at 329–330.
220 Art. 210 para. 3 of UNCLOS.

control such dumping." If dumping at sea can take place is thus ultimately dependent on the specific coastal states' consent.

Nevertheless coastal states are not entirely free in their decision, but they have to give due consideration to possible negative ramifications for other states, that are out of their geographical situation prone to be adversely affected by dumping at sea.[221] This obligation is compatible with the principle to refrain from using state territory in such a manner as to adversely affect another state's territory or properties and people therein (*"no harm"* rule), as it was developed in international environmental law through cases such as the *Trail Smelter Arbitration* and eventually adopted in legal soft and hard law agreements, such as principle 21 of the Stockholm Declaration, principle 2 of the Rio Declaration and art. 3 of the Convention on Biological Diversity, which is also reflected in principle 3 of the Malawi principles.[222] Article 210 paragraph 5 of UNCLOS thus embraces decision making that is precautionary and acknowledges the impacts management of a specific ecosystem (i.e. the dumping of waste in one specific marine location) can have on another ecosystem (i.e. the marine environment subject to jurisdiction to another state). This reference to the ecosystem approach needs to be put into perspective, however: Because the dumping of wastes at sea in any event causes a disturbance of the ecological balance of the marine environment (e.g. fish grounds are adversely affected by radioactive materials deposited at sea), considering negative ramifications for other states before deciding upon waste disposal is precautionary and also acknowledges parts of the ecosystem approach, but in an overall perspective does not adequately address risks emerging from waste disposal at sea in the light of the ecosystem approach. Only prohibiting dumping altogether would maintain the ecological balance of the marine environment and its functions and services in a long term perspective. In that context it must seem clear that the provisions to address pollution by dumping as they are set out in UNCLOS, are precautionary in scope, because they contain a margin of safety, but that they stand in contrast to the ecosystem approach, because as long as dumping is allowed maintaining ecosystem health and integrity is being put at risk.

221 See art. 210 para. 5 of UNCLOS.
222 See *supra* in fn 301 (part I) and in 4.5.2.2. c.

While dumping within the Arctic Ocean – the largest remaining wilderness of the northern hemisphere – would seem hypothetical, it is in fact a problem that is not only pertaining to the South. As became public in 1992 the former USSR had dumped radioactive waste for over three decades into the Kara and Barents Seas, which are situated around the Russian archipelago Novaya Zemlya.[223] While a study carried out by the International Atomic Energy Agency (IAEA) classified the risks in connection to this waste disposal for human and ecosystem health as low[224], the example shows that the Arctic is not exempt of dumping. The deposition of waste within Arctic waters is to that end addressed on a regional basis, e.g. in Canada's Arctic Waters Pollution Prevention Act (hereinafter AWPPA[225]), which generally prohibits[226] in its article 4 paragraph 1 the *"deposit of waste of any type in the arctic waters or in any place on the mainland or islands of the Canadian arctic under any conditions where the waste or any other waste that results from the deposit of the waste may enter the arctic waters."* Accordingly, when implementing articles 210 and 216 of UNCLOS, Canada followed the precautionary principle and the ecosystem approach by generally prohibiting the deposition of wastes within its Arctic waters in the AWPPA, in spite of the UNCLOS provisions themselves not specifically embracing such an approach.

v. Pollution From or Through the Atmosphere

Finally articles 212 and 222 of UNCLOS establish the base for marine protection against pollution from or through the atmosphere. While atmospheric marine pollution is in most cases a result of land-based activities, UNCLOS treats it separately. The Convention holds that states shall adopt and enforce *"laws and regulations to prevent, reduce and control pollution of the marine environment from or through the atmosphere (...) and take other measures as may be necessary to prevent, reduce and control such pollution. (...) [They] shall endeavour to establish global and regional rules,*

223 See Sale & Potapov, at 160–161, Hunter, et al., at 1121, Seelmann, at 27, Reiersen & Wilson, at 21-23 and <http://www.iaea.org/Publications/Magazines/Bulletin/Bull391/specialreport.html> (last visited: 24.06.2014), Sjoeblom & Linsley, at 25.

224 See <http://www.iaea.org/Publications/Magazines/Bulletin/Bull391/specialreport.html> (last visited: 24.06.2014) and for more details on the study see Sjoeblom & Linsley and Povinec, et al.

225 See for details *infra* in 5.3.1.1. c. and fn 232 (part II).

226 Exceptions are according to art. 4 para. 2 of the AWPPA made for specific waters pertaining to the *Canada Water Act*.

standards and recommended practices and procedures to prevent, reduce and control [atmospheric] pollution"[227].

Air is one of the media to transport persistent organic pollutants, stemming from industrial emissions hundreds of kilometers off the Arctic Ocean into the Arctic, where they are deposited in sea ice, eventually affecting Arctic ecosystems once they are being released.[228] Furthermore the discharge of anthropogenic greenhouse gases through emissions off industrial sites, airplanes or vessels into the atmosphere, alters the atmospheric transparency and thus leads to more extensive trapping of thermal radiation, which results in a rise in temperatures, causing ice and snow to melt, which will in turn release persistent organic pollutants and greenhouse gases (such as methane), accumulated in permafrost soils and Arctic sea ice and snow.[229] Because the emission of pollutants into the atmosphere causes a variety of feedback loops that in one way or another eventually will affect the Arctic ecosystems and are next to natural events responsible for a change in global climate, preventing, reducing and controlling atmospheric marine pollution is required to be one of the focal points when addressing climate change induced Arctic risks. UNCLOS, however, does not provide any guideline on how risks, caused by atmospheric pollution ought to be tackled. Rather it is providing a reference to other conventions, specifically addressing pollution from or through the atmosphere and thus links the law of the sea to the climate legal regime.[230] In any case it does not hamper states from adopting and enforcing jointly or individually precautionary laws, regulations, standards and practices as well as other measures deemed to be necessary to prevent, reduce and control marine pollution from or through the atmosphere or such pursuant to the ecosystem approach. In that context, the UNFCCC for example, which addresses greenhouse gas concentrations in the atmosphere, follows a precautionary approach, by holding in its article 3 that the *"Parties should take precautionary measures to anticipate, prevent or minimize the causes of climate change and mitigate its adverse effects."*

227 Art. 212 paras. 1, 2 and 3 of UNCLOS.
228 See *supra* in fn 109 (part I).
229 See for details *supra* in 2.2.3. and 2.3.
230 Article 237 of UNCLOS refers to the relationship of UNCLOS towards other "*conventions and agreements which relate to the protection and preservation of the marine environment*". UNCLOS does not prejudice any such legal documents. See on the climate legal regime *supra* in 5.2.

c. Ice-Covered Areas

While the above mentioned articles are due to the framework character of UNCLOS applicable to all seas and oceans on this planet, including the Arctic Ocean, and as such do address risk governance within the framework as established above, special attention ought in this context to be drawn to section 8 of part XII of UNCLOS, which mentions ice-covered areas. Just one article, article 234 of UNCLOS, can be found within this section, however. It is the only article within the whole UNCLOS regime, that explicitly refers to ice. Article 234 of UNCLOS reads as follows:

> *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.*

i. The Emergence of Article 234 of UNCLOS

It is widely accepted that Canada, influenced by the former USSR and the United States, is responsible for forming article 234 of UNCLOS.[231] The article can be traced back to Canada's Arctic Waters Pollution Prevention Act (AWPPA)[232], which on the other hand was established in the wake of the voyage of the ice-strengthened oil tanker, *Manhattan*, through the North-

231 See e.g. Rothwell (1996), at 369, Timtchenko, at 86, Moore, at 19, Birnie, et al., at 419, Joyner (Arctic Ocean), at 230, Stokke, at 368, Franckx, at 129, cf. Huebert (Article 234), at 251.

232 The Act to Prevent Pollution of Areas of the Arctic Waters Adjacent to the Mainland and Island of the Canadian Arctic of 26 June 1970, also known as Arctic Waters Pollution Prevention Act, came into force on August 2, 1972; see *Arctic Waters Pollution Prevention Act (consolidated text as of April 1, 2014)*, 1985, R.S. 1985 A-12 [hereinafter AWPPA] in its consolidated form and for the text and reviews on the original act of 1970: *Pollution Control Zones: Canada*, Huebert (Article 234), at 253–254, Pharand, at 203, 224-232, Morin, at 249.

west Passage in 1969 and 1970[233]. The journey's objective was to determine whether it was technically possible and financially feasible to transport oil from the United States' northern shores in Alaska to its eastern oil markets.[234] While using the Northwest Passage can be economically beneficial, because of the shortcut it provides, shipping through the passage remains even to this point ecologically risky. Oil spills in ice covered areas are difficult to handle, because of oil being persistent in ice and snow. Oil transports of tankers of the size of the *Manhattan* could therefore – in case of an accident – have a tremendous effect on the circumpolar ecosystems. This was even more accurate back in the 1970s, when the impact of climate change was not yet as severe in the Arctic and the Arctic Ocean was still extensively ice-covered. It was against this background that Canada decided on new policies governing its Arctic shores.

The AWPPA – today as it did back in 1970 – allows Canada to establish regulations prohibiting the deposit of waste[235] in its Arctic waters and to set standards regarding vessel construction and navigation in specifically designated shipping safety control zones[236]. The act is generally applicable to all Canadian Arctic waters, referring to *"the internal waters of Canada and the waters of the territorial sea of Canada and the exclusive economic zone of Canada, within the area enclosed by the 60th parallel of north latitude, the 141st meridian of west longitude and the outer limit of the exclusive economic zone"*[237].

The AWPPA – in the present, as well as in its initial form at the date of its introduction on December 26, 1970 – establishes a strong tool for Canada to legislate in favor of the Arctic marine environment. The AWPPA was not, however, always as widely accepted[238] as it is today. Originally created in re-

233 See e.g. Huebert (Article 234), at 252, Sale & Potapov, at 149, PAME (AMSA), at 39–40, Moore, at 19–20, Bartenstein, at 25, Rothwell (2012), at 369.
234 Ibid.
235 Arts. 4-9 of the AWPPA; see also *supra* in 5.3.1.1. b. iv.
236 Arts. 2 and 11-13 of the AWPPA; additionally, in the context of shipping within Canadian waters the Northern Canada Vessel Traffic Services Zone Regulations (NORDREG) must be mentioned. NORDREG is aimed at protecting the Canadian Arctic marine environment by establishing a previously voluntary and since 2010 mandatory ship reporting system. See for details <http://www.ccg-gcc.gc.ca/eng/MCTS/Vtr_Arctic_Canada> (last visited: 28.06.2014) and Huebert (Power Politics), at 68, Rayfuse (Polar Code), at 240, McDorman (2014), at 262-263 (on NORDREG's relationship to art. 234 of UNCLOS).
237 Art. 2 of the AWPPA.
238 See e.g. *Pollution Control Zones: U.S. Statement on Canada's Proposed Legislation,* Hakapää (Arctic Waters), at 73, Timtchenko, at 118, Rothwell (1996), at 371, Morin, at 250.

sponse to the *Manhattan* voyage[239], the AWPPA intended to protect the Arctic marine ecosystems. International rules that would allow an Arctic coastal state (or any coastal state for that matter) to develop such standards, however, did not exist at that time. In fact, the law of the sea was after UNCLOS II, still primarily conducted by a wide array of freedoms[240]. By allowing Canada to set regulations in order to protect the Arctic marine environment, the AWPPA, however, did expand the country's jurisdiction over vessels shipping within Arctic waters. Justification for the Act was seen in the inadequacy international law dealt with the matter and in Canada's right of self-defense to protect itself against grave threats to its environment.[241]

This view was not uncontroversially shared[242] by the international community and it was in this context clear, that support for the AWPPA from other states would be needed eventually. Although most Canadian initiatives[243] in that matter remained futile, the issue was successfully included in the third United Nations Conference on the Law of the Sea and in that sense was decisive in forming article 234 of UNCLOS.

One of the main disputes at UNCLOS III concerned retaining ancient rights of *mare liberum*[244], bestowing every state with freedoms regarding the seas, versus interests of coastal states to extend their jurisdiction over marine ar-

239 The AWPPA initially intended to provide rights to Canada to set environmental standards regarding vessels shipping through the Northwest Passage; see Huebert (Article 234), at 254, Bartenstein, at 25 and 26 and cf. PAME (AMSA), at 39, Rothwell (2012), at 369 and 372-373. Because Canada's claim over the passage is until this day being debated, it could be argued that Canada did not have any rights to set such standards in regards to the Northwest Passage. Yet, sovereignty disputes are not topic of this thesis. A further examination of the AWPPA's implications on the Northwest Passage shall therefore not be carried out.

240 For instance, coastal states still had not been able to agree on the delimitation of the territorial sea. Sovereign rights regarding the seas were still rather limited for that matter. See *supra* in 5.3.1. and cf. *Pollution Control Zones: U.S. Statement on Canada's Proposed Legislation,* at 211 (stating, that the enactment and implementation of these measures [i.e. of the AWPPA] would affect the exercise by the United States and other countries of the right to freedom of the seas in large areas of the high seas).

241 See *Pollution Control Zones,* at 216, Rothwell (1996), at 371, Pharand, at 206 and 233 and cf. at 238-244 (stating that *"[t]o qualify such an exercise of jurisdiction as "self-defense" is somewhat inaccurate, since it might not always be possible for Canada to prove that the situations envisaged by the Act constitute an actual threat to its territorial interests"* and suggesting to apply the concept of *"self-protection"* instead).

242 See ibid. and Brubaker (Navigational Issues), at 53.

243 For a more detailed description of Canadian initiatives regarding its AWPPA regime see McRae, at 102–104.

244 The *mare liberum* concept was established by Hugo Grotius in his eponymous book "mare liberum" of 1609; see Grotius, at 9, 19, 27, 49, 63, 65, 73, 75, 79 and Rothwell & Stephens, at 3, Douvier, at 21, Freestone & Salman, at 339 and Koivurova (2014), at 150.

eas. While many maritime states, especially the USSR[245] and the United States[246], held on to their freedoms of navigation in particular regarding international straits, Canada opted[247] – according to its AWPPA regime – for a replacement of the *laissez-faire* attitude and the protection of special zones in exceptionally vulnerable areas. By doing so, Canada followed a *"functional, comprehensive approach",* which would ensure an accurate prevention of marine pollution by setting minimum international standards, complemented by regional measures of coastal states.[248] It was in this respect an umbrella treaty[249], rather than a comprehensive legal regime regarding marine environmental protection, Canada was hoping for, which would secure and internationally support its AWPPA.

In favor of this view, Canada argued, that an exclusively international approach – as recommended by some states – would not only deprive countries from *"existing sovereign rights of States to protect themselves against threats to their environmental integrity"* but also be incapable of reacting timely to new environmental problems arising in the future.[250] Both arguments seem reasonable, especially when following the precautionary principle and considering how slowly international law is responding to new environmental threats, such as climate change.

ii. Interpretation of Article 234 of UNCLOS

In the end article 234 of UNCLOS was the result of informal negotiations and compromises on bilateral as well as multilateral levels,[251] essentially driven by Canada's interest to establish a functional approach to regulate

245 See e.g. the USSR proposal made in the Sub Committee III of the Committee on the Peaceful uses of Sea-Bed and Ocean Floor beyond the limits of National Jurisdiction (A/A.C.138/SC.III/L.32) regarding art. 7 and BARTENSTEIN, at 27.

246 See *Pollution Control Zones: U.S. Statement on Canada's Proposed Legislation*, regarding the U.S. reaction on Canada's AWPPA and BARTENSTEIN, at 26.

247 Accordingly expressed by Mr. Legault on behalf of Canada at the 4th meeting of the Third Committee. See THIRD COMMITTEE (4TH MEETING), at 192-193 notes 15 and 19 and cf. note 24 (mentioning that *"the question of measures for the prevention of marine pollution was intimately linked to the question of passage through straits [and that] [t]he right of passage must be assured, but must be [at the same time] subject not only to international regulation but also to the right of the coastal State to protect itself"*).

248 See THIRD COMMITTEE (4TH MEETING), at 193 note 17, 20 and 24.

249 See accord. ibid., at 192 note 17.

250 See ibid., at 193 note 21-23.

251 cf. NORDQUIST, ET AL., at 393 (stating that the general objective of the article is to balance the interests of the coastal State in ice-covered areas within the limits of its exclusive economic zone with the general interests of international navigation).

shipping within Arctic waters. The wording of the article was rather soon comparatively clear cut, mostly due to fruitful negotiations,[252] benefiting from the fact that governing especially vulnerable areas, such as ice-covered waters, was not the main issue at UNCLOS III. Yet, the exact definition of article 234 of UNCLOS remains controversial to this date.[253]

Nevertheless there are a couple of issues within article 234 of UNCLOS that are not subject of controversy. The article is the only clause within Part XII of UNCLOS (which provides regulations regarding the protection and preservation of the marine environment) that does imply a specific right of coastal states to adopt and enforce laws and regulations, without seeking permission from the International Maritime Organization (IMO).[254] While informing the IMO is in case of article 211 paragraph 6 of UNCLOS in respect of special areas required, the same is not applicable to article 234 of UNCLOS, which is a *lex specialis*[255] to the fore mentioned article. Why such a notification has been excluded from the final draft of UNCLOS regarding ice-covered areas cannot be determined by means of the official documents. It can, however, be assumed that given the lack of economic importance the polar regions had during the drafting of UNCLOS, a supervision by the International Maritime Organization seemed unnecessary. Furthermore in the context of article 211 of UNCLOS the necessity to address the IMO ultimate-

252 The article can be traced back to article 7 para. 3 sub-para. b (ii) of the draft articles on a zonal approach to the preservation of the marine environment, as proposed by Canada, Fiji, Ghana, Guyana, Iceland, Iran, New Zealand, Philippines and Spain during the informal UNCLOS III proceedings; see Document A/CONF.62/C.3/L.6. The wording of this article was discussed and further elaborated by the Informal Group of Juridical Experts on the Protection and Preservation of the Marine Environment (see for details Group of Juridical Experts (Feb.), Group of Juridical Experts (Mar.) and Group of Juridical Experts (Apr.)) and eventually incorporated into art. 20 para. 5 of the Informal Single Negotiation Text of UNCLOS in 1975; see *Informal Single Negotiating Text,* May 7, 1975 (A/CONF.62/WP.8) [hereinafter ISNT]. Para. 5 was ultimately detached from art. 20 of the ISNT and lead to the adoption of art. 43 of the Revised Single Negotiating Text of 1976, which now referred to ice-covered areas; see *Revised Single Negotiating Text,* May 6, 1976 (A/CONF.62/WP.8/Rev.1/Part III) [hereinafter RSNT]. UNCLOS III proceedings in the following years up until the adoption of the Law of the Sea Convention in 1982 did in this context not lead to any significant changes in wording; see also *Informal Composite Negotiating Text,* July 15, 1977; Apr. 28, 1979; Apr. 11, 1980 (A/CONF.62/WP.10; A/CONF.62/WP.10/Rev.1; A/CONF.62/WP.10/Rev.2) [hereinafter ICNT] and *infra* in fn 270 (part II).

253 More subsequently and for a list of questions pertaining to the interpretation of art. 234 of UNCLOS see Scovazzi (Arctic Navigation), at 373.

254 See *supra* in respect to article 211 of UNCLOS and furthermore McDorman (2012), at 418.

255 See accord. Nordquist, et al., at 393; the article is – as well as article 234 of UNCLOS – a consequence of the initial impetus to protect special areas against pollution from vessels. Both articles have in so far the same starting point, but were eventually parted as article 234 of UNCLOS became more specific. See also *supra* in 5.3.1.1. b. i.

ly needs to be seen as a compromise between the demands of coastal states to establish more stringent rules for the protection of their own marine environment and the concerns of states with merchant ships in respect to the establishment of such a variety of national laws and regulations that they would have to conform to.[256] Consequently since interests of coastal states to protect specifically vulnerable areas, such as ice-covered regions, outweigh trade interests of other states, requiring IMO permission for the establishment for laws and regulations to protect these vulnerable areas would be inappropriate.

Furthermore no controversy exists regarding the notion that subject to article 234 of UNCLOS measures taken by coastal states have to be non-discriminatory, i.e. they shall be applicable to all vessels shipping within ice-covered areas, no matter the flag they fly. Article 234 of UNCLOS is in that sense *lex specialis* to article 227 of UNCLOS, which generally prohibits discrimination *"against vessels of any other State"*.

Objective of the laws and regulations taken in regards of article 234 of UNCLOS has to be the prevention, reduction and control of marine pollution from vessels. While according to the wording vessel source pollution comparable to Canada's AWPPA is covered by article 234, land based pollution, pollution from installations and devices used in exploration or exploitation of the natural resources within the exclusive economic zone (e.g. oil drilling) and dumping (unless it occurs in conjunction with vessel source pollution) are not subject to the article. Preventing such environmental hazards lies within the scope of the general provisions in article 194 of UNCLOS and more specific in articles 207 et seq. of UNCLOS.[257]

Yet the fact, that article 234 of UNCLOS only applies to pollution from vessels, does not prevent states from taking general measures *"to protect and preserve rare or fragile ecosystems as well as the habitat of depleted, threatened or endangered species and other forms of marine life"* according to article 194 paragraph 5 of UNCLOS. It must seem clear from the overview provided in chapter 3 of this thesis, that the Arctic can be subsumed to this paragraph. Nevertheless, the measures described in article 194 paragraph 5 of UNCLOS do not pertain to the adoption and enforcement of laws and regulations comparable to article 234 of UNCLOS.[258]

256 See NORDQUIST, ET AL., at 200 note 211.15(a).
257 See for details *supra* in 5.3.1.1. a. and b.
258 See accord. art. 194 para. 4 and art. 227 of UNCLOS; rules and regulations that would, in the

To recapitulate, a couple of assumptions regarding article 234 of UNCLOS are uncontroversial: The article provides a right to coastal states to establish national non-discriminatory regulations, more stringent[259] than international rules and standards, pertaining to their exclusive economic zone in order to prevent, reduce and control marine pollution from vessels, without seeking IMO permission. The scope of article 234 of UNCLOS, however, is based solely on these premises far from clear.

The core of article 234 of UNCLOS is the allusion to ice-covered areas. This reference is made both, explicitly and implicitly within the article. The article's objective is to prevent, reduce and control marine pollution from vessels in *ice-covered areas*. A clearer description of such areas is made subsequently by referring to *"particularly severe climatic conditions and the presence of ice covering such areas for most of the year"*. It is especially this term that causes uncertainties with respect to the interpretation of article 234 of UNCLOS. While the phrase seems at a first glance rather uncontroversial, the word *"ice"* already poses difficulties in interpretation. There exists no definition of ice in international law and the term is – in respect of the fact that there are many variations of ice: sea ice/pack ice, shelf ice, icebergs, glaciers and permafrost[260] – also in natural science not clear cut. Since article 234 of UNCLOS refers to the creation of *"obstructions or exceptional hazards to navigation"* as well as to *"ice-covering"* it could be assumed, that the provision indicates sea ice. Having said that, article 234 of UNCLOS subsequently adds *"and pollution of the marine environment could cause major harm to or irreversible disturbance of the ecological balance"*. Because all forms of ice are persistent, e.g. also the release of pollutants from the melting of shelf ice or icebergs could cause major harm to or irreversible disturbance of the polar ecosystems. Furthermore both forms of ice can create obstructions or exceptional hazards to navigation. It is in this context the wording *"covering such areas for most of the year"* that attempts to limit the article's scope but in fact is responsible for its ambiguity.

light of article 234 in conjunction with article 194 para. 5, refrain other states from making use of their rights provided by UNCLOS are discriminatory and generally prohibited by UNCLOS.

259 See Hakapää (Arctic Waters), at 74, Hakapää (Marine Pollution), at 257, Rothwell (1996), at 210 and 297, Bartenstein, at 42, Brubaker (Russian Arctic Straits), at 26, Dresser, at 522, Franckx & Boone, at 180 and 194 and *supra* in fn 256 (part II).

260 See for details Dyer et al., at 111, 119, 145, 156, Joyner (Ice in International Law), at 23, 29, 31, 35, Pharand, at 153, Slaymaker & Kelly, at 21, 39, 43, 49 and *supra* in 2.3.

While *"covering"* undoubtedly singles out all forms of ice that do not overlay at least a minimal area, the extent of the word is still not clear. Glaciers, permafrost, sea ice and shelf ice are ice forms that the characteristic of *covering* may be suitable for. Glaciers and permafrost are land based, however, and therefore cannot create obstructions and hazards to navigation. Sea ice and shelf ice can be extensive and therefore a subsumption in regards to article 234 of UNCLOS seems plausible. Yet, neither sea ice nor shelf ice are permanent and especially the floating characteristic of the latter leaves doubts on whether or not a region in which shelf ice can be found, would be pertinent to article 234. As long as the presence of ice is extensive enough, however, article 234 should be applicable, no matter what form of ice is concerned, as long as the particular ice can create obstructions and hazards to navigation. That an exhaustive coverage of ice would be too far fetched is made evident by the fact that the Arctic Ocean's ice-coverage is underlying seasonal changes.[261] Presence of ice within more than half of the Arctic Ocean should therefore be extensive enough for the term *"covering"* to be applicable.

The need for ice to be extensive, as a condition of article 234 of UNCLOS, is also evidenced by the addition *"for most of the year"*. According to the wording, regions in which ice is present for only a short period of time, are not covered by the article. But what duration is long enough in order to be sufficient? The word *most* indicates, that the region must be ice covered at least half a year each year for article 234 of UNCLOS to be applicable. Following this assumption, ice would have to be present at least 184 days per year. Every duration beyond that number would imply that the period of the region being ice-free is longer than the period of the area being ice-covered, thus making the term *most of the year* inappropriate.

While the Arctic Ocean is currently ice-free only during a short amount of time, global warming is bound to change the presence of ice in the region. The latest scientific findings point to the conclusion that the Arctic ice is melting more rapidly than originally assumed.[262] If this warming trend continues an ice free Arctic Ocean for *most of the year* could eventually become reality, depriving article 234 of UNCLOS of its applicability to the Arctic. National laws and regulations for the prevention, reduction and control of marine pollution from vessels in ice-covered areas, that are based on article

261 See Comiso (1995), at 1, Comiso (2010), at 295, *The Arctic Ocean Review Project,* at 11 and *supra* in 2.3.

262 See for details *supra* in 2.3.

234, such as the AWPPA, would lose their foundation and become legally questionable.

It seems as if article 234 of UNCLOS stands and falls with the pertinence of the term *"ice-covered"*, which results in a contradiction not only in itself and in relation to other articles within Part XII[263] but also regarding its history of origin[264]. The objective of the article is to protect special marine environments against pollution from vessels. Even if the Arctic were not ice-covered for most of the year, it would still be a region experiencing *"severe climatic conditions"*. An ice-free Arctic Ocean for most of the year certainly would bring a benefit about in respect of navigation. It would not, however, make the Arctic marine environment any less special in comparison to other, more temperate, regions of the world. The possibility of an ice-free Arctic Ocean for most of the year within the next couple of centuries does not entail a complete loss of ice in the northern hemisphere. Climatic conditions would for that reason still be severe, making pollution within Arctic waters difficult to handle, even if ice were not as present within the region as it is today. To qualify the Arctic as a region, undeserving special attention, if ice continues to melt, would be contradictory to the initial comprehensive and functional approach, guiding the development of article 234 of UNCLOS and stand in contrast to articles 194 paragraph 4 and 211 paragraph 6. In short, when article 234 of UNCLOS was being debated it was not the covering of ice for most of the year, that constituted its core, but the protection of an area, designated by its special vulnerability in comparison to other regions of the world. There can no compelling arguments be found for states to surrender these initial thoughts, even if the Arctic ice is not present for most of the year.

Such an interpretation would also be supported by the Vienna Convention on the Law of the Treaties (VCLT)[265], which states that "*a treaty shall be interpreted (...) in the light of its object and purpose"*[266]. This might be one of the reasons why many legal scholars and scientists believe that the UNCLOS regime, as it is today, is sufficient in protecting the Arctic marine environment.[267] Nevertheless stretching the wording of article 234 of UNCLOS is

263 E.g. arts. 192, 194 para. 5 and 211 para. 6 of UNCLOS.
264 See also *supra* in 5.3.1.1. c. i.
265 *Vienna Convention on the Law of the Treaties*, May 23, 1969, 1155 U.N.T.S. 331 [hereinafter VCLT].
266 See art. 31 para. 1 of the VCLT.
267 A proof of that assumption is the Ilulissat Declaration, which was signed by the five Arctic littoral states in 2008; see for details *infra* in 6.2.2.

even in light of the VCLT not uncontroversial. Although the term *"most of the year"* does not provide an exact duration, it does indicate a minimum[268], which – if not fulfilled – could render the applicability of article 234 of UNCLOS questionable. To completely ignore the wording in favor of a broader interpretation by means of historic, systematic and teleological methods, would even if consistent with international law, certainly give rise to disputes. After all, states, interested in shipping within Arctic waters, would not accept the more stringent national laws and regulations of coastal states unchallenged, if the practicability of article 234 were contested in light of global warming. To assume that climate change will have no implications on article 234 of UNCLOS in the future is in so far certainly doubtful.[269]

The term "*ice-covering"* is, however, not the only clause causing discrepancies. Article 234 of UNCLOS allows coastal states to "*adopt and enforce non-discriminatory laws and regulations (...) within the limits of the exclusive economic zone"*. The word *"exclusive"* was not added until the final draft of UNCLOS, however, as the first draft versions referred to *"the economic zone"* and spoke of *"vessels navigating in their zones"*.[270] The addition of *exclusive* is in so far relevant, as it raises questions regarding the extent of jurisdiction over Arctic waters according to article 234 of UNCLOS. A narrow interpretation of the article would lead to the conclusion that coastal states are only allowed to establish laws and regulations in regards to their

268 See *supra* in 5.3.1.1. c. ii.

269 But see in this context Franckx, at 134–135 (claiming that art. 234 of UNCLOS is *"especially well suited to take into account climate change not only in a medium, but also in a long-term perspective"*, as the article *"would simply stop being operative (...) implying that no specific coastal state powers are needed anymore and that these Arctic waters would become totally governed by the normal rules of navigation to be found elsewhere in the 1982 Convention"*). In the opinion of the present author, this view does, however, not sufficiently reflect the special vulnerability of the region, as the decrease in ice-coverage will be a gradual, rather than a fast process, justifying the application of more stringent rules in respect to environmental protection within the Arctic Ocean, even if art. 234 of UNCLOS ceased to exist, due to the ice-coverage not being extensive enough for the article to be applicable.

270 The Informal Composite Negotiating Text (ICNT) as cited *supra* in fn 252 (part II) included the word *"exclusive"* in section 8, art. 235 (which was in the ICNT's first revision renumbered to 234). Previous drafts on the other hand – the Informal Single Negotiating Text (ISNT) and the Revised Single Negotiating Text (RSNT) as cited *supra* in fn 252 (part II) – referred to *"the economic zone"*. Furthermore during informal proceedings in the Third Committee on Marine Pollution draft articles on a zonal approach to the preservation of the marine environment were proposed by Canada, Fiji, Ghana, Guyana, Iceland, Iran, New Zealand, Philippines and Spain. Art. 7 of these draft articles, which gave the impetus for art. 234 of UNCLOS, spoke of *"vessels navigating in their zones"*. See art. 20 para. 5 of the ISNT, art. 43 of the RSNT and art. 7 para. 3, sub-para. b (ii) of the draft articles on a zonal approach to the preservation of the marine environment (Document A/CONF.62/C.3/L.6).

exclusive economic zone, excluding territorial seas.[271] This assumption is supported by the choice of wording *"within the limits"*, which singles out territorial seas.[272] However, a broader interpretation could also in this case be argued by application of article 31 of the Vienna Convention on the Law of the Treaties. Considering that Canada's AWPPA e.g. refers to "*the internal waters of Canada and the waters of the territorial sea of Canada and the exclusive economic zone of Canada"*[273], an interpretation that would limit the scope of article 234 of UNCLOS to the exclusive economic zone, would seem inappropriate. Even more so, since Canada's AWPPA provided the starting point for protecting ice-covered areas at UNCLOS III. Yet, as well as with the term *ice-covered* the article remains also in this point ambiguous.

This ambiguity is furthermore encouraged by the fact that the United States has still not ratified UNCLOS. Yet, the United States generally takes the view, that with the exception of the provisions concerning the Area (part XI of UNCLOS) and the dispute settlement mechanisms of Part XV of UNCLOS, the Law of the Sea Convention has become customary international law and is hence binding also upon the United States.[274] Consequently, as article 234 of UNCLOS is pertaining to part XII of the Convention, it can be assumed that the *Arctic exception* is also applicable to the United States.

In spite of the ambiguities and uncertainties pertaining to article 234 of UNCLOS just referred to, however, what is more important in the light of assessing and managing climate change induced Arctic risks is to attend to if, and if so in what way, article 234 of UNCLOS may aid in the governance of such risks.

iii. The Arctic Exception and Climate Change Induced Arctic Risks

Article 234 of UNCLOS does not explicitly refer to the precautionary principle, the ecosystem approach or any other tool designed to assess or manage risks. As a rule developed to protect and preserve the Arctic marine environment, however, the article tends to governing ecological risks stemming from vessel source pollution, which may adversely affect Arctic marine ecosystems. Any navigation possibly resulting in "*major harm*" or "*irre-*

271 See Hakapää (Marine Pollution), at 257, Scovazzi (Arctic Navigation), at 374, Bartenstein, at 28.
272 See also for a clear distinction between exclusive economic zone and territorial sea, art. 220 para. 6 of UNCLOS.
273 See *supra* in fn 237 (Part II).
274 See *supra* in fn 129 (Part I).

versible disturbance of the ecological balance" of the region,[275] thus, demands adequate legal efforts to be taken to prevent any negative ramifications from shipping activities within the Arctic Ocean from occurring, or to mitigate any such impacts, where they already emerged. While as a consequence, the article tends to the governance of climate change induced risks in relation to shipping, it does, however, not entail a clear obligation on how such governance may be undertaken. Or in other words, the article does not explicitly prescribe states to adopt laws and regulations pursuant to article 234 of UNCLOS, that are precautionary in character or tend to the ecosystem approach. However, in this context the notion *"based on the best available scientific evidence"* as referred to in the last paragraph of article 234 of UNCLOS requires further attention:[276]

Since the gathering of scientific data, adequate risk management is dependent upon,[277] is much more difficult within the Arctic than it is in more temperate regions, there exists no scientifically uncontested evidence on how vessel source pollution could impact on ice-covered Arctic waters. And that held even more true at the time article 234 of UNCLOS came into being. Of course some scientific data (e.g. in respect to the accumulation of persistent organic pollutants) is available.[278] Nevertheless much more data needs to be procured in order to understand the ecosystem processes adequately. To demand concise information before adopting and enforcing laws and regulations for the prevention, reduction and control of marine pollution from vessels in ice-covered waters, would thus be inappropriate to adequately protect the region pursuant to article 234 of UNCLOS. By referring to "*best*

275 See art. 234 of UNCLOS.

276 See in this context on the term *"scientific evidence"* Bartenstein, at 39–40 (concluding, that the term does not refer to *"the coastal state's scientific standards, but [to] internationally accepted standards that must be respected"*).

277 See *supra* in 1.3. and furthermore on the role of science in part XII of UNCLOS: Arts. 200 and 201 of UNCLOS, which refer to collaboration in scientific research and information exchange, as well as in the adoption of scientific criteria for the formulation and elaboration of rules, standards, recommended practices and procedures for the prevention, reduction and control of pollution to the marine environment subject to Part XII of UNCLOS. Additionally the duty to undertake risk assessment is – although scientific criteria are not mentioned explicitly – referred to in articles 204 (monitoring) and 206 of UNCLOS (assessment of potential effects of activities; the article is actually referring to conducting environmental impact assessments (EIA) in a trans-boundary context and as such is precautionary in scope; see for details *infra* in 5.5.2.). In order to implement the monitoring provision adequately the Global Environmental Monitoring System (GEMS) of the United Nations Environment Programme was developed. See for details: *The Global Environmental Monitoring System of the United Nations Environment Programme,* March 17, 1975 (A/CONF.62/C.3/L.23).

278 See *supra* in 3.2.2.2.

available scientific evidence" the article, however, leaves room to new findings while at the same time does not impede on member states to take any legal initiatives in respect to protecting the Arctic from vessel-source pollution. Such a choice of words is clearly in line with the precautionary principle.[279]

Yet, while the choice of words may suggest the applicability of the precautionary principle when implementing article 234 of UNCLOS, the article lacks an explicit obligation to member states to adopt and enforce laws and regulations according to this principle (or the ecosystem approach for that matter). As paragraph 1 of article 234 of UNCLOS holds, *"coastal states have the right to adopt and enforce non-discriminatory laws and regulations"* in order to prevent, reduce and control vessel-source pollution within ice-covered areas, they, however, do not have a *duty* to do so. If laws and regulations respectful of the precautionary principle and/or the ecosystem approach are being developed and enforced pursuant to article 234 of UNCLOS is thus ultimately dependent on member states' interests to adequately protect the polar marine environment from navigational hazards.

Yet, the right bestowed upon Arctic coastal states by means of article 234 of UNCLOS, does not exempt them from taking necessary measures and adopting and enforcing laws and regulations to prevent, reduce and control pollution of the Arctic marine environment to an extent to which the general provisions set out in articles 192-196 and 207-222 of UNCLOS are applicable. Hence, while in accordance with article 234 of UNCLOS the adoption and implementation of legal measures pursuant to the precautionary principle or the ecosystem approach pertaining to Arctic ice-covered waters is dependent on political will within the five Arctic littoral states, those states have nevertheless the duty to adequately protect and preserve the marine environment as obliged to by articles 192 et seq.

In this context especially relevant is article 211 of UNCLOS.[280] As *lex generalis* to article 234, article 211 paragraphs 3 to 6 of UNCLOS do not give any additional rights to Arctic coastal states in protecting the Arctic marine environment against vessel-source pollution. In fact these paragraphs – due to the prerequisite to consult the *"competent international organization"* and their restriction to specific areas – are rather limiting the scope of national

279 Accord. Borg Simone, at 179.
280 See also *supra* in 5.3.1.1. b. i.

regulatory measures.[281] Nevertheless article 234 of UNCLOS is being complemented by article 211 paragraphs 1 and 2 of UNCLOS, which oblige states to establish international rules and standards to protect the marine environment and adopt laws and regulations against vessel-source pollution from vessels flying their flag or of their registry. Hence, if article 234 of UNCLOS is read in conjunction with article 211 of UNCLOS, coastal states have not only the right to establish national non-discriminatory laws and regulations against the pollution from vessels in Arctic waters, but also the duty to adopt and enforce such laws against vessels flying their flag or of their registry.

However, while adopting and enforcing such laws and regulations in light of the precautionary principle is certainly encouraged by articles 234 and 192 of UNCLOS,[282] a duty to do so can neither be attested by the means of article 211 nor of articles 234 and 192 of UNCLOS. And this even less so regarding the inclusion of the ecosystem approach into legal initiatives adopted in response to vessel source pollution. In any case, however, Arctic coastal states are, when addressing pollution from foreign vessels or such flying their own flag or of their registry, not impeded by articles 211 and 234 of UNCLOS in developing and enforcing precautionary laws and regulations or such pursuant to the ecosystem approach.

5.3.1.2. Conclusion

Considering what has been just said, UNCLOS does, as a pre Rio Convention, not specifically oblige member states to follow the precautionary principle or the ecosystem approach[283] when adopting and enforcing laws and regulations, as well as other measures, standards and best practices aimed at preventing, reducing and controlling marine pollution. While the informal negotiations pertaining to Part XII of UNCLOS show that precautionary ideas and such adhering to ecosystem health and integrity were in parts present during the formation of UNCLOS,[284] neither the final text of the

281 See in this context also ibid. and 5.3.1.1. c. ii.
282 See *supra* in 5.3.1.1. a. and 5.3.1.1. c. iii.
283 Accord. Borg Simone, at 183.
284 Some states, *inter alia* Canada, Norway, Malta, and Germany, as well as international organizations such as UNESCO, have addressed precautionary and ecosystem thoughts during informal meetings at UNCLOS III pertaining to the protection and preservation of the marine environment; see for details *Third Committee Informal Sessions (Marine Pollution), Canada* (A/AC.138/SC.III/L.28), *Norway: working paper on preservation of the marine environment* (A/CONF.62/C.3/L.18), Third Committee (17th meeting), at 257 notes 1 et seq., *Third Committee Informal Sessions (Marine Pollution), Malta* (A/AC.138/SC.III/L.33),

Convention nor the propositions made during negotiations allow for assuming that the Law of the Sea Convention would entail a generally accepted duty to comply with the precautionary principle and/or the ecosystem approach when addressing risks from marine pollution.[285]

Accordingly the Law of the Sea Convention gives states the possibility to decide for themselves if or if not to legislate in favor of the precautionary principle or the ecosystem approach when implementing Part XII of UNCLOS. Unless other conventions that refer to a specific source of marine pollution more thoroughly, entail a duty to adopt any of these principles,[286] states are thus free to chose their preferred risk assessment and management tool. If laws and regulations adopted and enforced in order to protect the Arctic marine environment follow the precautionary principle or the ecosystem approach is, therefore, ultimately dependent on political will of the Arctic Nations and (in case of international agreements) the international community as a whole.

However, as a framework Convention UNCLOS sets the base for the adoption and enforcement for more detailed legal initiatives to address the protection and preservation of the marine environment, and as such does not impede on precautionary laws and regulations or such pursuant to the ecosystem approach to emerge. In fact the application of the ecosystem approach is supported by the Convention's preamble, which states *"that the problems of ocean space are closely interrelated and [thus] need to be considered as a whole"*.

Yet, such an approach, that leaves the decision of whether or not to adopt and implement precautionary practices or such following the ecosystem approach to the discretion of state parties, can in respect to the management of ecosystems – e.g. the marine environment of the Arctic Ocean – be problematic, when the risk governance initiatives taken by nation states differ in substance and scope. As has been shown *supra*[287] states following the cost-benefit analysis might be inclined to carry out activities, albeit potentially dangerous, unless clear proof of harm to the marine environment exists. By contrast, states following the precautionary principle might be too strict in

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Third Committee (3rd meeting), at 187 note 4 and Third Committee (5th meeting), at 199 notes 2 and 4; see on UNCLOS III negotiations furthermore *supra* in 5.3.1.1., esp. c. ii.

285 Accord. in respect to the ecosystem approach Hacquebord, at 203, Molenaar (Fisheries), at 459 and see furthermore *supra* in 5.3.1.1.

286 See in this context *infra* in 5.3.2.

287 See for details 4.4.3.2.

building a margin of safety within their framework to protect and preserve the marine environment, so that any activities – including shipping – would be banned altogether. Ultimately, since UNCLOS applies a zonal approach by dividing the seas according to the jurisdiction of the specific coastal states, how risks are assessed and managed would differ within these various zones. In one case it might lead to under-regulation, in the other to over-regulation, which both are not favorable.

Furthermore, because ecosystems do not begin at one state territory and end at the next, such a zonal approach in respect to risk assessment and management cannot be the adequate answer to protect and preserve the marine environment.

Consequently the Law of the Sea Convention is by itself a very weak risk assessment and management tool, because it does not directly affect their decision if or if not to build a margin of safety into their marine environmental regimes or to include adaptive and integrative rules and regulations. Yet, soft law instruments, such as Agenda 21[288], which emphasizes on integrated and precautionary approaches to protect and conserve the marine environment,[289] uphold the inclusion of risk assessment and management tools such as the precautionary principle and the ecosystem approach into the current regime of the law of the sea – an approach, which was also mirrored by the United Nations General Assembly (UNGA), *inter alia* in the context of resolution 61/222. The resolution, which was adopted on March 17, 2007 on the topic of *oceans and the law of the sea,*[290] held that "*the problems of ocean space are closely interrelated and need to be considered as a whole through an integrated, interdisciplinary and intersectoral approach,* [which requires improvements in] *cooperation and coordination at the national, regional and global levels"*[291].

288 See *supra* in fn 53 (part II).

289 Chapter 17 para. 17.1 of Agenda 21 holds that *"[t]he marine environment – including the oceans and all seas and adjacent coastal areas – forms an integrated whole that is an essential component of the global life-support system (...)"*. The protection and sustainable development of the marine and coastal environment and its resources requires *"new approaches to marine and coastal area management and development, at the national, sub-regional and global levels, approaches that are integrated in content and are precautionary and anticipatory in ambit (...)"*. See furthermore on the precautionary principle and the ecosystem approach paras. 17.21, 17.22 sub-para. (a), 17.97 and 17.98 of Agenda 21.

290 See *Resolution adopted by the General Assembly 61/222. Oceans and the law of the sea*, Mar. 16, 2007 (A/RES/61/222).

291 Ibid., preamble para. 6

This point of view was further emphasized by the General Assembly in context of addressing the results of the seventh meeting of the Open-Ended Informal Consultative Process on Oceans and the Law of the Sea[292], where it held that states are encouraged to *"cooperate and coordinate their efforts and take, individually or jointly, as appropriate, all measures, in conformity with international law, to address impacts on marine ecosystems (...) taking into account the integrity of the ecosystems concerned"*[293].

In the context of the Open-Ended Informal Consultative Process on Oceans and the Law of the Sea, at its seventh meeting held in 2006, furthermore a definition of an ecosystem approach, as well as means for its effective implementation, were considered.[294] The Consultative Process in this regard concluded that *"while there is no universally agreed definition of an ecosystem approach, which is interpreted differently in different contexts, (...)*[states should] *consider that an ecosystem approach should, inter alia:*

(a) Emphasize conservation of ecosystem structures and their functioning and key processes in order to maintain ecosystem goods and services;

(b) Be applied within geographically specific areas based on ecological criteria;

(c) Emphasize the interactions between human activities and the ecosystem and among the components of the ecosystem and among ecosystems;

(d) Take into account factors originating outside the boundaries of the defined management area that may influence marine ecosystems in the management area;

(e) Strive to balance diverse societal objectives;

(f) Be inclusive, with stakeholder and local communities' participation in planning, implementation and management;

(g) Be based on best available knowledge, including traditional, indigenous and scientific information and be adaptable to new knowledge and experience;

292 See *infra* in fn 294 (part II).

293 *Resolution adopted by the General Assembly 61/222. Oceans and the law of the sea*, Mar. 16, 2007 (A/RES/61/222), para. 119, sub-para. d.

294 See for details *Report on the work of the United Nations Open-ended Informal Consultative Process on Oceans and the Law of the Sea at its seventh meeting*, July 17, 2006 (A/61/156), paras. 6-8.

(h) Assess risks and apply the precautionary approach;

(i) Use integrated decision-making processes and management related to multiple activities and sectors;

(j) Seek to restore degraded marine ecosystems where possible;

(k) Assess the cumulative impacts of multiple human activities on marine ecosystems;

(l) take into account ecological, social, cultural, economic, legal and technical perspectives;

(m) Seek the appropriate balance between, and integration of, conservation and sustainable use of marine biological diversity; and

(n) Seek to minimize adverse impacts of human activities on marine ecosystems and biodiversity, in particular rare and fragile marine ecosystems."[295]

While most of these principles do not represent any significant addition to the description and the 12 principles proposed by the Conference of the Parties to the Convention on Biological Diversity as addressed *supra* in 4.5.2.2. (they are in fact rather limiting the ecosystem approach, because they predominantly address marine biodiversity conservation), the Consultative Process explicitly refers to risks and the application of the precautionary principle as an integral part of the ecosystem approach. Furthermore in fostering the implementation of the ecosystem approach, states should according to the Consultative Process improve *"as appropriate, legal and policy frameworks to support and facilitate the application of the precautionary principle and ecosystem approaches"*.[296]

The United Nations General Assembly welcomed these findings and invited states to consider the agreed consensual elements of an ecosystem approach in its 61/222 resolution and further noted that "*ecosystem approaches to ocean management should be focused on managing human activities in order to maintain and, where needed, restore ecosystem health to sustain goods and environmental services, provide social and economic benefits for food security, sustain livelihoods (...) and conserve marine biodiversity"*[297].

295 Ibid., para. 6.
296 See ibid., para. 8, sub-para. l.
297 *Resolution adopted by the General Assembly 61/222. Oceans and the law of the sea*, Mar.

While of course, the General Assembly resolutions, as well as Agenda 21, due to their soft law character[298] cannot amend UNCLOS and are not binding on member states, these instruments, nevertheless support the application of the precautionary principle and the ecosystem approach and hence may influence how the Convention's provisions are being interpreted and implemented by member states in practice. Without any binding obligation on a precautionary and holistic management of the seas, though, state practice will remain heterogeneous in this respect in spite of international initiatives, such as Agenda 21.

While in cases where uncertainty is low such an approach might be satisfactory, it is not where high uncertainties exist, such as in the case of the Arctic. As has been shown *supra*[299] climate change induced Arctic risks require the application of new risk assessment and management tools, such as the precautionary principle or the ecosystem approach. In order for it to adequately address ice-covered regions, amending article 234 of UNCLOS thus would seem reasonable. The scope of the article would have to be broadened by including other sources of marine pollution and by striking the passage *"for most of the year"*. Also in terms of addressing climate change induced Arctic risks the article would have to be enhanced, by explicitly referring to the application of the precautionary principle and the ecosystem approach.[300]

16, 2007 (A/RES/61/222), para. 119, sub-para. b.

298 See on soft law *supra* in fn 209 (part I) and *infra* in 6.

299 See 4.5. and 4.6.

300 By combining the approaches set out by the Law of the Sea Convention, the Convention on Biological Diversity (as referred to *supra* in 4.5.2. and *infra* in 5.4.1.) and the Rio Declaration (as referred to *supra* in 5.1.5.) an amended article 234 of UNCLOS could look somewhat like this:

Article 234, Ice-covered areas

1. States shall adopt and enforce laws and regulations to prevent, reduce and control pollution of the marine environment from any source pursuant to sections 5 and 6 to Part XII to this Convention, where pollution due to particularly severe climatic conditions and the presence of ice covering such areas could cause major harm to or irreversible disturbance of the ecological balance of the ecosystems. Such laws and regulations shall have due regard to the conservation of ecosystem structure and functioning in long term to maintain ecosystem services and assure ecosystem health and resilience. Inter alia the protection and preservation of the marine environment shall be following a precautionary approach, which shall be 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 measures to prevent degradation of the marine environment.

2. States shall take other measures as may be necessary to maintain ecosystem health and integrity of ice covered areas and prevent reduce and control pollution of the marine environment of such areas.

In summary the Convention on the Law of the Sea does not contain a duty for states to apply the precautionary principle or the ecosystem approach when addressing risks stemming from marine environmental pollution. Here and there the text of UNCLOS points to important ingredients of either the precautionary principle or the ecosystem approach (e.g. by referring to *"best available scientific evidence"* in article 234, or the re-examination of adopted rules, standards and practices, as well as the cooperation between states as held e.g. in articles 200, 207 paragraph 4, 208 paragraph 5, and 209 paragraph 1 of UNCLOS).[301]

Nevertheless no real duty to apply any of these principles can be identified from interpreting the Convention.[302] A fact that is barely remarkable, considering that the precautionary principle has not been endorsed by the international community in clear legal terms until the Rio Declaration of 1992[303] and the ecosystem approach will yet have to be codified on an international scale.

Yet, as has been pointed out, as a framework convention[304], UNCLOS leaves room for states to adopt and enforce laws, regulations and measures pursuant to any risk assessment and management tool they deem to be adequate to fulfill the responsibilities set out by Part XII of the Law of the Sea Convention, including the ecosystem approach or the precautionary principle. A more modern application of the Convention in light of newly emerging environmental risks, as e.g. promoted by Agenda 21,[305] would thus generally be feasible. The zonal approach taken by UNCLOS, however, exacerbates a holistic management of the seas, as coastal states are individually responsible for managing the waters under their jurisdiction.

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3. 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 the conditions as referred to in paragraph 1 create obstructions or exceptional hazards to navigation, and pollution of the marine environment from vessels could cause major harm or irreversible disturbance of the ecosystems.

4. Laws, regulations and measures adopted and enforced according to paragraphs 1, 2 and 3 shall be no less effective than international rules, standards and recommended practices and procedures and shall have due regard to interests of all stakeholders and be re-examined at regular intervals as necessary.

301 See for details *supra* in 5.3.1.1.
302 See for details *supra* in 5.3.1.1.
303 Accord. Birnie, et al., at 136 and 154.
304 See *supra* in 5.3.1.
305 See *supra* in fn 53 and 288 (part II).

5.3.2. The Legal Regime Developed Under the Auspices of the International Maritime Organization (IMO)

From an economic stance the development of new shipping lanes is one of the focal points within the Arctic region. Due to the loss of sea ice, global trade and recreational interests (polar tourism) could benefit from the opening of new waterways, such as the Northwest Passage (NWP) and the Northern Sea Route (NSR), which are connecting the Atlantic and the Pacific Ocean.[306] Yet, while complete sea ice loss during summer months is expected by scientists within the next couple of decades,[307] this will not change the fact that within the polar North special biotic and abiotic conditions will prevail, that due to their intrinsic complexities and uncertainties demand – as has been shown[308] – a cautious approach. In this context standards and guidelines concerned with vessel-construction, manning and vessel-source pollution become especially significant.

The international body to which the development and maintenance of such a regulatory framework for shipping has been entrusted to is the International Maritime Organization (IMO), which was established in 1948 under the auspices of the United Nations.[309] Key conventions include among others

306 It is important to note that in respect to both the Northwest Passage (NWP) and the Northern Sea Route (NSR) debate has risen over their jurisdiction. To date the legal status of the NWP and the NSR is uncertain, due to the fact that both Canada in respect to the NWP and Russia in respect to the NSR have claimed for these sea lanes to belong to their internal waters, which would extend their control over them, instead of regarding them as international straits, which would provide to all states a right of transit passage according to article 38 of UNCLOS. Yet, views on this topic are not unanimously shared either within Canada or Russia. This dispute, however, shall not be examined here any further. For details see e.g. Hakapää (Arctic Waters), at 70-71, Sale & Potapov, at 150-157, Timtchenko, at 138-171, Proelss & Müller, at 655-656, Rothwell & Joyner, at 17-18, Rothwell (1996), at 191-207, Brubaker (Russian Arctic Straits), at 25-31, Joyner (Arctic Ocean), at 230-231, King, at 278-286, Warner (Changing Arctic Waters), at 330-331, Boone, at 208-210, McDorman (2014), at 258-259, Rayfuse (Polar Code), at 241, Scovazzi (Arctic Navigation), at 375-377, McDorman (2010), at 230-238, Skaridov, at 286-295 and 300-301, Wolfrum, at 39-40 and on the history of the NWP and NSR see Seelmann, at 17-18 and Byers, at 131-148.

307 See *supra* in fn 71 (part I).

308 See *supra* in 4., esp. in 4.2. and 4.4, as well as furthermore in 5.3.1.1. c. ii.

309 The International Maritime Organization was formally established under the name of Inter-Governmental Maritime Consultative Organization (IMCO) by adoption of the Convention on the Inter-Governmental Maritime Consultative Organization of March 6, 1948; see the preamble of the *Convention on the International Maritime Organization*, March 6, 1948, 289 U.N.T.S. 3. The name of the organization was later changed to International Maritime Organization (IMO) by resolutions A.358 (IX) of November 14, 1975 and A.371 (X) of November 9, 1977; see for IMO resolutions: <http://www.imo.org/KnowledgeCentre/IndexofIMOResolutions/Pages/Default.aspx> (last

the International Convention for the Safety of Life at Sea (SOLAS)[310], the International Convention on Maritime Search and Rescue[311], the International Convention on Oil Pollution Preparedness, Response and Co-operation[312], the International Convention for the Prevention of Pollution From Ships (MARPOL 1973/1978)[313] and the International Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matters (London Convention)[314].

While in essence most IMO Conventions, standards and guidelines are applicable to shipping within the Arctic, it must seem clear from what has been held above[315], that the management of climate change induced Arctic risks ought predominantly be concerned with the protection of the Arctic marine environment. Shipping can constitute a variety of environmental hazards from both operational, as well as accidental pollution. Furthermore physical damage can be done to marine habitats and their organisms as a result of groundings related to an inadequate assessment of water depth or by ship strikes of marine mammals.[316] While in practice all of these hazards deserve equal attention, a comprehensive examination of all IMO Conventions addressing such issues would go beyond the scope of this thesis. Climate change induced Arctic risks, as they are to be understood for this thesis, reflect on hazards stemming of natural as well as anthropogenic origin, with the latter of course including both deliberate as well as unintentional human activities possibly resulting in negative ramifications for the Arctic ecosystems.[317] Risk governance tools are predominantly intended to aid decision-makers in choosing one out of several options to avoid or mitigate any negative ramifications resulting from initiating natural events or human ac-

visited: 29.06.2014); see also Douvier, at 25.

310 *International Convention for the Safety of Life at Sea*, 1974, 1184 U.N.T.S. 277 [hereinafter SOLAS].

311 *International Convention on Maritime Search and Rescue*, 1979, 1405 U.N.T.S. 118.

312 *International Convention on Oil Pollution Preparedness, Response and Co-operation*, 1990, 1891 U.N.T.S. 77.

313 As amended by its *Protocol of 1978 relating to the International Convention for the Prevention of Pollution from Ships*, 1973/1978, 1340 U.N.T.S. 61 [hereinafter MARPOL 1973/1978]; note that the abbreviation MARPOL is – if not explicitly stated otherwise – hereinafter used as to refer to the amended version of the International Convention for the Prevention of Pollution from Ships under its 1978 Protocol (i.e. MARPOL 1973/1978).

314 *Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matters*, 1972, 1046 U.N.T.S. 138 [hereinafter London Convention].

315 See *supra* in 5.3.

316 See International Maritime Organization (A.720(17)), at 6 and 13, International Maritime Organization (A.982(24)), at 4, Roberts, at 51.

317 See on the definition of climate change induced risks *supra* in 1.2.

tivities. In a most extreme version, this would mean to decide either in favor of or against a planned human activity. In any case such a decision ought to be based on a *deliberate* component: Any unintentional negative consequences are a result of an intentional initiating human activity.

To risk governance, however, it is indecisive if the negative outcomes are deliberate or not. As long as through risk assessment any negative consequences can be assumed – be they intentional or unintentional – risk management ought to be carried out. The negative results, however, as long as they are not causally connected to natural events, are always stemming from deliberate human activities, which is why – from an outset, as well as an outcome oriented risk governance perspective – these have to be addressed in the first place.[318] This, does of course, not mean that Conventions such as the International Convention for the Safety of Life at Sea or the International Convention on Oil Pollution Preparedness, Response and Co-operation are any less important in protecting the marine environment against pollution – in fact as of today accidental oil spills account for a much higher source of marine pollution than operational discharge of oil and other substances or the dumping of wastes at sea[319]. Yet, to the Arctic region of main importance is the question if shipping – as an initiating activity – can be carried out in an environmentally sound manner, i.e. in a way that adequately addresses deliberate pollution. To appropriately limit the scope of this thesis, it is thus deliberate pollution that shall be of main concern, while accidental pollution shall only be addressed where it is explicitly mentioned within the Conventions to be analyzed subsequently.

Deliberate pollution is reflected through the work of the International Maritime Organization in detail by the International Convention for the Prevention of Pollution From Ships, the International Convention for the Prevention of Pollution of the Sea by Oil and the London Convention. The task of the following paragraphs thus shall be to examine if and if so in what way these conventions support risk governance.

318 See also ibid.

319 See Birnie, et al., at 380 and 381, cf. PAME (AMSA), at 136 and 139, but note that the most common source of marine pollution stems from operational discharge; see Roberts, at 47 and 48.

5.3.2.1. International Convention for the Prevention of Pollution From Ships (MARPOL 1973/1978)

As the use of the seas developed throughout the beginning of the 20th century, an understanding began to grow of the damaging effect extensive exploitation and vessel source pollution, especially in connection to oil, can have on the balance of the marine ecosystems.[320] While the establishment of rules aimed at protecting the marine environment comprehensively, such as the framework provisions featured in part XII of UNCLOS, was at that time still decades away, states began to acknowledge the damaging effect of oil to the marine environment as a result of oil transports by tanker ships across the world oceans. It was in this context that the IMCO adopted the International Convention for the Prevention of Pollution of the Sea by Oil (hereinafter OILPOL)[321] in 1954.

Designed *"to prevent pollution of the sea by oil discharge from ships"*[322], the convention entered into force on July 26, 1958 and was in the following years several times amended.[323] However, as the maritime transport of oil and chemicals began to grow and oil spill disasters, such as the Torrey Canyon incident in 1967[324], challenged the existing regime, the question arose whether OILPOL was still adequate to protect the marine environment in spite of the expanded use of the seas. In 1969 the IMCO Assembly thus decided to convene an international conference to adopt a new convention that would incorporate OILPOL.[325] The conference which took place from October to November in 1973, around the same time when UNCLOS III commenced, culminated in the adoption of the International Convention for the Prevention of Pollution From Ships (hereinafter MARPOL 1973),

320 See *supra* in 5.3.1. and further Douvier, at 24.

321 *International Convention for the Prevention of Pollution of the Sea by Oil*, 1954, 327 U.N.T.S. 3 [hereinafter OILPOL].

322 Preamble of OILPOL; oil as referred to in the Convention means all forms of oil and oily substances such as *"crude oil, fuel oil, heavy diesel oil and lubricating oil"*; see art. 1 para. 1 of OILPOL.

323 See for details on OILPOL (also on the following) Douvier, at 25–26 and Birnie, et al., at 403.

324 The incident took place in the English channel and resulted in a spill of 120,000 tons of crude oil; see Hui, at 15, Douvier, at 22, Epps, at 204, Freestone & Salman, at 345, Pharand, at 206–207, Koivurova (2014), at 34 and Birnie, et al., at 380.

325 See on the following and for details on the development of MARPOL Douvier, at 24–28, Rothwell & Stephens, at 349, Roberts, at 62, Hui, at 16; the six Annexes to the Convention, that shall be referred to in detail below, entered into force on Oct. 2, 1983 (Annex I), April 6, 1987 (Annex II), Dec. 31, 1988 (Annex V) July 1, 1992 (Annex III), Sept. 27, 2003 (Annex IV) and May 19, 2005 (Annex VI).

which rendered OILPOL obsolete. Yet, despite the need shared by the international community to address oil discharge from ships more satisfactory, the ratification of the MARPOL Convention turned out to be a tedious process. In February 1978 another conference – on tanker safety and pollution prevention – was convened, leading to the adoption of a protocol to MARPOL, that incorporated the 1973 text of the Convention. The International Convention for the Prevention of Pollution from Ships as amended by its Protocol (hereinafter MARPOL 1973/1978) eventually entered into force on October 2, 1983, ten years after the initial conference took place.[326] All Arctic Nations are contracting parties to MARPOL 1973/1978.[327]

a. The Legal Regime of the International Convention for the Prevention of Pollution from Ships (MARPOL 1973/1978)

The Convention's objective is *"to achieve the complete elimination of intentional pollution of the marine environment by oil and other harmful substances and the minimization of accidental discharge of such substances"*[328]. By means of the Convention, harmful substances are, according to article 2 paragraph 2 defined as *"any substance which, if introduced into the sea, is liable to create hazards to human health, to harm living resources and marine life, to damage amenities or to interfere with other legitimate uses of the sea and includes any substance subject to control by the (...) Convention"*. Furthermore discharge is to be understood as *"any release [of harmful substances or effluents containing such substances] howsoever caused from a ship and includes any escape, disposal, spilling, leaking, pumping, emitting or emptying"*[329]. Excluded from this provision are, however, dumping – as referred to by the London Convention[330], and the release of harmful substances in relation to seabed exploration and exploitation or scientific research on pollution abatement and control.[331] As such the

326 *Protocol of 1978 relating to the International Convention for the Prevention of Pollution from Ships*, 1973/1978, 1340 U.N.T.S. 61 [hereinafter MARPOL 1973/1978]; see furthermore ibid.

327 See on the status of ratification: <http://www.imo.org/About/Conventions/StatusOfConventions/Pages/Default.aspx> (last visited: 29.06.2014); some Arctic Nations however, are exempt from the provisions held in one or several Optional Annexes III, IV, V and VI of MARPOL 1973/1978; see on this topic immediately *infra*.

328 See Preamble of MARPOL 1973/1978.

329 Art. 2 para. 3, sub-para. (a) of MARPOL 1973/1978.

330 See in detail *infra* in 5.3.2.2.

331 See art. 2 para. 3, sub-para. (b), (i)-(iii) of MARPOL 1973/1978.

Convention is aimed at preventing and minimizing intentional vessel-source pollution, other than dumping.

To fulfill its objective, the Convention obliges states to prohibit any violation of the Convention and to establish sanctions under the law of the government of the state under whose flag the ship flies, or the law of the Party under whose jurisdiction (i.e. territorial sea) the violation occurs.[332] To do so any party is allowed to inspect a ship "*for the purpose of verifying whether the ship has discharged any harmful substances in violation of the provisions of [MARPOL 1973/1978]"*[333]. Such inspection can be carried out *"in any port or offshore terminal [under the party's jurisdiction]",* as well as when the ship enters a port or offshore terminal, "*if a request for an investigation [was] received from [another] Party together with sufficient evidence that the ship has discharged harmful substances or effluents containing such substances".*[334] If, during the inspection, a violation of MARPOL 1973/1978 becomes apparent, the party within whose port or offshore terminal the ship lies or – once informed of the violation – the government of the state under whose flag the ship flies, ought to establish sanctions and cause proceedings under their respective laws.[335]

The legal essence of MARPOL 1973/1978 in respect to preventing vessel-source pollution cannot be found in the main body of the Convention, but in its six Annexes, that hold provisions dealing with the prevention of pollution by oil (Annex I[336]), the control of pollution by noxious liquid substances in bulk (Annex II[337]), the prevention of pollution by harmful substances carried by sea in packaged forms (Annex III[338]), the prevention of

332 See art. 2 para. 5 and art. 4 para. 1 and 2 of MARPOL 1973/1978.
333 Art. 6 para. 2 of MARPOL 1973/1978.
334 Art. 6 para. 2 and 5 of MARPOL 1973/1978.
335 See arts. 4 para. 2, sub-para. (a) and 6, paras. 3 and 4 of MARPOL 1973/1978.
336 Annex I of the MARPOL Convention entered into force on October 2, 1983 and as such incorporated the regulations of the OILPOL Convention into the MARPOL regime. It was amended when the MARPOL Protocol of 1978 was adopted, completely revised in 2004 and underwent several further amendments to date. See for a comprehensive list of amendments International Maritime Organization (Status of Conventions), at 99 et seq.; the revised text of Annex I was adopted by International Maritime Organization (MEPC 117(52)) on October 15, 2004 and entered into force on January 1, 2007.
337 Annex II originally entered into force on April 6, 1987 and was completely revised in 2004 by International Maritime Organization (MEPC 118(52)). The revised text entered into force on January 1, 2007.
338 Annex III of MARPOL 1973/1978 entered into force on July 1, 1992 and was revised in 2006 and 2010. See International Maritime Organization (MEPC 156(55)) and International Maritime Organization (MEPC 193(61)); the revised Annex III entered into force on January 1, 2010, 2013 and 2014 respectively.

pollution by sewage from ships (Annex IV[339]), the prevention of pollution by garbage from ships (Annex V[340]) and the prevention of air pollution from ships (Annex VI[341]). States who have become party to MARPOL 1973/1978, are, however, not automatically bound by all Annexes. According to article 14 of the Convention a state becoming party to MARPOL 1973/1978 may *"declare that it does not accept any one or all of [the optional] Annexes"*. Consequently, only the acceptance of the main body of the Convention, as well as its Annexes I and II is obligatory.[342] The Optional Annexes do not become binding, unless they are specifically accepted by member states. While each of the eight Arctic Nations has become party to MARPOL 1973/1978 and its Annexes I and II, three of them (Denmark (only in respect to Greenland), Iceland and the United States) have not yet accepted Optional Annex IV on the prevention of pollution by sewage.[343] Furthermore Optional Annex VI on the prevention of air pollution from ships has so far been accepted by Canada, Denmark, Finland, Norway, Sweden, Russia and the United States. The Icelandic approval is still pending.[344]

The MARPOL system to prevent intentional pollution of the marine environment by ships, as established by Annexes I to VI is a complex arrangement of provisions addressing operation, construction and equipment of ships carrying oil or other harmful cargo and of such transporting people or

339 Annex IV of MARPOL 1973/1978 originally entered into force on September 27, 2003 and was revised in 2004. See International Maritime Organization (MEPC 115(51)); The revised text entered into force on August 1, 2005 and the Annex was further amended in 2006 and 2007 by International Maritime Organization (MEPC 143(54)) and International Maritime Organization (MEPC 164(56)).

340 The Annex V originally entered into force on December 31, 1988 and was amended several times ever since. See International Maritime Organization (MEPC 36(28), International Maritime Organization (MEPC 42(30)), International Maritime Organization (MEPC 48(31)), International Maritime Organization MEPC 65(37), International Maritime Organization (MEPC 89(45)) and International Maritime Organization (MEPC 116(51)), International Maritime Organization (MEPC (201(62)).

341 Optional Annex VI on the prevention of Air Pollution from ships was adopted in 1997 and entered into force on May 19, 2005. In 2008 and 2011 the Annex was revised; its amendments entered into force on July 1, 2010 and January 1, 2013 respectively. See International Maritime Organization (MEPC 176(58)) and International Maritime Organization (MEPC 203(62)).

342 See art. 14 para. 1 of MARPOL 1973/1978.

343 See on the status of the Convention and its Annexes *supra* in fn 327 (part II).

344 Ibid.

animals,[345] as well as technical (e.g. installation of reception facilities[346]) and legal (e.g. inspection of ships and initiation of proceedings[347]) measures to prevent any pollution to the marine environment therefrom. To examine those regulations in detail, however, lies beyond the scope of this thesis.

In essence, the obligatory Annexes, Annex I and II, are of similar scope but differ in respect to the substances carried by ships, they address. Consequently operational standards as well as regulations pertaining to design, equipment and construction of vessel carrying oil and oily mixtures, ought to be distinguished from such, applying to noxious liquid substances.[348] Nevertheless – in combination – Annexes I and II provide a detailed set of rules generally prohibiting the discharge of substances likely to endanger the marine environment (i.e. oil and oily mixtures or noxious liquid substances). However, because – except for Antarctica – the discharge of such substances is not prohibited comprehensively,[349] the question must be asked if MARPOL 1973/1978 together with its obligatory Annexes is sufficient to adequately address shipping within fragile marine ecosystems, such as the Arctic. An answer to this question will be sought subsequently in 5.3.2.1. b. and 5.3.2.4.

345 See for details on operation, construction and equipment requirements, pertaining to machinery spaces of all ships regs. 12-17 and for cargo areas of oil tankers regs. 18-36 of Annex I, as well as regs. 11-15 of Annex II in respect to the pollution by noxious liquid substances, regs. 9-11 of Annex IV referring to the pollution by sewage, regs. 3-6 of Annex V covering the pollution by garbage and regs. 12-16 of Annex VI on air pollution. Also note, that for both Annex V and Annex VI amendments entered into force on January 1, 2013. Following these amendments under Annex V *inter alia* the discharge of all garbage into the sea is prohibited, unless specific permits exists; see reg. 3 para. 1 of the amendments subject to International Maritime Organization (MEPC (201(62)) and in this context also *infra* 5.3.2.2. As regards Annex VI, the July 2011 amendments add regulations on energy-efficiency in respect to operation, construction and equipment to the Annex VI. See for details International Maritime Organization (MEPC 203(62)).

346 See chapter 6 of Annex I, chapter 8 of Annex II, chapter 4 of Annex IV, reg. 7 of Annex V and reg. 17 of Annex VI.

347 See arts. 4, 5 and 6 of MARPOL 1973/1978 and regs. 6-11 of Annex I, regs. 7-10 and 16 of Annex II, reg. 8 of Annex III, regs. 4-8 of Annex IV, reg. 8 of Annex V and regs. 5-11 of Annex VI.

348 See regs. 12-17 and regs. 18-36 of Annex I and regs. 11-15 of Annex II; and see furthermore on a definition of noxious liquid substances *International Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk,* MEPC 19(22), chapter 17 and 18 and reg. 1 para. 10 of Annex II.

349 See regs. 15 and 34 of Annex I and reg. 13 of Annex II, but see also on exceptions of these regulations pertaining to the operational discharge of oil and noxious liquid substances, reg. 4 of Annex I and reg. 3 of Annex II; in respect to the Antarctic area see reg. 15 para. 4 and chapter 9 of Annex I as amended by International Maritime Organization (MEPC 189(60)) of March 26, 2010, as well as reg. 13 para. 8.2 of Annex II and arts. 3-6 of Annex IV to the *Protocol on Environmental Protection to the Antarctic Treaty*, 1991 [hereinafter Madrid Protocol].

b. Climate Change Induced Risks and the International Convention for the Prevention of Pollution from Ships (MARPOL 1973/1978)

While the MARPOL regime yields detailed norms on shipping in an environmentally sound manner, the articles and regulations of the Convention and its Annexes fall short in explicitly addressing any of the principles established by environmental law and risk governance, such as the precautionary principle and the ecosystem approach. Yet, implicitly, the precautionary principle is acknowledged through the survey, certification and control system as put forth in Annexes I to VI,[350] that – in the light of being *better safe than sorry* – guarantees that vessel are not being put into service until their compliance with the requirements provided by the two obligatory and for states that accepted any of the following, also the four optional Annexes, is verified and certified by the issuing of an *international pollution prevention certificate*.

Furthermore, in respect to climate change induced risks in relation to shipping within the Arctic the following considerations become necessary:

1. Because ice and snow prevail, shipping within the circumpolar North is to date still a difficult task to master. Standards on construction, design, equipment and operation of ships as referred to in the MARPOL regime, that may be adequate for ships sailing in more temperate seas, may be insufficient when it comes to shipping within the Arctic Ocean. This assumption is supported by the fact that for the release of all pollutants covered by Annexes I to VI several exclusions and exemptions are made.[351] However, even the smallest release of oil or of noxious liquid substances could, due to the fragility of the Arctic ecosystems and their many intrinsic uncertainties, result in negative ramifications to the region. It is thus questionable whether shipping, as one of the main climate change induced risks to the Arctic, is adequately covered by MARPOL 1973/1978.

2. Furthermore climate change does not only give way to new sea lanes within the Arctic and thus facilitates shipping in the region; it is also the other way around. As contributor to the greenhouse effect, the emission of ozone depleting substances by ships as referred to in Annex VI of MARPOL

350 See *supra* in fn 347 (part II).

351 See reg. 1 para. 2 in conjunction with reg. 7 of Annex III, reg. 11 in conjunction with reg. 3 of Annex IV, regs. 3-6 of Annex V and regs. 12-16 in conjunction with reg. 3 of Annex VI as well as on Annex I and II and see *supra* in fn 349 (part II).

1973/1978[352] enhances global warming, which on the other hand will accelerate shipping in the region. While MARPOL 1973/1978 limits the release of nitrogen and sulphur oxides[353] and as such contributes to mitigating climate change, it fails to address the specialty of the Arctic region, where due to the existence of ice and snow that provide effective grounds for accumulation of such substances, the consequences of a release of these chemicals, as well as any other pollutant covered by Annexes I to VI are much harder to assess. A solution to this problem might be found in designating the Arctic as a special[354] or an emission control area[355], as referred to in Annexes I, V and VI. This topic will be addressed in greater detail *infra* in 5.3.2.4.

Finally, MARPOL's impact on preventing deliberate vessel-source pollution is limited by the fact that only Annexes I and II are obligatory. However, with the exception of Annexes IV and VI all Arctic Nations have accepted the voluntary Annexes: Vessels flying their flag as well as those situated within their jurisdiction are thus subject to the requirements set out in the MARPOL regime, with some exceptions for Greenland, Iceland and the United States in respect to Annexes IV and VI.[356] Furthermore as regards article 234 of UNCLOS all Arctic coastal states are provided the possibility to establish more stringent laws to prevent pollution from shipping pertaining to vessels within their jurisdiction.[357] The MARPOL regime in combination with article 234 of UNCLOS thus provide to Arctic coastal states a comprehensive set of rules pertaining to marine pollution within the Arctic, albeit questionable if their content is sufficient to adequately protect the region.[358]

352 See reg. 12 para. 1 in conjunction with reg. 2 para. 6 of Annex VI, which refers for the definition of ozone depleting substances to the Montreal Protocol as cited *supra* in fn 111 (part II); such substances include e.g. chlorofluorcarbons (CFCs) and halons, which contain *inter alia* the greenhouse gas methane; see furthermore *supra* in 2.2.2. and 5.2.3.

353 See regs. 13 para. 3 and 14 para. 1 of Annex VI.

354 See section B of reg. 15 and 34 of Annex I and reg. 5 of Annex V. Special areas are defined by reg. 1 para. 11 of Annex I and reg. 1 para. 3 of Annex V as areas *"where for recognized technical reasons in relation to [their] oceanographical and ecological condition and to the particular character of [their] traffic the adoption of special mandatory methods for the prevention of sea pollution by oil is required"*.

355 Reg. 14 paras. 3 and 4 of Annex VI set out rules in respect to sulphur oxide (SO_x) emission control areas, which are subject to reg. 2 para. 11 of Annex VI to be understood as areas *"where the adoption of special mandatory measures for SO_x emissions from ships is required to prevent, reduce and control air pollution from SO_x and [related] adverse impacts on land and sea areas"*.

356 See on the status of the Convention and its Annexes *supra* in fn 327 (part II).

357 See for details *supra* in 5.3.1.1. c.

358 For more on MARPOL's impact on Arctic environmental protection see *infra* in 5.3.2.4.

Nevertheless ships within the high seas of the Arctic Ocean are not subject to the control of coastal states but are only responsible to the government under whose flag they fly and as such they are only bound by the obligations approved by their respective government. Yet, because the Arctic Ocean is the world's smallest ocean and to gain access to its high seas a ship will inevitably have to proceed through marine areas subject to the jurisdiction of one of the five Arctic coastal states,[359] requirements on design, construction and equipment of the ship will have to be fulfilled even if the respective requirements were not approved by the government under whose flag the ship flies. The same holds true for operational discharge and release of substances covered by the six Annexes of MARPOL 1973/1978, as far as applicable to the Arctic coastal state in question, during passage through internal waters, territorial seas and the exclusive economic zone. Within Arctic high seas, however, such pollution resulting from operating the vessel, will no longer be embraced by MARPOL standards unless the requirements were accepted by the ship's administration.

While the MARPOL regime is aimed at protecting the marine environment from deliberate pollution and for that reason member states are obligated to cooperate in detecting any violation of the MARPOL requirements and in enforcing them[360], no IMO body exists to supervise member states compliance with the Convention. Consequently, once Arctic shipping lanes and drilling grounds[361] for natural resources become easier accessible due to global climate change, the fact that the implementation of MARPOL 1973/1978 lies predominantly with the flag state and to a more limited extent with the coastal or port state,[362] complicates an effective management of climate change induced risks in relation to shipping. A fact that is further

359 Accord. Winkler, at 166, Brubaker (Navigational Issues), at 17.

360 See art. 6 para. 1 of MARPOL 1973/1978.

361 To some extent the MARPOL regime also covers operational discharge of substances from *"fixed or floating platforms including drilling rigs, floating production and offloading facilities (…) used for the offshore production and storage of oil" as well as "floating storage units (…) used for the offshore storage of produced oil (…) when engaged in the exploration, exploitation and associated offshore processing of sea-bed mineral resources;* see reg. 39 para. 1 and 2, sub-para. 3 of Annex I, reg. 4 para. 1 of Annex V, but see reg. 3 para. 3.1. subparas. 1 to 4 of Annex VI, which exempts *"emissions directly arising from the exploration, exploitation and associated processing of sea-bed mineral resources"* from the regulations subject to Annex VI. Note that oil drilling within the Arctic Ocean has become a reality in April 2014, with the first Arctic offshore oil being extracted from the Russian Arctic shelf by Gazprom; see <http://www.gazprom.com/press/news/2014/april/article189209/> (last visited: 29.06.2014) and on a critical view of the Russian oil drilling activity see e.g. Sauven.

362 See also *supra* in fn 188 (part II) and accord. Birnie, et al., at 408 and 414, cf. Hunter, et al., at 806–807.

enhanced by the lack of clear provisions addressing either the precautionary principle or the ecosystem approach.

5.3.2.2. Convention on the Prevention of Marine Pollution by Dumping of Wastes and other Matters (London Convention)

As sea ice continues to melt not only shipping for recreational or trade purposes but also activities to dump and incinerate substances and materials at sea become more likely within the Arctic Ocean. Furthermore dumping of wastes and other matter could inflict on the stability of the Arctic ecosystems and hence be responsible for further changes in the global climate system. It is thus in respect to the assessment and management of climate change induced risks required to not only address operational vessel-source pollution within the Arctic but also the pollution from dumping and incineration of wastes and other matters at sea. To regulate such activities on an international level the Convention on the Prevention of Marine Pollution by Dumping of Wastes and other Matters[363], or short London Convention, was adopted on November 13, 1972 and entered into force on August 30, 1975.

The Convention was one of the first multilateral agreements to address marine pollution from human activities and as such recognized *"that the marine environment and the living organisms which it supports are of vital importance to humanity (...) and that the capacity of the sea to assimilate wastes and render them harmless, and its ability to regenerate natural resources, is not unlimited"*[364]. Furthermore the Convention acknowledged the sovereign right of states *"to exploit their own resources"* while at the same time addressing *"the responsibility to ensure that [such] activities within their jurisdiction or control do not cause damage to the environment of other States or of areas beyond the limits of national jurisdiction"*.[365]

While in that sense already quite contemporary at the date of its adoption, the Convention was further modernized in 1996, by the London Protocol[366], which entered into force on March 24, 2006 and is meant to eventually re-

363 *Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matters*, 1972, 1046 U.N.T.S. 138 [hereinafter London Convention].

364 Preamble of the London Convention.

365 See preamble of the London Convention 1972; accord. principle 21 of the Stockholm Declaration and principle 2 of the Rio Declaration as referred to *supra* in 5.1.1. and 5.1.5, respectively.

366 *Protocol to the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matters*, 1996, SR 0.814.287.1 [hereinafter London Protocol].

place the London Convention.[367] Except for Finland, Russia and the United States, who are not yet members to the Protocol, both the London Convention and the London Protocol have been accepted by all Arctic Nations. While Denmark has ratified the Convention and the Protocol, the Convention is due to a reservation made by Denmark not applicable to Greenland.[368] This proofs however to be irrelevant, since such reservation was not made for the 1996 Protocol and the protocol supersedes the Convention in case a member state is party to both the Convention and the Protocol. Consequently, from an Arctic point of view the London Protocol of 1996 is of predominant importance. A detailed examination of the London Convention shall thus be refrained from, especially since the Protocol incorporated (and actually enhanced) most of the Convention's provisions. So as to include the legal framework for states within or beyond the Arctic that have not yet ratified the Protocol and may be threatening the Arctic marine environment by dumping a brief reference to the Convention is however required: Hence, where the regulations of the Protocol addressed subsequently correspond to provisions set out by the Convention this will be indicated in the respective footnotes to the Protocol articles. Additionally, if deemed necessary in the light of the governance of climate change induced Arctic risks, specific articles of the Convention not incorporated into the Protocol will be addressed in greater detail.

In its preamble the London Protocol explicitly refers to the precautionary principle, by noting the achievements for the protection and the establishment of a sustainable use and conservation of the marine environment through the framework of the London Convention *"and especially the evolution towards approaches based on precaution and prevention"*. Furthermore the Protocol recognizes *"that it may be desirable to adopt, on a national or regional level, more stringent measures with respect to prevention and elimination of pollution of the marine environment from dumping at sea than are [already] provided for"*[369]. As such the Protocol presents an expansion to article 234 of UNCLOS, which allows for the adoption and application for more stringent regulations in ice-covered regions in regards to

367 The London Protocol supersedes the Convention for all signatory states that are also contracting parties to the London Convention; see art. 23 of the London Protocol. As of March 2013, 87 states are members to the Convention and 42 to the London Protocol. See on the status of ratification: <http://www.imo.org/About/Conventions/StatusOfConventions/Pages/Default.aspx> (last visited: 03.08.2014).

368 See ibid.

369 Preamble of the London Protocol and see also art. 3 para. 4.

shipping.[370] By acknowledging the need *"to manage human activities in such a manner that the marine ecosystem will continue to sustain the legitimate uses of the sea and will continue to meet the needs of present and future generations"*[371], the Protocol obliges state parties to individually or jointly take all measures necessary to adequately protect and preserve the marine environment from all sources of pollution, especially dumping.[372] To do so, contracting parties are required by the Protocol to *"apply a precautionary approach to environmental protection from dumping of wastes or other matter"*, which means that *"appropriate preventative measures [shall be] taken when there is reason to believe that wastes or other matter introduced into the marine environment are likely to cause harm even when there is no conclusive evidence to prove a causal relation between inputs and their effects"*[373]. Next to this explicit reference to the precautionary principle, the Protocol further holds that *"in implementing the provisions of [the] Protocol, [state parties] stall act so as not to transfer, directly or indirectly, damage or likelihood of damage from one part of the environment to another"*[374]. This provision reflects the extraterritoriality rule as defined *inter alia* through the Trail Smelter Arbitration and hence acknowledges at least implicitly principle 3 of the Malawi Principles.[375] This provision alone of course does not lead to requiring the application of an ecosystem approach; nevertheless the London Protocol can be seen as an advancement in implementing new principles of environmental law and risk governance such as the precautionary principle within the law of the sea.

According to the Protocol dumping of wastes and other matters as well as the incineration at sea of such wastes and matters is generally prohibited.[376] Exempt from this provision is the dumping and incineration of wastes and other matters at sea if such action is necessary in exceptional circumstances (threat to the safety of human life or of vessels, aircraft, platforms and other man-made structures at sea), in case the result of such damage to human health or properties would outweigh the negative ramifications of dumping

370 See for details *supra* in 5.3.1.1. c.
371 Preamble of the London Protocol.
372 See art. 2 of the London Protocol and correspondingly arts. I and II of the London Convention.
373 Art. 3 para. 1 of the London Protocol; this provision is an enhancement to the London Convention, since the Convention does not refer to the precautionary principle.
374 Art. 3 para. 3 of the London Protocol.
375 See *surpa* in fn 301 (part I) and 4.5.2.2.
376 See arts. 4 para. 1.1 and 5 of the London Protocol; correspondingly art. IV para. 1 in respect to dumping and art. 10 of annex I of the London Convention in respect to incineration.

or incineration.[377] Consequently, according to article 8 paragraph 2 member state authorities are allowed to issue permits for dumping and incineration *"in emergencies posing an unacceptable threat to human health, safety or the marine environment"* if there is *"no other feasible solution"*. However, such permit only be given after consulting the International Maritime Organization and any country or countries likely to be affected by the dumping or incineration of wastes or other matters at sea.[378] Furthermore exceptions are made for wastes and other matters listed in annex 1 of the Protocol, which, given the existence of a respective permit by the state authority, are excluded from the prohibition of dumping – not however for incineration.[379] Yet, in consideration of annex 2 of the Protocol, dumping ought to be seen as *ultima ratio* – a view that is a new addition to the Protocol as it is not included in the London Convention.

It is also here that the reference to the precautionary principle can be seen: Article 4 paragraph 1.2. of the London Protocol holds that *"attention shall be given to opportunities to avoid dumping in favour of environmentally preferable alternatives"*. Such alternative waste management options are e.g. re-use, off-site recycling and the destruction or treatment to reduce or remove hazardous properties contained in the wastes and other matters referred to in annex 1, e.g. *"dredged material"*, *"sewage sludge"*, *"fish waste"*, *"vessels and platforms or other man-made structures"*, *"inert, inorganic*

377 Art. 8 para. 1 of the London Protocol and correspondingly art. V para. 1 of the London Convention.

378 See art. 8 para. 2 of the London Protocol and correspondingly art. V para. 2 of the London Convention.

379 See art. 4 paras. 1.1. and 1.2 and on the issuing of permits art. 9 paras. 1-3 of the London Protocol and arts. 17 and 18 of its annex 2. The London Convention follows a reverse approach as instead of referring to substances permitted for dumping, it mentions in its annex I specific wastes and matter for which dumping is prohibited (e.g. mercury, persistent plastics, crude oil and radioactive wastes); see art. IV para. 1 sub-para (a) and arts. 1-7 of annex I of the London Convention and Freestone & Salman, at 345 and 347 (referring in this context to a complete reversal of the burden of proof and to a 'negative listing' approach). Wastes and other matter not included in annex I may be suitable for dumping based on the prior issuing of a special (for substances and materials requiring special care such as arsenic, copper, lead, nickel, zinc, fluorides and pesticides) or general (for all other substances and materials) permit; see art. IV para. 1 sub-paras. (b) and (c) and art. III paras. 5 and 6 in conjunction with annex II and III of the London Convention. In respect to incineration the London Convention is less strict than the Protocol (which prohibits combustion of wastes or other matter at sea altogether; see art. 5 of the Protocol), since according to art. 10 para. (b) of annex I to the Convention *"incineration at sea of any (...) waste or (...) matter [not defined as industrial waste according to art. 11 (i.e. "waste materials generated by manufacturing or processing operations") or sewage sludge is permitted, given the issuing] of a special permit"*. On the issuing of permits see furthermore art. VI paras. 1-3 of the London Convention.

geological material", *"organic material of natural origin"* and *"bulky items primarily comprising iron, steel, concrete and similarly unharmful materials, in case such wastes are generated at locations (...) having no practicable access to disposal options other than dumping"* (e.g. small islands with isolated communities).[380]

While dumping of such wastes is generally permitted, given that no alternative exists, any materials referred to in annex 1 containing levels of radioactivity beyond acceptable as set out by the International Atomic Energy Agency, are exempt from this permission.[381] These provisions clearly reflect the precautionary principle by providing a cascade of possible solutions to waste management, with dumping or incineration being the least favorable option. Furthermore, according to articles 12 to 16 of annex 2, assessing the potential impacts of dumping at sea – and hence monitoring initiatives – are prerequisites to the issuing of dumping permits. If, as a result of a comparative analysis (i.e. after considering risks to human health, environmental costs, hazards and economics) dumping is deemed to be the least preferable option, according to article 14 of annex 2 to the Protocol no such permit shall be given. Such an integrative approach in risk analysis is not only reflective of the precautionary principle, as it awaits scientific information until carrying out dumping activities, but is also in line with the ecosystem approach, by including social, economic and ecological interests into the decision making process.

In respect to the preservation of the Arctic marine environment further attention ought to be given to article 12 of the London Protocol: While state parties are generally required to individually take all necessary measures to implement the London Protocol to vessels and aircraft under their jurisdiction,[382] the Protocol advocates the co-operation of member states in areas beyond their jurisdiction or in geographical regions that are of a common interest of several contracting parties.[383] Especially the latter could enhance Arctic co-operation in respect to the prevention, reduction and elimination of pollution by dumping or incineration at sea of wastes or other matters within ice-covered waters.

380 See art. 5 of annex 2 and arts. 1 and 3 of annex 1 of the London Protocol.
381 See art. 3 of annex 1 of the London Protocol and arts. 6 and 9 of annex I of the London Convention.
382 See art. 10 para. 1, sub-paras. 1-3 of the London Protocol and correspondingly art. VII para. 1 of the London Convention.
383 See arts. 10 para. 3 and art. 12 of the London Protocol and correspondingly arts. VII para. 3 and VIII of the London Convention.

In respect to co-operation the Convention – but not the Protocol – further holds, that contracting parties are to *"promote, within the competent specialized agencies and other international bodies, measures to protect the marine environment against pollution caused by [inter alia] hydrocarbons (…), noxious or hazardous matter transported by vessels for purposes other than dumping, wastes generated [due to the] operation of vessels, aircraft, platforms and other man-made structures at sea, radioactive pollutants (…), agents of chemical and biological warfare [and] wastes or other matter [as a result of] the exploration, exploitation and associated offshore processing of sea-bed mineral resources"*[384]. In this respect the Protocol only holds in its article 17 that member states *"shall promote the objectives of [the] Protocol within the competent international organizations"*. Both articles essentially refer to provisions and initiatives as set out by UNCLOS and the IMO regime, e.g. MARPOL 1073/1978.

Considering this brief overview, the London Convention was in most parts incorporated into the 1996 Protocol and as such does not bear any additional objectives. In respect to the assessment and management of risks stemming from pollution by dumping, however, the Convention is a rather weak tool, since it does not refer to the uncertainties entailed in pollution by dumping or incineration at sea and consequently does solely prohibit the dumping or incineration of substances and materials considered highly hazardous to the marine environment. The Protocol on the other hand is very cautious in that respect and allows dumping only for wastes and matter deemed acceptable in respect to the potential effect such dumping can have on the marine environment and forbids the incineration of wastes at sea altogether. Furthermore the dumping of wastes and other matter is subject to the Protocol only permitted if no other alternatives are feasible. In this respect, as a risk governance tool addressing environmental issues, the London Protocol, in comparison to the London Convention, must be seen as a decisive progress. In the Arctic a comprehensive application of the precautionary principle in respect to dumping is thus hampered by lacking Protocol ratifications of the U.S., Finland and Russia.

384 Art. XII of the London Convention.

5.3.2.3. IMO Polar Code

While shipping bears risks for the ship's operator as well as the marine environment no matter where it takes place, navigational hazards within the Arctic Ocean are much more profound, due to the harsh climatic conditions and the remoteness of the region. A fact that was legally recognized in article 234 of UNCLOS when UNCLOS III concluded.[385] Often, however, specific rules and regulations aimed at securing safety of life at sea (e.g. the International Convention for the Safety of Life at Sea (SOLAS)[386]) and protecting and preserving the marine environment from pollution by vessels (e.g. the International Convention for the Prevention of Pollution From Ships (MARPOL 1973/1978)[387], London Convention and London Protocol[388]), do not take the peculiar characteristics of ice-covered waters into account. Yet, disasters like the infamous Titanic incident or the Exxon Valdez[389] oil spill at the coast of Alaska in 1989, enlighten the necessity to address these peculiarities by establishing standards on the design, construction, equipment and operation for vessels working in polar waters as well as pollution control in order to regulate risks to the safety of seafarers as well as to the polar marine environment.

It is in this context that the International Maritime Organization (IMO) recognized *"the need for recommendatory provisions applicable to ships operating in Arctic ice-covered waters, additional to the mandatory (...) IMO instruments"*[390] and on December 23, 2002 approved recommendatory *Guidelines for ships operating in Arctic ice-covered waters*[391]. The fact that these guidelines were only applicable to the Arctic and did fall short in addressing the similar climatic conditions in Antarctica, however, was met with criticism, which eventually led to the adoption of recommendatory *Guidelines for ships operating in polar waters*[392] on December 2, 2009 that now included the Antarctic area. As were the guidelines of 2002, these recommendatory provisions, the so called *Polar Code*, are concerned with the safety of navigation within polar waters as well as pollution prevention as far

385 See for details *supra* in 5.3.1.1. c.
386 As cited *supra* in fn 310 (part II).
387 See for details *supra* in 5.3.2.1.
388 See for details *supra* in 5.3.2.2.
389 See Nilok, at 55, Sale & Potapov, at 189–190, Rothwell & Joyner, at 18, Allsopp, et al., at 145–146, Koivurova (2014), at 133, AMAP (Oil and Gas), at 24.
390 International Maritime Organization (MSC.1/Circ.1056).
391 Ibid.
392 International Maritime Organization (A.1024(26)), hereinafter Polar Code.

as existing requirements of SOLAS and MARPOL 1973/1978 are deemed insufficient.[393]

Polar waters are for the purpose of the Code understood as Arctic and Antarctic waters, which are defined in provisions G-3.3 and G-3.4 of the Code. While the term Antarctic waters corresponds to the waters south of the 60° South longitude, Arctic waters do not encompass all waters beyond 60° North. Rather parts of the Arctic Ocean (including e.g. all waters of the Norwegian coastline and parts of the Barents Sea) are singled out by the Code, rendering it inapplicable to these marine areas.[394] However, these regions are – as will be shown *infra* – legally covered by the Convention for the Protection of the Marine Environment of the North-East Atlantic, which is in comparison to the Polar Code legally binding.[395]

The Code recognizes the unique risks ships operating in polar waters are exposed to, such as poor weather conditions, a lack of good charts, communication systems and other navigational aids, as well as the fact that rescue and clean-up activities are hampered by the special abiotic conditions and the remoteness of the region. To encounter these peculiarities the Code follows an *integrated approach*, which means that the Code ought not to be understood as a stand-alone document, but rather as an additional part to existing (mandatory) regulations, such as SOLAS and MARPOL.[396] The Code's objective is to lay out requirements on construction, design, equipment and operation of ships, which includes training of the respective operators in order to *"ensure that all ship systems are capable of functioning effectively under anticipated operating conditions [i.e. inter alia cold temperatures, existence of ice] and provide adequate levels of safety in accident and emergency situations"*[397]. Since not *"all ships which enter the Arctic and Antarctic environment will be able to navigate safely in all areas at all times of the year"* the Polar Code establishes a system of different classes for ships operating in polar waters (so called *Polar Class* ships).[398] In any case only 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"*[399]. The Polar Code thus

393 See provs. P-1.3 and 2.1 of the Polar Code.
394 See prov. G-3.3 and Figure 1 of the Polar Code and Øystein, at 11.
395 See *infra* in 6.1.1.
396 See prov. P-2.2 of the Polar Code.
397 Prov. P-2.4 of the Polar Code.
398 See prov. P-2.8 of the Polar Code.
399 Prov. G-2.1 of the Polar Code.

exclusively applies to Polar Class ships, as designated in provision 1.1, table 1.1 of the Code. Furthermore the Code does not pertain to ships used solely for governmental and non-commercial services. Nevertheless, the government under whose flag those ships fly should ensure that the operation of such vessels does not infringe the guidelines as far as reasonable and practicable.[400]

Following these general provisions, the Polar Code in Part A sets out guidelines on construction of vessels operating in ice-covered waters, i.e. on materials required and stability calculations as well as on the design of personnel accommodations and escape routes in case of an emergency.[401] Furthermore Part A holds provisions on the construction of directional control systems, i.e. devices with the purpose of steering the ship, anchoring and towing arrangements, machinery systems and electrical installations.[402] Part B of the Polar Code provides recommendations on the equipment of ships operating in polar waters, such as special requirements for fire safety, life-saving appliances and survival arrangements (e.g. lifeboats, personal survival kits etc.), as well as navigational equipment (e.g. compasses, speed and distance measurements, radar, searchlights, ice and weather information system etc.).[403] Additionally Part C of the Polar Code holds guidelines on operational arrangements of vessels operating in polar waters. According to provision 13.1 all such vessels are to *"carry on board at all times a ship operating manual and a training manual"*, that provide information on how the ship is to be operated under normal conditions[404] and in case of an emergency[405], such as damage due to ice, as well as information on ice recognition, navigation in ice and the establishment of drill scenarios (e.g. evacuation drill, fire and damage control drill)[406], so that crew members are readily trained for the occurrence of different emergency conditions in reality. In this respect provision 14.1 of the Polar Code holds further requirements for the personnel operating ships within ice-covered waters. *Inter alia* for that

400 See prov. 1.1.9 of the Polar Code.
401 See provs. 2.1, 2.2, 3.1, 3.2, 3.3, 3.4, 4.1, 4.2 and 4.3 of the Polar Code.
402 See provs. 7.1, 7.2, 8.1, 8.2, 9.1 to 9.5 of the Polar Code.
403 See for details provs. 10.1-10.6, 11.1-11.7 and 12.1-12.11 of the Polar Code.
404 See prov. 13.3.1, sub-paras. 1-6 of the Polar Code.
405 Prov. 13.3.1, sub-paras. 7-14 of the Polar Code list the information necessarily to be included in the operational manual in case risk management to appropriately handle an emergency becomes necessary (e.g. damage control procedures, evacuation procedures, description and operation of fire detection and fire-extinguishing equipment etc.). Hence, the title *risk management* refers to specific measures that ought to be taken if a risk (i.e. an emergency) occurs.
406 See provs. 13.3.2 and 13.4 of the Polar Code.

reason an especially trained *ice navigator* should be assigned to steer the ship in polar waters, that is familiar with the characteristics of ice and how to adequately maneuver the ship within it.[407] Finally chapter 15 of Part C, provisions 15.1 to 15.3 of the Polar Code refer to the furnishing of emergency equipment, such as medical and reserve supplies (e.g. fuel) and damage control and repair equipment.

The final part of the Polar Code, Part D, addresses environmental protection and damage control and as such is aimed at setting up requirements to adequately prevent environmental threats in ice-covered waters from occurring. According to provision 16.1.2 procedures carried out to protect the environment and to control damage ought to take *"the remoteness and other environmental factors particular to Antarctic and Arctic waters"* into account. Other than recommending that all ships navigating in polar waters *"should have the capability to contain and clean up minor deck spills and contain minor over side spills"* and should be furnished with the appropriate damage control equipment, as referred to in provision 15.3, in order *"to make temporary repairs (...) so that the ship may proceed to a location where more substantial repairs can be effected"*, as well as setting out special requirements on hoses, chapter 16 does not prescribe any specific procedures to adequately protect the polar marine environment from adverse navigational effects.

All of the above-mentioned provisions are very detailed and mainly of technical scope, as they address materials and installations required as well as their handling in order to adequately meet the requirements presented by the harsh climatic conditions within the polar regions. An in-depth examination of these provisions would go beyond the scope of this thesis and shall for that reason be refrained from.

Nevertheless, this brief outline of the Polar Code shows that – while the Code certainly recognizes the need of taking precautions by using appropriate materials for construction and by furnishing the vessel with the necessary equipment to render due consideration to the special abiotic factors prevailing in the polar regions – the IMO Polar Code does not provide for a very strong risk governing tool, especially in relation to protecting the polar marine environment from any adverse effects stemming from shipping. In fact, the Code is mainly concerned with safeguarding life at sea, which is

407 See provs. 14.2 and G-3.12 of the Polar Code and for qualifications of the ship's officers and crew 14.1.3 of the Polar Code.

why it ought to be seen as being supplementary to the SOLAS, rather than to the MARPOL Convention.

However, attention should be drawn to the last provision of the Polar Code, 16.3, that states that *"procedures for the protection of the environment under normal operations should take into account any applicable national and international rules and regulations and industry best practices related to operational discharges and emissions from ships, use of heavy grade oils, strategies for ballast water management, use of anti-fouling systems, and related measures"*. While this provision is mainly directed at the regulations set out in MARPOL 1973/1978 and other specific IMO regimes addressing vessel-source pollution, according to provision 16.3 due consideration also ought to be given to national laws and international rules concerned with marine pollution from vessels, such as Canada's AWPPA[408] for example, that might be referring to the precautionary principle or the ecosystem approach.

Apart from the question what the Polar Code's implications on risk assessment and management might be, it is necessary to note that the Code is to date only recommendatory, i.e. soft law and thus not binding on state parties. Since 2009 proposals for a mandatory code for ships operating in polar waters are underway, however.[409] Canada stressed for example, that to date no provisions in the Code existed, *"dealing with alternative environmental protection measures such as Special Area designation or [Particularly Sensitive Sea Areas] that are already included in other IMO Conventions"*[410]. Furthermore other proposals are demanding stronger guidelines on environmental protection in order to adequately meet the unique ecological characteristics of the region and prevent or mitigate harm to its people, the environment, wildlife and climate.[411] Following these initiatives, the development of a mandatory Polar Code under the auspices of the International Maritime Organization is currently underway.[412]

408 See *supra* in 5.3.1.1. c. i. and *infra* in 6.3.1.1.

409 See International Maritime Organization (DE 53/18), International Maritime Organization (DE 53/18/1), International Maritime Organization (DE 53/18/2), International Maritime Organization (DE 53/18/3), International Maritime Organization (DE 53/18/4), International Maritime Organization (DE 53/18/5), International Maritime Organization (DE 53/18/6), International Maritime Organization (DE 53/18/7), International Maritime Organization (DE 53/18/8), International Maritime Organization (DE 53/18/9) and Rayfuse (Polar Code), at 245-249.

410 International Maritime Organization (DE 53/18/2), at 2 note 7.

411 See International Maritime Organization (DE 53/18/3), at 4 note 8.

412 In this context in September 2011 an IMO Workshop on Environmental Aspects of the Polar

5.3.2.4. Special Areas and Particularly Sensitive Sea Areas

a. Emergence of IMO Guidelines for the Designation of Special Areas and the Identification of Particularly Sensitive Sea Areas

In 1978 the International Maritime Organization (IMO) convened a conference on tanker safety and pollution prevention, during which not only the MARPOL protocol was adopted and incorporated the 1973 Convention for the Prevention of Pollution from Ships[413], but also thought was given to the fact that some areas of the world were more than others *"in special need of protection against marine pollution from ships and dumping, on account of the areas' particular sensitivity in respect of their renewable resources or in respect to their importance for scientific purposes"*[414].

Following these findings the IMO assigned its Marine Environment Protection Committee (MEPC) to further address this issue.[415] As a result of several discussions during MEPC sessions throughout 1986 to 1991, the IMO assembly adopted *Guidelines for the Designation of Special Areas and the Identification of Particularly Sensitive Sea Areas*[416] on November 6, 1991, as proposed by the MEPC.[417] The guidelines, which *"are primarily intended to assist [the] IMO and national [g]overnments in identifying, managing and protecting sensitive sea areas"*[418] and in designating special areas under the MARPOL regime, contain three chapters: Chapter 1 attends to *marine protected areas*, chapter 2 focuses on *special areas* and, finally, chapter 3 addresses *particularly sensitive sea areas*. During further negotiations fol-

Code was held in Cambridge, United Kingdom; see for details on the workshop and its results Det Norske Veritas. Additionally in January 2014 the Draft of a mandatory Polar Code was agreed upon in principle by the Sub-Committee on Ship Design and Construction and on February 28, 2014 another Workshop took place in London focusing on Safe Ship Operations in the Arctic Ocean, further advancing the matter. See for details <http://www.imo.org/MediaCentre/HotTopics/polar/Pages/default.aspx> (last visited: 29.03.2014) and Boone, at 198-200.

413 See *supra* in 5.3.2.1.

414 Resolution No. 9 adopted at the International Conference on Tanker Safety and Pollution Prevention in 1978; TSPP resolution 9, as provided in International Maritime Organization (A.720(17)), at 4.

415 Ibid.

416 Hereinafter: the Guidelines, as cited *infra* in fn 417 and 419 (part II); note that while the Guidelines are not mandatory, in case of special area designation a stronger legal effect exists, as special and emission control areas are enshrined within the legally binding MARPOL 1973/1978 Convention; see also *supra* in 5.3.2.1.

417 See the preamble of International Maritime Organization (A.720(17)).

418 International Maritime Organization (A.720(17)), at 4.

lowing the 1991 resolution, chapters 2 and 3 were renamed to Annex 1 and 2, amended and revised in 1999, 2001 and 2005 respectively.[419] The following paragraphs will first outline the purpose and designation process of the marine areas addressed by the Guidelines and will subsequently evaluate their benefit for the governance of climate change induced risks.

b. Marine Protected Areas (MPAs)

According to chapter 1 paragraph 1.1.2 of the Guidelines *marine protected areas (MPAs)* are to be defined as *"areas of intertidal or subtidal terrain together with their overlying waters and associated flora, fauna, historical and cultural features, which have been reserved to protect part or all of the enclosed environment"*.[420] Consequently most MPAs *"are located close to the shore within territorial waters or even in internal waters and may include land areas as well"*[421]. Following the Guidelines the establishment of MPAs is based on a wide array of objectives, such as *"the protection of ecologically or biologically important areas, the protection of specific marine organisms, the protection of important geological or geomorphological processes, the protection of beautiful seascapes, the protection of cultural or historic sites"* and the preservation of recreational interests as well as "*certain forms of fisheries"*.[422] Ultimately the management of MPAs depends *"upon the nature of the resources [they contain], their utilization and the human activities occurring within [them]"*[423]. While in some areas a comprehensive protection (i.e. banning of all human activities) might seem necessary to meet the objectives set out for the area, in others certain activities (e.g. shipping, fishing) might still be permitted, without failing to meet the purpose of MPA designation.

In summary the designation of MPAs can cover a wide array of areas, such as coral reefs, marshes, banks, mangroves and ice-covered areas,[424] as well as meet many different objectives by leaving room to choose the appropriate management option for the designated area. The designation process itself, as well as the management of the MPA generally lies in the responsibility of

419 See International Maritime Organization (A.885(21)), International Maritime Organization (A.927(22)) and International Maritime Organization (A.982(24)).
420 For an updated graphical display and search engine regarding marine protected areas see <http://www.protectplanetocean.org/> (30.06.2014).
421 Chapter 1 para. 1.1.4 of the Guidelines.
422 Chapter 1 para. 1.1.5 of the Guidelines.
423 Chapter 1 para. 1.1.6 of the Guidelines.
424 See Chapter 1 para. 1.1.3 of the Guidelines.

nation states, as the areas designated for MPA status in most cases are subject to their jurisdiction (i.e. land territories and internal or territorial seas).[425]

However, global and regional conventions, such as the Convention Concerning the Protection of the World Cultural and Natural Heritage (World Heritage Convention[426]), the Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar Convention[427]), the Convention on the Conservation of Migratory Species of Wild Animals (CMS[428]), the International Convention for the Prevention of Pollution From Ships (MARPOL 1973/1978)[429] and the Law of the Sea Convention by means of article 117, as well as article 192 in conjunction with article 194 paragraph 5, article 196 and article 211 paragraph 6 sub-paragraph a, do promote the designation of MPAs.[430] Such promotion does not entail a duty to establish MPAs beyond national jurisdiction, though. In fact, because UNCLOS bestows member states with high sea freedoms, to ascertain and manage MPAs not subject to national jurisdiction in the absence of regional regimes protecting specific marine areas comprehensively (e.g. the Convention for the Protection of the Marine Environment of the North-East Atlantic[431]), will remain difficult.[432]

425 See *supra* in fn 421 (part II). On the development of marine protected areas beyond national jurisdiction see Molenaar & Oude Elferink, at 11–12, Oral esp. at 106 and 108.

426 *Convention Concerning the Protection of the World Cultural and Natural Heritage*, Nov. 16, 1972, 1037 U.N.T.S. 151 [hereinafter World Heritage Convention].

427 *Convention on Wetlands of International Importance especially as Waterfowl Habitat*, Feb. 2, 1971, 996 U.N.T.S. 245 [hereinafter Ramsar Convention]; Art. 4 para. 1.

428 *Convention on the Conservation of Migratory Species of Wild Animals*, June 23, 1979, 1651 U.N.T.S. 333 [hereinafter CMS]; Art. III para. 4, sub-para. a.

429 See *supra* in 5.3.2.1. as regards the designation of special and emission control areas.

430 See for details on these conventions *supra* in 5.3.1.1. on UNCLOS and 5.3.2.1. on MARPOL, as well as *infra* in 5.4.

431 The Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR Convention) does by means of art. 2 para. 1 support the establishment of marine protected areas. In this respect the development of an OSPAR Network of Marine Protected Areas, which would include marine protected areas under national jurisdiction as well as such outside of national jurisdiction was addressed during several meetings of the contracting parties. See for details paras. 1.1. and 3.1 of *OSPAR Recommendation 2003/3 on a Network of Marine Protected Areas*, 2003 (OSPAR Recommendation 2003/3) including its amendments by para. 2.5 of *OSPAR Recommendation 2010/2 on amending Recommendation 2003/3 on a network of Marine Protected Areas*, 2010 (OSPAR Recommendation 2010/2); yet as of 2011 the development of the OSPAR Network of Marine Protected Areas (and especially the inclusion of MPAs beyond national jurisdiction) has proven to be difficult. See Rayfuse (Marine Biodiversity), at 8 and furthermore *infra* in fn 825 (part II) and 6.1.1.

432 Accord. Koivurova & Molenaar (2010), at 39 and Molenaar & Oude Elferink, at 18 (stating that *"the current international legal framework relating to [areas beyond national jurisdic-*

Because MPAs are generally subject to national environmental protection measures, on an international scale, and thus from an IMO perspective more relevant is the designation of *special areas* according to the MARPOL regime and of *particularly sensitive sea areas*, which are discussed in chapter 2 and 3 of the Guidelines – under the revised Guidelines Annex 1 and 2 respectively– in greater detail.[433]

c. Special Areas

Annex 1, as amended by resolution A.927(22), is intended to *"provide guidance to Contracting Parties to the International Convention for the Prevention of Pollution from Ships (...) in the formulation and submission of applications for the designation of Special Areas under (...) the Convention"*[434]. MARPOL 1973/1978 defines special areas as *"sea area[s] where for recognized technical reasons in relation to [their] oceanographic and ecological conditions and to the particular character of [their] traffic, the adoption of special mandatory methods for the prevention of sea pollution (...) is required"*[435]. However, special area designation is not comprehensive within the MARPOL regime. Explicit reference to special areas is only made within Annexes I, IV and V and thus allows for the adoption of special mandatory standards (i.e. a higher level of protection) to prevent marine pollution by oil and garbage within special areas.[436]

Originally, MARPOL 1973 (as well as in its amended form of the 1978 protocol) also in Annex II contained a definition of special areas in regulation 1 paragraph 7; such definition was, however, not incorporated into the revised version of the Annex of 2004.[437] Yet Annex II explicitly refers to the Antarctic area in regulation 13 paragraph 8 – which is one of the areas designated a special area under Annex I and V – and prohibits any discharge of noxious

tion] does not (...) provide for a process for the designation of holistic MPAs as well as for the regulation of all human activities therein").

433 The revised Guidelines do no longer speak of chapters but of Annexes instead (Annex 1 on special areas and Annex 2 on particularly sensitive sea areas).

434 Annex 1 para. 1.1. of the Guidelines (as amended by International Maritime Organization (A.927(22))).

435 Annex 1 para. 2.1. of the Guidelines; as held in reg. 1 para. 11 of Annex I and reg. 1 para. 3 of Annex V of MARPOL 1973/1978; see for details on MARPOL 1973/1978 also *supra* in 5.3.2.1.

436 Note that the possibility to include special area designation under Annex IV on the prevention of pollution by sewage was added to MARPOL 1973/1978 by means of amendments to the Convention adopted on July 15, 2011. The amendments entered into force on January 1, 2013. See International Maritime Organization (MEPC 200(62)).

437 See on Annex II, *supra* in fn 337 (part II).

liquid substances or mixtures thereof into the Antarctic sea. Furthermore, while not referring to special areas, Annex VI, holds special requirements for *emission control areas* as defined in regulation 2 paragraph 8 of Annex VI, as *"an area where the adoption of special mandatory measures for emissions from ships is required to prevent, reduce and control air pollution (...)"*. Specific guidelines on the designation of such areas are set out in Appendix III of Annex VI, according to which parties to the Annex are to propose an area as an emission control area to the International Maritime Organization (IMO), if such designation is deemed necessary to prevent, reduce and control ship emissions, which provide a risk to human populations and the environment. The IMO is then to decide on the adoption of the proposed area as an emission control area. To date three areas are designated as emission control areas under Annex VI: The Baltic sea, the North Sea and the North American sea area.[438] Special areas under Annexes I and V are more numerous:[439] To prevent the marine environment from pollution by oil, the Mediterranean Sea, the Baltic Sea, the Black Sea, the Red Sea, the "Gulfs" area, the Gulf of Aden, the Antarctic area, the Northwest European waters, the Oman area of the Arabian sea and Southern South African waters were designated special areas status under Annex I of MARPOL 1973/1978. These areas, except of the Northwest European waters, the Oman area and the Southern South African waters, form also special areas subject to Annex V, which furthermore includes the Wider Caribbean region. Additionally, as of January 2013 Annex IV lists the Baltic sea area as special area and thus allows for the adoption of special mandatory methods for the prevention of pollution by sewage in this region.[440]

The Arctic Ocean, or parts thereof, is to date not listed as a special area. The question thus arises what prerequisites will have to be met in order for a marine area to become a *special area* under the MARPOL regime. According to the Guidelines, the following criteria will have to be satisfied *"for an area to be given Special Area status"*[441]:

438 Amendments to the MARPOL 1973/1978 Convention adopted on July 15, 2011 furthermore foresaw the designation of the United States Caribbean Sea as an emission control area. These amendments entered into force on January 1, 2013; see International Maritime Organization (MEPC 202(62). Also for a list of all areas designated as special or emission control areas under the MARPOL Annexes see <http://www.imo.org/OurWork/Environment/PollutionPrevention/SpecialAreasUnderMARPOL/Pages/Default.aspx> (last visited: 30.06.2014).

439 See on the following ibid.

440 See on the amendments in this respect *supra* in fn 436 (part II).

441 Annex 1 para. 2.3 of the Guidelines.

- **Oceanographic conditions:** The first condition that will have to be met in order for a marine area to be designated as special area, is the existence of particular oceanographic conditions, that *"may cause the concentration or retention of harmful substances in the waters or sediments of the area"*, such as *"particular circulation patterns (...), long residence time (...), extreme ice state and adverse wind conditions"*.[442] In taking account of chapters 2 and 3 of the present thesis, it must seem self-explanatory that the Arctic Ocean meets these requirements. The Arctic deep water circulation as part of the global conveyor belt plays a decisive role in maintaining Earth's climate system and would transport pollutants released in the Arctic all over the planet. Furthermore many pollutants are persistent in ice and snow and the Arctic Ocean is defined by its extreme weather conditions and a year round presence of ice, which makes the concentration or retention of harmful substances in the region more likely.
- **Ecological conditions:** The second prerequisite in order for an area to be designated as special area is the existence of particular ecological conditions *"indicating that protection of the area from harmful substances is needed to preserve" inter alia "depleted, threatened or endangered marine species"* and their *"spawning, breeding and nursery areas"* as well as to preserve *"areas representing migratory routes for sea-birds and marine mammals"* and *"rare and fragile ecosystems such as coral reefs, mangroves, seagrass beds and wetlands"*.[443] While the Arctic does not fall entirely within any of the last mentioned categories, it is unquestionably composed of rare and fragile ecosystems (including wetlands), providing the living grounds for many marine species and mammals, as well as birds. While there's still a lack of comprehensive scientific data on the impact of harmful substances within the Arctic and many uncertainties in this regard prevail, studies have shown that pollutants accumulate in the fatty tissue of Arctic marine mammals and through consumption enter the food chain, endangering not only marine species but also indigenous peoples living in the high North.[444] Consequently the specific ecological conditions as required

442 Annex 1 para. 2.4, sub-paras. 1-4 of the Guidelines.
443 Annex 1 para 2.5, sub-paras. 1, 3 and 4 of the Guidelines.
444 See *supra* in fn 110 (part I).

for an area to be designated as special area would be met by the Arctic.

- **Vessel traffic characteristics:** The final criteria that must be satisfied in order for an area to be given special area status, is a certain extent of vessel traffic that takes place within the area. According to Annex 1 paragraph 2.6 of the Guidelines the *"sea area [in question must] be used by ships to an extent that the discharge of harmful substances by ships when operating in accordance with the requirements of MARPOL 1973/1978 for areas other than special areas would be unacceptable [due] to the existing oceanographic and ecological conditions in the area"*. Consequently minor vessel frequency would not fulfill this criteria. It is here that the Arctic Ocean does – at least to date – not meet the required condition. Because shipping is still a difficult task to undertake within the Arctic and demands special constructional prerequisites of ships, such as ice-strengthening materials, as well as operational skills of the crew, vessel traffic within the Arctic does to date not occur very frequently. Yet, given the special biotic and abiotic conditions within the region, even the use of the area by ships – and as such their operational discharge of harmful substances – to a very small extent could eventually result in unacceptable consequences for the region, even more so if the ice continues to melt, opening up new shipping lanes, which will ultimately increase the use of ships within the Arctic.

While it is debatable if the Arctic region meets the specific vessel traffic characteristics, as demanded by the Guidelines, the problem rather lies in implementing the special area status. For a special area designation to become effective *"adequate reception facilities need to be provided for ships in accordance with the provisions of MARPOL 1973/1978"*[445]. The five Arctic littoral states would thus have to undertake measures for port reception facilities in order for a possible designation of the Arctic Ocean as a special area under the MARPOL regime to become effective.[446] In any case if a state wishes to propose the designation of an area as a special area, such proposal will have to be submitted to the Marine Environment Protection Committee, according to Annex 1 paragraph 3.1 of the Guidelines. The proposal will have to include *"a draft amendment to MARPOL 1973/1978 as the formal basis*

445 Annex 1 para. 2.7 of the Guidelines.
446 Accord. recommendation III. A. of the PAME (AMSA) Report, at 7 and furthermore at 60, 137, 141 and 175.

for the designation and a background document [providing] the relevant information to explain the need for the designation"[447]. The latter will have to contain *inter alia "a definition of the area"*, as well as *"a general description (...) [of its] oceanography, ecological characteristics, social and economic value, scientific and cultural significance, environmental pressures from ship-generated pollution, other environmental pressures [and of] measures already taken to protect the area"*.[448] Furthermore states will have to present *"an analysis of how the sea area in question fulfills the criteria for the designation of special areas"* and provide *"information on the availability of adequate reception facilities in the proposed special area"*.[449] Consequently, as shipping in the Arctic increases, the designation of the Arctic Ocean as a special area under MARPOL 1973/1978 would seem likely, since the particular oceanographic and ecological conditions unquestionably deem such an appointment appropriate. The five Arctic coastal states are thus well advised to install adequate reception facilities within the region before shipping – and thus the ship's operational discharge – from an ecological stance becomes of such an extent that damage will become irreversible. In light of the precautionary principle the installation of adequate reception facilities within the Arctic is thus of utmost importance, since it is the only way to guarantee an effective implementation of the special area status.

d. Particularly Sensitive Sea Areas (PSSA)

Finally, Annex 2 of the Guidelines addresses the identification and designation of particularly sensitive sea areas (PSSA).[450] In comparison to special areas, which are enshrined in the MARPOL 1973/1978 Convention in a legally binding way, the regulations on particularly sensitive sea areas are not mandatory.

According to the Guidelines, particularly sensitive sea areas are areas that are in need of *"special protection through action by [the] IMO because of [their] significance for recognized ecological, socio-economic, or scientific attributes where such attributes may be vulnerable to damage by international shipping activities"*[451]. Once an area has been designated particularly

447 Annex 1 para. 3.2 of the Guidelines.
448 Annex 1 para. 3.3, sub-paras. 1 and 3 of the Guidelines.
449 Annex 1 para. 3.3, sub-paras. 1, 3, 4 and 5 of the Guidelines.
450 As revised by International Maritime Organization (A.982(24)).
451 Annex 2 para. 1.2 of the Guidelines.

sensitive sea area status *"an associated protective measure"* or several thereof must be *"approved or adopted by [the] IMO to prevent, reduce, or eliminate the threat or identified vulnerability"* of the area.[452] According to Annex 2 paragraph 1.5 of the Guidelines *"identification and designation of any PSSA and the adoption of associated protective measures require consideration of three integral components: the particular attributes of the proposed area, the vulnerability of such an area to damage by international shipping activities, and the availability of associated protective measures (...)"*.

- **Attributes of the proposed area:** In order for an area to be identified as a particularly sensitive sea area it must possess specific attributes. In this respect the Guidelines set out three categories of criteria of which at least one criterion must be met by the area that is wished to be designated as particularly sensitive sea area. The three categories are: Ecological criteria, socio-economic criteria and scientific criteria.[453]

  (a) Ecological criteria: In paragraphs 4.4.1 to 4.4.11 the Guidelines list several ecological criteria decisive for whether an area can be assigned particularly sensitive sea area status based on ecological points of view. These are *inter alia:*[454]

  - Uniqueness or rarity: Designation of particularly sensitive sea area status is possible for an area that is unique in the sense that it is *"the only one of its kind"*, e.g. because the area provides living ground to rare, threatened and endangered species that occur only in this specific area. Polar bears would be an example of such species. Furthermore an area *"is rare if it only occurs in a few locations or has been seriously depleted across its range"*. Given the special biotic and abiotic conditions of the Arctic, it certainly would meet the uniqueness and rarity criterion.

452 Ibid.
453 See Annex 2 para. 4.4 and sub-paras. 4.4.1-4.4.17 of the Guidelines.
454 See on the following Annex 2 paras. 4.4.1, 4.4.4, 4.4.8, 4.4.10 and 4.4.11 of the Guidelines. The criteria presented in detail were chosen in reference to the Arctic region. Other criteria not mentioned here are critical habitats, dependency, diversity, productivity, spawning or breeding grounds and integrity. See for details: Annex 2 paras. 4.4.2, 4.4.3, 4.4.5, 4.4.6, 4.4.7 and 4.4.9 of the Guidelines.

- Representativeness: An area is according to the Guidelines representative, if it *"is an outstanding and illustrative example of specific biodiversity, ecosystems, ecological or physiological processes or community or habitat types or other natural characteristics"*. While ice and snow also prevail in Antarctica, the region differs from the Arctic, due to their diverse geology: While Antarctica is composed by landmasses surrounded by an ocean, the Arctic is an ocean surrounded by landmasses. Ultimately – while similarities certainly exist – natural characteristics of the Arctic as well as its ecosystems and biodiversity differ from other regions of the world, which speaks for its representativeness.
- Naturalness: Furthermore an area can be given particularly sensitive sea area status if it can be contested that it *"has experienced a relative lack of human-induced disturbance or degradation"*. The Arctic, as the largest remaining wilderness in the northern hemisphere, certainly meets this criterion.[455]
- Fragility: An area can be considered as fragile in the sense of the Guidelines, if it *"is highly susceptible to degradation by natural events or by the activities of people"*. Ultimately the extent of the area's fragility – and thus the need to develop special protection measures – is dependent on its capabilities to adapt to change and to stressors of both natural as well as anthropogenic origin. While the Arctic is often described as a fragile area,[456] scientific data on the region is not comprehensive. How the region will adapt is to date still very much uncertain, especially since economic undertakings, such as shipping, have only very recently increased. Yet, developments of the region, such as the decline of polar bear populations due to the melting of sea ice, show that climate change is putting a strain on the area and it is in this context questionable how additional stress from human activities will affect the region in long term.

455 See *supra* in fn 98 (part I).
456 See *supra* in fn 95 (part I).

- Biogeographical importance: Areas are of biogeographic importance if they contain *"rare biogeographic qualities (...) or unique or unusual biological, chemical, physical, or geological features"*. As has been shown *supra* in 3.2 the Arctic ecosystems contain rare biogeograpic qualities, due to the special biotic and abiotic conditions prevailing in the region (e.g. the functioning of permafrost as a carbon sink or the importance of the Arctic Ocean to the thermohaline circulation and hence the global climate system).

(b) Socio-economic criteria: Additionally to the ecological criteria presented above, the Guidelines in paragraphs 4.4.12 to 4.4.14 list three criteria for particularly sensitive sea area designation pertaining to social, cultural and economic features of the proposed region. They are:

- Social or economic dependency: The first criterion refers to ecosystem goods and services. According to paragraph 4.4.12 of the Guidelines particularly sensitive sea area status can be given to an *"area where the environmental quality and the use of living marine resources are of particular social or economic importance"*. Economic development in the Arctic is to date still in its initial stages. Yet fishing plays an important role in the region, especially to indigenous peoples. In respect to the latter, however, one of the following criteria may be more fitting.
- Human dependency: In comparison to the first socio-economic criterion, the second focuses on traditions. Consequently human dependency is given in an *"area that is of particular importance for the support of traditional subsistence or food production activities or for the protection of the cultural resources of the local human populations"*. The Arctic undoubtedly falls within this category, since indigenous people are dependent on the functioning of the Arctic ecosystems to sustain their livelihood and cultural values.
- Cultural heritage: Furthermore particularly sensitive sea area designation is possible for an *"area that is of particular importance because of the presence of significant historical*

and archeological sites". Although climatic conditions within the Arctic do not present much hospitality, humans have been living in and from the Arctic at least ever since the last ice age, about 12,000 years ago.[457] In this context, the Arctic is of historic relevance, especially in relation to the establishment and way of living of indigenous communities.

(c) Scientific criteria: The final category of criteria listed in the Guidelines are referring to the importance of the region from a scientific point of view. Paragraphs 4.4.15 to 4.4.17 list three criteria:

- Research: Areas that are of *"high scientific interest"* can be designated a special area. Given the fact that high scientific uncertainties prevail within the Arctic region and that the area is somewhat of an *early warning* in respect to climate change, interest in scientific research at the North Pole – especially within the past couple of decades – has grown. Hence the first criterion would be met.
- Baseline for monitoring studies: Areas that have not experienced any substantial disturbances and have prevailed *"in a natural or near-natural condition"* for a long period of time, provide *"suitable baseline conditions with regard to [research] of biota or environmental characteristics"*. As the largest remaining wilderness in the North,[458] the Arctic has been barely touched by human activities and can thus provide scientific insight on biologic and environmental processes as they were millions of years ago. Climate change of course puts the region under stress and thus has caused perturbations of the ecosystems. However, in respect to monitoring biota and environmental characteristics in connection to global warming the Arctic is invaluable to scientific research, because it might help to better understand the complexities of the climate system and draw conclusions on possible climate change scenarios for other regions of the world.

From this brief outline on the criteria set out by the Guidelines it must seem clear that Arctic ecosystems, do not only meet one but

457 See *supra* in fn 119 (part I).
458 See *supra* in fn 98 (part I).

several of the proposed particular attributes required for an area to be designated particularly sensitive sea area status.

- **Vulnerability to damage by international shipping activities:** The second requirement for an area to be eligible for particularly sensitive sea area status is its susceptibility to damage by international shipping activities. According to paragraphs 5.1.1. to 5.1.7 of the Guidelines several factors ought to be taken into account when assessing the area's vulnerability in response to shipping, i.e. when assessing the relationship between shipping activities as an environmental hazard and the incidence of an adverse effect stemming thereof.[459] These factors include both natural (hydrographical, meteorological and oceanographic features that enhance the possibility of a negative result, such as extreme weather conditions, ice and water depth) as well as factors pertaining to vessel traffic (shipping frequency, the types of vessels used and the types of activities carried out in the region (fisheries, tourism, trade and exploration and exploitation of oil and gas resources) as well as the type and quantity of harmful substances carried on board).

  The vulnerability assessment further will have to provide information on e.g. *"any evidence that international shipping activities are causing or may cause damage to the attributes of the proposed area"* or *"any history of groundings, collisions, or spills in the area and any consequences of such incidents"*.[460]

  To assess the Arctic's vulnerability to damage by international shipping in detail would go beyond the scope of this thesis, especially because a lot of natural factors have not been thoroughly scientifically examined and vessel based activities are compared to other regions of the world not very frequent and not very extensive (e.g. oil and gas drilling activities in the region are to date mostly limited to exploration of the seabed expected to hold any resources). Climate change is however likely to alter this status quo and will thus make the Arctic, as its special abiotic conditions prevail even if the ice continues to melt, much more prone to adverse effects from shipping.[461]

459 See in this context *supra* in 1.2.

460 Annex 2 para. 5.2, sub-paras. 1 and 2 of the Guidelines. The Guidelines list other information that may be relevant in particularly sensitive sea area designation, such as stresses from other environmental sources and measures already in effect, in para. 5.2, sub-paras. 3-5.

461 See in this context PAME (AMSA), at 25 (stating that the fact that *"there will always be an*

- **Associated protective measures:** Once an area has been designated particularly sensitive sea area status the International Maritime Organization will subject to paragraphs 6.1 to 6.3 of the Guidelines approve or adopt associated protective measures, aimed at preventing, reducing or eliminating the identified vulnerability. Such measures include the designation of an area as a special or emission control area according to MARPOL 1973/1978, or the *"application of special discharge restrictions to vessels operating in a PSSA"*. Furthermore associated protective measures include the *"adoption of ship's routing and reporting systems near or in the area"* that would e.g. allow for a prohibition of any vessel traffic within the particularly sensitive sea area, as well as any *"other measure aimed at protecting specific sea areas against environmental damage from ships, provided that they have an identified legal basis"*.[462] In this context *"consideration [ought] also be given to the potential for the area to be listed on the World Heritage list"* subject to the World Heritage Convention[463] or to be *"declared a Biosphere Reserve"* under the UNESCO's Man and the Biosphere (MAB) Programme[464].

Member governments wishing to give a certain area particularly sensitive sea area status will have to submit a proposal to the International Maritime Organization or rather its Marine Environment Protection Committee[465], providing information on the fulfillment of the ecological, socio-economic or scientific criteria, on the vulnerability of the region to damage by international shipping activities by referring to *"current or future international shipping activities that are causing or may be expected to cause damage to the proposed area"*[466] and on the proposed associated protective measure(s),

Arctic sea ice cover (…) has important implications for all future Arctic marine activity and for the development of ship standards and measures to enhance Arctic marine safety and environmental protection"). Consequently the AMSA report *inter alia* recommends the establishment of Specially Designated Arctic Marine Areas e.g. under MARPOL or particularly sensitive sea area designation. A report on such areas is currently being produced under the auspices of the Arctic Council PAME working group; see PAME, at 13–16 and *infra* in 5.3.2.5. and 6.2.2.5. Note in this context, that Arctic offshore oil drilling activities – albeit on a small scale – have become reality as of April 2014. See for details *supra* in fn 361 (Part II).

462 See in this context for details Roberts, at 115–131.

463 See referred to *infra* in 5.4.3.2.

464 See *infra* in 5.4.3.3.

465 See for details on the procedure for particularly sensitive sea area designation by the International Maritime Organization and its committees and sub-committees respectively, Annex 2 para. 8.3 of the Guidelines.

466 Annex 2 para. 7.5.1, sub-para. 3 of the Guidelines.

in case no such measure is already in place to adequately protect the area.[467] States will have in this context to provide a detailed description of the *"existing and/or proposed associated protective measures"* including their legal basis[468] and their benefit in protecting the particularly sensitive sea area.[469] Furthermore member governments will have to elaborate on actions to be taken under domestic law in case a ship fails to comply with the requirements as set out by the associated protective measure(s).[470]

Proposals for particularly sensitive sea area designation submitted to the International Maritime Organization will be considered *"on a case-by-case basis"* in order to determine whether the area fulfills at least one of the required ecological, socio-economic or scientific criteria and is based on these attributes prone to damage by international shipping activities.[471] Furthermore the International Maritime Organization will ascertain if the existing or proposed associated protective measure is sufficient in adequately preventing, reducing or eliminating the identified vulnerability of the area to international shipping activities.[472]

Once an area has been assigned particularly sensitive sea area status, IMO member governments will be responsible for implementing the associated protective measures in accordance with the law of the sea by taking *"all appropriate steps to ensure that ships flying their flag comply with the associated protective measure adopted to protect the designated PSSA"*.[473]

e. Climate Change Induced Risks and the IMO Guidelines on Special Areas and Particularly Sensitive Sea Areas

While the Guidelines do not specifically refer to neither the precautionary principle nor the ecosystem approach, they certainly have implications on managing climate change induced risks in relation to international shipping

467 See Annex 2 para. 3.2 and for details paras. 7 and 8 of the Guidelines and for a graphical display of the PSSA consideration and designation process see Roberts, at 133.

468 According to the Guidelines a legal basis is given for any measure already existing under the IMO regime, *"any measure that does not yet exist but could become available through amendment of an IMO instrument or adoption of a new IMO instrument"*, as well as *"any measure proposed for adoption in the territorial sea or pursuant to art. 211 [para.] 6 of [UNCLOS]"*; see Annex 2 para. 7.5.2, sub-para. 3, (i)-(iii) of the Guidelines.

469 See Annex 2 para. 7.5.2, sub-para 1 of the Guidelines.

470 See Annex 2 para. 7.9 of the Guidelines.

471 See Annex 2 para. 8.1 of the Guidelines.

472 See Annex 2 para. 8.2, sub-para. 1 of the Guidelines.

473 See Annex 2 paras. 9.1-9.3 of the Guidelines.

activities. The designation of marine protected areas (MPAs) under domestic law, of special and emission control areas subject to the MARPOL regime and of particularly sensitive sea areas (PSSAs) according to the Guidelines are directed at preventing and reducing any negative ramifications to specific areas from shipping within such areas and as such are risk governance tools designed for risk prevention and mitigation.

That alone of course, does not say anything on their relationship with the precautionary principle and the ecosystem approach. Yet, considering the fact that the designation of a particular area as marine protected area, special area, emission control area, particularly sensitive sea area or a combination thereof,[474] recognizes the value of a given region, does not speak in favor of traditional risk management, but rather of a cautious approach. While special or emission control area designation does not completely prohibit shipping within the region assigned the respective status, it allows for stricter requirements of operational discharge and emission of harmful substances, such as oil, garbage and air pollutants in order to prevent any possible negative ramifications to the marine environment from occurring.[475] Consequently standards on operational discharge and emission are – by taking the special ecological features of the areas designated as special or emission control areas into account – more or less restrictive depending on the region they pertain to. By considering these ecological factors, that often entail uncertainties due to the fact that ecosystem processes within the areas are not comprehensively understood and that are defined by long residence time of harmful substances (e.g. the accumulation of persistent organic pollutants in ice-covered areas) and the possibility of irreversible damage occurring within the region (e.g. in case of rare and fragile ecosystems, where habitat depletion through shipping could lead already threatened or endangered species to extinction), the IMO Guidelines acknowledge – albeit not explicitly – the precautionary principle: The decision based upon which areas are given special or emission control area status, is clearly made in *dubio pro natura* and hence based on the precautionary principle, since the particular mandatory requirements for special and emission control areas build a margin of safety into shipping activities.[476]

474 See Annex 2 para 4.5 of the Guidelines.
475 See the definitions of special and emission control areas within MARPOL 1973/1978, as referred to *supra* in 5.3.2.4. c.
476 See fn 176 (part I) and in general on the precautionary principle *supra* in 4.4.

Marine protected area and particularly sensitive sea area designation go one step further, by allowing for a wide variety of options (not limited to discharge and emission control regulations) to be taken to adequately protect the area assigned the respective status. As ecological as well as socio-economic views are taken into account when designating an area as particularly sensitive sea area, such designation clearly is in favor of the ecosystem approach – and as such in compliance with the mandates of the Convention on Biological Diversity[477], albeit on a smaller scale, because in general only parts of seas or oceans are assigned particularly sensitive sea area status.

Nevertheless the particularly sensitive sea area designation reflects not only the ecologic, but also the economic and social goods of the region, by referring to its special biotic and abiotic characteristics, as well as its importance to economic development and the maintenance of traditional and cultural values of its people.[478] Associated protective measures appointed to the particularly sensitive sea area are thus not solely decided upon from a cautious point of view but are rather set up on the basis of ecological, economic and sociological factors pivotal to the region. In this context the Guidelines hold in Annex 2 paragraph 1.4. that their purpose is to *"ensure that in the process [of particularly sensitive sea area designation and the appointment of associated protective measures to prevent, reduce or eliminate the risk of damage from international shipping to the specific area] all interests – those of the coastal State, the flag State, and the environmental and shipping communities – are [to be] thoroughly considered on the basis of relevant scientific, technical, economic, environmental information regarding the [proposed] area (...)".* Consequently, this integrative approach as well as the possibility to assign a variety of protection measures to the particularly sensitive sea area, leaving greater flexibility to adequately address the area's assumed vulnerability to shipping activities, supports the implementation of an ecosystem approach within the shipping sector.

477 Accord. Roberts, at 107.
478 See on the particular attributes of the proposed area required for it to be designated PSSA status, *supra* in 5.3.2.4. d.

5.3.2.5. Conclusion

In summary the IMO regime does complement the UNCLOS provisions on protection and preservation of the marine environment against pollution from shipping and as such – at least partially (e.g. in case of the assignment of special areas or particularly sensitive sea areas and in application of the 1996 London Protocol in respect to dumping of wastes and other matter at sea) – is drawing attention to new environmental risk governance tools, such as the precautionary principle and the ecosystem approach. Nevertheless the IMO legal regime does not provide for a comprehensive approach to address climate change induced Arctic risks in relation to shipping and other activities (such as dumping and incineration at sea) linked thereto. If the ecosystem approach (e.g. in case of particularly sensitive sea area designation) is addressed at all, it is limited to a specific region and sector, i.e. the shipping sector. Yet special area and particularly sensitive sea area designation might provide for a starting point for an ecosystem-based management of wider oceanic areas and as such are helpful tools in addressing climate change induced Arctic risks, especially as they do not follow the zonal approach undertaken by UNCLOS.[479] In this context it is noteworthy that the Arctic Marine Shipping Assessment (AMSA) Report, explicitly recommends the establishment of specially designated Arctic Marine Areas e.g. through special area or particularly sensitive sea area designation under the International Maritime Organization, to adequately protect the Arctic marine environment.[480]

Furthermore the explicit reference to the precautionary principle within the London Protocol[481] shows that the potential risks shipping and activities related thereto can cause to the marine environment have been acknowledged and a departure from classical risk assessment and management is underway to a normative handling of the shipping sector in a more cautious way. The development of a cascade of management options in respect to dumping e.g. require states to consider feasible alternatives to activities regulated by the London Protocol. In light of risk assessment and management such an approach is favorable, because it provides states with clear guidelines in how to base their decisions on the precautionary principle. Consequently, the listing of an explicit cascade of several alternative options in respect to a

479 See in this context also *supra* in 5.3.1.2.
480 See PAME (AMSA), at 7, PAME (Work Plan 2013-2015), at 16 and see furthermore *infra* in 6.2.2.5.
481 See for details *supra* in 5.3.2.2.

specific activity related to vessel-source pollution may also be appropriate for other IMO Conventions, since the complexity of the provisions and their interaction may conceal precautionary objectives. E.g. MARPOL 1973/1978 does not explicitly refer to the precautionary principle. By demanding to install reception facilities, however, the Convention regards the discharge of pollutants into the seas as unfavorable. Yet, as such discharge is not – in comparison to the London Protocol – made *ultima ratio* and no cascade of alternatives is provided for, states are left alone with the decision on how much precaution to take, albeit of course that any discharge may only lawfully occur within the requirements set out by the MARPOL 1973/1978 provisions.[482] Ultimately the IMO regime by the many revisions that took place ever since the Rio Declaration of 1992[483], is, while certainly not on a comprehensive level, at least in parts guiding the shipping sector towards a new management of the oceans in order to guarantee their continuous benefit for all humankind.

5.3.3. Other International Agreements Protecting the Marine Environment

5.3.3.1. Pollution

Apart from UNCLOS, the International Convention for the Prevention of Pollution From Ships and the London Convention as well as its Protocol,[484] other multilateral agreements with an international scope aimed at protecting and preserving the marine environment from pollution exist; many of them deal with the negative impacts of nuclear weapons on the sea or civil liability in respect to oil pollution.[485] As they pertain to topics not specifically related to the assessment and management of climate change induced Arctic risks, they shall, however, not be further examined within this thesis.

Other multilateral conventions, such as the Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR Convention[486])

482 See for further details *supra* in 5.3.2.1.
483 As referred to *supra* in 5.1.5.
484 See for details *supra* in 5.3.1., 5.3.2.1. and 5.3.2.2.
485 E.g. *Treaty Banning Nuclear Weapon Tests in the Atmosphere, Outer Space and Under Water*, Aug. 5, 1963, 480 U.N.T.S. 44, *International Convention on Civil Liability for Oil Pollution Damage*, Nov. 29, 1969, 973 U.N.T.S. 3.
486 *Convention for the Protection of the marine Environment of the North-East Atlantic*, Sept. 22, 1992, 2354 U.N.T.S. 67 [hereinafter OSPAR Convention].

are limited in their spatial scope, since they pertain to only a certain area and not to the world's oceans as a whole. What they can do in order address climate change induced risks within the Arctic shall thus be examined in greater detail *infra* in 6. in respect to regional measures taken to respond to climate change induced Arctic risks. Furthermore marine pollution prevention can also benefit from international and regional agreements not particularly designed to protect and preserve marine spaces, such as the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal (Basel Convention[487]) and the Convention on Long-Range Transboundary Air Pollution (LRTAP[488]), as referred to above.

5.3.3.2. Living Resources

Given the vital role the Arctic Ocean plays in the subsistence of peoples, plant and animal species living in the high North, as well as in the functioning of the global climate system, and hence in the well-being of us all, climate change induced risk governance must be concerned with addressing any risks that may adversely affect the Arctic marine environment.[489] As a consequence the previous paragraphs of this thesis on the law of the sea predominantly focused on marine pollution from ships, as one of the main stressors to the Arctic marine ecosystems, even more so if shipping will, due to the melting of sea ice, increase in the future.

While the rules and regulations established within the shipping sector in relation to the assessment and management of climate change induced Arctic risks certainly play an important role in this context, other sectors, such as fisheries, deserve attention as well, since climate change induced risks do also touch on marine living resources, from both an ecological as well as an anthropogenic stance:[490] Climate change induced risks understood from an ecological point of view refer to climate change itself and its negative consequences on ecosystems; as such climate change induced risks are those directly linked to the alterations in climate. As scientific studies show, in respect to fisheries such alterations have had (and most likely will continue to have) an impact on fish stocks, since the rising temperatures of the world

487 *Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal*, March 22, 1989, 1673 U.N.T.S. 57.
488 See *supra* in 5.2.1.
489 See for details *supra* in 3.2.2.2.
490 See on the following definition of climate change induced risks *supra* in 1.2.

oceans have caused fish (and other marine species) to migrate.[491] Consequently fish stock, once available in a specific region might no longer be obtainable eventually or – on the contrary – the changing abiotic factors within the region might lead to the expansion of fish stocks, due to the more hospitable living conditions. Furthermore the migration of species, as a consequence of global warming, to regions where they were previously non-existent might lead to disturbances within local marine species. Regulations in respect to appropriately managing marine living resources will have to take these peculiarities into account.

From an anthropogenic point of view climate change induced risks refer to damages caused by human activities, which either are connected to the changes in climate (e.g. increase of shipping within the Arctic due to the melting of sea ice) or enhance the initiating natural event i.e. climate change itself or any natural phenomenon caused by it (e.g. the release of greenhouse gases that further advances climate change). Climate change induced risks understood – from an anthropogenic perspective – as the possibility of negative consequences arising from human activities, pertain to marine living resources as well, because human activities can directly (e.g. by increasing the number of fishing vessels within the Arctic, due to fish stocks being easier attainable because of the more hospitable climatic conditions) or indirectly (e.g. by the discharge of pollutants from cargo ships or such engaged in tourism, as well as noise, which negatively affect marine living resources) impact upon marine living resources.

Ultimately reasonable management of marine living resources (i.e. from a legal stance rules and regulations applicable to them) will have to take both, natural as well as anthropogenic factors pertaining to climate change induced risks into account. Furthermore, because marine living resources, as organisms, which are part of ecosystems, participate in the functioning of these ecosystems and provide valuable ecosystem goods and services, the application of risk governance tools reflective of the precautionary principle and the ecosystem approach are reasonable.[492] If and if so in what way international initiatives on the management of marine living resources address these risk governance principles and as such aid in governing climate change induced Arctic risks in relation to Arctic marine living resources, will be analyzed subsequently.

491 See *supra* in fn 94 (part I).
492 See *supra* in 3.2.1. and 4.5., esp. 4.5.2.2. d.

It is in this context important to note, that the management of marine living resources (especially as regards fisheries) has been one of the first sectors to introduce the ecosystem approach and make it feasible in practice.[493] Consequently the following paragraphs will predominantly focus on how the precautionary principle and the ecosystem approach can be made operational and as a result provide valuable insight into the effective implementation of these environmental risk governance principles. To that end the international initiatives on the management of marine living resources will be exemplified based on two marine species, fish and whale stocks as regulated by UNCLOS and its additional Agreement Relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks[494] as well as the voluntary FAO Code of Conduct for Responsible Fisheries[495] and the International Convention for the Regulation of Whaling[496].

a. Whaling

i. International Convention for the Regulation of Whaling

The International Convention for the Regulation of Whaling was adopted on December 2, 1946 and has as of 2014 entered into force for all Arctic Nations, except one: Canada. The latter was a former member, as Canada was among the original signatory states in 1946, but withdrew from the Whaling Convention by note of June 24, 1981.[497]

The Convention's objective is to accomplish a sustainable management of whale stocks by limiting whaling operations *"to those species best able to sustain exploitation in order to give an interval for recovery to certain species of whales now depleted in numbers"*[498]. As such the Convention can be seen as a reaction to the over-exploitation of whales in the past.[499] For the

493 See for details *infra* in 5.3.3.2. b. and 6.1.2.3.
494 *Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10 December 1982 Relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks*, Aug. 4, 1995, 2167 U.N.T.S. 3 [hereinafter Fish Stocks Agreement].
495 *Code of Conduct for Responsible Fisheries*, Oct. 31, 1995 [hereinafter FAO Code of Conduct].
496 *International Convention for the Regulation of Whaling*, Dec. 2, 1946, 161 U.N.T.S. 72 [hereinafter Whaling Convention].
497 See on the status of the Whaling Convention: <http://iwc.int/members> (last visited: 30.06.2014).
498 See the preamble of the Whaling Convention.
499 See *supra* in 3.2.2.3.

purpose of fulfilling its objective the Convention established an International Whaling Commission (IWC), which (or rather the Scientific Committee founded under its auspices[500]) is responsible for gathering, evaluating and providing scientific data and information on whales, the current conditions and trends of whale stocks and on methods of maintaining and increasing their populations.[501] In this context a special permit might be granted to nationals by contracting parties *"to kill, take and treat whales for purposes of scientific research"*. The results of any such research as well as any other *"scientific information (...) with respect to whales and whaling"* available to state parties will have to be submitted to the IWC on a regular basis, at least once a year.[502] Furthermore the Convention recognizes the indispensable need *"to sound and constructive management of the whale fisheries"* to continuously collect and analyze biological data gathered in connection with the operation of factory ships and land stations, entrusted with treating whales at sea or on land.[503]

ii. The Schedule

The Convention is complemented by the Schedule[504] to the International Convention for the Regulation of Whaling, as referred to in article V paragraph 1 of the Convention. The Schedule holds *"regulations with respect to the conservation and utilization of whale resources"* by establishing prohibitions or catch limits in respect to specific whale species or a certain temporal or spatial scale. Furthermore the Schedule provides rules on the adequate treatment of whales by specifying equipment and methods may be used to catch and measure them.[505] In order to respond to the latest scientific findings on whale stocks and whaling the Convention allows for regular updates of the Schedule, which was last amended in July 2012 at the 64th annual meeting of the IWC.[506]

Following a detailed description of the terminology on whale species and general terms to be employed within the Schedule, chapter II of the Sched-

500 See rule M para. 1 of the *Rules of Procedure and Financial Regulations, as amended by the Commission at the 64th Annual Meeting,* July 2012.
501 See art. IV para. 1, sub-paras. (a)-(c) of the Whaling Convention.
502 See art. VIII para. 3 of the Whaling Convention.
503 See arts. VIII para. 4 and II paras. 1 and 2 of the Whaling Convention.
504 The latest version of the Schedule is available at <http://iwc.int/convention> (last visited: 30.06.2014).
505 See art. V para. 1 of the Whaling Convention.
506 See art. V para. 1 of the Whaling Convention and *supra* in fn 504 (part II).

ule addresses open and closed seasons for whaling on either factory ships or land stations. According to chapter II, paras. 2 and 4 the taking or killing of particular whale species (sperm whales, mink whales and baleen whales) is permitted during a consecutive or intermittent period of six to eight months, depending on the whale species to be managed and whether the open season applies to factory ships or land stations.

For the sustainable management of whale stocks more significant, however, are the regulations set out in chapter III of the Schedule, which prohibit the killing of whales for commercial purposes within particular areas and by means of specific methods (i.e. the killing of whales by the use of a cold grenade harpoon). So called *ocean sanctuaries* have been established for the Indian Ocean and parts of the oceans in the southern hemisphere, within which commercial whaling is forbidden altogether.[507]

While the Arctic Ocean has not been designated an ocean sanctuary under the International Whaling Convention and its Schedule, the use of factory ships and whale catcher ships attached to the former for taking or treating baleen whales (except of minke whales), is generally forbidden in the waters north of 66° North. Exceptions apply to the sea areas between 66° and 72° North east of Greenland as far as 140° West.[508] Special rules also apply to aboriginal whaling, i.e. whaling carried out not for commercial purposes, but for the subsistence of indigenous populations, that are for their viability and maintenance of cultural values dependent on the killing and treating of whales. Hence, aboriginal whaling is for particular baleen whale stocks and in accordance with complying to specific catch limits pertaining to such stocks permitted under the Whaling Convention *"when the meat and products of such whales are (…) used exclusively for local consumption"*.[509]

As indigenous populations are part of the ecosystems they inhabit, the admissibility of aboriginal whaling based on specific catch limits in relation to particular whales stocks seems in the light of the ecosystem approach favorable, because such regulations will tend to both ecological interests in sustaining whale species and social interests of indigenous peoples in respect to their nutritional requirements and culture. Currently aboriginal whaling is permitted within the Arctic for Greenland (in respect to minke whales, fin

507 See chapter III para. 7 of the Schedule.
508 See chapter III para. 8, sub-para. (a) of the Schedule.
509 See for details chapter III para. 13, sub-para. (b) of the Schedule.

whales and bowhead whales),[510] Russia and the United States concerning Alaska (in respect to bowhead and gray whales)[511].

To further guarantee the sustainable management of whales the Schedule establishes in its chapter III, three categories for whale stocks in accordance with the scientific findings procured by the IWC's Scientific Committee. Depending on to which category a whale stock belongs to, whaling from this stock is either permitted or prohibited. The Schedule classifies the whale stocks into the following categories: Sustained Management Stock (SMS), Initial Management Stock (IMS) and Protection Stock (PS). Whale stocks belonging to the Sustained Management Stock are such, that have *"remained at a stable level for a considerable period under a regime of approximately constant catches"*[512].

Decisive on whether a stock is at a stable level or not is the Maximum Sustainable Yield (MSY).[513] MSY refers to the largest quantity of whales that can possibly be taken from a specific stock, without impeding on its maximum growth rate. Consequently, catching of both too many as well as too little quantities of whales, will have an impact on the maximum growth rate: The yield of too many whales will limit the growth rate and thus reduce the surplus of whales that can be harvested with the stock still being at a sustainable level. On the other hand the yield of too little quantities of whales can result in an increase in population density, which will put pressure on the environment (e.g. food, habitat) responsible for sustaining the species, affecting indefinite reproduction and thus growth rate. Accordingly, there only exists a largest possible catch, if whale populations are at an equilibrium, i.e. at a quantity that on the one hand allows for continuous reproduction, but on the other does not lead to an increase in population density that would have negative ramifications on the stock. Subject to chapter III paragraph 10, sub-paragraph (a) of the Schedule whale stocks are classified under the Sustained Management Stock, if they are not more than 10 % below and not

510 See chapter III para. 13, sub-para. (b), 3 of the Schedule.
511 See chapter III para. 13, sub-para. (b), 1 and 2 of the Schedule.
512 Chapter III para. 10, sub-para. (a).
513 See also on the following Rayfuse (Biological Resources), at 372, Churchill & Lowe, at 282, Birnie, et al., at 590-591 and 656 (critically assessing the Maximum Sustainable Yield approach, by pointing out that it *"is no longer acceptable as a conservation objective because if fails to take account not only of economic objectives but of the ecological relationship of species with each other and with their habitat and the quality status of that habitat, of the limits of the given area's biomass, and of factors disturbing the environment, such as pollution, habitat loss, disease, current and temperature changes, failures in the food chain of the oceans from disease, and other causes".*); accord. Hunter, et al., at 996.

more than 20 % above the Maximum Sustainable Yield. Commercial whaling on such stocks is generally permitted.

Whale stocks belonging to the Initial Management Stock, are such that are more than 20% above the Maximum Sustainable Yield. Consequently, to reduce pressure on the environment and achieve the sustainability of the species, as well as increase the surplus of whales to be caught, whaling is permitted as far as necessary to bring the stock to a level, where there is a largest possible catch, without risking to reduce the stock beyond the level of the Maximum Sustainable Yield.[514] Finally a stock classified under the Protection Stock, is one that is below 10% of the Maximum Sustainable Yield level. Consequently no whales can be caught without impeding on their sustainability. Hence, in order to bring such whale stocks to a sustainable level commercial whaling is prohibited on the Protection Stock.[515] What whale species and what specific stocks are assigned to any of the three categories is subject to the scientific data gathered by the IWC's Scientific Committee.

iii. The Moratorium on Commercial Whaling

What has been said above[516] in regard to regulations pertaining to commercial whaling, needs to be put in perspective: As the management procedure according to chapter III paragraph 10, sub-paragraph (a) to (c) proved to be inadequate to appropriately manage whale stocks in relation to commercial whaling[517], subject to chapter III paragraph 10, sub-paragraph (d) of the Schedule, except for minke whales, a moratorium applies on the taking, killing or treating of baleen whales, sperm whales and killer whales by factory ships or whale catchers attached to them. In respect to the catching of baleen whales only aboriginal whaling is thus allowed in accordance with the regulations set out in chapter III paragraph 13 of the Schedule as examined above. In any case, however, it *"is forbidden to take or kill suckling calves or female whales accompanied by calves"*[518]. Furthermore chapter III paragraph 10, sub-paragraph (e), as it came into force on February 3, 1983[519], set *"catch limits for the killing for commercial purposes of whales*

514 See chapter III para. 10, sub-para. (b) of the Schedule.
515 See chapter III para. 10, sub-para. (c) of the Schedule.
516 See *supra* in 5.3.3.2. a. ii.
517 See preamble of *IWC-Resolution 1994-5, Resolution on the Revised Management Scheme*, 1994 (Res.1994-5).
518 Chapter III para. 14 and 17 of the Schedule.
519 See footnote to chapter III para. 10 sub-para. (e) of the Schedule.

from all stocks to zero" from 1985/1986 and onwards. However, by 1990 a comprehensive assessment on the effects on whale stocks of such a pause in commercial whaling and possible new catch limits should have come to conclusion.[520] The comprehensive assessment was defined by the Scientific Committee as *"an in-depth evaluation of the status of [all whale] stocks in the light of management objectives and procedures (...) [that would] include [the] examination of current stock size, recent population trends, carrying capacity and productivity"*[521]. Because the gathering of such data has proven to be difficult and complex, however, the Scientific Committee is to date undertaking in-depth analysis in respect to various whale species and is establishing new management procedures and schemes in order to more adequately take scientific uncertainties and complexities into account.[522] The comprehensive moratorium for commercial whaling is thus still uphold.

iv. Conclusion

Considering this brief outline of the International Whaling Convention and its complementary Schedule, it becomes evident that science and as such the gathering as well as the evaluation of scientific data under the auspices of the Scientific Committee is paramount for the implementation of the Convention. The assignment of any whale species to one of the three categories listed above (Sustained Management Stock, Initial Management Stock and Protection Stock)[523] and the establishment of catch limits for both commercial and aboriginal whaling, are dependent on the availability of scientific information. This becomes especially important in respect to commercial whaling, since unless sufficient information on whale stocks can be procured, the catch limit for all stocks will remain at zero. Such an approach is clearly reflective of the precautionary principle – and a rather strict one at that[524], since under the current regime whaling is only permitted to indigenous populations in respect to specific whale stocks and quantities, while commercial whaling is prohibited altogether, until sound scientific knowledge on whale stocks exist that would provide reasonable grounds to set catch limits at a level other than zero, without risking a decline of whale

520 See HUNTER, ET AL., at 1054.
521 See *Report of the Special Meeting of the Scientific Committee on Planning for a Comprehensive Assessment of Whale Stocks,* at 147.
522 See on these new management plans immediately *infra*.
523 See for details *supra* in 5.3.3.2. a. ii.
524 Accord. BIRNIE, ET AL., at 726.

species. Consequently the moratorium for commercial whaling is directly linked to a lack of knowledge and prevailing uncertainties in the subject matter.

To overcome these shortcomings the Scientific Committee developed a *revised management procedure (RMP)*, a scientific method based on the so called *Catch Limit Algorithm (CLA)* that allows for the setting of safe catch limits, by using parameters that are taking uncertainty and new scientific knowledge into account.[525] Since, of course a lot of scientific information is needed and the assessment of different scenarios becomes necessary to carry out the revised management procedure, efforts to implement the procedure and to employ the Catch Limit Algorithm on different whale stocks are still underway. It is for that reason that the IWC decided to refrain from setting any catch limits for commercial whaling until a *revised management scheme (RMS)* was in place, that would allow for inspections and observations, *inter alia* in respect to under- and misreporting of whale catches, to guarantee member states' compliance with the revised management procedure and the catch limits based thereon.[526] Consequently commercial whaling under the revised management scheme would only be permitted *"for [whale] populations and seasons for which catch limits are in force"*[527] based on the calculations made by the Scientific Committee in accordance with the revised management procedure. For all other populations catch limits would remain at zero.[528] While this decision would present an opportunity to lift the moratorium for the commercial killing or treating of particular whale species the IWC reaffirmed in its resolution of 1994 that the revised management procedure (and thus any catch limits based on the Catch Limit Algorithm) should not be implemented, *"until all aspects of the [revised management scheme] are incorporated into the Schedule"*[529] While many efforts have been undertaken since 1994 to advance the development of the revised management scheme and to incorporate it into the Schedule, as of today the revised management scheme has not come to completion.[530]

525 Because the revised management procedure is mainly a scientific, mathematical undertaking, it shall due to its complexities not be addressed here in detail. For more information on the revised management procedure see INTERNATIONAL WHALING COMMISSION (CHAIR'S REPORT 2009), at 25–26 and <http://iwc.int/rmp2> (last visited: 30.06.2014).

526 See *IWC-Resolution 1994-5, Resolution on the Revised Management Scheme*, 1994 (Res.1994-5), para. 9.

527 Ibid. para. 11, sub-paras. (i) and (ii).

528 Ibid. para. 11, sub-para. (iii).

529 Ibid. para. 12.

530 As of 2006 the RMS discussions have actually come to a halt; see INTERNATIONAL WHALING

The cautious approach based on which the International Whaling Convention is implemented is reasonable, given the complexities and uncertainties intrinsic to whale species, their carrying capacity and biotic and abiotic factors affecting populations, such as climate change. In this context the IWC, at its 61st meeting in Portugal, held in resolution 2009-1, that *"the Scientific Committee should give priority to research on the effects of environmental changes [such as ozone depletion and UV-B radiation, chemical pollution, impact of noise, as well as physical and biological habitat degradation on whale species] in order to provide the best scientific advice for the Commission to determine appropriate response strategies to these new challenges"*[531].

However, as can be perceived by the existing difficulties to establish a management scheme that will guarantee a sound management of whale species, to make science and scientific evidence the pivotal point in implementing the Convention has its drawbacks. As the moratorium for commercial whaling continues, member states compliance with the Schedule, especially in regards to chapter III paragraph 10, sub-paragraph (e) is being tested – and that e.g. in the case of Iceland, which resumed commercial whaling in 2006, not always with success.

It is here that the shortcomings of a strict version of the precautionary principle become obvious, because a strict confinement to scientific certainty will restrict any actions likely to result in negative ramifications *in casu* on whale species, until such certainty has been established through in-depth scientific research.[532]

However, in case of the management of whale species, it is not so much the lack of scientific knowledge or a strict confinement to the precautionary principle that hamper the adequate management of whale stocks from an economic stance. In-depth analysis has been and is continuously being car-

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Commission (Chair's Report 2007), at 28, International Whaling Commission (Chair's Report 2008), at 25, International Whaling Commission (Chair's Report 2009), at 26. This impasse has led to increasing criticism by member states to the International Whaling Convention in regards to the moratorium. In this context Iceland fore example resumed commercial whaling in October 2006, albeit the moratorium for such action is still in place; see International Whaling Commission (Chair's Report 2007), at 26, Birnie, et al., at 726, Allsopp, et al., at 48; In September 2011 President Obama condemned Iceland's stance in this matter: Obama (Iceland Whaling).

531 Preamble of *Resolution 2009-1, Consensus Resolution on Climate Change and Other Environmental Changes and Cetaceans*, 2009 (Res. 2009-1).

532 See *supra* in 4.4.4.

ried out by the Scientific Committee in application of the revised management procedure, with first results on specific whale stocks already available.[533] It is clear that under these circumstances some member states are not willing to comply with the moratorium set out in chapter III paragraph 10, sub-paragraph (e) of the Schedule any longer, since from a precautionary perspective whaling in accordance with the catch limits as established under the revised management procedure would ensure the sustainable use of whale species, which is the Convention's objective. Accordingly it is the impasse on the establishment of a revised management scheme to guarantee an adequate implementation of the revised management procedure, that puts a strain on the international whaling regime. If in the near future no result in revised management scheme discussions can be achieved, it is likely that infringements of the International Whaling Convention and the Schedule in respect to the pause on commercial whaling will occur, since they lack any disciplinary measures – other than the establishment of resolutions through the IWC.

From the perspective of an ecosystem approach the upholding of the moratorium for commercial whaling on all whale stocks in all areas is under the given circumstances (i.e. available scientific data and catch limits based on the Catch Limit Algorithm for certain whale species) questionable. While the ecosystem approach of course does rely on the application of the precautionary principle and much thought ought to be given to the conservation of the natural resource in question in order to maintain ecosystem goods and services, stakeholder interests (which mostly are based on economic gain) cannot be completely ignored. While the sustainable use of whales as specified by the Whaling Convention and its Schedule is acknowledging the ecosystem approach, by tending to interests of stakeholders (member states longing for an economic benefit as well as indigenous populations depending on the killing and treating of whale species for nutritional and cultural reasons) and conservation interests, the current situation is not, since the moratorium does outstretch ecological reasoning, given the fact that enough scientific data would be readily available on particular whale species, which would allow for commercial whaling in a sustainable manner.

533 See International Whaling Commission (Chair's Report 2009), at 12-17, International Whaling Commission (Chair's Report 2010), at 10-14, International Whaling Commission (Chair's Report 2011), at 9-15 and International Whaling Commission (Chair's Report 2012), at 13-19 and<http://iwc.int/status> (last visited: 30.06.2014).

Additionally the moratorium is not sustainable in respect to some whale species, as it leads to a surplus of whales that were not below Maximum Sustainable Yield level when the moratorium was adopted, which on the other hand has consequences (e.g. a decline in fish stocks) for the marine ecosystems these whales are part of.[534] Accordingly, even if socio-economic reasons are left out of consideration, from an ecosystem perspective the moratorium is certainly debatable.

Yet, of course, the revised management procedure – and as such sustainable management of whale stocks – does only work if states comply with the catch limits established under the Catch Limit Algorithm. Consequently, it is from a precautionary perspective reasonable to formulate a strict management scheme in order to ensure compliance, before allowing any action, albeit not necessarily contradictory to the envisioned management procedure. Because such a highly cautious approach may eventually lead to non-compliance with the regime, it is, however, questionable if the moratorium for commercial whaling in respect to all whale stocks within all areas should be upheld, or if there should be a partial lift for those whale stocks that have been scientifically assessed in a comprehensive manner.

In summary, if the current moratorium is left out of consideration, the International Whaling Convention is reflective of both, the precautionary principle as well as the ecosystem approach – albeit on a sectoral scale and thus in a not completely holistic version.

Furthermore the Convention is an example of how risk governance in light of the precautionary principle and the ecosystem approach can be made operational in practice. In this respect the revised management procedure provides an effective risk management tool, as it ensures the sustainable use of whale stocks and as such addresses the economic and social needs of stakeholders, as well as the need to preserve whale species to maintain ecosystem functions and services. By taking uncertainties and complexities into account and being adaptive as Catch Limit Algorithm parameters change if new scientific knowledge is procured, the revised management procedure provides a sectoral approach to ecosystem-based management, whose effective implementation is currently hampered by the lack of binding regulations on disciplinary measures in case states fail to comply with the revised management procedure.

534 Accord. Fitzmaurice, at 255.

b. Fisheries

i. The United Nations Law of the Sea Convention (UNCLOS)

Up until the end of the 19th century the governance of the seas was dominated by the concept of *mare liberum*, a laissez-faire attitude that led states to an unbridled exploitation of resources provided by the world's oceans.[535] Only once knowledge began to grow that natural resources were by no means inexhaustible, the value of fish stocks as an important source of animal protein and the consequential need to prevent overfishing by developing appropriate management schemes to fisheries were recognized on a global scale. A notion that was reflected at the first United Nations Conference on the Law of the Sea held at Geneva in 1958, which resulted in the adoption of the Convention on Fishing and Conservation of the Living Resources of the High Seas[536]. A successful implementation of the Convention however failed, even more so since the establishment of the Law of the Sea Convention of 1982[537] now addressed the conservation and management of fisheries in respect to the exclusive economic zone, which was an innovation of UNCLOS III. In this context the Law of the Sea Convention is referring to marine living resources in part V, which establishes rules on the exclusive economic zone and part VII, section 2 of UNCLOS, dealing with the conservation and management of the living resources of the high seas.

Article 61 of UNCLOS bestows coastal states with the right to harvest fish species within their exclusive economic zone. However in doing so, states are obliged to establish conservation and management measures in due consideration of *"the best scientific evidence available"* on fish stocks, which will ensure *"that the maintenance of the living resources in the exclusive economic zone is not endangered by over-exploitation"*[538].

According to paragraph 3 the measures taken pursuant to paragraph 2 ought to be considerate of maintaining and restoring fish populations at *"levels which can produce the maximum sustainable yield[539] as qualified by relevant environmental and economic factors"*. Furthermore coastal states will in taking such measures have to account for possible *"effects on species*

535 See *supra* in 5.3.1.
536 See *supra* in fn 172 (part II).
537 *United Nations Convention on the Law of the Sea*, Dec. 10, 1982, 1833 U.N.T.S. 3 [hereinafter UNCLOS].
538 Art. 61 para. 2 of UNCLOS.
539 See on the Maximum Sustainable Yield *supra* in 5.3.3.2. a.

associated with or dependent upon harvested species with a view to maintaining or restoring populations of such associated or dependent species above levels at which their reproduction may become seriously threatened"[540].

Such an approach is not only reflective of the precautionary principle, as article 61 of UNCLOS bases any measures taken by coastal states to conserve and manage fish stocks on best available scientific data relevant to the conservation of fish stocks, which will, subject to article 61 paragraph 5 of UNCLOS, have to be contributed and exchanged by states *"on a regular basis through the competent international organizations (...) with participation by all [s]tates concerned"*. But it is also considerate of the ecosystem approach, since the article's objective is to keep harvested species at a Maximum Sustainable Yield level and as such is reflective of both, social and economic interests in respect to fisheries (nutritional value, financial gain), as well as what is best for maintaining the fish stocks and other species dependent thereon.[541]

According to article 62 paragraph 1 of UNCLOS an *"optimum utilization of the living resources"* shall be promoted within the exclusive economic zone. Since high population density of fish species can have negative ramification on the fish stock itself, as well as on other (associated and dependent) species, any surplus of the allowable catch as determined by the coastal state, pursuant to article 62 paragraph 1 of UNCLOS, ought to be harvested in order to reach Maximum Sustainable Yield levels. In case coastal states lack the capacity to harvest the entire surplus, UNCLOS stipulates that other states (especially land-locked and geographically disadvantaged states[542]) shall be granted access to the exclusive economic zone and the fish stocks within.[543]

Following these general provisions UNCLOS continues to define special requirements for specific living resources such as straddling fish stocks[544], highly migratory species[545], anadromous and catadromous fisheries[546] as

540 Art. 61 para. 4 of UNCLOS.
541 Accord. Birnie, et al., at 715, but see fn 513 (part II).
542 See arts. 69 and 70 of UNCLOS.
543 See art. 62 paras. 2 and 3 of UNCLOS.
544 See art. 63 of UNCLOS.
545 See art. 64 of UNCLOS which obliges states to cooperate in respect to the conservation and management of highly migratory fish stocks, either directly or through appropriate international organizations e.g. the UN Food and Agriculture Organization (FAO).
546 See arts. 66 and 67 of UNCLOS. Spawning of anadromous fish species takes place within

well as marine mammals[547]. Other than in case of article 65 of UNCLOS these provisions do however, besides appointing the responsibility for conservation and management and addressing how such responsibility shall be assigned, not hold any further requirements in respect to taking measures pursuant to article 61 of UNCLOS. Article 65 provides additional rights to coastal states in respect to the conservation and management of marine mammals, by granting coastal states or international organizations *"as appropriate, to prohibit, limit or regulate the exploitation of marine mammals more strictly than provided for in [part V of UNCLOS]"*. Measures to protect marine mammals, such as those adopted subject to the International Whaling Convention, are hence supported by UNCLOS.

The conservation and management of living resources is being further addressed in part VII, section 2, articles 116 et seq. concerning the high seas. As the high seas are open to fishing to all states, the provisions in section 2 of part VII of UNCLOS do oblige states to cooperate in taking measures to conserve and manage marine living resources within the high seas.[548] According to article 119 of UNCLOS, catch limits and conservation and management measures taken by states ought to – comparable to article 61 of UNCLOS in respect to the exclusive economic zone – account of the *"best scientific evidence available",* the maintenance of the Maximum Sustainable Yield of a specific stock, as well as any negative ramifications for species associated with or dependent upon harvested fish stocks.[549] In general the elaborations on article 61 presented above are also applicable to article 119 of UNCLOS.

Consequently, while UNCLOS does not explicitly refer to the precautionary principle or the ecosystem approach, the regulations on the conservation and management of living resources are implying the development of management options that are precautionary in scope and – as they ought to reflect on economic and social interests and avoid any negative ramifications on other species attached with or dependent upon harvested fish stocks –

rivers, while catadromous fish migrate to the ocean for spawning. In case of anadromous fish their management is primarily bestowed upon states *"in whose rivers anadromous stocks originate"*, while the responsibility for managing catadromous fish lies with the *"coastal state in whose waters (…) [the] species spend the greater part of their life cycle"*; see arts. 66 para. 1 and 67 para. 1 of UNCLOS as well as Birnie, et al., at 727 and 728, Churchill & Lowe, at 314 and 316.

547 See art. 65 of UNCLOS.

548 See arts. 117 and 118 of UNCLOS.

549 See art. 119 para. 1, sub-paras. (a) and (b) of UNCLOS.

also tend to the ecosystem approach, albeit on a limited, sectoral scale. Problematic in respect to the UNCLOS approach to the management of fisheries is however, that it relies on a legal division into several marine areas: Internal waters and territorial sea, exclusive economic zone and the high seas. As has been stated, dependent on in what legal zone fisheries are found different rules apply.[550] The paradox is, however, that viewed from a biological stance the oceans are a comprehensive whole, an ecosystem for which any legal division is inept.[551]

ii. Agreement for the Implementation of the UNCLOS Provisions Relating to the Conservation and Management of Straddling and Highly Migratory Fish Stocks (Fish Stocks Agreement)

With the growing understanding of marine ecosystem functions and services during the implementation of UNCLOS until the mid-nineties, *"the need to avoid adverse impacts on the marine environment, preserve biodiversity, maintain the integrity of marine ecosystems and minimize the risk of long-term or irreversible effects of fishing operations"*[552] was further articulated, which culminated in the adoption of an additional agreement to UNCLOS in 1995 with the purpose to guarantee the adequate implementation of the provisions of the Law of the Sea Convention relating to the conservation and management of straddling and highly migratory fish stocks.[553] The Agreement entered into force on December 11, 2001 and was ratified by all Arctic Nations.[554]

The Fish Stocks Agreement's objective is *"to ensure the long-term conservation and sustainable use of straddling (...) and highly migratory fish*

550 See in this context also *supra* in 5.3.1.2.

551 See BIRNIE, ET AL., at 704 and cf. in respect to the exclusive economic zone at 718.

552 Preamble of the Fish Stocks Agreement, as cited *infra* in fn 553 (part II).

553 *Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10 December 1982 Relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks*, Aug. 4, 1995, 2167 U.N.T.S. 3 [hereinafter Fish Stocks Agreement]. In the light of adequately managing high sea fisheries the FAO further adopted the 1993 Agreement to Promote Compliance with International Conservation and Management Measures by Fishing Vessels on the High Seas, which entered into force in 2003, in order to enforce international conservation and management measures by obliging flag states to ensure that fishing vessels flying their flag are in compliance with such measures; see art. III para. 1 of the *Agreement to Promote Compliance with International Conservation and Management Measures by Fishing Vessels on the High Seas*, Nov. 24, 1993, 2221 U.N.T.S. 91.

554 See on the status of ratification: <http://www.un.org/Depts/los/reference_files/status2010.pdf> (last visited: 30.06.2014).

stocks"[555] within high sea areas. Yet, the general principles as enumerated in article 5 of the Agreement apply *mutatis mutandis* to areas under national jurisdiction.[556] While some of the paragraphs of article 5 of the Agreement in essence reproduce the provisions of article 119 of UNCLOS,[557] others expand the scope of UNCLOS and as such reflect more explicitly on new environmental principles that started to emerge during the time when the Agreement came into force: Article 5 explicitly refers to the application of the precautionary principle[558], follows a sustainable approach in respect to measures taken to conserve and manage straddling and highly migratory fish stocks[559] and consequently requires states to *"assess the impacts of fishing, other human activities and environmental factors on target stocks and species belonging to the same ecosystem or associated with or dependent upon the target stocks"*[560] and for that reason renders scientific research, monitoring initiatives and collecting as well as sharing of scientific data indispensable[561].

Based upon such scientific data[562] states shall, subject to article 5 paragraph (c) in conjunction with article 6 of the Fish Stocks Agreement apply the precautionary principle *"to conservation, management and exploitation of straddling (…) and highly migratory fish stocks in order to protect the living marine resources and preserve the marine environment"*[563]. States are pursuant to article 6 paragraph 2 of the Agreement required to *"be more cautious when information is uncertain, unreliable or inadequate"* while the lack of any such information shall not hamper the application of conservation and management measures subject to article 7 of the Agreement[564].

555 Art. 2 of the Fish Stocks Agreement; see in this context Molenaar (Climate Change), at 158 (stating that within the Arctic *"fishing opportunities are (…) likely to relate to shared and anadromous fish stocks"* to which the Fish Stocks Agreement does not and hence *"only the relatively general obligations contained in [UNCLOS would] apply."*).

556 See art. 3 para. 2 of the Fish Stocks Agreement.

557 See art. 5 paras. (b) and (e) of the Fish Stocks Agreement; which correspond to what has been stated above in respect to art. 119 of UNCLOS (i.e. implicit references to the precautionary principle and the ecosystem approach).

558 See art. 5 para. (c) and more detailed art. 6 of the Fish Stocks Agreement.

559 See art. 5 paras. (a), (g) and (h) of the Fish Stocks Agreement.

560 Art. 5 para. (d) of the Fish Stocks Agreement.

561 See art. 5 paras. (j), (k) and (l) as well as for details on what kind of data and how it shall be collected and exchanged Annex 1 of the Fish Stocks Agreement, which points out the importance of a *"timely collection, compilation and analysis of data (…) to the effective conservation and management of straddling (…) and highly migratory fish stocks"*.

562 See in this respect also the provisions set out in art. 6 para. 3 of the Fish Stocks Agreement.

563 Art. 6 para. 1 of the Fish Stocks Agreement.

564 Art. 7 of the Fish Stocks Agreement requires states to cooperate when establishing conserva-

Accordingly to implement the precautionary approach as set out by article 6 of the Fish Stocks Agreement, focus lies on *"obtaining and sharing the best scientific information available"* and applying *"improved techniques for dealing with risk and uncertainty"* to decision-making processes.[565] Annex II of the Agreement provides in this context guidelines on how to implement conservation and management measures considerate of the precautionary principle by addressing so called *precautionary reference points*. Subject to article 2 of Annex II of the Agreement, such reference points are twofold: They either refer to conservation, by setting boundaries so as to allow fishing activities only within safe biological limits that will guarantee a Maximum Sustainable Yield[566], or to the establishment of management measures that meet management objectives from a precautionary stance.

Once precautionary reference points are set for specific fish stocks, management strategies will have to "*seek to maintain or restore populations of [these] stocks, and where necessary associated or dependent species, at levels consistent"* with the boundaries set (i.e. Maximum Sustainable Yield level) and management options already in place.[567] If there is inconclusive scientific data on a specific fishery, that will not allow the establishment of any reference points, such points ought to be set on a provisional basis, i.e. *"by analogy to similar and better-known stocks"*.[568] Since of course, such analogy bears risks of mismanagement, especially as uncertainties prevail, enhanced monitoring becomes necessary in order to revise provisional reference points once new information becomes available.[569]

A similar approach shall according to article 6 paragraph 5 of the Fish Stocks Agreement be taken where the status of fish stocks or species associated or dependent thereon is questionable. In such cases monitoring initiatives to be revised on a regular basis in the light of new information ought to be conducted *"in order to review [the stock's] status and the efficacy of conservation and management measures"* in place. Furthermore article 6 paragraph 7 holds that *"states shall adopt conservation and management*

tion and management measures (see in this respect also part III and IV of the Fish Stocks Agreement) and holds that no such measure shall *"result in harmful impact on the living marine resources as a whole",* which again reflects on negative ramifications for other species and ecosystems and as such takes ecosystem-based thinking into account.

565 Art. 6 para. 3, sub-para. (a) of the Fish Stocks Agreement.

566 See for details on the Maximum Sustainable Yield (MSY) *supra* in 5.3.3.2. a. and fn 513 (part II).

567 Para. 4 of Annex II of the Fish Stocks Agreement.

568 Para. 6 of Annex II of the Fish Stocks Agreement.

569 See ibid.

measures on an emergency basis to ensure that fishing activity does not exacerbate (...) adverse impact[s]" stemming from natural phenomena that have significant ramifications *"on the status of straddling (...) or highly migratory fish stocks"*. Given that climate change already has impacts on specific fish species[570], article 6 paragraph 7 of the Agreement read in light of climate change induced Arctic risks could prompt Arctic Nations to adopt emergency plans aimed at maintaining fisheries at a sustainable level and preventing an enhancement of climate change induced Arctic risks through fishing activities.

Following these general provisions and principles that ought to be considered when adopting conservation and management measures, the Agreement continues to set out regulations on the development of such measures. In correspondence to articles 117 and 118 of UNCLOS, states are according to article 8 paragraph 1 of the Fish Stocks Agreement obliged to cooperate internationally or regionally either directly or through the establishment of fisheries management organizations[571] or arrangements in developing in due consideration of the principles set out in article 5 of the Agreement, conservation and management measures, deciding upon catch limits and strengthening the basis for adequate fisheries assessment initiatives (i.e. monitoring, scientific research, data collecting and sharing).

iii. FAO Code of Conduct for Responsible Fisheries

As the Law of the Sea Convention leaves a lot of the responsibility in regards to the conservation and management of fisheries to the coastal states, a sustainable use of fish stocks is dependent on states' will to develop conservation and management measures in compliance with UNCLOS and the Fish Stock Agreement as referred to above[572]. Since fisheries have become an important sector in the food industry, however, developments within the fishing sector are often market-driven and thus bear the risk of over-exploitation of fish stocks. To elaborate on this problem and discuss a more sustainable solution to the management of fisheries a conference was held in Cancún, Mexico in 1992 on responsible fishing, during which the UN Food and Agriculture Organization (FAO) was requested to prepare an international

570 See e.g. *supra* in fn 94 (part I).
571 See for details arts. 8-13 of the Fish Stocks Agreement and *infra* in 6.1.2.2.
572 See for details supra in 5.3.3.2. b. i. and ii.

Code of Conduct to further address these concerns.[573] The voluntary[574] FAO Code of Conduct on Responsible Fisheries[575], which was adopted on October 31, 1995 *"sets out principles and international standards of behaviour for responsible practices [in respect to fisheries] with a view to ensure the effective conservation, management and development of living aquatic resources, with due respect for the ecosystem and biodiversity. The Code recognizes the nutritional, economic, social, environmental and cultural importance of fisheries and the interests of all those concerned with the fishery sector. [Furthermore it] takes into account the biological characteristics of the resources and their environment and the interests of consumers and other users."*[576] As such the FAO Code of Conduct is highly reflective of the ecosystem approach, although the term is not mentioned explicitly within the Code.[577] However, the Code refers to ecosystem issues on several occasions *inter alia* in articles 6 (general principles), 7 (fisheries management), 9 (aquaculture development), 10 (integration of fisheries into coastal area management) and 12 (fisheries research):

- **Article 6** sets out general principles on responsible fishing. The conservation of aquatic ecosystems to maintain ecosystem services and thus enable sustainability, lies at the center of article 6 of the FAO Code of Conduct. States are required to develop measures in response to fishing that will ensure food security for present and future generations by preventing over-fishing and using fishing gear and practices that will maintain biodiversity responsible for the proper functioning of ecosystems and hence the continuous production of ecosystem goods and services.[578] Subject to article 6 paragraph 6.4 of the FAO Code of Conduct management decisions made following these principles ought to *"be based on the best scientific evidence available, also taking into account traditional knowledge of the resources and their habitat, as well as relevant environmental, economic and social factors"* – a paragraph that acknowledges principle 11 of the Malawi principles.[579]

573 See Preface to the *Code of Conduct for Responsible Fisheries*, Oct. 31, 1995 [hereinafter FAO Code of Conduct].
574 See art. 1, sub-para. 1.1 of the FAO Code of Conduct.
575 As cited *supra* in fn 495 (part II).
576 Introduction to the FAO Code of Conduct; see in this context also art. 2 of the FAO Code of Conduct.
577 The Code explicitly refers to the term ecosystem, but not to the ecosystem approach.
578 See art. 6, paras. 6.2, 6.3, 6.6, 6.18 and 6.19 of the FAO Code of Conduct.
579 See in this context also art. 6 para. 6.9, 6.13 and 6.16 and art. 7, sub-para. 7.6.6 of the FAO

The FAO Code of Conduct does however, not only address (albeit implicitly) the ecosystem approach, but also the precautionary principle, by holding in article 6 paragraph 6.5 that *"[s]tates and subregional and regional fisheries management organizations should apply a precautionary approach (…) to conservation, management and exploitation of living aquatic resources in order to protect them and preserve the aquatic environment, taking account of the best scientific evidence available. The absence of adequate scientific information should not be used as a reason for postponing or failing to take measures to conserve target species, associated or dependent species and non-target species and their environment."*

- **Article 7** provides guidance on the development of management options reflective of the principles set out in article 6. Consequently states and all those engaged in fisheries management are required to *"adopt measures for the long term conservation and sustainable use of fisheries resources"* by developing *"an appropriate policy, legal and institutional framework"*. In application of an ecosystem approach to fisheries (EAF) collaboration between states and the inclusion of all interested parties when adopting such measures as well as the establishment of transparent decision-making processes in due consideration of the best scientific evidence available are the focal points of article 7 of the FAO Code of Conduct.[580]

  To ensure a long term sustainable use of fish stocks, management measures taken should *inter alia* be aimed at maintaining or restoring populations at Maximum Sustainable Yield levels[581], which includes the prevention of any adverse human activities on fish stocks or associated or dependent species.[582] Article 7 of the FAO Code of Conduct further addresses the precautionary principle in paragraph 7.5, which sets out regulations on the establishment of reference points and the adoption of conservation and management measures

Code of Conduct concerning the integration of stakeholder interests into decision-making.

580 See art. 7, sub-paras. 7.1.2-7.1.6 and 7.1.9 and 7.1.10 and on the gathering of scientific data and their assessment 7.2.3, 7.4.1-7.4.7 of the FAO Code of Conduct.

581 See for details on the Maximum Sustainable Yield (MSY) *supra* in 5.3.3.2. a. and fn 513 (part II).

582 See art. 7 para. 7.2.1 and 7.2.2 and furthermore 8.4, 8.5, 8.7 and 8.8 for details on marine environmental protection against anthropogenic pollution (in reference to MARPOL 1973/1978; for details see *supra* in 5.3.2.1.) and on the carrying out of fishing operations and the use of fishing gear.

on an emergency basis comparable to article 6 and Annex II of the Fish Stocks Agreement.[583]

- **Article 9** addresses aquaculture development, which refers to the farming of marine living resources. As aquaculture is important to ensure food security and is often market-driven it can have adverse impacts (e.g. by the introduction of non-native species or genetically altered stocks used for aquaculture into marine environments[584]) on natural processes within ecosystems and hence affect their functioning and production of inherent natural ecosystem goods and services. To prevent any negative ramifications, the development of aquaculture is dependent upon a sound scientific analysis of possible adverse effects stemming therefrom.[585] Consequently states are required to *"establish effective procedures (...) to undertake appropriate environmental assessment and monitoring with the aim of minimizing adverse ecological changes [as a result of aquaculture] and related economic and social consequences"*[586]. As aquaculture can have impacts on adjacent ecosystems beyond national jurisdiction, states should furthermore cooperate in developing aquaculture in order to adequately protect trans-boundary aquatic ecosystems.[587]
- **Article 10** sets out regulations pertaining to coastal areas, the management of their natural resources as well as their protection. In this context states are required to *"ensure that an appropriate policy, legal and institutional framework is adopted to achieve the sustainable and integrated use of the resources, taking into account the fragility of coastal ecosystems and the finite nature of their natural resources and the needs of coastal communities"*[588]. Consequently decision making processes will have to include interests of all stakeholders involved (which includes regional cooperation between adjacent coastal states) and will have to be based on environmental assessments taking into account risks and uncertainties pertaining to coastal areas.[589]

583 See for details *supra* in 5.3.3.2. b. ii.
584 See for details art. 9 para. 9.3 of the FAO Code of Conduct.
585 See art. 9 sub-para. 9.1.2. and 9.1.5 of the FAO Code of Conduct.
586 Art. 9, sub-para. 9.1.5 and see on the prevention of connected negative social or economic results of aquaculture art. 9.4 of the FAO Code of Conduct.
587 See art. 9 para. 9.2 of the FAO Code of Conduct.
588 Art. 10 sub-para. 10.1.1 of the FAO Code of Conduct.
589 See for details art. 10, paras. 10.1, 10.2 and 10.3 of the FAO Code of Conduct.

- **Article 12** further elaborates on the importance of scientific information and hence fisheries research for the establishment of appropriate conservation and management measures to fisheries. In this context article 12 paragraph 12.1 holds that *"[s]tates should recognize that responsible fisheries requires the availability of a sound scientific basis to assist fisheries managers and other interested parties in making decisions. Therefore [s]tates should ensure that appropriate research is conducted into all aspects of fisheries including biology, ecology, technology, environmental science, economics, social science, aquaculture and nutritional science"*. To comply with this regulation states will have to carry out either individually or jointly research and monitoring initiatives, collect and evaluate scientific data gathered therefrom and share it with all interested parties *"in order that the best scientific evidence is made available as a contribution to fisheries conservation, management and development"*[590]. Additionally states *"should investigate and document traditional fisheries knowledge and technologies (...) in order to assess their application to sustainable fisheries conservation, management and development"*[591].

iv. Further Advancements in an Ecosystem Approach to Fisheries

From the brief overview presented *supra*[592] it becomes evident that the establishment of an ecosystem approach to fisheries (EAF) has been of growing concern within the past couple of decades. Yet, its effective implementation in practice, is hampered by the fact that the mandatory rules and regulations pertaining to fisheries set out in UNCLOS and the Fish Stocks Agreement leave a lot of discretion to member states in their implementation and connected thereto by the zonal approach adopted within the UNCLOS regime, which makes ecosystem-based management difficult.[593] In contrast, the establishment of an ecosystem approach to fisheries lies at the center of the voluntary FAO Code of Conduct for Responsible Fisheries. Yet, due to its recommendatory character and the fact that its rules are rather broad and in this respect do help only little in applying the ecosystem approach to fish-

590 Art. 12 para. 12.3 of the FAO Code of Conduct and see further 12.4, 12.5, 12.8, 12.9, 12.10, 12.11, 12.13, 12.16 and 12.17.
591 Art. 12 para. 12.12 of the FAO Code of Conduct.
592 See *supra* in 5.3.3.2. b. i.-iii.
593 See in this context also *supra* in 5.3.1.2.

eries, an effective implementation in practice of an ecosystem approach in response to fishing activities still remains difficult.

One attempt in order to overcome this problem was made during the Reykjavik Conference on Responsible Fisheries in the Marine Ecosystem from October 1 to 4 in 2001, which culminated in the adoption of the Reykjavik Declaration on Responsible Fisheries in the Marine Ecosystem[594].

By acknowledging that the application of an ecosystem approach to fisheries is first and foremost dependent upon a better understanding of ecosystem functions and processes, such as interactions between predators and their prey, among different stocks and species and impacts of human activities on ecosystems, the Reykjavik Fisheries Declaration emphasized the need to further develop *"the scientific basis for including ecosystem considerations in fisheries management"*, which requires scientific data to be procured on *"the structure, functioning, components and properties of the ecosystem as well as about the ecological impact of fishing"*.[595] *Inter alia* the Declaration thus requires of states to *"advance the scientific basis for developing and implementing management strategies that incorporate ecosystem considerations (...), identify and describe the structure, components and functioning of relevant marine ecosystems (...), build or enhance systematic monitoring [initiatives] (...), support research and technology developments of fishing gear and practices (...) and assess adverse impacts of non-fisheries activities on the marine environment"*[596].

While according to these regulations the establishment of a sound scientific basis to effectively implement the ecosystem approach is paramount, the Declaration nevertheless recognizes the necessity *"to take immediate action to address particularly urgent problems"* where scientific data is not available or inconsistent and hence follows the precautionary principle.[597]

The application of an ecosystem approach to fisheries in practice, as proposed by the FAO Code of Conduct was advanced by the Reykjavik Fisheries Declaration.[598] Yet to further facilitate the implementation of the ecosystem approach within the fisheries sector FAO developed subject to article 10 of

594 *Reykjavik Declaration on Responsible Fisheries in the Marine Ecosystem*, Oct. 2001 [hereinafter Reykjavik Fisheries Declaration].
595 See preamble of the Reykjavik Fisheries Declaration.
596 Art. 5 paras. (a)-(f) and additionally on monitoring art. 6 of the Reykjavik Fisheries Declaration.
597 See art. 5 of the Reykjavik Fisheries Declaration.
598 See DOULMAN, at 215.

the Reykjavik Fisheries Declaration technical guidelines on the ecosystem approach to fisheries[599], which are designed to make the ecosystem approach to fisheries *"operational by recognizing that this approach is a way to implement many of the provisions of the [FAO Code of Conduct] and achieve sustainable development in a fisheries context"*[600]. As such the guidelines are seen as *"an extension of current fisheries management practices that need to be broadened to take into account the biotic, abiotic and human components of ecosystems in which fisheries operate"*[601].

Consequently FAO recommends a six step scheme in implementing the ecosystem approach to fisheries:[602]

- Identification of broad objectives relevant to the fishery (or area) in question (monitoring, gathering of scientific data).
- Breaking these objectives down into smaller priority issues and sub-issues that can be addressed by management measures (evaluation of scientific information).
- Setting operational objectives.
- Developing indicators and reference points (risk assessment).
- Developing decision rules on how the management measures are to be applied (risk management)
- Monitoring and evaluating performance possibly highlighting areas of uncertainties or malfunctions where further scientific research is necessary.

These steps do not essentially differ from traditional fishing practices (or risk assessment and management operations for that matter). However to effectively implement the ecosystem approach to fisheries ecosystem thinking (i.e. ecological, social and economic interests) will have to be included when identifying and setting objectives, as well as in the decision-making process itself (e.g. by allowing for integrated decision-making through in-

599 See Food and Agricultural Organization (2003), Food and Agricultural Organization (2008) and Food and Agricultural Organization (2009).

600 Food and Agricultural Organization (2003), at 5 (abstract).

601 Ibid. See also for details on the definition of an ecosystem approach to fisheries Food and Agricultural Organization (2003), at 6 and on the components of the ecosystem approach in general *supra* in 4.5.

602 See Food and Agricultural Organization (2003), at 17 and more detailed at 44-45 (providing a scheme for a fishery management plan under the ecosystem approach to fisheries) .

volving stakeholders as well as other sectors). Management options chosen will thus have to consider the information gathered on ecosystem functioning and processes and due to intrinsic uncertainties in this context will have to be precautionary in scope.[603] Possible management measures might be to restrict fishing to a certain period of time or for a certain area (e.g. through the establishment of marine protected areas) or to use fishing gear and apply fishing practices that minimize adverse effects to the ecosystem (e.g. by selecting fishing gear that does limit by-catch).[604]

v. Conclusion

While the FAO guidelines are very detailed[605] and a such provide an important tool in facilitating the implementation of an ecosystem approach to fisheries and in making it operational in practice, the governance of climate change induced risks related to fisheries under such an approach is still hampered due to the lack of any binding legal norms in that context – UNCLOS and the Fish Stock Agreement, which are legally binding, do only provide framework regulations and are thus not extensive enough to ensure an effective implementation of the ecosystem approach to fisheries as established by the voluntary FAO Code of Conduct or the Reykjavik Fisheries Declaration.[606] The implementation of the ecosystem approach to fisheries is thus ultimately dependent upon political will and determination within state governance, as well as a reorientation of attitudes and management thinking of those responsible for carrying out fishing activities.[607] Consequently the ecosystem approach to fisheries' value to the assessment and management of climate change induced Arctic risks is determined by the Arctic Nations' interest in effectively implementing the ecosystem approach to the fishing sector and hence making such an approach – by following the voluntary set of rules established in this context – operational in practice.

603 See for details Food and Agricultural Organization (2003), at 25–28 and *supra* in 4.5.

604 See Food and Agricultural Organization (2003), at 30 and 31 and for details on possible management options relating to fisheries at 29-42.

605 Which is why an extensive analysis of the guidelines shall not be provided here as it would go beyond the scope of this thesis. See for details *supra* in fn 599 (part II) and generally on the FAO Guidelines in 5.3.3.2. b. iv.

606 See for details *supra* in 5.3.3.2. b. i.-iv.

607 See Doulman, at 216 and *supra* in 4.5.4.; note in this context that the close relationship of the maritime sector to the ecosystem approach was also endorsed at the recent Rio +20 Conference, which took place from June 20 to 22, 2012 in Rio de Janeiro; see for details *supra* in 5.1.5., esp. fn 67 (part II) and *The future we want*, June 19, 2012 (A/CONF.216/L.1), at 30, para. 158.

5.4. Biodiversity and the Protection of Species and their Habitats

Within the Arctic region, as an ocean surrounded by landmasses, the law of the sea plays a vital role in addressing climate change induced risks.[608] Yet effectively governing such risks demands participation of stakeholders stemming from all relevant sectors; thus, no matter the importance of protecting and conserving the Arctic marine ecosystems for the benefit of the circumpolar North and beyond, the effective governance of climate change induced Arctic risks cannot be restricted to the shipping or fishing industry. Furthermore, due to the interconnectedness of ecosystems, the governance of climate change induced risks adversely affecting terrestrial ecosystems, may also aid in maintaining marine ecosystems and vice versa.[609] Addressing such risks comprehensively, thus requires to also seek guidance in international legal documents pertaining to fields other than the law of the sea.

In this context it must be considered that the protection and conservation of biological diversity and the plant and animal species forming such diversity, is a decisive factor in governing climate change induced risks, as intact and healthy ecosystems are much more capable to cope with biotic and abiotic changes caused by naturally and anthropogenically induced risks adversely affecting habitats and species and ultimately ecosystems in their entirety.[610] Hence effectively addressing climate change induced risks requires outset and outcome oriented risk governance related to biodiversity conservation:[611] From an outset based risk governance perspective, it is important to maintain intact ecosystems and their functions, so as to foster ecosystem health and resilience, which will make ecosystems more resistant to change and will allow for the continuous emergence of ecosystem goods and services, responsible for the well-being of mankind.[612] Additionally, outcome centered risks governance, requires the restoration of already depleted ecosystems, as well as the protection and conservation of negatively affected

608 See *supra* in 3.2.2.2. and 5.3.3.2.

609 See *supra* in 3.2.1. and furthermore note that, apart from maritime activities, such as shipping and fishing, the conduct of land-based activities may also have negative ramifications upon the marine environment. As a consequence addressing such activities through legal initiatives other than the law of sea, will ultimately benefit the marine ecosystems as well; see in this context *supra* in 5.3.1.1. b. ii. and *infra* in 6.1.1.

610 See also *supra* in 4.5. and furthermore *infra* in 5.4.1.

611 See also *supra* in 1.2.

612 See *supra* in 4.5., esp. 4.5.2.2. and 4.5.2.3. as well as *infra* in 5.4.1.

plant and animal species. Against this backdrop subsequently the most important international legal approaches in addressing biological diversity as a whole and the protection and conservation of specific species, other than in the context of marine resources[613], as well as their respective habitats, shall be addressed. In doing so focus will be given to what these conventions can add to the governance of climate change induced Arctic risks, while special attention will be drawn to any references to the precautionary principle and the ecosystem approach.

5.4.1. The International Convention on Biological Diversity (CBD)

Goods and services provided by nature are dependent on the variety and variability of genes, species, populations and ecosystems.[614] Sustainability, or in other words the balance between ecological, social and economic processes that is responsible for the well-being of mankind,[615] thus ought to be aware of maintaining biological diversity. It was in this context that the Convention on Biological Diversity (hereinafter CBD[616]) was established. Opening for signature at the Rio Conference of 1992, the CBD's objective is the conservation of biological diversity, which it defines as *"the variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part"*[617], and the management of ecosystem goods and services in a sustainable way as promoted by the Rio Declaration and Agenda 21.[618]

To achieve this goal states are obliged to cooperate as far as practicable in developing strategies, plans or programs for the conservation (both *in-situ*[619]

613 See on marine living resources *supra* in 5.3.3.2. a. and b.
614 See Agenda 21, sec. II, ch. 15, para. 15.2, as cited *supra* in fn 332 (part I) and fn 53 (part II).
615 See *supra* in 4.5., esp. 4.5.2.2. and 4.5.2.3.
616 *United Nations Convention on Biological Diversity*, June 5, 1992, 1760 U.N.T.S. 79 [hereinafter CBD].
617 Art. 2 para. 1 of the CBD.
618 See *supra* in 5.1.5.
619 *In-situ* conservation refers to the conservation of ecosystems and natural habitats and the maintenance and recovery of species in their natural surroundings. See arts. 2 and 8 of the CBD. In this context the Convention foresees the establishment of protected marine and land areas or the designation of such areas as biosphere reserves under the Man and the Biosphere Programme subject to objective 1.1. para. 5 of the Seville Strategy; see United Nations Educational Scientific and Cultural Organization (Biosphere Reserves), at 7 and see furthermore in respect to marine protected areas *supra* in 5.3.2.4. b.

as well as *ex-situ*[620]) and sustainable use of biological diversity and in this respect ought to identify and manage activities likely to have significant adverse impacts thereon.[621] Six of the eight Arctic Nations have developed National Biodiversity Strategies and Action Plans (NBSAPs) subject to article 6 paragraph (a) of the CBD.[622] As an assessment of existing NBSAPs in 2010 shows, however, states are reluctant to include the CBD's main tool to reach it's objective – the ecosystem approach – into these national strategies and action plans.[623]

The Convention in it's preamble holds that: *"Where there is a threat of significant reduction or loss of biological diversity, lack of full scientific certainty should not be used as a reason for postponing measures to avoid or minimize such a threat."* As such the CBD implicitly endorses the precautionary principle.[624] Similarly, in accordance with what has been stated *supra* in 4.5.2., the ecosystem approach, while not having found way into the Convention as a specific term, is mirrored in several articles[625] and has, of course, found great recognition in the CBD's implementation work by the Conference of the Parties[626]. In order to avoid any unnecessary reiterations for further details it shall thus be referred to *supra* in 4.5.2.

In terms of the CBD's implementation it ought to be noted that in October 2010 the Conference of the Parties to the Convention on Biological Diversity took place in Nagoya, Japan, which resulted in the adoption of the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization[627] and the development of a Strate-

620 *Ex-situ* conservation means the conservation of components of biological diversity outside their natural habitats (e.g. in zoos, botanic gardens and scientific aquaria). See arts. 2 and 9 of the CBD and RAYFUSE (BIOLOGICAL RESOURCES), at 387.

621 See arts. 5, 6 para. (a), 7 para. (c) and 8 para. (l) of the CBD. See on risk assessment and management in relation to maintaining biological diversity furthermore arts. 10 paras. (a) and (b), 12, 14 (on environmental impact assessment) and 17 and 18 of the CBD.

622 Note that the U.S. is not party to the CBD and thus has no obligation to develop an NBSAP. See for a detailed list on the status of development of NBSAPs <http://www.cbd.int/doc/nbsap/nbsap-status.doc> and <https://www.cbd.int/nbsap/default.shtml> (last visited: 01.07.2014).

623 See PRIP, ET AL., at 30 and 66 and see furthermore *infra* in 6.3.1. regarding Canada's Biodiversity Strategy.

624 Additionally the precautionary perspective of the CBD can be found in art. 14 para. 1, subparas. (a) and (b), which refer to the conduct of environmental impact assessments; see in this context also *infra* in 5.5.2.

625 E.g. a reference to integrated management is made in arts. 8 para (j) and 17 para. 2 (both referring to indigenous knowledge).

626 See in detail *supra* in 4.5.2.1.

627 *Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of*

gic Plan for Biodiversity for the period of 2011 to 2020 as well as the Aichi Biodiversity Targets as annexed to the COP 10 Decision X/2[628]. The Strategic Plan's purpose is to further the CBD's effective implementation, as the value of biodiversity is still not reflected properly in many national policies and incentive structures and the pressure on biodiversity remains constant or increases in intensity mainly due to human action.[629] Consequently the Strategic Plan's underlying mission is to *"take effective and urgent action to halt the loss of biodiversity in order to ensure that by 2020 ecosystems are resilient and continue to provide essential services, thereby securing the planet's variety of life, and contributing to human well-being (...)"*[630].

According to the Strategic Plan effective valuation and protection of biodiversity will furthermore *"help to slow climate change by enabling ecosystems to store and absorb more carbon; and it will help people to adapt to climate change by adding resilience to ecosystems and making them less vulnerable"*[631]. Accordingly biodiversity protection is viewed as *"a prudent and cost-effective investment in risk reduction for the global community"*[632]. To achieve this goal, the Strategic Plan refers to a variety of long-term as well as immediate initiatives to be taken by states, *inter alia "to conserve biodiversity (...) by means of protected areas, habitat restoration [and] species recovery programmes"*.[633]

Such action-taking is further emphasized by the Aichi Biodiversity Targets listed under five strategic goals, which are to (1) address the underlying causes of biodiversity loss by integrating the values of biodiversity into governments and society,[634] to (2) reduce direct pressure on biodiversity and promote sustainable use, *inter alia* by applying ecosystem-based approaches,[635] to (3) improve the status of biodiversity by safeguarding ecosystems, species and genetic diversity, e.g. by establishing protected areas and other

Benefits Arising from their Utilization to the Convention on Biological Diversity, Oct. 29, 2010, UNEP/CBD/COP/DEC/X/1; see also *supra* in fn 272 (part I).

628 Available at <http://www.cbd.int/decision/cop/?id=12268> (last visited: 01.07.2014).

629 See paras. 1, 5 and 7 of the Strategic Plan as annexed to COP 10 Decision X/2.

630 Para. 12 of the Strategic Plan as annexed to COP 10 Decision X/2.

631 Para. 9 of the Strategic Plan as annexed to COP 10 Decision X/2; see accord. CLIQUET, ET AL., at 158, NESSHÖVER, ET AL., at 425 and also COP 11 Decision XI/19 as adopted in Hyderabad, India in 2012, available at <http://www.cbd.int/decisions/cop/?m=cop-11> (last visited 01.07.2014).

632 Para. 9 of the Strategic Plan as annexed to COP 10 Decision X/2.

633 See Para. 10; esp. sub-para. (c) of the Strategic Plan as annexed to COP 10 Decision X/2.

634 See Targets 1-4 of the Aichi Biodiversity Targets.

635 See Targets 5-10, esp. Target 6 of the Aichi Biodiversity Targets (para. 13 of the Strategic Plan) in respect to marine plant and animal species.

area based conservation measures,[636] to (4) enhance the benefits to all from biodiversity and ecosystem services, *inter alia* by enhancing ecosystem resilience through conservation and restoration measures,[637] and to (5) strengthen implementation through participatory planning (which includes the participation of indigenous peoples in the decision-making process[638]), knowledge management and capacity-building[639].

As the CBD promotes the conservation of assets important to Arctic ecosystems its application is paramount in addressing climate change induced Arctic risks. After all many rare animal and plant species can be found in the region that are threatened by climate change and hence require protection. Furthermore indigenous knowledge should play a vital role in assessing and managing development activities and the yield of natural resources in the region, in order to maintain the Arctic ecosystems and enhance their resilience against climate change induced risks, while at the same time due consideration ought to be given to social and economic needs of indigenous peoples, as proposed by the ecosystem approach.

However, as with UNCLOS, the CBD was ratified by all Arctic Nations except the United States, which signed the Convention in 1993 but as of today has not become party.[640]

5.4.2. Protection and Conservation of Animal Species

As has been stated[641] biological diversity plays a significant role in maintaining ecosystem health and resilience, which allows ecosystems to much better cope with natural and anthropogenic threats, such as climate change and as a consequence reduces risks of a loss of ecosystem goods and services provided by intact ecosystems. Maintaining the variability among living organisms is thus not only vital for the governance of climate change induced

636 See Targets 11-13, esp. Target 11 of the Aichi Biodiversity Targets, which holds that by 2020 *"at least 17 per cent of terrestrial and inland water areas, and 10 per cent of coastal and marine areas"* are to be conserved through protected area designation or other area based conservation measures. In this context also see COP 11 Decision XI/24 as adopted in Hyderabad, India in 2012, available at <http://www.cbd.int/decisions/cop/?m=cop-11> (last visited 01.07.2014).

637 See Targets 14-16, esp. Target 15 of the Aichi Biodiversity Targets.

638 See Target 18 of the Aichi Biodiversity Targets.

639 See Targets 17-20 of the Aichi Biodiversity Targets.

640 See on the status of ratification: <http://www.cbd.int/convention/parties/list/> (last visited: 01.07.2014).

641 See *supra* in 5.4.1.

risks, as healthy and intact ecosystems are much more capable to cope with such risks, but also for the well-being of mankind dependent on the goods and services ecosystems provide.

While the Convention on Biological Diversity is addressing biodiversity following a holistic approach, as a framework convention, it lacks more specific rules and regulations necessary to appropriately manage ecosystems in practice.[642] The effective implementation of the CBD is thus dependent upon other conventions – albeit less comprehensive and more sectoral in scope – aimed at protecting and conserving species and their respective habitats, so as to maintain biological diversity.[643] There exists a variety of agreements that focus on protecting and conserving animals.[644] While some are limited in scope to specific species and/or on a spatial scale, others are of a broader, global importance as their conservation objective is not restricted to one specific species and/or region. Within the Arctic a couple of multilateral as well as bilateral agreements are present on the conservation and management of Arctic species, such as polar bears, caribou and migratory birds.[645] As they are mainly of regional significance they shall be addressed *infra* in 6.

5.4.2.1. Convention on the Conservation of Migratory Species of Wild Animals (CMS)

Much broader in this respect is the Convention on the Conservation of Migratory Species of Wild Animals (hereinafter CMS[646]). The CMS recognizes *"that wild animals (...) are an irreplaceable part of the earth's natural system which must be conserved for the good of mankind"* and consequently obliges member states to take necessary action to conserve migratory species, i.e. species that "*cyclically and predictably cross (...) boundaries"*[647]

642 Accord. Shearing, at 47, but see Marauhn, at 268 and Meinhard (2004), at 84 (denying the Convention's framework character, but holding that the CBD does not provide a clear international consensus on specific actions to be taken).

643 See accord. Birnie, et al., at 650-652 and 667.

644 Ibid., at 652.

645 See *infra* in 6.1.2.1. as well as on the conservation of caribou e.g. the *Agreement Between the Government of Canada and the Government of the United States of America on the Conservation of the Porcupine Caribou Herd*, 1987 and on the conservation of migratory birds the *Agreement on the Conservation of African-Eurasian Migratory Waterbirds*, Sept. 2008, 2365 U.N.T.S. 203, which *inter alia* is applicable to the Arctic tern.

646 *Convention on the Conservation of Migratory Species of Wild Animals*, June 23, 1979, 1651 U.N.T.S. 333 [hereinafter CMS].

647 Art. I para. 1 sub-para. a) and for an interpretation of the terms Birnie, et al., at 683.

and prevent them from becoming endangered.[648] Such action in particular includes to individually or jointly carry out research activities on migratory species[649], to provide immediate protection for species listed in Appendix I of the CMS[650] and to conclude additional agreements on the conservation and management of migratory species listed in Appendix II of the Convention[651].

Appendix I lists endangered migratory species, i.e. such that are in danger of extinction throughout all or a significant portion of their range, e.g. seals, migratory birds and whale species, such as humpback and sei whales.[652] According to article IV paragraph 1 of the CMS Appendix II lists *"migratory species which have an unfavourable conservation status and which require international agreements for their conservation and management, as well es those which have a conservation status, which would significantly benefit from the international co-operation that could be achieved by an international agreement"*. E.g. harbor seals are listed among the species in Appendix II.

As of today of the eight Arctic Nations only four (Denmark, Finland, Norway and Sweden) have ratified the Convention on the Conservation of Migratory Species of Wild Animals.[653]

648 See preamble and art. II of the CMS.
649 See art. II para. 3 sub-para. (a) of the CMS.
650 See art. II para. 3 sub-para. (b) and art. III of the CMS as well as Lausche, at 173 note 20.
651 See art. II para. 3 sub-para. (c) and arts. IV and V of the CMS as well as Lausche, at 173 note 20; in respect to these provisions a couple of agreements have been concluded, e.g. on seals, small cetaceans and various bird species; see *inter alia* the *Agreement on the Conservation of Seals in the Wadden Sea*, Oct. 16, 1990, the *Agreement on the Conservation of Small Cetaceans of the Baltic and North Seas*, March 17, 1992, 1772 U.N.T.S. 217, the *Agreement on the Conservation of African-Eurasian Migratory Waterbirds*, Sept. 2008, 2365 U.N.T.S. 203 and the *Agreement on the Conservation of Bats in Europe*, Dec. 4, 1991, 1863 U.N.T.S. 101. Furthermore it is noteworthy that the CMS supports the establishment of additional agreements pertaining to species not listed in Appendix II; see art. IV para. 4 of the CMS and Birnie, et al., at 682.
652 See art. I para. 1 sub-para. (e) and art. III para. 1 of the CMS and Lausche, at 173 note 21.
653 See on the status of ratification: <http://www.cms.int/en/parties-range-states> (last visited: 01.07.2014). Note that while Denmark is party to the CMS, the Convention is not applicable to Greenland. Birnie et al. see a weakness in such a lack of ratifications, as many range states of Appendix I species failed to become party to the CMS and hence endanger the adequate protection of these species; see Birnie, et al., at 684.

5.4.2.2. Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)

Endangered species are furthermore protected by the Convention on International Trade in Endangered Species of Wild Fauna and Flora (hereinafter CITES[654]), to which all Arctic Nations have become party[655]. The Convention recognizes the *"irreplaceable part of the natural systems of the earth"*[656] that wild flora and fauna play and thus prohibits or limits the commercial trade of endangered animal and plant species according to their conservation status.[657] Consequently CITES is aimed at protecting both specific animal species as well as parts of their habitat and thus plays a role in maintaining biodiversity by regulating trade so as to control exploitation of species and genetic resources and prevent or control the introduction of alien and invasive species affecting biodiversity within a specific ecosystem.[658]

5.4.2.3. Protection and Conservation of Animal Species under CMS and CITES and Climate Change Induced Risks

Maintaining ecosystem health and resilience, through the protection and conservation of wild flora and fauna, not only provides for the continuous emergence of ecosystem goods and services, but also makes ecosystems more capable to cope with threats such as climate change induced risks.[659] Consequently in an overall perspective, CMS and CITES are two important international legal contributions to the maintenance of ecosystems, as they aim to protect and conserve plant and animal species part thereof. Yet while CMS and CITES recognize the necessity to maintain wild flora and fauna for the benefit of ecosystems and the services and goods they provide, as agreements that were developed in the context of the post Stockholm, but pre Rio

654 *Convention on International Trade in Endangered Species of Wild Fauna and Flora*, March 3, 1973, 993 U.N.T.S. 243 [hereinafter CITES].

655 See on the status of ratification <http://www.cites.org/eng/disc/parties/alphabet.php> (last visited: 01.07.2014).

656 See preamble of CITES.

657 Subject to art. II of CITES Appendix I includes species threatened with extinction (para. 1), Appendix II lists species that are not yet threatened with extinction but may become so unless strict trade regulations are applied (para. 2) and finally Appendix III lists species whose trade is already regulated by member countries, but requires the co-operation of other parties in order to prevent over-exploitation.

658 See Rayfuse (Biological Resources), at 384, Birnie, et al., at 685.

659 See also supra in 5.4.1.

era in environmental law,[660] none of these Conventions specifically refer to the precautionary principle or the ecosystem approach and shall thus not be addressed here any further.

5.4.3. Protection and Conservation of Habitats

In its preamble the World Charter for Nature[661] expresses the *"conviction that the benefits which could be obtained from nature (...) [are] jeopardized by the excessive exploitation and the destruction of natural habitats"*. Maintaining biodiversity – and hence ecosystem goods and services – is thus linked to the protection and conservation of both, animal species and their respective natural habitats. In fact changes in habitats (e.g. habitat destruction due to pollution and other anthropogenic activities, as well as due to natural phenomena such as climate change) pose an even greater threat to marine and terrestrial species than such affecting them directly (e.g. harvesting of or trade in animal species).[662]

As with the agreements on the protection and conservation of animal species, a multitude of multi- or bilateral conventions exist addressing the conservation of valuable marine or terrestrial landscapes. Since an in-depth examination of all of them would go beyond the scope of this thesis, however, two of the most important shall be mentioned here briefly: The Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar Convention[663]) and the Convention Concerning the Protection of the World Cultural and Natural Heritage (World Heritage Convention[664]).

5.4.3.1. Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar Convention)

The Convention on Wetlands of International Importance especially as Waterfowl Habitat was adopted in 1971 and amended twice (in 1982 and 1987). All Arctic Nations have become party to the Convention.[665] The Ramsar Con-

660 See for details *supra* in 5.1.
661 As referred to *supra* in 5.1.3.
662 See RAYFUSE (BIOLOGICAL RESOURCES), at 380.
663 *Convention on Wetlands of International Importance especially as Waterfowl Habitat*, Feb. 2, 1971 (as amended in 1982 and 1987), 996 U.N.T.S. 245 [hereinafter Ramsar Convention].
664 *Convention Concerning the Protection of the World Cultural and Natural Heritage*, Nov. 16, 1972, 1037 U.N.T.S. 151 [hereinafter World Heritage Convention].
665 See on the status of ratification including a list of the respective designated areas under the Convention <http://www.ramsar.org/cda/en/ramsar-about-parties-contracting-parties-to-

vention recognizes *"the interdependence of Man and his environment"* and views wetlands (e.g. marshes, fens and peatlands[666]) as an important asset in this context, as they *"constitute a resource of great economic, cultural, scientific, and recreational value"* that requires protection.[667] Furthermore intact wetlands contribute to slowing climate change, as they help in carbon sequestration and storage.[668]

Subject to article 2 of the Ramsar Convention contracting parties are to designate *"suitable wetlands within [their] territory for inclusion in a List of Wetlands of International Importance"* and take individually or jointly appropriate action to conserve and manage them in a sustainable way.[669] As the Convention deals with a particular ecosystem (i.e. wetlands) rather than with a specific area to be protected, states should follow the ecosystem approach when implementing it.[670] However, no clear reference to either the ecosystem approach or the precautionary principle is made within the text of the agreement. Yet article 3 paragraph 1 of the Ramsar Convention holds that contracting parties shall *"promote the conservation (...) and as far as possible the wise use of wetlands in their territory"*.

The term *wise use* was originally defined by the Conference of the Parties to the Ramsar Convention (as established in accordance with article 6 of the

23808/main/ramsar/1-36-123%5E23808_4000_0> (last visited: 01.07.2014).

666 See art. 1 para. 1 of the Ramsar Convention.

667 See preamble of the Ramsar Convention.

668 As a consequence the maintenance of wetlands in connection to climate change was discussed at the Standing Committee meeting to the Ramsar Convention from October 31 to November 4, 2011 in Gland, Switzerland; the draft resolution on climate change and wetlands adopted in this context and considered, amended and approved at the COP 11 meeting in July 2012 specifies the need *"to maintain or improve the ecological character of wetlands, including their ecosystem services, to enhance the resilience of wetlands as far as possible in the face of climate-driven ecological changes including, where necessary, to promote the restoration of degraded wetlands, and further to promote the ability of wetlands to contribute to nature-based climate change adaptation (...) and to sequester and store carbon as important responses for climate change mitigation, through the maintenance and enhancement of their ecological functions, and to reduce or halt the release of stored carbon that can result from the degradation and loss of wetlands;"* See *Climate change and wetlands: implications for the Ramsar Convention on Wetlands*, July 6-13, 2012 (Resolution XI.14), at 5, para. 26 . It is in this context important to note, that Arctic wetlands are mainly covered by permafrost, which is an important carbon sink. The maintenance of Arctic wetlands is thus all the more vital, as the melting of permafrost would release large quantities of greenhouse gases into the atmosphere; see Minaeva, at 1 and *supra* in 2.3.

669 See art. 2 para. 1, art. 3 para. 1 and art. 5 of the Ramsar Convention.

670 But see Birnie, et al., at 673 (stating, that the *"Ramsar Convention is essentially sectoral and its approach is accordingly limited [and] not well tuned to the holistic, broadly ecological approach required to effectively implement the Biodiversity Convention"*).

Convention) at their third meeting in 1987[671] and was – in light of the changes that underwent in environmental law – redefined at COP 9 in 2005: *"Wise use of wetlands is the maintenance of their ecological character, achieved through the implementation of ecosystem approaches, within the context of sustainable development."*[672] For this definition the Conference of the Parties to the Ramsar Convention relied *inter alia* on Decision V/6 of the Conference of the Parties to the CBD. What has been stated in respect to the ecosystem approach and its implementation under the CBD framework thus applies likewise to the Ramsar Convention on Wetlands.[673]

The wise use concept, which forms the first pillar of the Ramsar Convention,[674] is one of the Convention's main principles and as such has been continuously and extensively elaborated on within the Ramsar framework, *inter alia* in the Ramsar Handbooks for the wise use of wetlands.[675] As the Ramsar Convention promotes the conservation and protection of entire ecosystems, rather than territorially restricted areas, the management of wetlands under the wise use concept lies within the scope of a variety of sectors and stakeholders, including local communities and indigenous peoples that benefit from the goods and services wetlands provide.[676] Consequently it is essential to allow for participatory management of wetlands in order to achieve their adequate protection and conservation, which in turn will make them more resilient against threats, including climate change. The wise use concept takes this necessity into account, by calling for integrated management as established through the CEPA program, as early as in 1990.[677]

671 The wise use concept was initially defined as: *"The wise use of wetlands is their sustainable utilization for the benefit of humankind in a way compatible with the maintenance of the natural properties of the ecosystem."* See *Guidelines for the Implementation of the Wise Use Concept*, Introduction.

672 *A Conceptual Framework for the wise use of wetlands and the maintenance of their ecological character,* at 6 note 22.

673 See for details *supra* in 4.5.2. and *Additional Guidance for the Implementation of the Wise Use Concept* and Ramsar Convention Secretariat (Handbook 1), at 30; the Conference of the Parties to the Ramsar Convention *inter alia* encourages execution of environmental impact assessments, the institution of a permit system for activities affecting wetlands and the establishment of integrated management.

674 The other two pillars refer to the designation and management of Ramsar sites according to arts. 2-4 (pillar 2) and international cooperation in implementing the Convention subject to art. 5 of the Ramsar Convention (pillar 3); see Ramsar Convention Secretariat (Handbook 21), at 6 and 11-12, Ramsar Convention Secretariat (Handbook 3), at 24.

675 The handbooks are available at <http://www.ramsar.org/cda/en/ramsar-pubs-handbooks-handbooks4-e/main/ramsar/1-30-33%5E21323_4000_0> (last visited: 01.07.2014).

676 See Ramsar Convention Secretariat (Wetland CEPA), at 31 and Ramsar Convention Secretariat (Handbook 7).

677 See *Guidelines for the Implementation of the Wise Use Concept*. Following these guidelines,

CEPA, which stands for "communication, education, participation and awareness" points out that state parties, in effectively implementing the Ramsar Convention and its wise use concept subject to article 3 paragraph 1 of the Convention, ought to establish the necessary legal and institutional framework to help people understand about the values of wetlands and include them in any decision making process concerning them. *Inter alia* this might call for the launch of campaigns and programs raising awareness among stakeholders, decision-makers and the public about the benefits stemming from wetland conservation, as well as for capacity building, e.g. by means of establishing educational programs and workshops to train people in the wise use of wetlands, for the inclusion of local and indigenous knowledge into planning and management schemes and other participatory measures.[678]

Furthermore at the fifth meeting of the Conference of the Parties in Japan in 1993, the Conference of the Parties found in respect of the application of the wise use concept that *"while comprehensive understanding of the ecological constraints of a wetland system should be sought, activities affecting wetlands need to be governed by the "precautionary principle" when such knowledge is not available. In other words, if the impact of specific actions is not clearly understood, then these actions should be prohibited even if there is insufficient evidence to prove a direct link between the activities and resulting wetland degradation."*[679] In this respect the Ramsar Convention follows a rather strict precautionary principle, as it forbids all action unless sufficient scientific data becomes available to disprove the causal connection between a specific initiating activity or event and any negative result. As a consequence where human activities may have damaging effects upon wetlands, a legal framework is required to adequately address the planning and conduct of such activities, in order to avoid any negative consequences upon wetland ecosystems and maintain their health and integrity, responsible for the goods and services they provide.[680] Environmental impact assessments (EIA) and strategic environmental assessment (SEA) in

today the current Ramsar CEPA program is governed by *Programme on communication, education, participation and awareness (CEPA) 2009-2015 of the Convention on Wetlands*, 2008 (Resolution X.8) of 2008.

678 See for details *Programme on communication, education, participation and awareness (CEPA) 2009-2015 of the Convention on Wetlands*, 2008 (Resolution X.8), Ramsar Convention Secretariat (Wetland CEPA), at 11 and 20 and on the implementation of participatory governance of wetlands see Ramsar Convention Secretariat (Handbook 7), at 46–53.

679 *Additional Guidance for the Implementation of the Wise Use Concept*.

680 Accord. Ramsar Convention Secretariat (Handbook 3), at 36 para. 47.

this context become especially relevant. As EIA and SEA are prominently addressed by the Espoo Convention and the SEA Protocol, which will be referred to in greater detail subsequently in 5.5.2. they will not be attended to here any further.[681]

In respect to the Arctic region the Ramsar Convention is, however, not only noteworthy regarding the application of its wise use concept, which calls for ecosystem-based and precautionary management of wetlands, and the fact that it is the only agreement addressing an ecosystem in its entirety: All Arctic Nations list several sites on the Ramsar List of Wetlands of International Importance.[682] To date in total the eight Arctic States combined list an area of about 30,000,000 hectares protected by the Ramsar Convention and thus subject to the application of the precautionary principle and the ecosystem approach as established by the Conference of the Parties to the Ramsar Convention.[683]

681 However on details regarding environmental impact assessment (EIA) and strategic environmental assessment (SEA) within the Ramsar framework see Ramsar Convention Secretariat (Handbook 16). Furthermore it is noteworthy, that the *Convention on Environmental Impact Assessment in a Transboundary Context*, Feb. 25, 1991, 1989 U.N.T.S. 309 [hereinafter Espoo Convention] in its Annex III lists location criteria as indicators for state activities likely to have a significant adverse trans-boundary impact. Among these criteria are *"wetlands designated under the Ramsar Convention"*. Consequently, an activity planned to be carried out in or close by a Ramsar site requires specific consideration on its impacts, before it is conducted; see on details regarding environmental impact assessment, *infra* in 5.5.2.

682 See *The List of Wetlands of International Importance*; note that not all of the areas listed are situated within the Arctic.

683 Note that in 2013 Iceland, Norway, Sweden and Denmark have designated 31 new sites in total (albeit only some of them beyond the Arctic Circle) under the Ramsar Convention. See for details <http://www.ramsar.org/cda/en/ramsar-news-archives-2013-iceland-three/main/ramsar/1-26-45-590%5E26132_4000_0>, <http://www.ramsar.org/cda/en/ramsar-news-archives-2013-norway-12/main/ramsar/1-26-45-590%5E26238_4000_0__>, <http://www.ramsar.org/cda/en/ramsar-news-archives-2013-sweden-15/main/ramsar/1-26-45-590%5E26263_4000_0__> and <http://www.ramsar.org/cda/en/ramsar-news-archives-2013-denmark-43/main/ramsar/1-26-45-590%5E26254_4000_0__> (last visited: 01.07.2014).

5.4.3.2. Convention Concerning the Protection of the World Cultural and Natural Heritage

The scope of the Convention concerning the Protection of the World Cultural and Natural Heritage is not as broad as the Ramsar Convention, as it does not apply to ecosystems as a whole. Nevertheless the World Heritage Convention is a useful tool in protecting and conserving habitat, i.e. natural sites and features considered as *"natural heritage",* according to article 2 of the Convention, i.e. natural components and areas of an *"outstanding universal value from"* an aesthetic, scientific or conservation point of view as well as natural sites that are of such value due to their natural beauty. While the identification, protection and conservation of such sites is predominantly a national obligation, as the areas subject to the Convention are mostly situated on state territories and are thus subject to the jurisdiction of the parties to the Convention,[684] international cooperation is required and expected, as the world heritage sites are of universal value making their protection and conservation of interest to the international community as a whole.[685] What sites can be considered as being of outstanding universal value and how states are to propose specific areas within their territories to the World Heritage List, as well as how to manage and protect them pursuant to the rules set out by the Convention, is elaborated in detail in the Operational Guidelines for the Implementation of the World Heritage Convention.[686] While according to these Guidelines legislative and regulatory measures taken at national and local levels should assure the survival of the property and its protection for present and future generations against development and change that might negatively impact its outstanding universal value or integrity, the particular management system chosen lies in the responsibility of state parties.[687] Neither the Convention nor the Implementation Guidelines do in that context refer to the precautionary principle and/or the ecosystem approach.

Nevertheless in protecting and conserving natural areas of great ecological, scientific or aesthetic value for the benefit of present and future generations the World Heritage Convention is applying a precautionary stance in environmental protection,[688] and is thus also of great value in maintaining the

684 See in this respect the designation of marine protected areas *supra* in 5.3.2.4. b.
685 See arts. 4, 5 and 6 para. 1 of the World Heritage Convention.
686 See United Nations Educational Scientific and Cultural Organization (WHC.08/01).
687 See United Nations Educational Scientific and Cultural Organization (WHC.08/01), at 25, II.F, notes 98-119, esp. 98, 109 and 117.
688 See accord. *Climate Change and the Great Barrier Reef,* at 16–17 para. 35 and Viikari, at 199.

fragile ecosystems of the Arctic and protecting them against anthropogenic threats, especially such emerging due to climate change, e.g. an increase in shipping or oil and gas activities. All Arctic Nations have become member states to the Convention.[689] As of July 2014 the World Heritage List holds 1007 properties,[690] of which 5 (4 of them being natural properties) are situated beyond the Arctic Circle: The Wrangel Island Reserve and the Putorana Plateau in Russia, the Laponian area of Sweden, the Ilulissat Icefjord in Greenland and the prehistoric rock art of the Alta Fjord in Norway.[691] While this includes only a small portion of the Arctic, other Arctic properties that are not listed on the World Heritage List – at least in principle – demand some protection under the World Heritage Convention as well, as article 12 of the Convention holds that *"[t]he fact that a property belonging to the cultural or natural heritage has not been included in [the World Heritage List does not mean] that it does not have an outstanding universal value",* which would imply the taking of effective conservation and protection measures subject to the Convention.[692]

5.4.3.3. UNESCO Man and the Biosphere Programme

In terms of habitat conservation UNESCO's Man and the Biosphere (hereinafter MAB) Programme, which was already briefly mentioned above[693], deserves some more attention. The MAB Programme was established in 1974 and has since become a voluntary tool to maintain biodiversity and thus implement the Convention on Biological Diversity as well as achieve sustainable development.[694] Biosphere reserves assigned under the Programme are according to article 1 of the Statutory Framework of the World Network of Biosphere Reserves[695] *"areas of terrestrial and coastal/marine ecosystems*

689 See on the status of ratification <http://whc.unesco.org/pg.cfm?cid=246> (last visited: 06.07.2014).

690 For an updated map of the sites listed under the World Heritage Convention see <http://whc.unesco.org/en/list> (last visited: 06.07.2014).

691 See ibid. and Viikari, at 189; it is noteworthy, that Canada in 2004 and Norway in 2007, respectively, have added Qutinirpaaq, Ivvavik and Vuntut National Parks, as well as Herschel Island and Svalbard to the tentative list of the World Heritage Convention; see Norwegian Ministry of Foreign Affairs (Building Blocks), at 75 (stating that a nomination application for Svalbard can be expected earliest in 2014) and for further details see <http://whc.unesco.org/en/tentativelists/5161>, <http://whc.unesco.org/en/tentativelists/1943/>, <http://whc.unesco.org/en/tentativelists/1939/> (last visited: 06.07.2014).

692 See Viikari, at 199–200, Lenzerini, at 205, 215-216.

693 See *supra* in 5.3.2.4. d. and fn 619 (part II).

694 See art. 2 para. 2 of the Statutory Framework, as cited *infra* in fn 695 (part II).

695 United Nations Educational Scientific and Cultural Organization (Biosphere Reserves), at

or a combination thereof" designated by the International Co-ordinating Council of the MAB Programme, at the request of UNESCO member states.[696] In practice biosphere reserves protection is often undertaken by the means of protected area designation or such under the World Heritage or the Ramsar Convention,[697] as the areas assigned fall within the jurisdiction of a specific state.[698] Yet since the sites are internationally recognized within the MAB Programme and in this respect form a World Network of Biosphere Reserves[699], which is aimed at exploring and demonstrating approaches to conservation and sustainable development (e.g. the ecosystem approach as established under the Convention on Biological Diversity), their value goes beyond that of protected areas.[700] In order for an area to be designated as biosphere reserve it must fulfill three complementary functions as set out by article 3 of the Statutory Framework: Conservation, development and logistic support.[701]

- **Conservation:** The first criterion refers to the value of the biosphere reserve in terms of conservation. According to article 3 paragraph (i) the reserve ought to *"contribute to the conservation of landscapes, ecosystems, species and genetic resources"*.
- **Development:** The second criterion focuses on socio-economic aspects and hence the second function of biosphere reserves should be to *"foster economic and human development which is socio-culturally and ecologically sustainable"*[702].
- **Logistic support:** Finally, the third function of a biosphere reserve lies in its value for *"environmental education and training, research and monitoring related to local, regional, national and global issues of conservation and sustainable development"*[703].

16–18 [hereinafter Statutory Framework].

696 See ibid., Introduction and for details art. 5 of the Statutory Framework.

697 See *supra* in 5.3.2.4. and 5.4.3. and furthermore fn 619 (part II).

698 See art. 2 para. 3 of the Statutory Framework and United Nations Educational Scientific and Cultural Organization (Biosphere Reserves), at 3.

699 See art. 2 paras. 1 and 2 of the Statutory Framework and United Nations Educational Scientific and Cultural Organization (Madrid Action Plan), at 8–9.

700 See United Nations Educational Scientific and Cultural Organization (Biosphere Reserves), at 4, United Nations Educational Scientific and Cultural Organization (Madrid Action Plan), at 3, 5 and 9 and Roberts, at 40.

701 See art. 4 para. 4 in conjunction with art. 3 of the Statutory Framework.

702 Art. 3 para. (ii) of the Statutory Framework.

703 Art. 3 para. (iii) of the Statutory Framework.

These functions are subject to article 4 paragraph 5 of the Statutory Framework achieved by a zonal division into a core area, a buffer zone and an outer transition area:[704] The core area is composed by *"areas devoted to long-term protection, according to the conservation objectives of the biosphere reserve"*; the core area thus has to be securely protected, which means that, except for low-impact uses (such as monitoring, non-destructive research and education) no human activities are to be carried out within this area. Consequently the core area fulfills the first function – conservation – according to article 3 paragraph (i) of the Statutory Framework. The buffer zone, i.e. areas, which are *"surrounding or contiguous to the core area"* on the other hand, allow for "*activities compatible with the conservation objectives"* i.e. sound ecological practices, e.g. environmental education, recreation, eco-tourism and applied and basic research and as such mostly pertain to the third function subject to article 3 paragraph (iii) of the Statutory Framework – logistic support. Finally, biosphere reserves contain *"an outer transition area, where sustainable resource management practices are promoted and developed"*. The outer transition area thus leaves room for cooperation – especially regarding monitoring, scientific research and information exchange[705] – between local communities, decision-makers, scientists and other stakeholders in respect to a sustainable management of the area's resources and consequently pertains mainly to the second function of biosphere reserves – development – subject to article 3 paragraph (ii) of the Statutory Framework.

The establishment of biosphere reserves is in particular aimed at maintaining biological diversity and for this reason promotes the development and implementation of interdisciplinary management approaches, such as the ecosystem approach, that take economic, social and ecological values into account.[706] The designation of the Arctic as a biosphere reserve would thus support the effective management of climate change induced Arctic risks, even more so, as biosphere reserves help in climate change adaptation and mitigation, due to their focus on the maintenance of biological diversity and sustainable management.[707] The assignment of the Arctic region as a whole

704 See on the following art. 4 para. 5 of the Statutory Framework and United Nations Educational Scientific and Cultural Organization (Biosphere Reserves), at 4.

705 See in this respect arts. 7 and 8 of the Statutory Framework.

706 See accord. Fritz, at 325.

707 See in this context *Dresden Declaration on Biosphere Reserves and Climate Change*, June 28, 2011, at 1; The Declaration was adopted during the MAB Programme 40 years anniversary conference, which took place from June 27 to 28, 2011 in Dresden, Germany under the title "Biosphere reserves and climate change".

under the MAB Programme is unlikely, however, as every Arctic State would have to request their Arctic marine and terrestrial areas for biosphere reserve designation.[708]

Furthermore, even if all Arctic Nations opted for such an approach, every biosphere reserve would be subject to individual management schemes pursuant to the respective state's national legislation.[709] Consequently biosphere reserve designation would not provide for a comprehensive management of the Arctic, in spite of the wider (in comparison to e.g. protected area designation) cooperation possibilities under the MAB Programme through the World Network of Biosphere Reserves. Hence, while an important tool to effectively implement the Convention on Biological Diversity and to support global cooperation through the Network especially in terms of scientific initiatives aimed at understanding ecosystem functions and processes,[710] the Man and the Biosphere Programme is impaired by the fact that it pertains only to areas situated within a specific UNESCO member state's jurisdiction. Yet, as a tool to implement the ecosystem approach in practice, biosphere reserve designation certainly provides for a good starting point in ecologically sound management of ecosystems and sustainable development, as it attends to interests of all stakeholders within a specific country and leaves room for cooperation in scientific fields pertaining to other biosphere reserves in the Network, so as to enhance the development of models for global, national and local sustainability.[711]

5.4.4. Conclusion

As has been shown,[712] biodiversity conservation and in this context the protection of plant and animal species forming such diversity against threats, is a decisive element in governing climate change induced risks, as biological diversity is a vital factor in maintaining ecosystem health and resilience. Such maintenance is not only valuable for purely ecological reasons, but also

708 See on designated biosphere reserves located within the Arctic tundra Folch & Camarasa, at 140–148 and for more information search <http://www.unesco.org/mabdb/br/brdir/directory/database.asp#theme> (last visited: 06.07.2017).

709 But see in this respect *infra* in 8.2.1.1. on the Mura-Drava-Danube UNESCO trans-boundary Biosphere Reserve.

710 See art. 7 of the Statutory Framework.

711 See United Nations Educational Scientific and Cultural Organization (Madrid Action Plan), at 3 and 4.

712 See *inter alia supra* in 5.4. and 5.4.2.

for the general benefit of mankind, as intact and healthy ecosystems are much more capable to cope with natural and anthropogenic threats, such as climate change induced risks and hence will continue to provide ecosystem goods and services human well-being depends upon.[713] As a consequence international conventions pertaining to biological diversity and the animal and plant species such diversity is composed of, are of great value, not only in governing climate change induced risks, but also in maintaining human well-being from a more general perspective.

The Convention on Biological Diversity (CBD) deserves exceptional attention in this context as it addresses biodiversity conservation comprehensively and in this context adopted the ecosystem approach as one of its guiding principles.[714] As a framework convention, however, the CBD is lacking specific rules and regulations necessary to manage ecosystems appropriately in practice.[715] Biodiversity conservation is thus by and large reliant on domestic implementation efforts pertaining to the CBD[716] as well as on other conventions, which address biodiversity on a less comprehensive and more sectoral level by referring to specific species and their respective habitat. The conventions analyzed in 5.4. however, do not entail an explicit duty to be reflective of the precautionary principle or the ecosystem approach. Yet, because they are concerned with the protection and conservation of plant and animal species and in this context *inter alia* require the listing of specific species as demanding special protective measures and the designation of protected areas (or biosphere reserves under the Man and the Biosphere Programme), these conventions are certainly precautionary in scope.[717] Furthermore, the Ramsar Convention, by its wise use concept and its ecosystem-based scope, provides for a holistic approach in governing wetlands.[718] Yet as the Convention is restricted to its specific spatial range and only applies to wetland ecosystems, its character is not as broad as the CBD's.

Consequently, while the conventions addressed in 5.4 provide for valuable guidance in maintaining biological diversity and in this context protecting plant and animal species, they either are not comprehensive in scope, or only provide for a framework set of rules and as such leave the governance

713 See *supra* in 4.5.2.2. d., 5.4.2. and furthermore *infra* in 8.2.1.3.
714 See for details on the CBD *supra* in 4.5.2. and 5.4.1.
715 See *supra* in fn 642 (part II).
716 See in this context on the development of National Biodiversity Strategies and Action Plans (NBSAPs) *supra* in 5.4.1. and *infra* in 6.3. as regards NBSAPs developed by Arctic States.
717 See for details *supra* in 5.4.2., 5.4.3. and on the precautionary principle in 4.4.
718 See for details on the Ramsar Convention *supra* in 5.4.3.1.

of climate change induced Arctic risks in relation to biological diversity conservation and the protection of plant and animal species predominantly to the eight Arctic states.

5.5. General Multilateral Environmental Agreements

The above-mentioned conventions are all rather specific in scope, as they pertain to a certain environmental issue: The conservation of the climate system, the territorial and marine environment and the species thriving therein. The Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters (Aarhus Convention[719]) and the Convention on Environmental Impact Assessment in a Transboundary Context (Espoo Convention[720]) are more general in this perspective. As they play an important role in risk assessment and management they shall subsequently be briefly examined in regards to their value for the governance of climate change induced Arctic risks.

5.5.1. Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters (Aarhus Convention)

The 1998 Aarhus Convention is based on the premise that *"human well-being and the enjoyment of basic human rights, including the right to life itself"*[721] is dependent on an intact environment. Environmental protection is thus a prerequisite for the granting of basic human rights and needs. Consequently, for states to assert the right to life and to fulfill the duty to individually and jointly protect the environment for the benefit of present and future generations, they must grant their citizens access to environmental information and entitle them to participate in decision-making processes pertaining to environmental issues.[722] The Convention recognizes that such improved

719 *Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters*, June 25, 1998, 2161 U.N.T.S. 447 [hereinafter Aarhus Convention].

720 *Convention on Environmental Impact Assessment in a Transboundary Context*, Feb. 25, 1991, 1989 U.N.T.S. 309 [hereinafter Espoo Convention].

721 See Preamble of the Aarhus Convention, as cited *supra* in fn 719 (part II).

722 Ibid.

access to information and participation in environmental matters *"enhance[s] the quality and the implementation of decisions, contribute[s] to public awareness of environmental issues, give[s] the public the opportunity to express its concerns and enable[s] public authorities to take due account of such concerns".*[723]

Following its preamble the main focus of the Aarhus Convention is thus on integrated management, i.e. decision-making based on information and interests of all relevant sectors and stakeholders as proposed by the ecosystem approach[724]. Consequently states are obliged to guarantee (e.g. by promoting environmental education and awareness[725]) its citizens without discrimination[726] *"the rights of access to information, participation in decision-making and access to justice in environmental matters (...)".*[727] As integrated management is by means of involving all stakeholders and parties concerned a prerequisite of good risk governance,[728] the Aarhus Convention plays a significant role when protecting ecosystems against climate change induced risks, appropriately. Hence the following paragraphs shall outline in greater detail in what way the Convention obliges states to provide for integrated management, i.e. by means of granting a right of access to information, participation in decision-making and access to justice in environmental matters.

The *right of access to information* requires parties to the Convention to make environmental information available in a timely manner to the public following a request for such information, unless there is a well-founded reason to refuse such a disclosure (e.g. because the authority addressed does not hold the specific information requested or a disclosure of any such information would adversely affect international relations, intellectual property rights or confidentiality issues).[729] Furthermore any information *"which could enable the public to take measures to prevent or mitigate harm arising from [an imminent threat to human health or the environment is to be] (...) disseminated immediately and without delay to members of the public*

723 Ibid.
724 See Principle 12 of the Malawi Principles, *supra* in 4.5.2.2. l.
725 See art. 3 para. 3 of the Aarhus Convention.
726 See art. 3 para. 9 of the Aarhus Convention.
727 Art. 1 of the Aarhus Convention.
728 See *inter alia supra* in 1.4. and 4.5.4.
729 See art. 4 paras. 1, 2, 3 and 4 of the Aarhus Convention; Louka notes in this respect the necessity of a cost-benefit analysis between the public interest served by the disclosure and the interest protected by nondisclosure; see Louka, at 132.

who may be affected"[730].

In respect to decision-making states are subject to article 6 of the Aarhus Convention obliged to in a timely and effective manner inform the public, presumably to be affected by a specific activity listed in Annex I of the Convention (e.g. the installation of mineral oil and gas refineries or the production and processing of metals) or by any activity which may be having a significant effect on the environment, *inter alia* on the proposed activity, the nature of possible decisions and the envisaged procedure.[731] Additionally states ought to provide for *"appropriate practical and/or other provisions for the public to participate during the preparation of plans and programmes relating to the environment, within a transparent and fair framework, having provided the necessary information to the public"*[732]. Environmental management plans, e.g. to manage fisheries within the Arctic would thus, according to the Aarhus Convention, have to be made available and open to discussion for all sectors and stakeholders interested.

Furthermore each party to the Convention is urged to *"promote effective public participation at an appropriate stage, and while options are still open, during the preparation by public authorities of executive regulations and other generally applicable legally binding rules that may have a significant effect on the environment"*[733]. As an effective management of climate change induced Arctic risks will likely demand both structured planning as well as the formation of legally binding rules, indigenous populations (among other interested citizens) may be granted a right to participate in the planning and policy making process according to articles 7 and 8 of the Aarhus Convention.[734]

730 Art. 5 para. 1 sub-para. (c) of the Aarhus Convention.

731 See for details on the information to be disclosed art. 6 para. 2 of the Aarhus Convention.

732 Art. 7 of the Aarhus Convention. LOUKA refers here to *general public participation* as opposed to *specific public participation* subject to art. 6 of the Convention; see LOUKA, at 133; see in this context also *infra* in 5.5.2. regarding the Protocol on Strategic Environmental Assessment (SEA).

733 Art. 8 of the Aarhus Convention; LOUKA refers here to *normative public participation* as opposed to *specific public participation* and *general public participation* subject to arts. 6 and 7 of the Convention; see LOUKA, at 133.

734 Note that the granting of such a right to indigenous peoples may also be derived from art. 6 of the *Convention concerning Indigenous and Tribal Peoples in Independent Countries*, June 27, 1989, ILO Convention No. 169; of the eight Arctic States only Norway and Denmark have so far however, ratified the Convention. In this context also note art. 18 of the legally non binding *United Nations Declaration on the Rights of Indigenous Peoples* as adopted by the General Assembly in September 2007; see *Resolution adopted by the United Nations General Assembly 61/295. United Nations Declaration on the Rights of Indigenous Peoples*,

Finally the Convention obliges states to grant an access to justice, i.e. to *"ensure that any person who considers that his or her request for information [subject to article 4] (...) has been ignored, wrongfully refused (...), inadequately answered, or otherwise not dealt with in accordance to [the Convention] (...), has access to review procedure before a court of law or another independent and impartial body established by law"*[735]. In addition access to justice is not only granted in case of a procedural violation or such of access to information rights as warranted by the Convention, but also for any violation of national environmental law.[736]

As of today the Aarhus Convention was ratified by five of the eight Arctic States: Finland, Norway, Sweden, Iceland and Denmark, which, however, excludes the Faroe Islands and Greenland from its applicability.[737]

5.5.2. Convention on Environmental Impact Assessment in a Transboundary Context (Espoo Convention)

While the Aarhus Convention, according to what has just been stated, gives the public a right to gain all the necessary information in respect to environmental risks and participate in the decision-making process based thereon, the Espoo Convention deals with the gathering of scientific data pertaining to such risks. In short it is a Convention on risk assessment, or more precisely on environmental impact assessment (hereinafter EIA) in a transboundary context. Consequently the Convention does not provide for guidance in respect to conducting EIA in case national activities would not result in transboundary impacts or if areas beyond national jurisdiction (e.g. the high seas) were to be affected.[738] The Convention defines *environmental im-*

Oct. 2, 2007 (A/RES/61/295); furthermore as regards public participation during the planning stage see also *infra* in 5.5.2. concerning the Protocol on Strategic Environmental Assessment (SEA).

735 Art. 9 para. 1 of the Aarhus Convention.

736 See art. 9 para. 3 of the Aarhus Convention.

737 See on the status of ratification: <http://www.unece.org/env/pp/ratification.html> (last visited: 06.07.2014); note that the Aarhus Convention is as an United Nations Economic Commission for Europe (UNECE) Convention primarily open for ratification by signatories and members of regional European economic integration organizations; see art. 19 of the Aarhus Convention. All Arctic States have become members to the UNECE, however, and thus would be eligible for becoming parties to the Convention; see on the UNECE membership <http://www.unece.org/oes/nutshell/member_States_representatives.html> (last visited: 06.07.2014).

738 Art. 17 of the Rio Declaration differs in this respect as it does not limit the conduct of envi-

pact assessment as *"a national procedure for evaluating the likely impact of a proposed activity on the environment"*[739]. Impact in this context is understood as any effect on the environment caused by an activity authorized by a competent authority.[740]

In order to prevent, reduce and control any significant adverse trans-boundary impact on the environment the Espoo Convention obliges member states to individually or jointly[741] conduct environmental impact assessments prior to a decision to authorize or undertake a proposed activity likely to cause such an impact.[742] In this context Appendix I to the Convention holds a incomplete list of activities requiring an environmental impact assessment, e.g. the construction of large-diameter oil and gas pipelines, thermal power stations or crude oil refineries.[743] As any such proposed activity may negatively affect citizens of both, the state of origin of the activity as well as of other states affected by such activity, the public concerned ought to be provided the opportunity to participate in the environmental impact assessment procedure.[744] This implies that the state of origin of the proposed activity notifies an affected party as early as possible about the activity to be undertaken.[745]

In respect to the conduct of an environmental impact assessment, Appendix II lists a minimal content of the information to be gathered subject to such

ronmental impact assessments to a transboundary context. It holds that *"Environmental impact assessment, as a national instrument, shall be undertaken for proposed activities that are likely to have a significant adverse impact on the environment and are subject to a decision of a competent national authority"*. However, this regulation does not provide for a lot of guidance on how to conduct environmental impact assessments and additionally as a soft law instrument, the Rio Declaration does not have the binding effect of the Espoo Convention; see for details on the Rio Declaration *supra* in 5.1.5.

739 Art. 1 para. (vi) of the Espoo Convention, as cited *supra* in fn 720 (part II).

740 See art. 1 paras. (v) and (vii) of the Espoo Convention.

741 See art. 8 in conjunction with Appendix VI para. (g) of the Espoo Convention.

742 See arts. 1 para. 1 and 2 para. 3 of the Espoo Convention.

743 Activities not listed in Appendix I may require the conduct of an environmental impact assessment in case the proposed activity is likely to cause a significant adverse trans-boundary impact according to Appendix III of the Espoo Convention; see art. 2 para. 5 in conjunction with Appendix III of the Espoo Convention. Decisive in this context is e.g. the location of the proposed activity: Areas of special environmental sensitivity or importance demand an environmental impact assessment prior to undertaking any activities within such areas; see Appendix III para. 1 sub-para. (b) of the Espoo Convention. Due to the fragility of Arctic ecosystems any proposed activity (and not just the ones listed in Appendix I) may in this context require an environmental impact assessment before said activity is to be carried out in the region.

744 See art. 2 paras. 2 and 6, as well as art. 3 para. 8 of the Espoo Convention.

745 See for details art. 3 of the Espoo Convention.

an assessment. *Inter alia* the environmental impact assessment documentation shall provide a description of the proposed activity, its purpose and any possible alternatives, as well as information on the environment likely to be affected and the expected impact thereon. Furthermore the impact assessment shall contain a description of mitigation measures to keep adverse environmental impacts to a minimum.[746] All Arctic States, except Iceland, Russia and the United States, have become parties to the Espoo Convention.[747]

The Convention on Environmental Impact Assessment in a Transboundary Context is complemented by the Protocol on Strategic Environmental Assessment (SEA Protocol[748]), which was adopted in 2003 and entered into force on July 11, 2010. As the Protocol refers to the evaluation of the likely environmental effects of plans and programs (e.g. prepared for the agriculture, forestry, fisheries or energy sector),[749] its objective pertains to a much earlier stage in the decision making process,[750] as is the case with the Espoo Convention, which requires an assessment for a specific activity already determined. It is as such an important tool in sustainable development, as it allows for detecting negative ramifications for the environment, including human health, and the participation of the public as well as the respective authorities concerned, early on in the decision making process.[751] Furthermore the SEA Protocol can help to address climate change induced risks, as the Protocol requires states to assess any effects on the environment, includ-

746 See art. 4 para. 1 in conjunction with Appendix II and art. 5 para. (a) of the Espoo Convention.

747 See on the status of ratification: <http://www.unece.org/env/eia/eia.html> (last visited: 06.07.2014); note that the Espoo Convention is as an United Nations Economic Commission for Europe (UNECE) Convention primarily open for ratification by signatories and members of regional European economic integration organizations; see art. 17 para. 1 in conjunction with art. 16 of the Espoo Convention. All Arctic States have become members to the UNECE, however, and thus would be eligible for becoming parties to the Convention. See on the UNECE membership <http://www.unece.org/oes/nutshell/member_States_representatives.html> (last visited: 06.07.2014).

748 *Protocol on Strategic Environmental Assessment to the Convention on Environmental Impact Assessment in a Transboundary Context*, May 21, 2003, Economic and Social Council ECE/MP.EIA/2003/2 [hereinafter SEA Protocol]; see for status of ratification: <http://treaties.un.org/Pages/ViewDetails.aspx?src=TREATY&mtdsg_no=XXVII-4-b&chapter=27&lang=en> (last visited: 06.07.2014); and furthermore ibid.

749 See arts. 2 para. 6 and 4 para. 2 of the SEA Protocol.

750 See accord. arts. 5 and 6, referring to screening and scoping initiatives, which belong to the pre-assessment stage of risk assessment; see *supra* in fn 21 (part I) and Louka, at 119 (stating, that the Espoo Convention refers to implementation assessments carried out after a policy has been decided, while the SEA Protocol takes place at the level of policy formulation).

751 See art. 1 para. (e), art. 3 para. 7, art. 6 para. 3 and arts. 8 and 9 of the SEA Protocol.

ing climate and its interactions with other factors (such as biodiversity) during the planning stage.[752] The effective potential of the SEA Protocol is however dampened by the fact that as of today among the eight Arctic Nations only Denmark, Finland, Norway and Sweden have become parties to the Protocol.[753]

Finally, it is important to note that, while neither the Espoo Convention, nor the SEA Protocol explicitly refer to the precautionary principle, they are clearly precautionary in scope, as they require an assessment of the impact human activities may have upon the environment at the earliest stage possible and in doing so are aimed at preventing any negative ecological ramifications from occurring.[754] Moreover it is noteworthy, that the International Court of Justice (ICJ) most recently has held in its Argentina v. Uruguay Pulp Mills case *"that it may now be considered a requirement under general international law to undertake an environmental impact assessment where there is a risk that the proposed industrial activity may have a significant adverse impact in a transboundary context, in particular, on a shared resource."*[755] While, as a consequence the ICJ thus acknowledged in its judgment the existence of a general obligation to conduct EIA in a transboundary context, it also noted in the subsequent paragraph, that the precise content of the environmental impact assessment will have to be determined under domestic law.[756] Yet the court's ruling may foster the development of domestic EIA standards, where no such regime is in place and the Espoo Convention is not applicable.

5.5.3. Conclusion

Considering what has been said *supra* in 5.5.1. and 5.5.2., neither the Aarhus nor the Espoo Convention (as well as its supplementary Protocol on Strategic Environmental Assessment) explicitly address the ecosystem approach or the precautionary principle. Furthermore they are, unlike the conventions referred to in 5.2., 5.3. and 5.4., not concerned with a specific environmental issue (such as atmospheric and marine pollution or biodiversity loss) whose regulation may be required in the light of governing climate

752 See art. 2 paras. 6 and 7 and art. 4 para. 1 of the SEA Protocol.
753 See on the status of ratification *supra* in fn 748 (part II).
754 Accord. Fritz, at 63, 173 and 185 and Warner (Environmental Assessments), at 139.
755 *Case concerning Pulp Mills on the River Uruguay (Argentina v. Uruguay),* 2010 I.C.J. 8 (April 20, 2010), para. 204.
756 See ibid. para. 205.

change induced risks in the Arctic adequately. Yet the Aarhus and Espoo Conventions, as well as the SEA Protocol provide for a legally binding framework pertaining to topics that are vital ingredients of both the precautionary principle as well as the ecosystem approach. Integrated management forms an important part of the ecosystem approach.[757] Such management is prominently supported by the Aarhus Convention, which ensures public participation in respect to the governance of environmental risks, by warranting a right to gain all the necessary information pertaining to the risks involved and to participate in the decision-making process based thereon.[758] Additionally in effectively protecting ecosystems against threats, such as climate change induced risks, it is vital to address any such negative ramifications preferably before they occur. Strategic environmental assessments and environmental impact assessments as fostered by the Espoo Convention and the SEA Protocol may help in this context, as they call for conducting assessments on potential adverse impacts upon the environment from human activities, prior to carrying out any such activity so as to avert or reduce potential negative results at the earliest stage possible.[759] As such both the Convention as well as its Protocol are very much reflective of the precautionary principle, as they require the adoption of a margin of safety whenever human activities are to be carried out, that may have deleterious impacts upon the environment and hence threaten an ecosystem's health and integrity.

As a consequence the rules and regulations adopted by means of the Aarhus and Espoo regime on integrated management and environmental impact assessment ought to be seen as valuable assets in the application of the precautionary principle and the ecosystem approach and ultimately the governance of climate change induced risks. However the conventions' impact in this context is lessened by the fact that none of the conventions hold a legally binding reference to either the precautionary principle or the ecosystem approach and by the fact that they are not applicable across the entire Arctic.[760]

757 For details see *inter alia supra* in 4.5.2.2., esp. l.
758 See *supra* in 5.5.1.; note that public participation and stakeholder involvement also plays a role in the Espoo Convention and the SEA Protocol; see art. 2 paras. 2 and 6, and art. 3 para. 8 of the Espoo Convention and arts. 8 and 9 of the SEA Protocol.
759 See also on the following *supra* in 5.5.2. and furthermore *infra* in 8.2.1.1.
760 On the status of ratification see *supra* in fn 737, 747 and 748 (part II).

5.6. Conclusion: A Fragmentary Approach to Governing Climate Change Induced Risks

As this brief overview over the most important international legal initiatives pertaining to the protection and conservation of the environment shows, the inclusion of new environmental principles, such as the precautionary principle and the ecosystem approach, in international environmental law is far from consistent. While some of the legal texts do not refer to the the precautionary principle or the ecosystem approach at all or only implicitly, others – especially conventions developed or amended after the Rio Earth Summit – endorse these principles in a more explicit way. Yet the application of the precautionary principle and even more so of the ecosystem approach is still hampered in practice, either because states have not ratified the conventions holding obligations to comply to any of these principles or because the respective obligations are not legally binding.

Furthermore state practice established throughout the years may impinge on the effective implementation of the precautionary principle or the ecosystem approach. This becomes especially evident in the context of UNCLOS, as the Convention follows a zonal approach and hence leaves the decision on how to manage the marine environments and natural resources under their jurisdiction to coastal states, given their compliance to the general obligations as set out in part XII of UNCLOS.[761] Similar approaches are taken by protected area designation (as e.g. encouraged by the International Convention for the Prevention of Pollution from Ships, the Convention on Biological Diversity, the Ramsar Convention and the World Heritage Convention) or biosphere reserve designation under the Man and the Biosphere Programme;[762] while certainly beneficial to ecosystem conservation, these approaches are limited on a spatial scope as the areas designated fall within the jurisdiction of one specific state. Ecosystems, however, do not make halt at legal borders and neither do the risks they are affected by, such as climate change induced risks.[763] The Ramsar Convention, which under its wise use concept calls for the application of the ecosystem approach and the precautionary principle to manage wetlands and thus addresses an ecosystem in its

761 See for details *supra* in 5.3.1., esp. 5.3.1.2.
762 See for details *supra* in 5.3.2.1, 5.3.2.4. b. and c., 5.4.1. and 5.4.3.
763 A network of protected areas will in this context e.g. much better serve the needs of species migrating in order to adapt to climate change; see IUCN (PROGRAMME 2009-2012), at 12 and *supra* in 3.2.2.

entirety, ought to be seen as an advancement in this context. Yet the Convention's role in effectively implementing the precautionary principle and the ecosystem approach across the Arctic is impaired by the fact that its rules and regulations are restricted to their specific spatial – and as such domestic – scope, as well as by the fact that the Convention only applies to wetland ecosystems.[764] Ultimately, in order to foster the application of the precautionary principle and the ecosystem approach on a circumpolar level, a more comprehensive approach is required – one that allows for collaboration not only between sectors and stakeholders within a specific country, but also on a transnational level. While the Man and the Biosphere Programme is at least in parts reflective of this need by establishing a World Network of Biosphere Reserves, cooperation between states is predominantly limited to scientific issues.[765]

Consequently, while after the Stockholm Conference[766] many advancements have been made in environmental law to protect ecosystems, most of the existing international environmental law regime does address ecosystem issues from a fragmented, sectoral approach and is thus not comprehensive in scope.[767] To adequately manage ecosystems, such as the Arctic, however, a more holistic strategy is needed, which calls for an increased interaction between the existing legal regimes (i.e. the climate legal regime, the law of the sea and the legal instruments protecting and conserving biodiversity, species and their habitat) as well as for a closer cooperation (not only in scientific matters but especially in policy making referring to ecosystem management) between states involved.[768] It is in this context that regional measures become especially important. The aim of the following chapter is thus to provide an overview of what rules and regulations are pertaining to the Arctic region from a regional perspective and what implications they may have on the assessment and management of climate change induced Arctic risks.

764 See in this context accord. Birnie, et al., as cited *supra* in fn 670 (part II) and for details on the Ramsar Convention *supra* in 5.4.3.1.

765 It is in this context noteworthy that protected area designation is gradually becoming a process of transnational cooperation, at least in scientific terms, similar to the Man and the Biosphere Programme's Network of Biosphere Reserves: The European Commission's Joint Research Center set up a Digital Observatory for Protected Areas (DOPA), which is aimed at providing decision-makers with all the relevant data to establish and adequately manage protected areas. See for details European Commission Joint Research Center and <http://dopa.jrc.ec.europa.eu/> (last visited: 06.07.2014).

766 See for details *supra* in 5.1.1.

767 See for details *supra* in 5.2., 5.3., 5.4. and 5.5.

768 Accord. Fritz, at 65.

6. The Regional Legal Regime Applicable to the Governance of Climate Change Induced Risks

As has been pointed out *supra*[769] environmental risks such as those induced by climate change, are due to their intrinsic uncertainties and complexities hardly manageable by traditional approaches to risk management. Rather, holistic methods, as reflected by the ecosystem approach, ought to be applied in order to adequately govern such risks. Such an approach, however, requires cooperation between various sectors, institutions and communities on a national, regional as well as on an international level. As has been shown,[770] while international environmental law certainly fosters the coordination of national, regional and global measures as well as encourages the cooperation between state parties on several occasions, such duties are predominantly limited to scientific undertakings, such as monitoring and research initiatives and hence pertain to risk assessment rather than risk management. Consequently, policy questions, i.e. how environmental risks are to be managed in practice, are foremost answered by policy makers of nation states in cooperation with – if at all – regional communities, indigenous peoples and other national stakeholders, often on a sectoral scale. In light of the ecosystem approach, such management of risks fails to adequately protect and conserve ecosystems, however, because they are not limited to any legal boundaries or sectors. An effective implementation of the ecosystem approach, hence requires enhancing coordination of national measures as well as cooperation between states and their stakeholders involved not only in terms of scientific research, but also in respect to decision-making processes.

In the context of governing climate change induced Arctic risks, cooperation in the Arctic as well as the adoption and application of the precautionary principle or the ecosystem approach may be fostered through both, hard law as well as soft law initiatives. In contrast to hard law, which is legally binding, soft law is of a more recommendatory character. By being legally binding upon member states, or in case of customary law, upon those states that have not persistently objected the development of such customary rules, hard law entails stringent duties that can be legally enforced and in case of a

769 See for details *supra* in 4., esp. 4.6. and furthermore 5.6.
770 See for details *supra* in 5., esp. e.g. in 5.1.5., 5.2.3., 5.3.1. and 5.4.3.3.

breach lead to state responsibility.[771] While enforcement and responsibility are dependent on the legal regime concerned, and thus can be of a more or less profound consequence, ultimately varying the binding effect of hard law in practice, soft law has no such legally binding effect. Rather soft law serves as a guideline and is an expression of generally accepted views given within the institutional and/or regional boundaries it is developed.[772]

The following paragraphs will provide an overview over regional hard and soft law initiatives and analyze their benefit for fostering concerted, pan-Arctic action in adopting and implementing a holistic approach to governing climate change induced risks across the circumpolar North.

6.1. Arctic Cooperation I: Hard Law

Multi- and bilateral binding legal agreements in the Arctic relevant for the management of climate change induced Arctic risks, are either lacking completely or are limited to a spatial or sectoral scope, which reflects the desire of some Arctic Nations to jointly advance environmental protection and conservation in the North foremost in response to problems arising in the marine environment. Regional hard law conventions, i.e. such that are legally binding[773], in that context e.g. address the implementation of international provisions as set up by MARPOL 1973/1978: E.g. the 1993 Agreement Concerning Cooperation in Measures to Deal with Pollution of the Sea by Oil or Other Harmful Substances (Copenhagen Agreement[774]) between Denmark, Finland Iceland, Norway and Sweden and the 1983 Agreement for the Co-Operation in Dealing with Pollution of the North Sea by Oil and Other Harmful Substances (North Sea Agreement[775]) established a legal regime pertaining to marine pollution by obliging state parties to inform[776] affected other parties about a given threat of marine pollution and render assis-

771 See Murphy, at 21–22, Kirton & Trebilcock, at 9, Bhat, at 373, Beyerlin & Marauhn, at 290 and furthermore *supra* in fn 209 (part I).

772 See Kälin, et al., at 264, c.f. Kirton & Trebilcock, at 9.

773 See on the definition of hard law also *supra* in 6. and furthermore for a distinction between soft and hard law *supra* in fn 209 (part I).

774 *Agreement Between Denmark, Finland, Iceland, Norway and Sweden Concerning Cooperation in Measures to Deal with Pollution of the Sea by Oil or Other Harmful Substances*, March 29, 1993, 2084 U.N.T.S. 283 [hereinafter Copenhagen Agreement].

775 *Agreement for the Co-Operation in Dealing with Pollution of the North Sea by Oil and Other Harmful Substances*, Sept. 13, 1983, 1605 U.N.T.S. 33 [hereinafter North Sea Agreement].

776 See art. 5 of the Copenhagen Agreement and arts. 5 and 6 para. 3 of the North Sea Agreement.

tance[777] when taking action against such a threat or to guarantee compliance with the agreements.

The North Sea Agreement of course, does not pertain to the Arctic Ocean. Yet as the North Sea forms part of the North-Atlantic waters and is thus adjacent to the Arctic Ocean, and three of the eight Arctic Nations (Denmark, Norway and Sweden) border the North Sea, the protection of the former against marine pollution will ultimately also benefit the Arctic marine environment. The same holds true for the Baltic Sea Area, which is extensively protected by the 1992 Convention on the Protection of the Marine Environment of the Baltic Sea Area (Helsinki Convention[778]), that in essence mirrors the provisions set out in the Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR Convention), which will be addressed in greater detail subsequently.[779]

Another regional agreement adopted by Denmark, Finland, Norway and Sweden is the 1974 Convention on the Protection of the Environment (Nordic Environmental Protection Convention[780]), which grants state parties or their civil society respectively, access to justice in environmental matters[781] and holds obligations on examining *"the permissibility of environmentally harmful activities"* as well as on the disclosure of any information gathered by such examination.[782] In essence the Convention does refer to

777 See arts. 8 and 10 (in respect to reimbursement of expenses resulting from assistance provided) of the Copenhagen Agreement and arts. 7 and 9 para. 1, sub-para. (a) (referring to the reimbursement of any expenses of a state party assisting in dealing with the pollution) and para. 2 of the North Sea Agreement.

778 *Convention on the Protection of the Marine Environment of the Baltic Sea Area*, 1992 [hereinafter Helsinki Convention].

779 While the Helsinki Convention shall, due to its inapplicability to the Arctic Ocean, not be addressed here any further, it is noteworthy, that in comparison to the OSPAR Convention its Annexes are much more detailed, providing for clearer cut regulations in terms of protecting the Baltic marine environment against all sources of pollution. This is especially relevant in respect to Annex III, which lists detailed criteria and measures to be taken concerning the prevention of pollution from land-based sources. See on the topic of protecting the marine environment against land-based pollution furthermore *infra* in 6.1.1., 6.2.2.5. and 6.3.3.2.

780 *Convention on the Protection of the Environment*, Feb. 19, 1974, 1092 U.N.T.S. 295 [hereinafter Nordic Environmental Protection Convention]; see for details on the Convention e.g. Koivurova (2008).

781 Art. 3 of the Nordic Environmental Protection Convention holds that *"[a]ny person who is affected or may be affected by nuisance caused by environmentally harmful activities in another Contracting State shall have the right to bring before the appropriate Court (...) the question of the permissibility of such activities, including the question of measures to prevent damage (...)".*

782 See arts. 5-6 of the Nordic Environmental Protection Convention.

topics now regulated in greater detail in the Aarhus and Espoo Conventions.[783] As the four Arctic Nations, which are party to the Nordic Environmental Protection Convention are also signatories to the Aarhus and the Espoo Convention this regional Convention becomes more or less obsolete.[784]

Furthermore, since the agreements just referred to – apart from the Helsinki Convention and the Copenhagen Agreement, which however in essence reflects its predecessor the 1971 Agreement Concerning Co-operation in Measures to Deal with Pollution of the Sea by Oil between Denmark, Finland, Norway and Sweden[785] – ought to be seen as achievements of the modern era of environmental law[786], none of them does of course refer to the precautionary principle or the ecosystem approach. Yet they call attention to the necessity to cooperate in environmental matters and hence provided a good starting point in the adoption of more recent regional initiatives, such as the Convention for the Protection of the Marine Environment of the North-East Atlantic, which shall be addressed in greater detail subsequently.

6.1.1. Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR)

The Convention for the Protection of the Marine Environment of the North-East Atlantic (hereinafter OSPAR Convention[787]) of 1992 had its origins back in 1972, when the Convention for the Prevention of Marine Pollution by Dumping from Ships and Aircraft (Oslo Convention[788]) was adopted. This Convention was further supported by the 1974 Convention for the Prevention of Marine Pollution from Land-Based Sources (Paris Convention[789]). Together these two conventions established a legal regime against marine pollution for the North Atlantic marine environment and parts of the Arctic Ocean.[790] In light of the Rio Earth Summit, however, the conventions

783 See for details on the Aarhus and Espoo Convention *supra* in 5.5.
784 Accord. KOIVUROVA (2008), at 90.
785 *Agreement Concerning Co-operation in Measures to Deal with Pollution of the Sea by Oil*, Sept. 16, 1971, 822 U.N.T.S. 324.
786 See for details *supra* in 5.1.1. et seq.
787 *Convention for the Protection of the marine Environment of the North-East Atlantic*, Sept. 22, 1992, 2354 U.N.T.S. 67 [hereinafter OSPAR Convention].
788 *Convention for the Prevention of marine pollution by dumping from ships and aircraft*, Feb. 15, 1972, 932 U.N.T.S. 4 [hereinafter Oslo Convention].
789 *Convention for the Prevention of Marine Pollution from Land-Based Sources*, Jun. 4, 1974, 1546 U.N.T.S. 119 [hereinafter Paris Convention].
790 See art. 2 para. a) of the Oslo Convention and art. 2 of the Paris Convention.

seemed inadequate to *"control some of the many sources of pollution [and therefore were replaced by the OSPAR Convention, which now] addresses all sources of pollution of the marine environment and the adverse effects of human activities upon it, [while taking] into account the precautionary principle and [strengthening] regional cooperation"*.[791] The Convention entered into force on March 25, 1998 and was ratified by five of the eight Arctic Nations, Denmark, Finland, Iceland, Norway and Sweden.[792]

As was the case with the Oslo and Paris Convention, the OSPAR regime does not protect the Arctic Ocean as a whole, but only in parts, as it is applicable to the Atlantic and the Arctic Ocean, north of 36° north longitude and between 42° west and 51° east longitude, which includes the Norwegian, Greenland and Iceland Sea, as well as parts of the Barents Sea up to the North Pole.[793]

The aim of the Convention is *"to prevent and eliminate pollution and (...) to protect the marine area against the adverse effects of human activities so as to safeguard human health (...), to conserve ecosystems and, when practicable, restore marine areas which have been adversely affected"*[794]. In implementing this duty, member states shall apply *"the precautionary principle, by virtue of which preventive measures are to be taken when there are reasonable grounds for concern that substances or energy introduced"* may have adverse impacts on the marine environment or human health, even if *"there is no conclusive evidence of a causal relationship between the inputs and the effects"*[795]. Furthermore, the OSPAR Convention holds in its Preamble *"that concerted action at national, regional and global levels is essential to prevent and eliminate marine pollution and to achieve sustainable management of the maritime area, that is, the management of human activities in such a manner that the marine ecosystem will continue to sustain the legitimate uses of the sea and will continue to*

791 Preamble and art. 31 para. 1 of the OSPAR Convention; on the sources of marine pollution see furthermore arts. 3-5 and 7 and in respect to cooperation *inter alia* art. 21 of the OSPAR Convention, which urges member states to negotiate a cooperation agreement, in case pollution originating from one party is likely to prejudice the interests of one or more of the other parties to the OSPAR Convention.

792 See for status of ratification: <http://www.ospar.org/content/content.asp?menu=00380108110000_000000_000000> (last visited: 06.07.2014).

793 See art. 1 para. (a), sub-para. (i) of the OSPAR Convention.

794 Art. 2 para. 1, sub-para. (a) of the OSPAR Convention.

795 Art. 2 para. 2, sub-para. (a) of the OSPAR Convention; the precautionary principle is also mentioned in art. 3 para. 1, sub-para. (b) (ii) of Annex V; see for details *infra* in 6.1.1.

meet the needs of present and future generations". Yet, such a holistic management scheme is difficult to implement, as the OSPAR Convention does apply only to parts of the Atlantic and the Arctic Ocean. In this context article 2 paragraph 4 of the Convention obliges contracting parties to *"apply the measures they adopt in such a way as to prevent an increase in pollution of the sea outside the maritime area"* the OSPAR regime is applicable to. Following these obligations, in practice integrated management strategies have developed for the Barents and the Norwegian Sea.[796]

Additionally, in order to guarantee the Convention's effective application and functioning, the contracting parties are obliged to *"undertake and publish at regular intervals joint assessments of the quality status of the marine environment and of its development"*[797]. Such assessments are subject to art. 6 paragraph (b) of the OSPAR Convention to include *"an evaluation of the effectiveness of the measures taken and planned for the protection of the marine environment and [an] identification of priorities for action"*. In this context Annex IV of the Convention holds further provisions on the assessment of the quality of the marine environment and *inter alia* urges states to cooperate in monitoring programs as well as in conducting scientific research on which the assessment is to be based upon.[798]

Article 9 of the OSPAR Convention grants access to information on the state of the marine environment of the OSPAR region, as well as on activities or measures adversely affecting or likely to affect it, to any natural or legal person requesting such information, unless there is a well-founded reason to refuse a disclosure. Since this provision holds similar obligations as the ones established in the Aarhus Convention, it does not bring about any new rights or duties to the Aarhus participants.[799] The OSPAR Convention, unlike the Aarhus Convention, does not grant a possibility for public participation as well as access to justice in environmental matters, though. As a consequence the access to information subject to the OSPAR Convention may only be relevant insofar as to educate people and raise awareness about the status of

796 See *infra* in 6.3.2.

797 Art. 6 para. (a) of the OSPAR Convention.

798 See for details art. 2, paras. (a), (c) and (d) of Annex IV to the OSPAR Convention and see on the gathering of scientific and technical research also art. 8 of the OSPAR Convention. In this respect the OSPAR Commission, as established by art. 10 para. 1 of the OSPAR Convention, has e.g. issued a report on climate change and its implications for the OSPAR maritime area and how the OSPAR legal regime ought to address these challenges. The report *inter alia* considers the need to address climate change adaptation by including *"climate change implications into (...) tools to implement an ecosystem approach"*; see OSPAR Commission, at 21.

799 See on the Aarhus Convention *supra* in 5.5.1.

the OSPAR marine region and the actions taken therein. Yet, this limitation is only of secondary significance, as the five Arctic Nations, which are contracting parties to OSPAR are also bound by the Aarhus Convention's provisions.

As has been stated above, the OSPAR Convention does refer to all forms of marine pollution, including dumping and incineration at sea, pollution from offshore sources and land-based activities. Articles 3 to 5 of the OSPAR Convention do in this respect hold, that *"all possible steps to prevent and eliminate pollution"* from these specific sources ought to be taken by member states. Specifics are elaborated in the Convention's Annexes I to III. In order to adequately protect the OSPAR marine environment contracting parties are furthermore urged to collaborate in adopting additional Annexes pertaining to other sources of pollution not yet subject to any regional or international measures and legal initiatives.[800]

Annexes II and III to the OSPAR Convention generally prohibit incineration and dumping of wastes and other matters at sea, except for specific wastes or matters listed in the Convention.[801] Accordingly, the OSPAR regime follows a similar approach to the London Protocol by establishing a list of substances permitted for dumping. This list does, however, not apply to the disposal of wastes and other matters from offshore installations and pipelines subject to Annex III, but only to wastes and other matters disposed from vessels or aircraft according to Annex II. Dumping of wastes and other matter from offshore installations is thus – apart from the discharge of carbon dioxide streams from carbon dioxide capture processes – comprehensively prohibited.[802] Such a disposal does, however, not include the discharge and emission of substances may resulting in the operation of the offshore sources. Any such discharge and emission is subject to *"authorisation or regulation by the competent authorities of the Contracting Parties"*[803]. Similar permissions are required in respect to the wastes and other matters may be suitable for dumping as they are listed in the list of Annex II.[804] In gener-

800 See art. 7 of the OSPAR Convention.
801 See arts. 2 and 3 of Annex II and art. 3 para. 1 of Annex 3; and see for the list of substances permitted for dumping art. 3 para. 2 of Annex II and art. 3 para. 3 of Annex III to the OSPAR Convention.
802 See art. 3 paras. 1 and 3 of Annex III to the OSPAR Convention.
803 Art. 4 of Annex III to the OSPAR Convention; further permits by the competent authority are required in case of the dumping of disused offshore installations or pipelines subject to art. 5 of Annex III to the OSPAR Convention.
804 See art. 4 of Annex II to the OSPAR Convention.

al, since the dumping of wastes and other matters as well as the discharge and emission of substances from offshore sources, involved in the exploration, exploitation and associated offshore processing of seabed mineral resources (unless the release of harmful substances is directly arising from such activities[805]) is subject to the IMO legal regime by which the OSPAR parties are bound[806], no exceptional novelties – apart from an enhanced co-operation[807] between member states to prevent and eliminate said sources of pollution – emerge from the rules held in Annex II and III.

In this context Annex I is broadening the scope of the international legal regime on the prevention of marine pollution, as it addresses pollution from land-based sources. While article 207 of UNCLOS urges states to *"adopt laws and regulations to prevent, reduce and control pollution of the marine environment from land-based sources"*[808], international initiatives in this respect have remained minimal.[809] Of course international conventions, such as the Stockholm Convention, the United Nations Framework Convention on Climate Change or the Convention on Long-Range Transboundary Air Pollution and their respective protocols, partake in the protection of the marine environment from pollutants emitted from industrial and domestic sites.[810] Yet, to date, no international Convention exists, explicitly addressing the pollution of the marine environment from land-based sources. On a global level land-based activities are rather regulated through soft law achievements such as the Washington Declaration on the Protection of the

805 See art. 2 para. 3, sub-para. (b) (ii) of MARPOL 1973/1978 and reg. 19 para. 2 of Annex VI to MARPOL 1973/1978.

806 All Arctic Nations which are contracting parties to the OSPAR Convention have also ratified MARPOL 1973/1978 and the relevant optional Annexes, with the exception of Iceland in relation to Annex VI, which regulates air pollution from ships; see on fixed or floating platforms engaged in the exploration, exploitation and associated offshore processing of seabed mineral resources reg. 39 para. 1 and 2, sub-para. 3 of Annex I, reg. 4 para. 1 of Annex V and reg. 19 para. 1 of Annex VI to MARPOL 1973/1978. In respect to the London Convention all OSPAR signatories, except Finland, have become parties to the London Protocol, which supersedes the Convention. However as Finland has ratified the London Convention it is bound by these regulations on dumping. Consequently the approach taken by the OSPAR Convention is a significant enhancement of the international dumping regime applicable to Finland subject to the London Convention. See for details *supra* in 5.3.2.2.

807 E.g. by means of art. 4 para. 1 sub-para. (c), art. 9 and art. 10 para. 2 of Annex II and art. 9 para. 1 of Annex III (in respect to consultation and information of other contracting parties) as well as art. 6 of Annex II and art. 10 of Annex III to the OSPAR Convention (in respect to the collaborative work through the OSPAR Commission).

808 Art. 207 para. 1 of UNCLOS.

809 Accord. Birnie, et al., at 385 and 464-466; and see furthermore subsequently in 6.1.1. and *supra* in fn 779 (part II).

810 See for details on these conventions *supra* in 5.2.

Marine Environment from Land-based Activities[811] of 1995 and its corresponding Global Programme of Action (GPA)[812], which leave the responsibility to adequately protect the marine environment against such sources of pollution to national and regional measures.

Consequently while the governments and the European Commission participating in the Washington Conference declared *"their commitment to protect and preserve the marine environment from the impacts of land-based activities"* and for that reason expressed their intention to individually and jointly take *"action to deal with all land-based impacts upon the marine environment"*, no ambitions to establish a global legally binding treaty on the protection of the marine environment from land-based sources resulted from this Conference.[813] The GPA is under these circumstances to be understood as guidance in developing and amending national or regional seas programs, such as the OSPAR legal regime. As such the GPA recommends that states identify and assess problems related to the pollution of the marine environment from land-based pollution, establish priorities in the management of such problems and develop and apply the most effective management strategies, by *inter alia* promoting sustainable development. In this context the GPA is reflective of the ecosystem approach, as it supports the application of integrated management, involving all stakeholders, and recognizes the linkages between social, economic and environmental factors in protecting the marine environment against land-based pollution.[814]

While legally binding, the OSPAR Convention, however, does not include these thoughts into Annex I. Rather it leaves the management of land-based pollution (i.e. the development of pollution control standards) to the competent authorities of the contracting parties, given their compliance with deci-

811 *Washington Declaration on Protection of the Marine Environment from Land-Based Activities*, 1995 [hereinafter Washington Declaration].

812 See for details <http://www.gpa.unep.org/> (last visited: 06.07.2014) and Kimball, at 189–190, Powers, at 30–31; the effective implementation of the GPA was topic of the Intergovernmental Review Meeting on the Implementation of the Global Programme of Action for the Protection of the Marine Environment from Land-based Activities on January 25-27, 2012, which resulted in the adoption of the Manila Declaration, addressing such implementation; see *Manila Declaration on Furthering the Implementation of the Global Programme of Action for the Protection of the Marine Environment from Land-based Activities*, Jan. 26, 2012, esp. paras. 1 and 3.

813 Preamble and para. 1 of the Washington Declaration.

814 See for details <http://www.gpa.unep.org/index.php/about-gpa> (last visited: 06.07.2014), United Nations Environment Programme (GPA), at 7–9, Rothwell & Stephens, at 380–381, VanderZwaag (Land-based Marine Pollution), at 183.

sions, plans and programs as established by the OSPAR Commission.[815] Yet, states are required to set priorities subject to Appendix 2 to the OSPAR Convention and use the best available techniques and environmental practices, when adopting programs and measures to prevent and eliminate the pollution of the marine environment from land-based sources, which means the use of *"the latest stage of development"* of processes, facilities and methods to limit discharge, emissions and waste, as well as *"the application of the most appropriate combination of environmental control measures and strategies"*.[816] Nevertheless, in essence these regulations do not provide for very detailed obligations to member states, but rather leave room for individual national legislation.

Finally, Annex V to the OSPAR Convention is concerned with the *"Protection and Conservation of Ecosystems and Biological Diversity of the Maritime Area"* and for that purpose makes reference to the Convention on Biological Diversity.[817] Subject to article 2 of Annex V, contracting parties are urged to *"take the necessary measures to protect the ecosystems and the biological diversity of the maritime area, and to restore, where practicable, marine areas which have been adversely affected"* as well as to *"cooperate in adopting programmes and measures for (...) the control of (...) human activities"* pertaining to the criteria listed in Appendix 3 to the Convention (e.g. extent, intensity, duration and irreversibility of human activities).[818] In terms of cooperation to protect the ecosystems and biological diversity of the OSPAR marine area, the contracting parties are furthermore by means of their collaborative work through the OSPAR Commission, obliged to *inter alia "develop means, consistent with international law, for instituting (...) precautionary measures"* and *"to aim for the application of an integrated ecosystem approach"*.[819]

The ecosystem approach was further elaborated at the joint meeting of the OSPAR Commission and the Helsinki Commission to the Convention on the Protection of the Marine Environment of the Baltic Sea Area in Bremen on June 25 to 26, 2003.[820] Paragraph 5 of the Statement following this meeting

815 See arts. 2 para. 1 and 3 of Annex I to the OSPAR Convention and BIRNIE, ET AL., at 457.
816 See art. 1 paras. 1 and 2 of Annex I and paras. 2 and 6 of Appendix 1 to the OSPAR Convention.
817 See art. 1 of Annex V to the OSPAR Convention.
818 Art. 2 paras. (a) and (b) of Annex V and art. 1 paras. (a) and (d) of Appendix 3 to the OSPAR Convention.
819 Art. 3 para. 1, sub-para. b. (iii) and (iv) of Annex V to the OSPAR Convention.
820 See FIRST JOINT MINISTERIAL MEETING OF THE HELSINKI AND THE OSPAR COMMISSION.

defines the ecosystem approach *"as the comprehensive integrated management of human activities based on the best available scientific knowledge about the ecosystem and its dynamics, in order to identify and take action on influences which are critical to the health of marine ecosystems, thereby achieving sustainable use of ecosystem goods and services and maintenance of ecosystem integrity"*. Additionally the statement holds, that *"[t]he application of the precautionary principle is equally a central part of the ecosystem approach"*.

While, by referring to *"management of human activities"* being more anthropocentric than what has been elaborated in the Conference of the Parties to the CBD, the ecosystem approach as established subject to the OSPAR regime, does provide for a brief and clear cut definition of the approach, without failing to address the essence of the CBD's Malawi Principles.[821] Subject to article 4 of Annex V, however, the management of fisheries is generally exempt from the provisions held in article 3 of Annex V to the OSPAR Convention. Yet, the Commission and the contracting parties who are members to the respective international bodies are urged to cooperate with such organizations in respect to questions arising in the fisheries or shipping sector (e.g. the North Atlantic Fisheries Commission (NEAFC) and the International Maritime Organization (IMO)).[822]

In practice Annex V to the OSPAR Convention and hence its guiding principles, the precautionary principle and the ecosystem approach, are implemented through the OSPAR Biological Diversity and Ecosystem Strategy[823], whose objective it is to by 2020 *"halt and prevent (…) further loss of biodiversity in the OSPAR maritime area, to protect and conserve ecosystems and to restore, where practicable, marine areas which have been adversely affected"*[824]. This aim is *inter alia* fulfilled by means of establishing marine protected areas (MPAs) within and outside of national jurisdiction in order to achieve a network of marine protected areas within the OSPAR maritime area (the so called *OSPAR Network of Marine Protected Areas*).[825]

821 See for details on the CBD's ecosystem approach *supra* in 4.5.2.

822 See art. 4 paras. 1 and 2 to Annex V of the OSPAR Convention, with para. 2 explicitly mentioning the International Maritime Organization.

823 See for details *The North-East Atlantic Environment Strategy: Strategy of the OSPAR Commission for the Protection of the Marine Environment of the North-East Atlantic 2010–2020*, 2010 (Agreement 2010-3).

824 See ibid., at 7 para. 1.1.

825 See ibid., at 7 para. 1.2. sub-para. (b) and *supra* in fn 431 (part II) and paras. 2 and 4 of the *Guidelines for the Management of Marine Protected Areas in the OSPAR Maritime Area*, 2003 (Agreement 2003-18). The Network was supposed to be established by December

According to the Guidelines for the Management of Marine Protected Areas in the OSPAR Maritime Area[826] the aim of the establishment of the OSPAR Network of Marine Protected Areas is to attain *"an ecologically coherent network of well-managed MPAs"* by means of protecting, conserving and restoring *"species, habitats and ecological processes which are adversely affected as a result of human activities"*, by preventing *"degradation of and damage to species, habitats and ecological processes, following the precautionary principle"* and by protecting and conserving *"areas that best represent the range of species, habitats and ecological processes in the OSPAR maritime area"*.[827] Additionally, according to the Guidelines, the Network ought to *"take into account the linkages between marine ecosystems and the dependence of some species and habitats on processes that occur outside the MPA most directly concerned"*[828].

In 2008 these thoughts were, by means of Agreement 2008-2, enhanced in respect to stakeholder participation when establishing marine protected areas according to the OSPAR Recommendation 2003/3.[829] The aim of Agreement 2008-2 is to facilitate good practice for communication with stakeholders on marine protected areas in order to achieve their support in marine protected area designation and protection.

While none of the OSPAR Agreements and Recommendations just referred to are legally binding[830], they nevertheless provide valuable insight into the Convention's rational in respect to the protection and conservation of the

2010. Yet an assessment at the end of 2010 showed, that the Network of Marine Protected Areas is not yet considered to be ecologically coherent throughout the entire OSPAR maritime area, which was why Recommendation 2003/3 was amended by Recommendation 2010/2 in order to establish a revised target; for a citation of the Recommendations see *supra* in fn 431 (part II).

826 *Guidelines for the Management of Marine Protected Areas in the OSPAR Maritime Area*, 2003 (Agreement 2003-18).

827 Ibid., paras. 4 and 5.

828 Ibid., para. 6; see in this context also *Guidance on Developing an Ecologically Coherent Network of OSPAR Marine Protected Areas*, 2006 (Agreement 2006-3) which holds in paras. 5.2 and 5.3 in more general terms that *"[a] functioning ecologically coherent network of MPAs should interact with, and support, the wider environment as well as other MPAs although this is dependent on appropriate management to support good ecosystem health and function within and outside the MPA"*.

829 See *Guidance for Good Practice for Communicating with Stakeholders on the Establishment & Management of Marine Protected Areas*, 2008 (Agreement 2008-2) and *supra* in fn 431 (part II) regarding OSPAR Recommendation 2003/3.

830 See art. 10 para. 3 in conjunction with art. 13 para. 5 of the OSPAR Convention; in comparison to Recommendations and Agreements, Decisions adopted by the Commission are subject to art. 10 para. 3 in conjunction with art. 13 para. 2 legally binding.

marine biodiversity in the North East Atlantic. It is in this holistic and integrative MPA strategy that the OSPAR Convention's devotion to both the precautionary principle as well as the ecosystem approach becomes evident.

Considering what has been just said, the OSPAR Convention does provide for a couple of significant enhancements to the international rules applicable when managing climate change induced Arctic risks: Its most obvious benefit lies in strengthening regional measures and cooperation between contracting parties as well as forming linkages to international bodies such as the International Maritime Organization, especially by means of the work of the OSPAR Commission. This integrative approach is furthermore reflected by the Conventions incorporation of the ecosystem approach especially by means of Annex V.

Additionally the Convention addresses all sources of marine pollution and is thus much broader in scope than the – albeit more detailed – international regime established under the auspices of the International Maritime Organization.[831] As article 7 of the OSPAR Convention allows parties to cooperate in adopting new Annexes prescribing measures, procedures and standards to protect the OSPAR maritime area against pollution from sources not yet mentioned in the Convention, it provides for a flexible mechanism in addressing newly arising environmental problems. And as the precautionary principle is regarded as one of the guiding principles when applying existing as well as when establishing new management mechanisms, the OSPAR Convention is also more attuned to managing complex environmental risks affecting its maritime area, that involve high uncertainties. Yet, as the Convention is supervised by the OSPAR Commission, which is made up of representatives of each of the contracting parties, no independent organization exists to ensure the compliance with the Convention. Ultimately, an effective implementation of the OSPAR Convention is dependent on national authorities' will to comply to the Convention's provisions and – because many of these provisions[832] are not very detailed – to find adequate solutions to ensure its effective implementation.

Yet, the probably biggest downfall in protecting and conserving the Arctic marine environment through the OSPAR Convention, ought to be seen in the fact that it only applies to parts of the Arctic Ocean. No matter how well elaborated and implemented the ecosystem approach applicable to the

831 See on the IMO regime *supra* in 5.3.2.
832 See e.g. Annex I to the OSPAR Convention, as referred to *supra* in 6.1.1.

OSPAR maritime area may be, an effective implementation of this approach, requires a more holistic management regime that takes Arctic ecosystems, adjacent to the OSPAR maritime area into account as well. In this context article 27 of the OSPAR Convention deserves some attention, as it allows for amending the definition of the maritime area to which the Convention is applicable, if states not referred to in article 25 of the Convention are unanimously invited by the contracting parties to accede to the Convention. According to article 25 paragraphs (b) and (c) any coastal state bordering or located upstream on watercourses reaching the maritime area may accede to the Convention without a formal invitation. As parts of Russia are bordering the current OSPAR maritime area, it thus would be able to accede to the Convention, without an invitation by the contracting parties. Although article 27 paragraph 2 does not define which states are envisaged by the article, considering the list of article 25, it seems likely that states whose maritime zones are adjacent or near to the OSPAR area, as well as such that conduct any activities (e.g. shipping) within this region, are encompassed by article 27 paragraph 2 of the OSPAR Convention.[833] Consequently, both Canada, as well as the U.S. would be suitable for accession if contracting parties so decide. Such an accession then would – following article 27 paragraph 2 of the OSPAR Convention, lead to a new definition of the maritime area the Convention is applicable to. As a result, while the current OSPAR regime is only applicable to the Atlantic part of the Arctic Ocean, article 27 paragraph 2 in conjunction with article 25 of the OSPAR Convention, may allow for expanding this regime to further parts or even the Arctic Ocean in its entirety.[834]

6.1.2. Protection and Conservation of Arctic Species

Given the fact that the Arctic mainly consists of an ocean, surrounded by the land territories of the eight Arctic States, it seems comprehensible that regional hard law regimes, i.e. such that are legally binding, for a specific area in the high North, have foremost developed in response to problems arising in the Arctic marine environment. In this context joint initiatives have *inter alia* been undertaken pertaining to marine pollution, e.g. by means of the OSPAR Convention addressed *supra* in 6.1.1., and the protection and con-

833 See KOIVUROVA, ET AL., at 283.
834 See also ibid., at 284. According to MOLENAAR such an expansion would however not be uncontroversial, as it is questionable whether Canada, Russia and the U.S. would be prepared to accept the entire OSPAR 'acquis'. See MOLENAAR (FISHERIES), at 461.

servation of species dependent on the Arctic Ocean for their livelihood. The regional hard law regime applicable to two of these species – polar bears and fisheries – shall be addressed in greater detail subsequently, while focus will be given to their relevance to risk governance and in doing so to their benefit for implementing a holistic approach to managing climate change induced Arctic risks. In this context – while not of any importance to Northern cooperation in governing Arctic risks – attention shall be furthermore drawn to the Convention on the Conservation of Antarctic Marine Living Resources, as this convention serves as an important example of a legally binding regional treaty that comprehensively addresses the management of marine living resources from a limited spatial scope.

6.1.2.1. Agreement on the Conservation of Polar Bears (ACPB)

One of the first legally binding treaties referring exclusively to the Arctic[835] is the Agreement on the Conservation of Polar Bears (hereinafter ACPB[836]) of 1973.[837] As has been shown *supra* polar bears are among the most threatened species by global warming.[838] But not only the melting of sea ice and other natural events caused by climate change, is causing difficulties to polar bear populations. Increasing human activities, that deplete polar bear habitats and are responsible for the release of toxic substances such as persistent organic pollutants that result in health issues for the species, are equally as threatening. Due to the decline in polar bear populations and their comparatively small range, polar bears have been listed as *vulnerable* on the IUCN Red List of Threatened Species, which means that the species is being *"considered to be facing a high risk of extinction in the wild"*.[839] Consequently, dwindling numbers of polar bears due to climate change and its related natural and anthropogenic incidents are amongst the most visible climate change induced risks within the Arctic region.

The Polar Bear Agreement was, however, not developed with the management of climate change induced Arctic risks in mind. Rather it was a result of negotiations between the five Arctic States hosting polar bear populations

835 To date there exist only three legally binding agreements, which are exclusively Arctic in scope: The Polar Bear Agreement, the Arctic Search and Rescue Agreement and the Agreement on Arctic Marine Oil Pollution, Preparedness and Response; see *infra* in 6.2.2.

836 *Agreement on the Conservation of Polar Bears*, Nov. 15, 1973 [hereinafter ACPB].

837 Accord. VERHAAG, at 566, TIMTCHENKO, at 203, RICHARDSON, ET AL., at 324.

838 See *supra* in fn 247 and 320 (part I).

839 See the IUCN Red List of Threatened Species, Version 2014.1, available at <http://www.iucnredlist.org/> (last visited: 06.07.2014) and IUCN SPECIES SURVIVAL COMMISSION.

(Canada, Denmark (Greenland), Norway, Russia and the United States (Alaska)) with contributions by the Polar Bear Specialist Group (PBSG) of the IUCN Species Survival Commission[840] in respect to unsustainable polar bear harvesting from the 18th to the mid-20th century.[841] In the Agreement's preamble the five contracting parties recognize their *"special responsibilities and special interests (...) in relation to the protection of the fauna and flora of the Arctic Region"* as well as the significant value of polar bears within that context and hence decide that a protection of the polar bear *"should be achieved through co-ordinated national measures taken by the States of the Arctic Region"*. Such coordination of national initiatives to protect and conserve the polar bear species is further emphasized by means of articles VII and IX, which oblige the contracting parties to coordinate their national scientific research and management programs and to *"consult with one another with the object of giving further protection to polar bears"*.

Article I prohibits the taking (i.e. hunting, killing and capturing) of polar bears, except for scientific or conservation purposes or in order to prevent any serious disturbances of the management of other living resources.[842] This prohibition does however not apply to the taking of polar bears by indigenous peoples and nationals for traditional means.[843] Consequently, as in the case of whale species subject to the International Whaling Convention,[844] the taking of polar bears is comprehensively prohibited for commercial purposes and as such follows a strict precautionary practice.[845]

The Convention's main contribution to the protection and conservation of the Arctic in light of climate change induced Arctic risks lies in its article II, however, which holds that

> *"[e]ach Contracting Party shall take appropriate action to protect the ecosystems of which polar bears are a part, with special attention to habitat components such as denning*

840 The PBSG's aim is to provide independent scientific information on polar bear populations to decision-makers and management authorities. For details on the group's work see <http://pbsg.npolar.no/en/> (last visited: 06.07.2017).
841 See Norris, et al., at 19, Bankes (2009), at 355, Bankes (2010), at 373, 378.
842 See art. I in conjunction with article III para. 1, sub-paras. (a), (b) and (c) of the ACPB.
843 See art. III para. 1, sub-paras. (d) and (e) of the ACPB.
844 See for details *supra* in 5.3.3.2. a.
845 This precautionary practice was further supported in respect to polar bear harvest by local hunters on the 14th meeting of the Polar Bear Specialist Group in 2005, during which a resolution on *"a precautionary approach when setting catch levels in a warming Arctic"* was adopted; see IUCN (Polar Bears 2006), at 57.

> *and feeding sites and migration patterns, and shall manage polar bear populations in accordance with sound conservation practices based on the best available scientific data."*

This provision is not only aimed at protecting polar bear populations and their habitat (e.g. by establishing protected areas), but also the ecosystems of which they are a part. Consequently, in fulfilling their obligations subject to article II of the ACPB, the contracting parties will have to take measures to conserve the Arctic ecosystems as a whole, which provides the Polar Bear Agreement with a highly holistic scope that would require the implementation of the ecosystem approach and hence urge state parties to participate in national, regional and global measures relevant to effectively protect the Arctic ecosystems. Adaptation and mitigation measures in response to climate change are in this respect especially important, as global warming is one of the main stressors to polar bears but also the ecosystems they are a part of.[846] At the meeting of the parties to the Polar Bear Agreement in Tromsø on March 17 to 19 in 2009[847] the signatory states acknowledged these concerns and agreed to *"look to other fora and national and international mechanisms to take appropriate action to address climate change"* and additionally recognized the *"urgent need for an effective global response that will address the challenges of contaminants"* and *"the likelihood of dramatically increased shipping as longer ice-free seasons increase access"* to the Arctic region.[848] All these natural as well as anthropogenic impacts combined put polar bear populations and the ecosystems they belong to at risk and require *"comprehensive circumpolar plans for action"*, which according to the outcome decisions of the meeting of the parties, should be developed at a national level and eventually – under support by the Polar Bear Specialist Group – provide for a comprehensive strategy to fully implement article II of the ACPB.[849]

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846 In this context the Polar Bear Specialist Group, at its 15th meeting in 2009, adopted a resolution on *"effects of global warming on polar bears"* which recommended that *"urgent global actions be taken to significantly reduce atmospheric greenhouse gas concentrations, and that polar bear range state governments and designated authorities agree to consider the current and likely future impacts of global warming in all management and planning affecting polar bears and their likely habitats."*; see IUCN (Polar Bears 2010), at 81.

847 See *Meeting of the parties to the 1973 Agreement on the Conservation of Polar Bears*, Outcome of Meeting (Tromsø, Norway March 17-19, 2009).

848 Ibid. at 1, 3 and 4 and see in this context also Bankes (2010), at 382–384 (critically assessing the Tromsø outcome).

849 See *Meeting of the parties to the 1973 Agreement on the Conservation of Polar Bears*, Outcome of Meeting (Tromsø, Norway March 17-19, 2009), at 5.

Consequently, while a comprehensive approach to protect and conserve polar bear species and the ecosystems they depend on, is the ultimate goal of the Polar Bear Agreement, an effective implementation of article II is first and foremost relying on national initiatives to protect polar bears and their habitat directly (e.g. by establishing protected areas, i.e. national wildlife refuges or national parks and reserves[850]) or indirectly by addressing the natural and anthropogenic threats they are facing (e.g. climate change, shipping and pollution) through the respective legal regimes applicable to them.

In this context much debate has arisen about the implications of the Polar Bear Agreement on the United States in respect to its climate change policy. As of May 15, 2008 polar bears are listed as *threatened*[851] under the United States Endangered Species Act (ESA[852]) of 1973, whose purpose subject to section 2 paragraph (b) is to provide the means *"whereby the ecosystem upon which endangered species and threatened species depend may be conserved, [as well as] to provide a program for the conservation of such (...) species"*.

In this context the ESA defines conservation as *"the use of all methods and procedures which are necessary to bring any endangered (...) or threatened species to the point at which the measures provided pursuant to [the ESA] are no longer necessary"*[853] (e.g. scientific research, law enforcement, habitat acquisition and maintenance). In essence this provision mirrors article II of the ACPB, which would mean that the U.S. would have to advance its climate change policy, in order to effectively implement its duties subject to the ACBP and the ESA. Reality however looks different.[854]

A species may be listed as threatened under the ESA if it *"is likely to become an endangered species [i.e. a species in danger of extinction] within the foreseeable future throughout all or a significant portion of its range"*[855]. Subject to section 4 paragraph (d) the Secretary of the Interior may issue any regulations as deemed *"necessary and advisable to provide for the conservation of threatened species"*[856]. Such a special rule was adopted in De-

850 See for details on the establishment of protected areas under the APBC Norris, et al., at 20–21.
851 See U.S. Department of the Interior (73 FR 28212), at 28212 and for details on the listing procedure Siegel & Cummings, at 131–136.
852 *Endangered Species Act*, 1973, 16 U.S.C. 1531 [hereinafter ESA].
853 Sec. 3 para. (3) of the ESA.
854 Accord. Bankes (2010), at 382.
855 Sec. 3 paras. (6) and (20) of the ESA.
856 Sec. 4 para. (d) and sec. 3 para. (15) of the ESA.

cember 2008 in respect to polar bears. Yet, instead of enhancing the ESA regime, the 4(d) rule actually restricted the full range of conservation measures pursuant to the ESA and did not address topics such as habitat loss from climate change.[857] In fact, under special rule 4(d) incidental taking of polar bears is permitted, while *"taking"* has subject to section 3 paragraph (19) of the ESA to be understood as *"harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to engage in any such conduct"*, which includes the modification and degradation of habitat through public and private activities that may enhance climate change and thus alter the polar bears' sea ice habitat.[858]

In this respect some alleviation came from the final rule 75 FR 76086, which on July 12, 2010 designated approximately 484,734 km² of Alaskan territory as critical habitat for polar bears subject to section 3 paragraph (5) and section 4 paragraph (a), sub-paragraph (3) of the ESA; a rule that was, however, vacated and remanded by court order in 2013.[859] Even if the critical habitat rule was still in place, such a rule has its limitations of course: While, by designating critical habitat the needs of polar bears in respect to their environment (including the value of sea ice habitat that is threatened by climate

857 The special rule in essence adopts existing conservation regulations under the Marine Mammal Protection Act of 1972 (*Marine Mammal Protection Act*, 1972, 16 U.S.C. 1361 [hereinafter MMPA]), which generally prohibits the taking and import of marine mammals and their products (see sects. 101 and 102 of the MMPA), as well as under CITES, as the appropriate regulatory provisions for polar bears. See for details U.S. Department of the Interior (73 FR 76249), WWF (Polar Bears) and Siegel & Cummings, at 135–136; note that the 4(d) rule was challenged via litigation, which eventually led to its re-evaluation. A new rule 4(d), in essence mirroring its original form as adopted in December 2008, was, however, put into force as of March 2013. See for details <http://www.regulations.gov>, Docket No: FWS-R7-ES-2012-0009.

858 See in this respect the definition of "harm" by the Fish and Wildlife Service in its statement to rule 4(d): Harm is defined as *"significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding or sheltering"*. As polar bears are dependent on sea ice habitat for all these purposes, the definition of harm is certainly fulfilled if sea ice continues to melt due to anthropogenic greenhouse gas emissions. See U.S. Department of the Interior (73 FR 76249), at 76251 and note furthermore that "harm" was defined in the *Code of Federal Regulations, Title 50 Wildlife and Fisheries*, Oct. 1, 2002 [hereinafter 50 CRF] in its chapter 1, sub-chapter B, part 17, sub-part A, sec. 17.3. (50 CRF 17.3) as *"an act which actually kills or injures wildlife (…) [including] significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding or sheltering"*. See in this context however, U.S. Fish and Wildlife Service (FONSI), at 3 (stating in respect to the 4(d) rule, that this rule *"does not address climate change"*).

859 See U.S. Department of the Interior (75 FR 76086) and on the decision of the U.S. District Court for the District of Alaska see <http://law.alaska.gov/press/releases/2013/011113-PolarBear.html> (last visited 06.07.2014).

change[860]) will be recognized, no explicit obligations to federal authorities to advance engagements in the international global climate regime can be derived from such a rule, however; the Department of the Interior's Fish and Wildlife Service acknowledges the challenges posed to fish and wildlife by climate change and is determined to address these issues appropriately (*inter alia* by development of a Strategic Plan for Climate Change), such an approach does, however, not provide for any binding greenhouse gas emission reduction targets as established under the United Nations Framework Convention on Climate Change and the Kyoto Protocol regime.[861]

In this respect it does not help, that section 7 paragraph (a), sub-paragraph (2) of the ESA obliges federal agencies to ensure that no *"action authorized, funded, or carried out"* by such agencies is likely *"to jeopardize the continued existence of any (...) threatened species or result in the destruction or adverse modification of habitat of such species"* [862] – which would logically include the reduction of greenhouse gas emissions that enhance the loss of polar bears' sea ice habitat. And this holds even more true given the existence of the 4(d) rule, which lessens the duties of both public and private sectors under sections 7 and 9 respectively of the ESA.

Ultimately, while the designation of polar bears as threatened species has advanced discussions on climate change and provided for new insight in respect to the establishment of a more stringent and comprehensive climate change legislation in the U.S., the Act is not viewed by its administration as the right legal mechanism to regulate greenhouse gases[863] – as the Fish and Wildlife Service states: *"[T]he underlying causes of climate change are complex global issues that are beyond the scope of the Act"*[864].

860 See for details ibid., at 76115–76116.
861 See ibid., at 76093 and 76100.
862 An agency's action may be exempt from this provision, *inter alia* because there are no reasonable and prudent alternatives to the agency's action, the benefits of such action clearly outweigh the benefits of alternatives and the action is of regional or national significance; see sec. 7 para. (h), sub-para. (1), (A) and para. (g), sub-para. (4) of the ESA. If an agency's action is exempt from the provisions of sec. 7 para. (a), sub-para. (2) it will, however, pursuant to sec. 7 para. (h), sub-para. (1), (B) have to establish *"reasonable mitigation and enhancement measures (...) as are necessary and appropriate to minimize the adverse effects of the agency action upon the (...) threatened species, or critical habitat concerned"*.
863 See U.S. Fish and Wildlife Service (Polar Bears), accord. Mooar, at 419 and 422; and neither is it viewed as such by NGOs such as WWF, see WWF (Polar Bears).
864 U.S. Department of the Interior (75 FR 76086), at 76116.

Nevertheless a strict implementation of the Polar Bear Agreement as well as of the ESA should not only further national policy-making in respect to climate change, but especially enhance administrative engagement in binding legal responses on this topic on a global scale. Such a duty to further commitments to reduce greenhouse gas emissions does of course not only apply to the U.S. but also to the other contracting parties to the Polar Bear Agreement, which are bound by its article II. In this respect the Convention shows how a regional treaty aimed at protecting one specific species can not only foster coordination of national measures but also form linkages between legal regimes of different sectors, which is one of the main ingredient in effectively applying the ecosystem approach.

6.1.2.2. Protection and Conservation of Arctic Fisheries

While there exists no comprehensive regional treaty, similar to the Polar Bear Agreement, addressing fisheries exclusively within the Arctic Ocean, some Arctic fish stocks are protected by several multilateral regional fisheries management organizations (RFMOs) applicable to the Atlantic or the Pacific Ocean: The North Atlantic Fisheries Commission (NEAFC), the Northwest Atlantic Fisheries Organization (NAFO), the North Atlantic Salmon Conservation Organization (NASCO), the International Commission for the Conservation of Atlantic Tunas (ICCAT), the North Pacific Anadromous Fish Commission (NPAFC) and the Western Central Pacific Fisheries Commission (WCPFC).[865] However, as their field of work is limited to only parts of the Arctic marine area,[866] an in-depth examination of these RFMOs and their respective hard law regulations (i.e. Conventions)[867] would go be-

865 Note that besides these multilateral regional fisheries management organizations there exist a couple of bilateral organizations and arrangements regarding fisheries; see for details e.g. Molenaar (Fisheries), at 439–441 and Molenaar (Fisheries Management), 249.

866 See art. 1 para. a), sub-para. (1) of the NEAFC Convention, art. 1 of the NAFO Convention, art. 1 para. 1 of the NASCO Convention, art. I of the ICCAT Convention, art. 1 of the NPAFC Convention (limiting the scope of the Convention, except for scientific purposes, to high sea areas within the NPAFC area) and art. 3 para. 1 of the WCPFC Convention. Additionally see Molenaar (Fisheries), at 447 and 451 (stating, that while *"all the globally intergovernmental organizations, bodies and legally binding and non-legally binding instruments related to fisheries conservation and management are also applicable to the Arctic marine area, a large part of the Arctic marine area is not covered by an RFMO or Arrangement with competence over target species other than tuna and tuna-like species and anadromous species.")*.

867 See *Convention on Future Multilateral Cooperation in North-East Atlantic Fisheries*, Nov. 18, 1980, 1285 U.N.T.S. 129 [hereinafter NEAFC Convention], *Convention on Future Multilateral Cooperation in Northwest Atlantic Fisheries*, Oct. 24, 1978, 1135 U.N.T.S. 369 [here-

yond the scope of this thesis. Even more so since in respect to the governance of climate change induced Arctic risks, which as has been shown, also pertains to the management of fisheries, the respective RFMO Conventions do in essence not provide for any additional rights or duties to flag, coastal or port states.[868] Rather, on a common note, they establish the RFMOs' main body of work, the Organization or Commission[869], which is responsible for enhancing cooperation in the fisheries sector by *inter alia* advancing monitoring initiatives and scientific research on the respective stocks and their environment to be protected as well as on other fisheries dependent thereon.[870] The scientific studies developed and the analysis of data and exchange of information under the auspices of the respective authorities then form the base for management recommendations and proposals, which are binding upon state parties, unless they explicitly oppose to them.[871] Dependent on

inafter NAFO Convention], *Convention for the Conservation of Salmon in the North Atlantic Ocean*, March 2, 1982, 1338 U.N.T.S. 33 [hereinafter NASCO Convention], *International Convention for the Conservation of Atlantic Tunas*, May 14, 1966, 673 U.N.T.S. 64 [hereinafter ICCAT Convention], *Convention for the Conservation of Anadromous Stocks in the North Pacific Ocean*, Feb. 11, 1992 [hereinafter NPAFC Convention] and *Convention on the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean*, Sept. 5, 2000, 2275 U.N.T.S. 43 [hereinafter NPAFC Convention].

868 But see art. 2 of the NASCO Convention and art. III to VII of the NPAFC Convention, which *inter alia* both prohibit fishing of salmon and anadromous fish stocks (see on anadromous fish species furthermore *supra* in fn 546 (part II)) respectively in areas beyond national jurisdiction, as well as arts. 24 and 27 of the WCPFC Convention, holding specific duties for flag and port states.

869 See art. 3 para. 1 of the NEAFC Convention, art. II para. 1 of the NAFO Convention, art. 3 para. 1 of the NASCO Convention, art. III para. 1 of the ICCAT Convention, art. VIII para. 1 of the NPAFC Convention and art. 9 para. 1 of the WCPFC Convention. If not stated otherwise these respective Commissions and Organizations are the authorities responsible for conducting the tasks referred to subsequently.

870 See art. 4 para. 3 of the NEAFC Convention, art. VI para. 1 of the NAFO Convention (scientific matters lie in the responsibility of the Scientific Council of the NAFO), art. 4 para. 1, sub-para. (a) of the NASCO Convention (holding that the NASCO Council functions as a forum for the study, analysis and exchange of information among the contracting parties in respect to salmon stocks), art. IV and VI para. (a) of the ICCAT Convention, art. XI paras. 6, 8 and 9 and additionally art. VII of the NPAFC Convention, which directly obliges state parties to cooperate in conducting scientific research, and art. 5 paras. (i) and (j), art. 10 para. 1, sub-paras. (d)-(f), (i) and arts. 12, 13 and 28 of the WCPFC Convention.

871 See art. 5, para. 1, art. 6 para. 1, arts. 8, 9 and 12 paras. 1 and 2, sub-paras. (b) and (c) of the NEAFC Convention, art. XI paras. 2, 5 and 7 and art. XII, paras. 1 and 3 of the NAFO Convention (which appoint the forming of proposals to the NAFO Fisheries Commission), art. 7 para. 1, sub-paras. (b) and (c), art. 8 para. (b) and art. 13 paras. 2 and 3 of the NASCO Convention (which appoint the task to propose binding regulatory measures to the Organization's respective Commissions subject to art. 3 para. 3, sub-para. (b) and art. 10 para. 1) and art. VIII para. 1, sub-para. (a), paras. 2 and 3, sub-para. (c) of the ICCAT Convention, cf. art. XI paras. 1, 11, 12 and 13 of the NPAFC Convention (holding no provisions on the legal status of the Commission's recommendations and proposals) and art. 10 para. 1, sub-paras. (a), (c)

their geographical location, all Arctic littoral states have become party to one or more RFMOs.[872]

As far as the governance of climate change induced Arctic risks is concerned the work programs of the RFMOs deserve greater attention: NASCO e.g. and its contracting parties in 1998 adopted a precautionary approach in order to protect salmon and preserve the environments in which it lives: *"The absence of adequate scientific information should not be used as a reason for postponing of failing to take conservation and management measures"*.[873] According to the Agreement on Adoption of a Precautionary Approach[874], such an approach requires *inter alia* to consider the needs of future generations, to avoid changes that are not potentially reversible, to identify negative impacts and measures to avoid or correct them prior to conducting any activities (or in other words to conduct environmental impact assessments) and in case any such impact is uncertain, to give priority to conserving the productive capacity of salmon stocks.[875]

Also, NAFO in 2007 established a *Working Group on Ecosystem Approach to Fisheries Management (WGEAFM)*.[876] However, as the WGEAFM's purpose is to guide the work of NAFO's Scientific Council, the ecosystem approach is mainly applied in a scientific context, rather than as a management tool *per se*. Consequently, the NAFO ecosystem approach requires to identify ecosystems and conduct scientific studies in order to gather comprehensive data pertaining to them, as well as to develop scientific parameters and models, which are reflective of the ecosystem approach, to guide fisheries management within the NAFO area.[877] This assumption is confirmed by article VI paragraph 1, sub-paragraphs a) and b) of the NAFO Convention, which outlines the Scientific Council's functions and in this respect refers to the gathering, exchange and valuation of scientific data not

and para. 2, art. 20 paras. 5 and 6 of the WCPFC Convention.

872 See on the status of ratification to NEAFC <http://www.neafc.org/system/files/%252Fhome/neafc/drupal2_files/london-declarlation_and_new_convention.pdf> at 3, to NAFO <http://www.nafo.int/about/frames/about.html>, to NASCO <http://www.nasco.int/about.html>, to ICCAT <http://www.iccat.es/en/contracting.htm>, to NPAFC <http://www.npafc.org/new/about_convention.html> and to WCPFC <http://www.wcpfc.int/doc/wcpfc2-2005-07-rev2/status-convention-34k> (last visited: 06.01.2014).

873 Para. 1 of the NASCO Agreement, as cited *infra* in fn 874 (part II).

874 *Agreement on Adoption of a Precautionary Approach*, 1998 [hereinafter NASCO Agreement].

875 See para. 2, sub-paras. a), b) and d) of the NASCO Agreement.

876 See Northwest Atlantic Fisheries Organization, at 1.

877 See for details ibid.

only pertaining to fish stocks within the NAFO area, but also to *"environmental and ecological factors affecting these fisheries"*. As scientific research conducted by the Scientific Council (or any of its Working Groups) provides the base upon which the NAFO Fisheries Commission is to propose management and conservation measures,[878] applying the ecosystem approach at the assessment stage, will – from an ecosystem perspective – ultimately benefit the regulatory outcome. Nevertheless the ecosystem approach adopted by NAFO does not require the Commission's proposals to be integrative and holistic, other than being consistent with conservation and management measures taken by coastal states.[879]

In this respect it is noteworthy, that in 2007 an Amendment[880] to the NAFO Convention was adopted, which in its article 2, explicitly holds, that the preamble of the NAFO Convention shall be modified to include the following passage: *"Committed to apply an ecosystem approach to fisheries management in the Northwest Atlantic that includes safeguarding the marine environment, conserving its marine biodiversity, minimizing the risk of long term or irreversible adverse effects of fishing activities, and taking account of the relationship between all components of the ecosystem".* This view is furthermore supported through the amendment of article III to the NAFO Convention, which calls for the application of the precautionary principle as well as ecosystem-based and sustainable management of fish stocks.[881] As the NAFO Amendment has not been ratified by the necessary number of parties, it is, however, currently not in force.[882]

The NEAFC Convention is more advanced in this context: Already in its preamble the Convention refers, albeit implicitly, to the ecosystem approach, by holding that by means of the Convention the contracting parties desire *"to promote the long term conservation and optimum utilization of the fishery resources of the North-East Atlantic area, and in doing so to safeguard the marine ecosystems in which [they] occur, and accordingly to encourage*

878 See art. VI para. 1, sub-para. c) and art. XI para. 2 of the NAFO Convention.
879 See art. XI para. 3 of the NAFO Convention.
880 *Amendment to the Convention on Future Multilateral Cooperation in the Northwest Atlantic Fisheries (GC Doc. 07/4)*, Sept. 28, 2007 [hereinafter NAFO Amendment].
881 See art III, paras. (a), (c), (d) and (e) of the amendments to the NAFO Convention according to art. 3 of the NAFO Amendment.
882 See in this respect art. XXI of the NAFO Convention, which requires the adopted amendment to be ratified by at least three-fourths of the NAFO members. As of September 2013 the amendment was ratified by 5 of the 12 contracting parties, *inter alia* by Norway, Canada and Russia. See <http://www.nafo.int/about/frames/convention.html> (last visited: 06.07.2014).

international cooperation and consultation with respect to these resources." Consequently article 2 of the NEAFC Convention lays down the Convention's objective as *"the long-term conservation and optimum utilization of the fishery resources"* which are responsible for *"providing sustainable economic, environmental and social benefits"*. To follow this aim the NEAFC Commission, when making recommendations, will have to *"take due account of the impact of fisheries on other species and marine ecosystems (...) as well as of the need to conserve marine biological diversity"*[883]. Furthermore the Commission shall *"apply the precautionary approach"*[884] when making such recommendations pursuant to articles 5, 6, 8 and 9 of the NEAFC Convention, concerning fisheries conducted beyond and within areas under jurisdiction of a contracting party.

A similar approach is taken by the WCPFC Convention, which holds in its art. 5 paras. (a) to (c) that the Commission, when adopting *"measures to ensure long-term sustainability for highly migratory fish stocks"* within the WCPFC area, is to *"ensure that such measures are based on the best scientific evidence available and are designed to maintain or restore stocks at levels capable of producing maximum sustainable yield, as qualified by relevant environmental and economic factors"* and will have to *"apply the precautionary approach"*. In respect of the latter the Convention further obliges the Commission to *"be more cautious when information is uncertain, unreliable or inadequate"*[885]. Consequently, *"[t]he absence of adequate scientific information shall not be used as a reason for postponing or failing to take conservation and management measures"*[886]. Rather, *"uncertainties relating to the size and productivity of the stocks"*[887] will have to be taken into account, when adopting any conservation and management measures. Such measures include determining, *"on the basis of the best scientific information available, stock-specific reference points and the action to be taken if they are exceeded"*, developing *"data collection and research programmes to assess the impact of fishing on non-target and associated or dependent species and their environment, and adopt[ing] plans where necessary to ensure the conservation of such species and to protect habitats of special concern"*.[888] Furthermore cautious conservation and manage-

883 Art. 4 para. 2, sub-paras. c) and d) of the NEAFC Convention.
884 Art. 4 para. 2, sub-para. b) of the NEAFC Convention.
885 Art. 6 para. 2 of the WCPFC Convention.
886 Ibid.
887 Art. 6 para. 1, sub-para. (b) of the WCPFC Convention.
888 Art. 6 para. 1, sub-para. (a) and (c) of the WCPFC Convention.

ment measures (e.g. setting of catch limits) may be taken for *"new or exploratory fisheries"*, as well as emergency measures may be adopted *"[i]f a natural phenomenon has a significant adverse impact on the status of highly migratory fish stocks"*, in order to ensure that fishing activities do not *"exacerbate such adverse impacts"*.[889] In this context the WCPFC does hold similar provisions to the ones established in article 6 of the Fish Stocks Agreement.[890]

As with the OSPAR Convention, the main problem in implementing the precautionary principle and the ecosystem approach to fisheries within the Arctic, however, stems from the fact that the NEAFC or WCPFC area respectively does not pertain to the Arctic Ocean as a whole – and neither does any of the other RFMO areas presented above.

Yet, in this respect the NEAFC Convention deserves some greater attention: According to article 1 paragraph a), sub-paragraph (1) of the NEAFC Convention, the NEAFC area is restricted to *"those parts of the Atlantic and Arctic Ocean and their dependent seas which lie north of 36° north latitude and between 42° west longitude and 51° east longitude"*, excluding the Baltic Sea area. This restriction is the same as applicable to the Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR Convention).[891] Consequently, as OSPAR is aimed at conserving its maritime area against adverse effects from human activities, except for fishing[892], the NEAFC regime is complementary to the OSPAR Convention.[893]

As held *supra*[894] an expansion of the OSPAR regime to cover the Arctic Ocean comprehensively would not be precluded by the Convention. The same holds true for the NEAFC Convention, as article 18 allows alterations to the NEAFC area boundaries, given that such a decision is supported by the contracting parties exercising jurisdiction in any part of the area that might be affected by such a change. However, to assume that article 18 of the NEAFC Convention would provide the base for expanding the NEAFC area to include the entire Arctic Ocean might be too far fetched. Nevertheless, neither article 18 nor any other article in the NEAFC Convention does

889 Art. 6 paras. 5 and 6 of the WCPFC Convention.
890 See for details *supra* in 5.3.3.2. b. ii.
891 See art. 1 para. (a) sub-para. (I) of the OSPAR Convention and for details *supra* in 6.1.1.
892 See art. 4 para. 1 of Annex V to the OSPAR Convention and for details *supra* in 6.1.1.
893 See in this respect also the Memorandum of Understanding (MoU) between NEAFC and the OSPAR Commission: North-East Atlantic Fisheries Commission & OSPAR Commission, at 2 para. 1.
894 See in 6.1.1.

impede on amending the spatial scope of the Convention.[895] Furthermore, pursuant to article 20 paragraph 4 of the NEAFC Convention, non parties *"may accede to the Convention (...) provided that an application for accession of that [s]tate meets with the approval of three-fourths of all the [c]ontracting [p]arties"*. In theory this would allow the Arctic States, not yet members to the Convention (i.e. Canada and the United States)[896] to accede to the Convention, if such accession finds support by contracting parties and hence may provide for an alteration of the NEAFC maritime boundaries. Such an expansion would certainly benefit the Arctic Ocean, as the combined regimes of NEAFC and OSPAR would provide for a comprehensive management approach in respect to the Arctic marine ecosystems, which would, due to the application of the precautionary principle and the ecosystem approach, be capable to address risks to the Arctic Ocean induced by climate change.

Finally it has to be noted that the Atlantic sector of the Arctic, as defined by the NEAFC and OSPAR Conventions, is further covered by the work of other regional bodies, that primarily have a scientific mandate[897]: The International Council for the Exploration of the Sea (ICES) and the North Atlantic Mammal Commission (NAMMCO). The aim of ICES and NAMMCO is to promote and encourage scientific research into the marine environment and specific marine mammals living therein respectively, as well as to provide a forum for analyzing and exchanging the information gained.[898] In turn this

895 See accord. Koivurova & Molenaar (2010), at 73 and Molenaar (Fisheries), at 454 and 456-458 (stating that an expansion of the spatial scope of the NEAFC could take place under large marine ecosystem (LME) designation, as supported by the Arctic Council PAME working group; see for details *infra* in 6.2.2.5. Also Molenaar points out that an expansion of the NEAFC regime to the entire Arctic Ocean bears problems in respect to the willingness of Canada and the U.S. to agree with NEAFC practices and in respect to interests of states that are not coastal states to the North-East Atlantic or the Arctic Ocean.)

896 See on the status of ratification *supra* in fn 872 (part II); note that Sweden discontinued its membership with NEAFC and Finland has never ratified the Convention on its own behalf, however both countries are member states to the European Union, which is a contracting party to NEAFC.

897 The NAMMCO mandate goes further as the Commission's Management Committee may *"with respect to stocks of marine mammals"* propose to the contracting parties *"measures for conservation and management";* see art. 5 para. 1, sub-para. (a) of the NAMMCO Agreement, as cited *infra* in fn 898 (part II).

898 See art. 1 of the *Convention for the International Council for the Exploration of the Sea*, Sept. 12, 1964, 652 U.N.T.S. 237 and arts. 2 and 4 para. 2, sub-paras. (a) and (e) of the *Agreement on Cooperation in Research, Conservation and Management of Marine Mammals in the North Atlantic*, April 9, 1992 [hereinafter NAMMCO Agreement]. See furthermore on the coordination of NAMMCO and ICES mandates: art. 4 para. 2, sub-para. (e) of the NAMMCO Agreement.

information is then used to fulfill the management mandates by NEAFC and OSPAR.[899] Consequently the work of ICES and NAMMCO can be regarded as complementary to the NEAFC and OSPAR regimes. Yet, if an expansion of the spatial scope to cover the entire Arctic Ocean would be feasible also for these scientific bodies, is questionable, since no regulation can be found within the Conventions that would support such an expansion. In any case, however, a change in spatial scope would not be precluded by the Conventions.

6.1.2.3. Convention on the Conservation of Antarctic Marine Living Resources (CCAMLR)

In respect to the management of marine living resources from a limited spatial scope another regional treaty – albeit irrelevant to Arctic cooperation – shall be briefly addressed: The Convention on the Conservation of Antarctic Marine Living Resources (hereinafter CCAMLR[900]). The CCAMLR, which was adopted on May 20, 1980 pursuant to article IX paragraph 1, sub-paragraph (f) of the Antarctic Treaty[901] and came into force in 1982, is evidently not applicable to the Arctic Region, as it pertains solely to Antarctica. An in-depth examination of the Convention would thus go beyond the scope of this thesis. Even more so, since Antarctica differs from the Arctic profoundly in geographical as well as legal terms.

A landmass surrounded by an ocean, Antarctica is subject to a comprehensive legal regime – the Antarctic Treaty System – which restricts the use of Antarctica for peaceful purposes only and establishes a base for scientific investigation and cooperation towards that end.[902] The treaty in this respects suspends any legal claims regarding territorial sovereignty over Antarctica.[903] Consequently the preservation and conservation of living resources in the region is not dependent on the zonal approach as established by UNCLOS. It is in this respect inadvisable to compare legal circumstances pertaining to the Arctic to those applicable to Antarctica. Yet, the Convention on the Conservation of Antarctic Marine Living Resources was the first regional le-

899 See art. 14 para. 1 of the NEAFC Convention and art. 3 para. (c) of Annex IV to the OSPAR Convention.
900 *Convention for the Conservation of Antarctic Marine Living Resources*, May 20, 1980, 1329 U.N.T.S. 47 [hereinafter CCAMLR].
901 *The Antarctic Treaty*, Dec. 1, 1959, 402 U.N.T.S. 71 [hereinafter Antarctic Treaty].
902 See art. I para. 1 and art. II of the Antarctic Treaty.
903 See art. IV para. 2 of the Antarctic Treaty.

gal treaty to establish an ecosystem approach in respect to fisheries.[904] Hence, a brief reference to the CCAMLR as another regional fisheries management regime is justified. In this respect the main focus ought to be given to article II paragraph 3 of the CCAMLR, which defines the guiding principles of the Convention:[905]

> *(a) Prevention of decrease in the size of any harvested population to levels below those which ensure its stable recruitment. For this purpose its size should not be allowed to fall below a level close to that which ensures the greatest net annual increment;*
>
> *(b) Maintenance of the ecological relationships between harvested, dependent and related populations of Antarctic marine living resources and the restoration of depleted populations to the levels defined in sub-paragraph (a) above; and*
>
> *(c) Prevention of changes or minimization of the risk of changes in the marine ecosystem which are not potentially reversible over two or three decades, taking into account the state of available knowledge of the direct and indirect impact of harvesting, the effect of the introduction of alien species, the effects of associated activities on the marine ecosystem and of the effects of environmental changes, with the aim of making possible the sustained conservation of Antarctic marine living resources.*

While not using the term explicitly, article II paragraph 3, sub-paragraph (a) of the CCAMLR is similar to the Maximum Sustainable Yield approach, as used by other (global) fishery regimes presented in greater detail above.[906] The Maximum Sustainable Yield refers to the largest quantity that can pos-

904 See Rayfuse (Biological Resources), at 381, Agnew, et al., at 9; the CCAMLR's holistic, ecosystem-based perspective is furthermore supported by the Protocol on Environmental Protection to the Antarctic Treaty (Madrid Protocol), which recognizes the need to protect the Antarctic environment and its dependent and associated ecosystems when planning and conducting activities within Antarctica in order to prevent any harmful interference with the ecosystem, *inter alia* by carrying out environmental impact assessments and designating protected areas and protected species. See for details art. 2, art. 3, paras. 1 and 2, art. 8, art. 12 para. 1, sub-para. (g) and Annexes I and II, art. 3, paras. 1, 3, sub-para. (c) and 4 of the *Protocol on Environmental Protection to the Antarctic Treaty*, 1991 [hereinafter Madrid Protocol].

905 See in this context also art. I para. 3 of the CCAMLR, which defines the Antarctic marine ecosystem as *"the complex of relationships of Antarctic marine living resources with each other and with their physical environment"*.

906 See for a detailed technical analysis of the management approach used in the CCAMLR: Agnew, et al., at 16–19 and on the Maximum Sustainable Yield *supra* in 5.3.3.2. a. and b. i.

sibly be taken from a specific stock, without impeding on the stocks' maximum growth rate. In the case of the CCAMLR such an approach was mainly developed to manage krill species in a sustainable way, as in the 1970's understanding grew about the fundamental value of krill conservation to maintaining the Antarctic marine ecosystem and to help depleted whale populations in their recovery.[907] While the Maximum Sustainable Yield adopted in the CCALMR, through the setting of catch limits, is a management tool that is reflective of the precautionary principle,[908] as a single-species approach it does not address ecological relationships between different species, as well as their habitat. It is for this reason nowadays widely considered to be an unsound management tool for marine living resources.[909] This change in perspective is of rather recent origin, though, which is why it is all the more important to note, that already in the 1980's when CCAMLR was developed, the Convention went beyond the scope of Maximum Sustainable Yield practice and followed a *"multi-species approach"* as it considers the ecological relationships between harvested, dependent and related stocks,[910] and refers to the status of ecosystems from a holistic point of view by including information not only on the harvesting of species but also on other natural and anthropogenic impacts on the marine ecosystem of Antarctica[911].

The gathering of scientific data is a self-explanatory prerequisite in implementing the ecosystem approach as adopted in article II paragraph 3 of the CCAMLR. For that reason article IX obliges the Commission for the Conservation of Antarctic Marine Living Resources, as established subject to article VII of the Convention, to facilitate research, compile the relevant data (e.g. on population status, abundance and productivity), analyze as well as publish such information and eventually formulate, adopt and revise conservation measures on the best scientific evidence available (e.g. setting of catch limits, designation of protected species and special areas, reserved for protection and scientific study, or assignment of open and closed seasons for

907 See Agnew, et al., at 7 and 20, Rayfuse (Marine Biodiversity), at 9, Potts, at 70, Rothwell (1996), at 124, Hunter, et al., at 1107, Fabra, at 576–577.

908 The precautionary principle is further reflected by the CCAMLR in art. II para. 3, sub-para (d), which is aimed at preventing risks of long-term adverse effects to the Antarctic marine environment. See for details Agnew, et al., at 9, Potts, at 70–72 and cf. Rayfuse (Marine Biodiversity), at 9.

909 See for details *supra* in fn 513 (part II).

910 See art. II para. 3, sub-para. (b) of the CCAMLR and see for details on the technical aspects of the application of the multi-species approach to krill species in practice Agnew, et al., at 20–22.

911 See art. II para. 3, sub-para. (d) of the CCAMLR.

harvesting).[912] The Commission is in this task supported by the Scientific Committee, whose duty it is to provide *"a forum for consultation and co-operation concerning the collection, study and exchange of information with respect to the marine living resources to which [the CCAMLR] applies"*[913].

While much more could be said in respect to the CCAMLR, considering that CCAMLR is a regional approach solely applicable to Antarctica and as such to a range of very specific species, this brief overview shall be sufficient, as a more detailed examination would go beyond the scope of this thesis. Nevertheless, since a lot of expertise on the application of both the precautionary principle as well as the ecosystem approach in practice (especially in the context of krill fishing) was gained throughout the years since the adoption and entry into force of the Convention, the CCAMLR certainly provides for a starting point when seeking to establish an ecosystem approach for the protection of the Arctic marine environment in order to effectively address climate change induced Arctic risks.

6.1.3. Duty to Cooperate through the Law of the Sea Convention

The regional legal treaties addressed *supra* in 6.1.1. and 6.1.2. have developed based on the desire of some Arctic States to jointly advance environmental protection and conservation in the North. Such cooperation as well as coordination of national measures is an essential prerequisite to the establishment and effective implementation of the ecosystem approach, as leaving the question of how environmental risks are to be managed in practice to policy makers of nation states will not adequately address risks, such as climate change induced Arctic risks, that do not make halt at legal borders and sectors. A holistic management of ecosystems and the risks they are threatened by within the Arctic, thus requires coordination of national measures as well as cooperation between all Arctic States and their stakeholders. While the regional legal treaties presented above provide for such coordination and cooperation between some states of the Arctic, they do, as they are restricted to specific regions in the area (i.e. the OSPAR marine environment and areas providing habitat for polar bears) not involve *all* Arctic

912 See for further details on the data to be gathered AGNEW, ET AL., at 11–16.
913 Art. XV of the CCAMLR; the Scientific Committee was established by means of art. XIV of the CCAMLR.

Nations. Consequently in seeking ways and means to foster the establishment and application of the ecosystem approach across the Arctic, the question arises whether any hard law regulations exist to support such a coordination of national initiatives and a closer collaboration between all Arctic States.

Considering the rather small number of regionally binding treaties, from a regional stance an agreement that would comprehensively address the Arctic and establish a duty to all Arctic Nations to cooperate and coordinate their Arctic policies is currently lacking.[914] Attention thus will have to be drawn to international hard law regimes. However, most of the legal treaties on international environmental law addressed above, fail to refer to any clear obligation for states to cooperate in developing and implementing measures to manage risks and to coordinate them. The Law of the Sea Convention deserves some further consideration in this context, as it may provide for a starting point in establishing a pan-Arctic legal regime, that would comprehensively address the region and hence provide for a good base in developing and implementing the ecosystem approach. Two provisions of UNCLOS deserve some greater attention in this respect: Article 197 and article 123 of UNCLOS. Article 197 of UNCLOS holds that

> *"States shall cooperate on a global basis and, as appropriate, on a regional basis, directly or through competent international organizations, in formulating and elaborating international rules, standards and recommended practices and procedures consistent with this Convention, for the protection and preservation of the marine environment, taking into account characteristic regional features".*

As the wording of article 197 of UNCLOS shows, however, this article is primarily aimed at fostering global and regional cooperation in the light of adequately implementing the Law of the Sea Convention on a global scale, rather than on a regional scale. Coordination of national measures and regional cooperation in response to challenges arising on a limited spatial scale, such as within the Arctic marine environment, would thus not be the primary goal of article 197 of UNCLOS.

914 This does, however, not hold true for soft law regulations, as will be focused on in greater detail *infra* in 6.2.; furthermore note that in 2011 and 2013 two legally binding agreements applicable to the Arctic were adopted: the Agreement on Cooperation on Aeronautical and Maritime Search and Rescue in the Arctic and the Agreement on Cooperation on Marine Oil Pollution, Preparedness and Response in the Arctic; see for details *infra* in 6.2.2.

But even if so, the provision does not essentially hold any duty to cooperate in adopting binding laws to protect and preserve the marine environment, as in comparison to articles 207 et seq. which clearly refer to adopting *"laws and regulations"*, article 197 speaks of *"rules, standards and recommended practices and procedures"*.[915]

Article 123 of UNCLOS does in that context not pose a stricter duty on member states, as it uses the word "should", rather than "shall" (as e.g. applied in articles 207 of UNCLOS et seq.), which is generally regarded as a more stringent obligation to do something.[916] However, the article is more limited in its scope and consequently also more detailed. It holds that:

> *"States bordering an enclosed or semi-enclosed sea should cooperate with each other in the exercise of their rights and in the performance of their duties under this Convention. To this end they shall endeavour, directly or through an appropriate regional organization:*
>
> *(a) to coordinate the management, conservation, exploration and exploitation of the living resources of the sea;*
>
> *(b) to coordinate the implementation of their rights and duties with respect to the protection and preservation of the marine environment;*
>
> *(c) to coordinate their scientific research policies and undertake where appropriate joint programmes of scientific research in the area;*
>
> *(d) to invite, as appropriate, other interested States or international organizations to cooperate with them in furtherance of the provisions of this article."*

While article 123 of UNCLOS would oblige states (albeit in a less stringent way) to cooperate in response to regional issues arising e.g. in the Arctic marine environment, it must be considered if the article is applicable to the Arctic, at all. In other words, the question must be answered, if the Arctic Ocean can be regarded as an enclosed, or semi-enclosed sea. According to article 122 of UNCLOS, enclosed or semi-enclosed seas are gulfs, basins or

915 Accord. Proelss & Müller, at 684, Koivurova & Molenaar (2010), at 47 (stating, that UNCLOS obligations on cooperation *"do not provide guidance on the outcome of such regional cooperation (e.g. (...) a legally binding or non-legally binding instrument)"*).

916 See e.g. Statsky, at 691, Burton, at 468.

seas *"surrounded by two or more [s]tates and connected to another sea or (...) ocean by a narrow outlet or consisting entirely or primarily of the territorial seas and exclusive economic zones of two or more coastal [s]tates"*. As has been shown in 3.2.2.2. the Arctic consists of an ocean, connected to the Atlantic Ocean through the Greenland and the Labrador Sea and the Pacific Ocean through the Bering Strait, surrounded by the landmasses of the five Arctic littoral states. *Prima facie* an application of article 122 would seem appropriate.

Nevertheless, while due to the vague use of the wording in article 122 of UNCLOS, in academics opinions on this topic are not precisely clear, in general the Arctic Ocean is not considered an enclosed or semi-enclosed sea.[917] As the Arctic Ocean possesses a rather broad area of high seas, it can hardly be assumed that it does *"primarily"* consist of the territorial seas and the exclusive economic zone of the Arctic coastal states. Furthermore, in comparison to the Bering Strait, the Greenland Sea and the Labrador Sea can rather not be regarded as a *"narrow outlet"*. But even if the article were applicable to the Arctic Ocean, it would make comprehensive circumpolar cooperation doubtful, as article 123 of UNCLOS only refers to states *"bordering an enclosed or semi-enclosed sea"*, which would restrict the application of the article to the five Arctic coastal states, Canada, Denmark (Greenland), Norway, Russia and the U.S. Additionally such cooperation would be limited by the specific enumeration of fields in which to coordinate measures subject to article 123 paragraphs (a) to (d) of UNCLOS (e.g. management, conservation, exploration and exploitation of marine living resources or in scientific research). Consequently while article 123 of UNCLOS may be seen as a legal duty for Arctic littoral states to cooperate in addressing problems arising within the Arctic marine environment due to climate change induced Arctic risks, this duty is neither comprehensive nor very strict.

Under these circumstances soft law regimes, established within the circumpolar North during the past century, such as the regime developed under the auspices of the Arctic Council which will be addressed in greater detail subsequently in 6.2., may provide for a much broader base to adopt and effec-

917 See on the following Koivurova & Molenaar (2010), at 67–68, Heidar, at 158, Dresser, at 525, Proelss & Müller, at 684, Sale & Potapov, at 146, cf. Rothwell (1996), at 211 and 251 (stating that there is a debate as to whether the Arctic Ocean can be considered an enclosed or semi-enclosed sea, without taking a clear stand regarding this question), but see Scovazzi (Arctic Navigation), at 379, Vukas, at 40, Rayfuse (Melting Moments), at 215, Schofield, et al., at 44 and Rayfuse (Marine Biodiversity), at 10 (assuming the applicability of article 122 of UNCLOS to the Arctic Ocean).

tively implement the ecosystem approach as well as the precautionary principle across the Arctic in response to climate change induced Arctic risks.

6.1.4. Conclusion

Governing climate change induced Arctic risks in an adequate way, requires a holistic approach and hence calls for adopting and implementing the ecosystem approach (including the precautionary principle, which forms an integral part thereof) across the Arctic.[918] The fragmented, sectoral approach provided for by international regimes, as referred to above,[919] does, however, not sufficiently account to this need. Ultimately coordination and cooperation among Arctic states is necessary to establish and effectively implement the ecosystem approach on a pan-Arctic scale. Regional hard law initiatives developed in this context,[920] however, are scarce and, with the exception of the Polar Bear Agreement, do not cover the Arctic in its entirety. Additional to this limitation in spatial scope, comes one in respect to their subject matter: The Conventions presented above are all restricted to a specific sector, predominantly pertaining to maritime issues (e.g. fisheries).

From an ecosystem perspective, the complementary regimes of the Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR) and the Convention on Future Multilateral Cooperation in North-East Atlantic Fisheries (NEAFC), provide a fundamental advancement to an ecosystem-based management within their overlapping maritime areas. However, as both their scopes are limited on a spatial scale, and pertain only to north-eastern parts of the Arctic Ocean, their effectiveness in applying the precautionary principle or the ecosystem approach when managing climate change induced Arctic risks to the Arctic marine ecosystems as a whole is insufficient. Furthermore, Arctic land areas are not covered by this regime.

The Polar Bear Agreement differs in this context, as by means of protecting and conserving the ecosystems polar bears are part of, state parties have to address threats to the marine as well as to the terrestrial Arctic ecosystems, that sustain the polar bears' livelihood. Yet, again the Convention's effectiveness in dealing with climate change induced Arctic risks in a circumpolar context is lessened by the fact that ratification of the Convention is subject

918 See *supra* in 4.5., esp. 4.5.2.1. and 4.5.2.4. as well as 4.6.
919 See for details *supra* in 5., esp. 5.6.
920 See for details *supra* in 6.1. and 6.2.

to the countries hosting polar bears. Consequently the regional hard law regime applicable to the Arctic is, due to its limitations in a spatial or sectoral perspective, not comprehensive enough, to adequately address climate change induced Arctic risks.

As a result, further cooperation and coordination of national measures is deemed necessary if climate change induced risks are to be governed appropriately. As has been shown, some support in this respect may be found in the Law of the Sea Convention.[921] However, the applicability of articles 123 and 197 of UNCLOS, which provide for cooperative action, is questionable in the context of the Arctic Ocean and furthermore, even if a base for cooperation and coordination of national measures in response to climate change induced risks can be established by means of these articles, they do only provide for domestic initiatives undertaken in respect to the Arctic marine ecosystems. Effectively governing climate change induced risks, requires, however, that the Arctic is addressed on a more comprehensive scale. Pan-Arctic cooperation necessary to provide for such a holistic approach in governing risks that may adversely affect the Arctic ecosystems, can however, not only take place in a binding legal setting, but also, as shall be shown subsequently, within a more flexible soft law framework.

6.2. Arctic Cooperation II: Soft Law

As has been shown there currently exists no legally binding pan-Arctic regime, that would involve all of the eight Arctic Nations. In fact Arctic cooperation and interaction is an issue of rather recent origin, since until the end of the 1980s the region served as a platform for the Cold War between the eastern and western hemisphere, primarily the former Soviet Union and the United States.[922] This tension began to see a change in 1987 with Mikhail Gorbachev's speech in Murmansk, in which he called upon the Northern

921 See for details *supra* in 6.1.3.

922 KOIVUROVA, ET AL., at 259, KOIVUROVA (ARCTIC COUNCIL), at 1, VANDERZWAAG, ET AL., at 142 and 154. Note that the following paragraphs will – in light of a comprehensive, integrative and ecosystem-based approach – address pan-Arctic cooperation, which involves all Arctic Nations. There exist however other, on a spatial scale more limited organizations dealing with Arctic issues on a cooperative level, such as the Barents Euro-Arctic Council (BEAC), the Nordic Council of Ministers and the Council of Baltic Sea States; see for details KESKITALO, ET AL., at 6, KESKITALO, at 103, SREEJITH, at 389, VERHAAG, at 568–569, HASANAT and for official documents and information the Councils' web pages at <http://www.beac.st>, <http://www.norden.org/en> and <http://www.cbss.org> (last visited: 07.07.2014).

States to resolve the security problems that have accumulated in the Arctic region and *"[l]et the North of the Globe, the Arctic, become a zone of peace".*[923] In this respect he suggested to jointly establish *"an integrated comprehensive plan for protecting the natural environment of the North"* and *"forming there a genuine zone of peace and fruitful cooperation".*[924]

On the initiative of Finland this change of view led in the following years to several negotiations between the eight Arctic Nations, which in June 1991 culminated in the adoption of the Declaration on the Protection of the Arctic Environment (Rovaniemi Declaration[925]) by the Arctic States' respective representatives (i.e. their ministers responsible for Arctic environmental issues).[926] This Declaration formed the base of a new established, pan-Arctic program to protect and conserve the Arctic environment: The Arctic Environmental Protection Strategy (AEPS), which will be addressed in greater detail subsequently.[927]

What ought to be noted regarding the AEPS, as well as other initiatives following this Strategy, is their legally non-binding, i.e. soft law character. In contrast to hard law, soft law is mainly recommendatory and hence has no legally binding effect, that would result in state responsibility in case of a breach. As such soft law serves merely as a guideline and is an expression of generally accepted views given within the institutional and/or regional boundaries it is developed in.[928] Consequently enforcement of soft law regulations proves difficult and its implementation is mainly dependent on the will of states to effectively introduce the soft law regulations they are addressed by into domestic law. In spite of its legally non-binding effect, there is a significant value to soft law, however, because its more flexible approach may establish a base for cooperation and involvement of states that would not be willing to be bound by any mandatory obligations.

Additionally the establishment of soft law may foster the development of hard law regulations, as existing cooperation through soft law regimes can

923 Gorbachev, at 4 and further Reiersen & Wilson, at 15.
924 Ibid., at 5 and 6.
925 *Declaration on the Protection of the Arctic Environment*, 1991 [hereinafter Rovaniemi Declaration].
926 See *Arctic Environmental Protection Strategy*, June 14, 1991 [hereinafter AEPS], at 1-4 and VanderZwaag, et al., at 144, Sale & Potapov, at 139, Koivurova & VanderZwaag, at 123, Koivurova (2005), at 208, Verhaag, at 566, Stokke, at 354, Keskitalo, et al., at 5, Tennberg, at 21.
927 *Arctic Environmental Protection Strategy*, June 14, 1991 [hereinafter AEPS].
928 See *supra* in fn 772 (part II).

facilitate the emergence of legally binding agreements. The following chapters ought to be seen against this background.

6.2.1. The Arctic Environmental Protection Strategy (AEPS)

The Arctic Environmental Protection Strategy's (AEPS) main objective is to allow for regional as well as international cooperation *"to ensure the protection of the Arctic environment and its sustainable and equitable development, while protecting the cultures of indigenous peoples"*[929]. The stewardship role in this context lies with the Arctic Nations and their indigenous population.[930] Acknowledging *"the importance of Arctic ecosystems"* on a national and international scale, the Rovaniemi Declaration hence adopted the AEPS to establish a forum for *"[c]ooperation in scientific research"* in order to identify sources of Arctic pollution[931], to assess potential environmental impacts as a result of development activities (or in other words to conduct environmental impact assessments[932]) and to implement and consider *"further measures to control pollutants and reduce their adverse effects to the Arctic environment"*.[933]

To this end the AEPS was to be guided *inter alia* by the principle that the *"[u]se and management of natural resources shall be based on an approach which considers the value and the interdependent nature of ecosystem components"* and that *"[m]anagement, planning and development activities which may significantly affect the Arctic ecosystems shall (...) provide for the maintenance of the region's ecological systems and biodiversity"* as well as *"respect the Arctic's significance for and influence on the*

929 AEPS, at 7 and see also in this context at 9, paras. 2.1. and 2.2., sub-para. (I), viii) and ix).
930 Ibid., at 7.
931 The AEPS in particular mentions as sources of Arctic environmental pollution oil, acidification, persistent organic contaminants, radioactivity, noise and heavy metals. See for details AEPS, at 12 et seq.
932 See also AEPS, in para. 2.2., sub-para. iii, a); in this context specific Guidelines for Environmental Impact Assessment in the Arctic were developed in 1997 under the AEPS. While aimed at harmonizing the conduct of environmental impact assessments within the circumpolar North, these Guidelines have, due to the soft law character of the AEPS (and the follow up forum, the Arctic Council; see *infra* in 6.2.2.) only had little influence in practice; see Arctic Environmental Protection Strategy, at 5, 13-29 on the different steps of environmental impact assessments and 32-38 on public participation and inclusion of indigenous knowledge into the environmental impact assessment process, Koivurova & VanderZwaag, at 157–158. Furthermore on the Arctic EIA Guidelines see Warner (Environmental Assessments), at 152-154.
933 See paras. 4 and 8-10 of the Rovaniemi Declaration.

global climate (...)".[934] Although not mentioned explicitly the AEPS in this context is clearly reflective of ideas as proposed by the ecosystem approach, as the strategy is taking the linkages between ecosystem components and their importance on a global scale into account and is also tending to socio-economic issues in promoting sustainable development and including rights and interests of indigenous peoples.[935] Additionally, the AEPS in recognizing that the *"vulnerability of the Arctic to pollution requires that action be taken now, or degradation may become irreversible"* is also following the precautionary principle.[936]

In jointly fulfilling the objectives outlined above and taking cooperative action to address the sources of pollution within the Arctic, four working groups were established under the AEPS: The Arctic Monitoring and Assessment Programme (AMAP), the Protection of the Arctic Marine Environment (PAME), The Emergency Prevention, Preparedness and Response (EPPR) and the Conservation of Arctic Flora and Fauna (CAFF).[937] As these working groups were later incorporated into the Arctic Council[938], they will be addressed in greater detail *infra* in 6.2.2.

In paragraph 17 of the Rovaniemi Declaration the Arctic Nations furthermore agreed to hold *"regular meetings to assess the progress made and to coordinate actions which will implement and further develop the [AEPS]"*. Based on this agreement several Ministerial Meetings, which culminated in the adoption of specific Declarations, were convened under the AEPS. The first meeting, after the founding conference in Rovaniemi, Finland took place on September 16, 1993 in Nuuk, Greenland. The Nuuk Declaration on Environment and Development in the Arctic (Nuuk Declaration[939]) adopted thereon, acknowledged that Arctic ecosystems, as they are *"especially slow to recover from the impact of human activities"* require special protective measures and that such measures ought to be taken individually and jointly *"for the benefit of present and future generations [including local populations and indigenous peoples], as well as for the global environment"*.[940] In essence the Nuuk Declaration hence reaffirmed the establishment of the

934 AEPS, in para. 2.2. sub-paras. ii) and iii), b) and c).
935 See ibid. and *supra* in fn 929 (part II).
936 AEPS, at 6 and Verhaag, at 568.
937 See paras. 12 to 16 of the Rovaniemi Declaration and AEPS, at 30-41.
938 See para. 10 of the Alta Declaration, as cited *infra* in fn 948 (part II).
939 *Nuuk Declaration on Environment and Development in the Arctic*, 1993 [hereinafter Nuuk Declaration].
940 Paras. 2 and 4 of the preamble and para. 2 of the Nuuk Declaration.

AEPS and its working groups and their guiding principles of sustainability and integrative management by recognizing *"the special role of indigenous peoples in environmental management and development in the Arctic"*.[941]

Additionally the Nuuk Declaration also acknowledged the value of international advancements in environmental protection and sustainable development, such as the Rio Declaration and Agenda 21, as well as the CBD, the UNFCCC and the Espoo Convention.[942] In respect to the latter the Declaration explicitly addressed the precautionary principle by holding that *"development in the Arctic must incorporate the application of precautionary approaches to development with environmental implications, including prior assessment and systematic observation of the impacts of such development"*[943] (i.e. environmental impact assessment, as governed by the provisions of the Espoo Convention).

Three years later another Ministerial Meeting was convened in Inuvik, Canada on March 21, 1996, during which the Declaration on Environmental Protection and Sustainable Development in the Arctic (Inuvik Declaration[944]) was adopted. The Declaration reaffirmed previous considerations as held in the Rovaniemi and Nuuk Declarations[945] and referred to the fact that both local as well as distant human activities are the cause for changes in the Arctic environment, which have significant impacts on a local as well as on a global scale[946] and thus *"require local, regional, circumpolar and global cooperation and coordination"*[947] in taking measures to adequately protect the Arctic ecosystems.

Just one year later, in 1997 the Ministers of the Arctic States met again in Alta, Norway, which represented the last Ministerial Meeting under the AEPS. The Alta Declaration[948] again tended to the overarching issues of sustainable development, integrative management and the conservation of biological diversity in the Arctic region and hence requested to individually and

941 Para. 7 of the preamble and paras. 6 and 7 of the Nuuk Declaration.
942 See para. 7-9 of the preamble and paras. 5, 8 and 10 of the Nuuk Declaration.
943 Para. 8 of the Nuuk Declaration.
944 *Declaration on Environmental Protection and Sustainable Development in the Arctic*, 1996 [hereinafter Inuvik Declaration].
945 See e.g. paras. 1, 5, and 8 of the Inuvik Declaration which reaffirm the AEPS principle of sustainable development and the inclusion of indigenous peoples into the strategy.
946 See paras. 4 and 5 of the preamble to the Inuvik Declaration.
947 See para. 8 of the preamble to the Inuvik Declaration and cf. para. 11 of the Inuvik Declaration.
948 *The Alta Declaration*, 1997 [hereinafter Alta Declaration].

jointly take special precautionary and protective measures, including scientific research, to adequately protect the Arctic environment from human activities negatively affecting its ecosystems.[949]

6.2.2. The Arctic Council

While the Arctic Environmental Protection Strategy (AEPS) lay the grounds for pan-Arctic cooperation and coordination of measures to advance scientific research, to protect the Arctic ecosystems against anthropogenic threats from within and outside of the region, to encourage sustainable use of natural resources and to maintain biodiversity within the Arctic,[950] eventually the desire awoke to further promote such *"cooperative activities (...) and to ensure full consultation with and the full involvement of indigenous people and their communities and other inhabitants of the Arctic in [these] activities"*[951].

To this end on September 19, 1996 the Arctic Council was, subject to the Declaration on the Establishment of the Arctic Council (Ottawa Declaration[952]) established as a high level forum to *"provide [the] 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 (...)"*[953]. To achieve these objectives biennial Ministerial as well as biannual Senior Arctic Official Meetings

949 See paras. 4, 6-8 of the preamble and paras. 1, 6, 7, 9 and 18 of the Alta Declaration; in respect to human activities the Alta Declaration especially addressed environmental risks and problems arising within the region from nuclear wastes and contaminants such as persistent organic pollutants from both local as well as from sources beyond Arctic boundaries; see in this respect para. 5 of the preamble and paras. 2, 16 and 17 of the Alta Declaration. The Declaration in this respect refers to international standards as established under the London Convention and its Protocol or the Convention on Long-Range Transboundary Air Pollution; see for details *supra* in 5.2.1. and 5.3.2.2.

950 See for details on the AEPS *supra* in 6.2.1.

951 Paras. 4-7 of the preamble to the Ottawa Declaration as cited *infra* in fn 952 (part II). And see additionally Koivurova (2010), at 119 (stating that under the AEPS indigenous peoples had only Observer status along with NGOs, intergovernmental organizations and non-Arctic states).

952 *Declaration on the Establishment of the Arctic Council*, 1996 [hereinafter Ottawa Declaration].

953 Para. 1 of the Ottawa Declaration; it is noteworthy that sustainable development played an important role right from the beginning when the Council took up its work. This ought to be seen against the backdrop of international advancements during the time the Arctic Council was founded, such as the Rio Declaration or Agenda 21; for details see *supra* in 5.1.

are convened to govern the work of the Arctic Council, which is composed of its Member States, Permanent Participants and countries or organizations that have Observer status.[954] The Arctic Council *Member States* are the eight Arctic Nations, Canada, Denmark, Finland, Iceland, Norway, Russia, Sweden and the United States.[955]

The category of *Permanent Participants* was created to allow *"for active participation and full consultation with the Arctic indigenous representatives within the Arctic Council"*[956], which is why several organizations representing Arctic indigenous peoples have been designated as Permanent Participants. These organizations may become Permanent Participants in case they represent a single indigenous community resident in several Arctic States or more than one indigenous population resident in only one Arctic State.[957] Whether or not any of these criteria is met will be decided by decision of the Arctic Council.

As of today six organizations representing Arctic indigenous peoples have been given Permanent Participant status: The Aleut International Association (AIA), the Arctic Athabaskan Council (AAC), the Gwich'in Council International (GCI), the Inuit Circumpolar Council (ICC), the Saami Council (SC) and the Russian Association of Indigenous Peoples of the North, Siberia and Far East (RAIPON).[958]

954 See paras. 2, 3 and 4 of the Ottawa Declaration, as well as paras. 15, 25 and 37 of the *Arctic Council Rules of Procedure*, as adopted by the Arctic Council at the first Arctic Council Ministerial Meeting, Iqaluit, Canada, Sept. 17-18, 1998, Revised by the Arctic Council at the eighth Arctic Council Ministerial Meeting, Kiruna, Sweden, May 15, 2013 [hereinafter Rules of Procedure]; In following the procedural framework established under the AEPS (see *supra* in 6.2.), also under the Arctic Council, regular Ministerial Meetings are to be convened subject to para. 4 of the Ottawa Declaration. This paragraph, however, additionally refers to meetings of *"senior officials"*. According to para. 21 of the Rules of Procedure, these Senior Arctic Officials (SAO) are to be designated by each Arctic State and are responsible for coordinating, guiding and monitoring the Arctic Council activities, as well as reviewing proposals by Arctic States and Permanent participants to be submitted to a Ministerial Meeting, and to make recommendations thereon; see paras. 23 and 24 of the Rules of Procedure. As an in depth examination of the SAO meetings – as well as further elaborations on organizational issues pertaining to the Arctic Council – would go beyond the scope of this thesis, the following analysis will be limited to the Council's focal points, as established through the Declarations adopted at the biennial Ministerial Meetings. For details on the Arctic Council's institutional composition see its Rules of Procedure.

955 See para. 2 of the Ottawa Declaration.

956 Ibid.

957 See para. 2, sub-paras. (a) and (b) of the Ottawa Declaration.

958 See para. 2 of the Ottawa Declaration, para. 2 of the Iqaluit Declaration as cited *infra* in fn 963 (part II) and para. 22 of the Barrow Declaration as cited *infra* in fn 965 (part II); these Permanent Participants are supported by the Arctic Council Indigenous Peoples' Secretariat

In comparison to the involvement of Permanent Participants, contributions by countries and organizations given *Observer status* is self-evidently very limited and e.g. concerns the making of statements or the submission of relevant documents to the Arctic Council meetings they are invited to.[959] Observer status may be given to non-Arctic states, global and regional inter-governmental and inter-parliamentary organizations, as well as NGOs.[960] As of July 2014 Observer status was granted to nine international organizations (among them IUCN, NAMMCO and UNEP), eleven NGOs (*inter alia* the Circumpolar Conservation Union (CCU), the Northern Forum (NF) and the WWF Arctic Program) and twelve non-Arctic states (France, Germany, Netherlands, Poland, Spain, the United Kingdom, China, Italy, Japan, Korea, Singapore and India).[961]

In order to achieve the Arctic Council's aim to enhance pan-Arctic cooperation between Arctic States and its indigenous peoples in the fields of scientific research, sustainable development, maintaining biodiversity and protecting and conserving Arctic ecosystems, the four working groups under the AEPS were incorporated into the Council's work, which is now responsible for overseeing and coordinating the specific programs.[962]

(IPS), whose aim it is to provide a forum for the Indigenous Peoples' Organizations, supply them with the necessary information and materials on Arctic issues and support their participation within the Arctic Council and its working groups; see para. 8 of the Ottawa Declaration and for details <http://www.arcticpeoples.org> (last visited: 07.07.2014).

959 See on the role of Observers, paras. 36-38 of the Rules of Procedure, Arctic Council (Observer Manual), at 3 and 5, as well as Senior Arctic Officals (SAO), at 51, Graczyk, at 614 (stating that, while there exists a broad agreement *inter alia* on the general rights of Observers to participate, their role within the Arctic Council is not completely clear); Also on the criteria for admitting Observers as adopted at the Nuuk Ministerial Meeting in 2011 at 50-51; see para. 5 of section 1 "Strengthening the Arctic Council" of the Nuuk 2011 Declaration as cited *infra* in fn 981 (part II).

960 See para. 3 of the Ottawa Declaration and para.

961 See para. 3 of the Iqaluit Declaration as cited *infra* in fn 963 (part II), para. 24 of the Barrow Declaration, as cited *infra* in fn 965 (part II), para. 13 of the Inari Declaration, as cited *infra* in fn 966 (part II), para. 7 of the final section "Other" of the Reykjavik Declaration, as cited *infra* in fn 969 (part II), para. 20 of the final section "Other" of the Salekhard Declaration, as cited *infra* in fn 969 (part II), para. 5 of section 4 "Strengthening the Arctic Council" of the Kiruna Declaration, as cited *infra* in fn 990 (part II) and for an updated list on all Arctic Council Observers see <http://www.arctic-council.org/index.php/en/about-us/arctic-council/observers > (last visited: 07.07.2014). Note that the EU's application for Observer status was received affirmatively but is pending a final decision; see para. 6 of section 4 "Strengthening the Arctic Council" of the Kiruna Declaration.

962 See para. 1 sub-para. (b) of the Ottawa Declaration, para. 12 of the Iqaluit Declaration, as cited *infra* in fn 963 (part II); note that the work of the Arctic Council working groups is mainly governed by the Senior Arctic Officials (SAO), which receive reports from working groups, task forces and other Arctic Council subsidiary bodies and discuss them at their meetings; see paras. 23 and 28 of the Rules of Procedure.

The first Ministerial Meeting of the Arctic Council, after its establishment in 1996, took place in Iqaluit, Canada in 1998. The Declaration adopted thereon (Iqaluit Declaration[963]) reaffirmed the Arctic Council's establishment as a high level forum to address pan-Arctic issues, such as sustainable development and environmental protection and in this context established the Sustainable Development Working Group (SDWG) and acknowledged the initiatives undertaken by the former AEPS working groups and their successful integration into the Council.[964]

Since, subject to paragraph 4 of the Ottawa Declaration, meetings of the Arctic Council usually take place on a biennial basis, the Ministers of the Arctic Nations met again on October 13, 2000 in Barrow, Alaska, by the means of which an Arctic Council Action Plan to Eliminate Pollution of the Arctic (ACAP) was adopted, which eventually became the last of the six Arctic Council working groups and was for this purpose renamed to Arctic Contaminants Action Program (ACAP).[965]

The third Ministerial Meeting held in Inari, Finland in 2002 by the means of the Inari Declaration[966] reaffirmed the Arctic Council's objective to, on a cooperative basis, promote sustainable development and environmental protection in the Arctic region[967] and referred to several issues pertaining to the specific Arctic Council working groups. These will be addressed in greater detail subsequently. It is, however, important to note, that due to the progress of the Arctic Climate Impact Assessment (ACIA), a joint project of the AMAP and CAFF working groups, which was adopted subject to paragraph 3 of the Barrow Declaration, an increased focus was brought upon the topic of climate change.[968] This focus was maintained during the following years at the fourth and fifth Ministerial Meetings in Reykjavik and Salekhard respectively.[969]

963 *The Iqaluit Declaration*, 1998 [hereinafter Iqaluit Declaration].

964 See para. 1 of the preamble and paras. 9 and 12, as well as for details paras. 13-26 of the Iqualuit Declaration.

965 See para. 2 of the *Barrow Declaration on the occasion of the Second Ministerial Meeting of the Arctic Council*, 2000 [hereinafter Barrow Declaration] and para 2 of section 5 "Action on Contaminants in the Arctic" of the Salekhard Declaration, as cited *infra* in fn 969 (part II).

966 *Inari Declaration on the occasion of the Third Ministerial Meeting of the Arctic Council*, 2002 [hereinafter Inari Declaration].

967 See paras. 2 and 3 of the preamble and paras. 1, 9-11 and 13 of the Inari Declaration.

968 See para. 8 of the Inari Declaration; in comparison, under the AEPS climate change was not one of the focal points; see Koivurova (2010), at 122, Nilsson, at 81 and Koivurova & Hasanat, at 64.

969 See for details *Reykjavik Declaration on the occasion of the Fourth Ministerial Meeting of the Arctic Council*, 2004 [hereinafter Reykjavik Declaration], esp. section 2 "Climate Change

On April 29, 2009 the Ministers of the Arctic Nations met in Tromsø, Norway and stressed once more the fundamental challenges global climate change is posing to the Arctic and hence noted *"that preserving the unique Arctic environment and protecting the Arctic against potentially irreversible impacts of anthropogenic climate change depends mainly on substantially reducing global emissions of CO2 and other greenhouse gases"* and *"that indigenous peoples in the Arctic"* play a key role in using *"best available traditional and scientific knowledge to help understand and adapt to challenges relating to climate change (...)".*[970] As *"climate change and its consequences [for the Arctic], including the loss of sea ice, is a major stressor to the Arctic's biodiversity"* the Tromsø Declaration furthermore addressed the importance of better *"understanding the impacts of climate change and other stressors on nature and biodiversity"* and in this context welcomed projects such as the Arctic Biodiversity Assessment (ABA) and the Circumpolar Biodiversity Monitoring Programme (CBMP), which will be addressed more detailed *infra*.[971]

Climate change does however, not only affect biodiversity in the region. It also grants an increased access to marine activities and navigation in the Arctic Ocean. It is in this context important to note, that during the time between the Salekhard and Tromsø meeting, Arctic marine activities had gained momentum (especially in the media), due to an increased interest in navigation as well as exploration and exploitation of oil and gas resources in the Arctic Ocean, and associated sovereignty disputes between the five Arctic littoral states.[972] To discuss these issues on May 27 to 29, 2008 an Arctic Ocean Conference was convened in Ilulissat, Greenland, between the five

in the Arctic" and *Salekhard Declaration on the occasion of the tenth Anniversary of the Arctic Council and the Fifth AC Ministerial Meeting*, 2006 [hereinafter Salekhard Declaration], esp. para. 7 of the preamble and for details sections 1 and 2 "Climate Change in the Arctic" and para 8 of section 2 "International Polar Year" as well as paras. 1 and 2 of section 3 "Sustainable Development".

970 Paras. 2 and 11 of section 1 "Climate Change in the Arctic" of the *Tromsø Declaration on the occasion of the Sixth Ministerial Meeting of the Arctic Council*, 2009 [hereinafter Tromsø Declaration].

971 Paras. 1 and 2 of section 7 "Biodiversity" of the Tromsø Declaration and see *infra* in 6.2.2.3.

972 See for details *supra* in 3.2.2.3.

Arctic Nations bordering the Arctic Ocean.[973] The Ilulissat Declaration[974], adopted during the conference, held that *"the law of the sea provides for important rights and obligations concerning the delineation of the outer limits of the continental shelf, the protection of the marine environment, including ice-covered areas, freedom of navigation, marine scientific research, and other uses of the sea"* and that this *"framework provides a solid foundation for responsible management"* of the Arctic Ocean, rendering a comprehensive international legal regime to govern the Arctic Ocean unnecessary.[975]

Nevertheless, the Arctic littoral states understand to have a stewardship role in protecting the Arctic Ocean and hence agreed to *"take steps in accordance with international law both nationally and in cooperation, [especially in scientific matters], among the five [Arctic coastal] states and other interested parties [as well as international organizations such as the IMO] to ensure the protection and preservation of the fragile marine environment in the Arctic Ocean"*[976].

At the Tromsø Ministerial Meeting these views were reaffirmed,[977] as the Declaration holds in paragraph 8 of the Preamble *"that an extensive legal framework applies to the Arctic Ocean including, notably, the law of the sea, and that this framework provides a solid foundation for responsible management of this ocean"*. Furthermore the Tromsø Declaration calls for the *"development and implementation of suitable national and international regulations (...) to advance the safety of Arctic marine shipping, in-*

973 On March 29, 2010 and on May 1, 2013, representatives of the five Arctic littoral states met again (in Chelsea, Canada and Washington, D.C., United States) to further discuss issues related to their roles and responsibilities in areas under their jurisdiction within the Arctic Ocean (e.g. fisheries); see for details <http://www.international.gc.ca/media/aff/news-communiques/2010/120.aspx?lang=eng> and <http://www.state.gov/e/oes/rls/pr/2013/209176.htm> (last visited: 07.07.2014), as well as Stephens & VanderZwaag, at 11 and VanderZwaag (Arctic Council), at 331.

974 *The Ilulissat Declaration*, 2008 [hereinafter Ilulissat Declaration].

975 Ibid., at 1-2.

976 Ibid., at 2.

977 Note, however, that the Ilulissat Conference lead to friction among the Arctic Council members and Permanent Participants, as the meeting was convened only between the five Arctic littoral States; see Koivurova (Arctic Council), at 6, Bohlin, at 28, Koivurova & Duyck, at 185–186, but see Vasiliev, at 31 (stating that *"[c]ontrary to some expressed fears and concerns, the Ilulissat process was very stimulating for the central international intergovernmental organization of the region – the Arctic Council"*, as the Ilulissat Declaration e.g. *"paved the way for (...) negotiations on [a] multilateral instrument on cooperation in aeronautical and maritime search and rescue operations"* under the auspices of the Arctic Council); see furthermore *infra* in 6.2.2.5.

cluding marine pollution prevention, reduce accident risk, and facilitate effective emergency response" and hence encourages the active cooperation with the International Maritime Organization on this topic.[978]

In respect to oil and gas related activities within the region, the Tromsø Declaration additionally emphasized that as environmental risks stemming from such activities cannot be completely eliminated, conducting risk and environmental impact assessments is required before any such activities are to be undertaken.[979] In this context member states are urged *"to apply the precautionary principle (…) as reflected in (…) the Rio Declaration"*.[980]

On May 12, 2011, the seventh Ministerial Meeting of the Arctic Council took place in Nuuk, Greenland. The Declaration adopted thereon[981] emphasized *"the importance of strengthening the Arctic Council to address"* the changing circumstances in the Arctic, especially as a result of global climate change.[982] In this context the Nuuk 2011 Declaration highlights *"the need for forward looking Arctic cooperation with a view to increase Arctic resilience and to enhance Arctic Council leadership to minimize the human and environmental impacts of climate change"*[983]. Strengthening the role of the Council was in this regard *inter alia* to be achieved by the establishment of a Standing Arctic Council Secretariat.[984] Furthermore the Declaration held, that Arctic environmental protection should be advanced by the foundation of *"an expert group on Arctic ecosystem-based management (EBM) for the Arctic environment"*[985] by 2013. It is here that the ecosystem ap-

978 Paras. 2, 3 and 4 of section 3 "Arctic Marine Environment" of the Tromsø Declaration.

979 See paras. 2 and 4 of section 5 "Energy" of the Tromsø Declaration.

980 Ibid., para. 4.

981 *Nuuk Declaration On the occasion of the Seventh Ministerial Meeting of the Arctic Council*, May 12, 2011 [hereinafter Nuuk 2011 Declaration].

982 Preamble of the Nuuk 2011 Declaration.

983 Para. 2 of section 2 "Major Accomplishments and Future Work", sub-section 2 "Climate Change and Environmental Protection" of the Nuuk 2011 Declaration.

984 Para. 3 of section 1 "Strengthening the Arctic Council" of the Nuuk 2011 Declaration; the Secretariat was formally opened in January 2013 by the Arctic Council Ministers at the Arctic Frontier meeting in Tromsø. See <http://www.arctic-council.org/index.php/en/resources/news-and-press/news-archive/676-arctic-council-secretariat-in-tromso-opened-by-arctic-ministers> (last visited: 07.07.2014).

985 Para. 9 of section 2 "Major Accomplishments and Future Work", sub-section 2 "Climate Change and Environmental Protection" of the Nuuk 2011 Declaration. The EBM experts group met for the first time in October, 2011 in Washington D.C. and *inter alia* discussed human and socio-economic dimensions of Arctic ecosystem-based management and the need to apply precautionary measures under uncertainty; see for details Ecosystem-based Management Experts Group (1st meeting), at 2. In May 2012 another meeting took place in Gothenburg, Sweden during which the experts group *inter alia* adopted a definition of ecosystem-based management, which was defined as *"comprehensive integrated manage-*

proach is explicitly used in a broader context by the Ministers of the Arctic Council, outside of a sectoral scope, and is especially not restricted to the Arctic marine environment. As regards the Arctic Ocean it ought to be noted that at the occasion of the Nuuk 2011 Ministerial Meeting the Agreement on Cooperation on Aeronautical and Maritime Search and Rescue in the Arctic (Arctic Search and Rescue Agreement[986]) was adopted[987], whose objective *"is to strengthen aeronautical and maritime search and rescue cooperation and coordination in the Arctic"*[988]. While the Agreement falls in terms of assessing and managing climate change induced Arctic risks outside of the scope of the present thesis, it is nevertheless noteworthy, as this agreement constitutes the first legally binding act developed under the auspices of the Arctic Council and hence is proof that pan-Arctic cooperation through the Arctic Council can not only result in soft, but also in hard law commitments.[989]

On May 15, 2013, the eighth Ministerial Meeting of the Arctic Council took place in Kiruna, Sweden. The Declaration[990] adopted, following this meeting, *inter alia* focused on promoting sustainable Arctic economies and in this context decided *"to establish a Task Force to facilitate the creation of a circumpolar business forum"*[991]. Such a forum was agreed upon in March 2014 under the name of the Arctic Economic Council (AEC). The AEC's aim is to foster *"sustainable development, including economic growth, environmental protection and social development in the Arctic region"* and as such requires to take environmental protection and social well-being into account

ment of human activities based on best available scientific knowledge about the ecosystem and its dynamics, in order to identify and take action on influences which are critical to the health of ecosystems thereby achieving sustainable use of ecosystems goods and services and maintenance of ecosystem integrity". In order to advance such management the experts group developed a report aimed at providing *"guidance for advancing EBM in the work of the Arctic Council"* which was presented at the Arctic Council Ministerial Meeting in Kiruna, Sweden in May 2013; see for details Ecosystem-based Management Experts Group (2nd meeting), at 1 and 2, as well as Ecosystem-based Management Experts Group (EBM Report).

986 *Agreement on Cooperation on Aeronautical and Maritime Search and Rescue in the Arctic*, May 12, 2011 [hereinafter Arctic Search and Rescue Agreement].

987 See para. 1 of section 1 "Strengthening the Arctic Council" of the Nuuk 2011 Declaration.

988 Art. 2 of the Arctic Search and Rescue Agreement.

989 Note in this context that by means of the Nuuk 2011 Declaration a Task Force was established, which was mandated to develop an international instrument on Arctic marine oil pollution preparedness and response; see para. 1 of section 2 "Major Accomplishments and Future Work", sub-section 3 "Arctic marine environment" of the Nuuk 2011 Declaration.

990 *Kiruna Declaration On the occasion of the Eighth Ministerial Meeting of the Arctic Council*, May 15, 2013 [hereinafter Kiruna Declaration].

991 Ibid., para. 3 of section 1 "Improving Economic and Social Conditions".

when economic activities are to be undertaken within the Arctic.[992] By considering environmental, social and economic aspects the AEC could therefore aid in advancing the ecosystem approach within the circumpolar North.

Furthermore the Kiruna Ministerial Meeting has brought about the adoption of yet another legally binding circumpolar agreement: the Agreement on Cooperation on Marine Oil Pollution, Preparedness and Response in the Arctic.[993] This is the second legally binding agreement established under the auspices of the Arctic Council and its focus lies, similar to the Arctic Search and Rescue Agreement of 2011, on the governance of the Arctic Ocean. According to its article 1, the Agreement's objective is *"to protect the [Arctic] marine environment from pollution by oil"* by means of strengthening *"co-operation, coordination and mutual assistance among the Parties on oil pollution preparedness and response"* within the circumpolar North, as set out in articles 4 to 13 of the Agreement.

While the agreement does not provide any significant insight to the topic of this thesis and thus shall not be addressed here any further, it nevertheless is yet another proof that the Arctic Council is willing to venture beyond its soft law character and possesses the necessary requirements to serve as a platform for finding legally binding solutions to pan-Arctic problems.

The will to further strengthen the Arctic Council as a circumpolar platform was however not only made evident by the Kiruna Declaration and the adoption of yet another legally binding Arctic agreement, but also by the *"Vision for the Arctic"* adopted following the first round of eight successive chairmanships of the Arctic Council.[994] This document envisions the Arctic *"as a zone of peace and stability"*, that provides a common ground for socio-economic development and prosperity, including that of indigenous peoples, while fostering and maintaining ecological sustainability and resilience *inter alia* by *"managing the region with an ecosystem-based approach"*.[995] Advancing the development and implementation of such an ecosystem-based

992 See e.g. <http://www.arctic-council.org/index.php/en/resources/news-and-press/news-archive/858-agreement-on-the-arctic-economic-council> (last visited: 07.07.2014) and para. vi of the objectives of the AEC, as held in Arctic Council (AEC), at 1.

993 *Agreement on Cooperation on Marine Oil Pollution Preparedness and Response in the Arctic,* May 15, 2013 [hereinafter Agreement on Arctic Marine Oil Pollution, Preparedness and Response]; see also para. 1 of section 3 "Protecting the Arctic Environment" of the Kiruna Declaration.

994 See Arctic Council (Vision for the Arctic), at 1 and 3 and furthermore para. 1 of section 4 "Strengthening the Arctic Council" of the Kiruna Declaration.

995 See Arctic Council (Vision for the Arctic), at 2 and 3.

approach (EBM) has been on the agenda of the Arctic Council since the Nuuk 2011 Ministerial Meeting, in the wake of which an Ecosystem-based Management Experts Group was established. The group's recommendations, which include an EBM definition and recommendations for action, have been presented at the Kiruna Ministerial Meeting in 2013 and provide valuable grounds for further (and potentially legally more binding) advancements in developing and implementing the ecosystem approach across the Arctic.[996]

As this brief overview shows, the Ministers of the eight Arctic Nations do not fail to address the current challenges facing the Arctic, such as sustainable development and ecosystem protection in the light of climate change. Yet, while the problems seem to have been recognized, so far action remains – except for the projects undertaken under the former Arctic Environmental Protection Strategy (AEPS) and now the Arctic Council working groups – rather minimal. Especially on a legally binding scale.

As the Arctic Council is a forum to cooperate and coordinate measures, it requires a high amount of flexibility and hence the soft law, i.e. legally non-binding approach seems to date to be the more favorable option. Yet of course, it fails to effectively bind Arctic Nations that might prove reluctant to address the identified challenges appropriately. For one, while human induced climate change has been recognized as one of the greatest challenges to the Arctic and the reduction of greenhouse gases has been noted as the main objective in addressing this challenge, such considerations affirmed at the Arctic Council Ministerial Meetings have not led the United States to adopt any binding emission reduction targets as the ones listed in the Kyoto Protocol.[997]

Consequently, the soft law regime developed under the AEPS and the Arctic Council, that seems to be the Arctic's greatest asset, because it allows for pan-Arctic cooperation and involves indigenous peoples, represents at the same time not much more than a memorandum of understanding. Yet, as the Ministerial Meeting in Nuuk in 2011, as well as the Meeting in Kiruna in 2013 have proven, the Arctic Council can also serve as a platform to establish legally binding rules, such as the Arctic Search and Rescue Agreement and the Agreement on Arctic Marine Oil Pollution, Preparedness and Re-

996 See for details *supra* esp. in fn. 985 (part II) and on a suggestion for a legally binding version of the ecosystem approach applicable to the Arctic see *infra* in 8.

997 See *supra* in 5.2.4. and 6.2.2., esp. *supra* in fn 970 (part II).

sponse. Hence, the future possibility exists to govern climate change induced Arctic risks in light of the precautionary principle and the ecosystem approach on a legally more mandatory level under the auspices of the Arctic Council. For the time being advancements in assessing and managing climate change induced Arctic risks on a more comprehensive scale than provided for by the hard law regime elaborated above in 5. and 6.1., may be made within the Council, especially on behalf of the six working groups. Consequently these working groups' main fields of work shall subsequently be addressed briefly, and more profoundly where appropriate in respect to the effective governance of climate change induced Arctic risks.

6.2.2.1. Arctic Contaminants Action Program (ACAP)

Initial steps for the establishment of an Arctic Contaminants and Action Program working group were made at the Iqaluit Ministerial Meeting in 1998. Considering the findings of the AMAP Report on Arctic Pollution Issues[998], the ministers of the Arctic Nations in paragraph 16 of the Iqaluit Declaration recognized *"the need to continue to identify actions to address the pollution sources identified by the AMAP report, and [in this respect] (...) develop an overall plan of action"*.[999] Such a plan, *"the Arctic Council Action Plan to Eliminate Pollution of the Arctic (ACAP)"*, was to include actions *"on pollution prevention and remediation measures"* including cooperative projects.[1000] In 2006 the Action Plan was reaffirmed to be *"an effective means of increasing efforts to reduce releases of contaminants locally and regionally and to promote international cooperation"* and thus was approved to become a working group within the Arctic Council under the name of *"Arctic Contaminants Action Program"*.[1001] Next to fostering cooperative measures between Arctic Council Member States, as well as their Permanent Participants to take action against contaminants in the Arctic, the ACAP working group also supports the implementation of international hard law regulations addressing anthropogenic pollutants, such as the Stockholm Convention and the Convention on Long-Range Transboundary Air Pollution and its protocols.[1002]

998 See AMAP (Arctic Pollution).
999 Accord. para. 5 of the Inari Declaration.
1000 Para. 16 of the Iqaluit Declaration.
1001 Paras. 1 and 2 of section 5 "Action on Contaminants in the Arctic" of the Salekhard Declaration.
1002 See ibid., paras. 3 and 9, as well as para. 8 of section 6 "Contaminants" of the Tromsø Declaration and for a current list on ACAP projects see Arctic Council (Working Groups), at 1-7.

6.2.2.2. Arctic Monitoring and Assessment Programme (AMAP)

The Arctic Monitoring and Assessment Programme (AMAP) was established under the Arctic Environmental Protection Strategy with the aim to monitor the levels and assess the effects of anthropogenic pollutants in the Arctic so as *"to anticipate adverse biological, chemical and physical [impacts] to the ecosystems and to prevent, minimize and mitigate these adverse effects"*.[1003] In short AMAP's role is to provide the necessary scientific information on contaminants in the Arctic and an assessment thereof, upon which decision-makers within the circumpolar North are to base their management measures.

As pollution data on the Arctic available during the time AMAP was adopted, mainly resulted from national research programs, AMAP's priority was to coordinate these initiatives and further cooperation, also on an international level, especially in regards to climate change research.[1004] The results of the data gathered and analyzed is to be presented by AMAP in integrated assessment reports, defining the status and trends in the condition of Arctic ecosystems and elaborating on the causes for changes and potential risks to these ecosystems as well recommending action to be taken in order to address these risks. Since its establishment the AMAP working group has in this context issued several reports on Arctic contaminants, *inter alia* on persistent organic pollutants.[1005] As a consequence, due to its mandate AMAP plays an important role in assessing climate change induced Arctic risks, which is reflected in the establishment of the Arctic Climate Impact Assessment (ACIA) under the auspices of AMAP and the Conservation of Arctic Flora and Fauna (CAFF) working group.[1006]

1003 AEPS, at 30 and see para. 13 of the Rovaniemi Declaration, para. 2 of the Alta Declaration and accord. para. 15 of the Iqaluit Declaration as well as para. 5 of the Inari Declaration and on specific AMAP research projects see para. 8 of the Barrow Declaration, section 4 "Action Against Pollutants" of the Reykjavik Declaration and section 4 "Arctic Monitoring and Assessment" of the Salekhard Declaration.

1004 See AEPS, at para. 6.1 (iii) and section 1 "Climate Change in the Arctic" of the Salekhard Declaration.

1005 See e.g. *supra* in 2.3. and 3.2.2.2., esp. fn 109 and 110 (part I) and for a current list of AMAP projects see Arctic Council (Working Groups), at 12 and 13.

1006 See para. 21 of the Iqaluit Declaration and para. 3 of the Barrow Declaration.

6.2.2.3. Conservation of Arctic Flora and Fauna (CAFF)

As Arctic ecosystems are in respect to their flora and fauna unique and maintaining their functions and processes is a prerequisite for sustainable development in the region, they require special strategies to deal with problems, such as over-exploitation of natural resources, pollution, degradation of habitats, threats from economic development in the Arctic and climate change.[1007] As these threats are not limited to specific Arctic Nations, but are rather circumpolar (or even global) in scope, they make close cooperation between Arctic Nations and their indigenous peoples as well as non-Arctic states and international organizations necessary to advance effective conservation measures of species and their habitats within the circumpolar North.[1008] For this reason the Conservation of Arctic Flora and Fauna (CAFF) working group was established under the AEPS, in order to provide a *"forum for scientists, indigenous peoples and conservation managers engaged in Arctic flora, fauna and habitat related activities"* as to *"facilitate the exchange of information and coordination of research on species and habitats of [Arctic] flora and fauna"*.[1009] Consequently, the CAFF working group was designed to enhance cooperation between the Arctic Nations and indigenous peoples in conducting scientific research, developing effective laws, regulations and practices to conserve the Arctic flora and fauna, as well as to coordinate their monitoring, research and conservation initiatives.[1010]

a. Co-operative Strategy for the Conservation of Biological Diversity in the Arctic Region

CAFF's work is guided by the Strategic Plan for the Conservation of Arctic Biological Diversity[1011], which establishes a framework for activities undertaken by CAFF based upon the targets of the Convention on Biological Di-

1007 AEPS, at 38, para. 2 of section 7 "Biodiversity Conservation" of the Reykjavik Declaration, para. 1 of section 6 "Conservation of Arctic Flora and Fauna" of the Salekhard Declaration, cf. CAFF (Co-operative Strategy), at 3, 5 and 10, CAFF (Strategic Plan), at 1, CAFF (CBMP Implementation Plan), at 4.

1008 See AEPS, in para. 9.1. i) and iv) and para. 7 of the Inari Declaration, para. 3, 7 and 8 of section 7 "Biodiversity Conservation" of the Reykjavik Declaration, para. 4 and 5 of section 6 "Conservation of Arctic Flora and Fauna" of the Salekhard Declaration and CAFF (Co-operative Strategy), at 6.

1009 AEPS, at 38 and para. 16 of the Rovaniemi Declaration.

1010 See AEPS, in para. 9.1, sub-paras. i), iv), v) b) and for a current list of CAFF projects see Arctic Council (Working Groups), at 17-21.

1011 CAFF (Strategic Plan).

versity (CBD) as elaborated in the Co-operative Strategy for the Conservation of Biological Diversity in the Arctic Region[1012].[1013] The Co-operative Strategy was adopted in 1997 and is *"loosely based on the CBD"*[1014]. As a consequence the guiding principles of the CBD are also reflected in CAFF's Co-operative Strategy: Precautionary principle, ecosystem approach, sustainable use of resources and public participation in developing and implementing policies and programs to address biological diversity and sustainable use within the Arctic (especially in respect to indigenous peoples) are the guidelines from which the Strategy is derived.[1015] Reflective of these principles the Strategy lists three goals to be aimed for, which will be addressed in greater detail subsequently.

i. Goal I

"Support the conservation of arctic biological diversity, including the diversity of ecosystems, species, populations and their habitats, and genetic resources. Where arctic biological resources are used, the use should be at levels that are sustainable and meet the needs of local and indigenous people and do not adversely affect other ecosystem components."[1016]

To achieve goal I, it is first and foremost important to identify (preferably through collaborative research) Arctic biological diversity and its threats and consequently analyze which species, habitats and ecosystems are most at risk from naturally and anthropogenically induced risks, such as climate change, pollution and economic development in the region.[1017] Furthermore it is necessary to establish long-term monitoring programs, which will help to detect changes in Arctic biodiversity and conduct environmental impact assessments, especially in respect to activities with potentially trans-boundary impacts.[1018] To this aim, by request of ACIA and CAFF's Flora and Fauna

1012 CAFF (Co-operative Strategy).
1013 See para. 6 of the Inuvik Declaration and CAFF (Co-operative Strategy), at preface and on the relationship between the work conducted under the Convention on Biological Diversity and under CAFF respectively see CBD & CAFF, at 2 (holding that in *"the face of increasing threats to Arctic biodiversity, cooperation towards the enhanced phase of implementation of the CBD within this fragile and unique ecosystem is extremely important (...) Governments and other Stakeholders may see the activities of CAFF and the CBD as mutually supportive."*).
1014 CAFF (Co-operative Strategy), at 6.
1015 See ibid., at 7.
1016 Ibid., at 9.
1017 See ibid., at 9, 10, 12 and 14 paras. 2.1, 2.3, 2.8 and 2.11.
1018 Ibid., at 9 and 10, paras. 2.2 and 2.4.

Report[1019], two scientific research and monitoring programs have been developed under the auspices of CAFF to advance considerations on the status and trends of Arctic biodiversity: The Arctic Biodiversity Assessment (ABA) and the Circumpolar Biodiversity Monitoring Programme (CBMP).[1020]

(i) Arctic Biodiversity Assessment (ABA)

The Arctic Biodiversity Assessment (hereinafter ABA) was adopted at the Salekhard Ministerial Meeting in 2006, as a program to provide *"policy-makers with comprehensive information on the status and trends of Arctic biodiversity"*[1021]. Consequently ABA's aim was to compile current scientific data and indigenous knowledge (i.e. *traditional ecological knowledge* (TEK)) on biodiversity as well as to identify gaps within this data record, while special attention was given to highlighting the processes leading to ecological change and to the main stressors to Arctic ecosystems. Furthermore, based upon these scientific and traditional findings on biodiversity, ABA could propose recommendations for developing and adopting appropriate conservation measures.[1022]

As ABA was relying on existing data, no new research or monitoring initiatives were conducted under the program.[1023] Rather the data was compiled from cooperation with international and regional scientific research and monitoring initiatives, such as those undertaken in respect to the Convention on Biological Diversity, the specific Arctic projects conducted under the Arctic Monitoring and Assessment Programme or the Circumpolar Biodiversity Monitoring Programme as well as national projects on assessing biodiversity.[1024]

In 2013 ABA came to completion, with recommendations for action in place, which are currently in the process of being implemented.[1025]

1019 See e.g. ACIA (2005), at 1019, CAFF (Arctic Flora and Fauna), at 100, 101, 213 and 255.
1020 See para. 4 and 5 of section 7 "Biodiversity Conservation" of the Reykjavik Declaration and paras. 2 and 3 of section 7 "Biodiversity" of the Tromsø Declaration.
1021 Para. 4 of section 6 "Conservation of Arctic Flora and Fauna" of the Salekhard Declaration.
1022 See CAFF (ABA), at 2.
1023 Ibid., at 8 and 9.
1024 Ibid., at 3 and 8.
1025 Ibid., at 2 and para. 4 of section 2 "Major Accomplishments and Future Work", sub-section 4 "Science and Monitoring" of the Nuuk 2011 Declaration, Arctic Council (Working Groups), at 19, CAFF (2013-2015 Work Plan), at 4 and for the final ABA report, including recommendations for action, see CAFF (ABA Final Report), at 59 et seq.

(ii) Circumpolar Biodiversity Monitoring Programme (CBMP)

As the Circumpolar Biodiversity Monitoring Programme provided the scientific data for the Arctic Biodiversity Assessment, the two programs are closely interlinked. Biodiversity conservation and sustainable use of Arctic living resources is dependent upon knowledge on ecosystem processes and functions as well as on global and regional stressors adversely affecting them. In this respect the Inari Declaration recognized *"that enhanced monitoring of biodiversity at the circumpolar level, fully utilizing traditional knowledge, is required to detect the impacts of global changes on biodiversity and to enable Arctic communities to effectively respond and adapt to these changes"*[1026]. In the Arctic, however, lots of uncertainties still prevail, often because scientific research and monitoring initiatives are either lacking completely, or they are not coordinated so as to provide for a comprehensive data record on Arctic biodiversity. Consequently, as held in paragraph 2, section 7 of the Tromsø Declaration, the Circumpolar Biodiversity Monitoring Programme (CBMP) (and the evaluation of the data gathered by the CBMP through the Arctic Biodiversity Assessment program) is an important contribution *"towards understanding the impacts of climate change and other stressors on nature and biodiversity and the adaptability and sustainable use of all living resources in the Arctic"*, as it allows cooperation and coordination in respect to monitoring efforts and as a consequence provides invaluable comprehensive information to decision-makers, indigenous peoples and other stakeholders within the Arctic, upon which adaptation and mitigation measures are to be taken.[1027] In this context, the CBMP follows five objectives[1028]:

- Coordination and integration of Arctic monitoring, e.g. by developing monitoring plans[1029].
- The management of the data gathered, through a web-based portal.
- Integration of indigenous knowledge, by promoting community-based monitoring techniques.

1026 Para. 7 of the Inari Declaration.
1027 See CAFF (CBMP Implementation Plan), at 5, 7 and 8.
1028 See on the following CAFF (CBMP Implementation Plan), at 5, 6, 20 to 23, CAFF (CBMP), at 21, 24, 25 and 27 to 29, as well as <http://www.caff.is/about-the-cbmp> (last visited: 03.08.2014).
1029 See for the current monitoring plans <http://www.caff.is/monitoring> (last visited: 09.07.2014).

- Advancing communication between stakeholders (i.e. scientific community, Arctic residents, policy makers).
- Raising awareness through issuing reports on biodiversity status and trends.

As the CBMP is aimed at monitoring the Arctic ecosystems on a holistic scale,[1030] it – together with other monitoring initiatives undertaken e.g. by the Arctic Monitoring and Assessment Programme – provides for a comprehensive data record on the current status of Arctic biodiversity, but also, by functioning as an early warning system, reflects trends and identifies gaps in existing conservation regimes, consequently influencing management decisions accordingly. Hence, in combination with the work undertaken by the Arctic Biodiversity Assessment to evaluate the data gathered, the CBMP allows for a comprehensive approach in addressing biological diversity and sustainable use of Arctic resources and is as such very much reflective of the ecosystem approach.

In practice implementing this approach is realized through the establishment of four integrated, multi-disciplinary Expert Monitoring Groups responsible for gathering data on marine, coastal, freshwater and terrestrial ecosystems within the Arctic.[1031] These four monitoring groups are support-

1030 See CAFF (CBMP Implementation Plan), at 9, CAFF (Arctic Marine Biodiversity Monitoring Plan), at 14–15 (stating that the Circumpolar Biodiversity Monitoring Programme *"is adopting an integrated ecosystem-based approach to monitoring in its program design, organization, and operation"*).

1031 See CAFF (CBMP Implementation Plan), at 9 and 10 as well as CAFF (CBMP Strategic Plan 2013-2017), at 14-15; note that initially the Implementation Plan foresaw the establishment of five Expert Monitoring Groups, with two of them addressing terrestrial ecosystems (terrestrial fauna and terrestrial vegetation). This distinction was omitted eventually, however; see e.g. CAFF (Background Paper TEMG), at 5, which refers to four Expert Monitoring Groups instead. On May 11, 2011 the first monitoring plan on Arctic marine biodiversity was released, deciding *inter alia* on parameters, indicators and sampling schemes to be applied when monitoring Arctic marine ecosystems. See for details CAFF (Arctic Marine Biodiversity Monitoring Plan). Additionally, in the process to adopt further such plans, in March and in September 2011 respectively, a framework document on the establishment of an Arctic freshwater biodiversity monitoring plan and a background paper on the development of a multidisciplinary, integrated, pan-Arctic, long-term terrestrial ecosystem-based biodiversity monitoring plan were issued; see for details CAFF (Arctic Freshwater Biodiversity Monitoring Plan Framework Document) and CAFF (Background Paper TEMG). The Arctic freshwater biodiversity monitoring plan was concluded at the end of 2012 (see CAFF (Arctic Freshwater Biodiversity Monitoring Plan)). Work on establishing an Arctic terrestrial biodiversity monitoring plan came to conclusion at the end of 2013; see CAFF (Arctic Terrestrial Biodiversity Monitoring Plan). A plan addressing Arctic coastal ecosystems is currently still underway; see for details <http://www.caff.is/monitoring> (last visited: 09.07.2014).

ed by existing species and habitat or site based networks.[1032] Finally the CBMP is responsible for coordinating these, as well as other monitoring initiatives (e.g. such conducted outside of the Arctic),[1033] that might be useful in monitoring Arctic biodiversity in a comprehensive manner. Furthermore CBMP will manage the data gathered and provide the results to policy-makers and stakeholders, so as to allow for integrated and adaptive policy making.[1034]

The CBMP is a work in progress and still more monitoring ought to be undertaken to provide for comprehensive results in respect to Arctic biodiversity. Nevertheless, as the CBMP's aim is to facilitate access to comprehensive data on Arctic biodiversity, this program is an important contribution to the assessment and consequently the management of climate change induced Arctic risks.

(iii) Circumpolar Protected Areas Network (CPAN)

In respect to the management of natural resources, collaborative approaches (especially such that include interests of indigenous populations) that are reflective of sustainability are required to attain the *goal I*, as established under the Co-operative Strategy for the Conservation of Biological Diversity in the Arctic Region.[1035] Integrating economic and social issues into biological diversity conservation and sustainable use of resources is paramount in this respect. Consequently integrated decision-making is required, that allows for all stakeholders to become involved in policy and planning processes in respect to biodiversity conservation and sustainable use of Arctic resources.[1036]

In practice, one way to achieve the conservation of biological diversity and the use of natural resources in a sustainable way is the designation of protected areas. While several protected areas exist in the Arctic,[1037] an effective

1032 See for details CAFF (CBMP Implementation Plan), at 13.
1033 See for an exemplary list of monitoring networks relevant to the CBMP, ibid. at 11 and 12.
1034 See ibid. at 2, 5 and 6 and furthermore CAFF (CBMP Strategic Plan 2013-2017), at 19-21
1035 See CAFF (Co-operative Strategy), at 9, 10, 12 and 14 at 11, 13 and 14, paras. 2.5, 2.9 and 2.10.
1036 Ibid., at 14, para. 2.10.
1037 In 1998 about 15% of Arctic terrestrial and 2% of Arctic marine area were designated protected area status; see CAFF (Strategic Plan), at 6 for an updated list of Arctic protected areas in 2001, including a map showing their distribution across the Arctic see CAFF (Arctic Flora and Fauna), at 77–80. The most recent numbers published indicate that there are now 1127 protected areas in the Arctic covering a region of 3.5 million km^2, which is about 11% of the

protection and conservation of Arctic ecosystems demands further designations of such areas and at the same time requires additional conservation measures outside of protected areas, as species living within protected areas do not recognize any legal boundaries. Consequently, harmonization of national conservation laws and regulations is required as well as the development of trans-boundary measures, such as the establishment of endangered species lists, which aim to protect a specific species irrespective of its range.[1038] In respect to protected areas CAFF has promoted the designation of such areas within the Arctic (and has also encouraged harmonization of legislation in this respect) by establishing a Circumpolar Protected Areas Network (CPAN).[1039]

The designation of protected areas within the circumpolar North has been of interest right from the start of pan-Arctic cooperation, as habitat conservation was recognized as one of the important areas to be addressed under the Arctic Environmental Protection Strategy (AEPS).[1040] At the CAFF meeting in Reykjavik in 1994, it was agreed that Arctic habitat conservation demanded a multiple-step strategy, which included the preparation of an Action Plan for developing a Protected Area Network for terrestrial and marine ecosystems in the Arctic.[1041] Consequently the Action Plan recognized the CPAN to be *"the core and principal step in CAFF's holistic and comprehensive approach to habitat conservation"*[1042] – a view that was shared at the Inuvik Ministerial Meeting in 1996, as the establishment of such a network was given priority under the CAFF working group.[1043] The development of the CPAN would, however, not only allow for a comprehensive management of Arctic habitats, as it would represent a wide variety of polar ecosystems and thus contribute to the maintenance of species' populations and ecological and evolutionary processes within the circumpolar North,[1044] but also meet the conservation obligations under international and regional conventions, such as the Convention on Biological Diversity, the Ramsar Convention or the Polar Bear Agreement.[1045]

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entire Arctic; see CAFF (Biodiversity Trends), at 97.

1038 See CAFF (Co-operative Strategy), at 11 and 12, paras. 2.6 and 2.7.

1039 See ibid., at 11, 12 and 15, paras. 2.6 and 2.9 and furthermore para. 6 of the Inuvik Declaration, para. 9 of the Alta Declaration, para. 20 of Iqaluit Declaration.

1040 See AEPS, in para. 9.1, v).

1041 See CAFF (Reykjavik Meeting), at 9.

1042 CAFF (CPAN Strategy), at 12.

1043 See para. 6 of the Inuvik Declaration.

1044 See CAFF (CPAN Strategy), at 18.

1045 All of these Conventions support the establishment of protected areas; see for details *supra*

To achieve such a comprehensive network of Arctic terrestrial and marine protected areas, the CPAN Strategy and Action Plan recognized a variety of tasks to be undertaken on a national as well as on an international level (under the Arctic Environmental Protection Strategy or the Arctic Council respectively): *Inter alia* gaps in existing and proposed protected areas would have to be identified, and eventually filled by expanding and creating new protected areas, the legal and institutional framework for protected areas would have to be improved and needs of such areas would have to be integrated into existing national legal management regimes. Additionally stakeholders would have to be included into the process of designating and managing protected areas so as to gain their support in this respect and the national initiatives would have to be coordinated on a pan-Arctic level, i.e. by the Arctic Environmental Protection Strategy or the Arctic Council respectively.[1046]

Following the CPAN Strategy, Action Plan and the Principles and Guidelines[1047] established to guide the Arctic States in the development and implementation of the Network, a variety of monitoring, scientific and legal initiatives were undertaken by the Arctic Nations in respect to terrestrial and marine protected areas, which were presented in detail in the CPAN Progress Report of 1997 and the Country Updates Report of 2004.[1048] Despite these improvements in respect to protected areas in the Arctic, the CPAN project came to a complete halt in 2004, however. Once a priority within the CAFF working group, the CPAN is currently dormant and was consequently not included into recent CAFF work plans.[1049]

in 5.4.1., 5.4.3.1., 6.1.2.1. and additionally CAFF (CPAN Strategy), at 12, CAFF (CPAN Country Updates), at iii.

1046 See for details CAFF (CPAN Strategy), at 18, 20 and 21.

1047 See for details CAFF (CPAN Principles and Guidelines), at 3 to 11; the principles *inter alia* require the CPAN sites to be managed according to the precautionary principle and the wise use concept; see principle 8.

1048 See CAFF (CPAN Progress Report) and CAFF (CPAN Country Updates).

1049 The 2009-2011 Work Plan solely refers to updating the map of protected areas within the Arctic and holding a workshop on Arctic monitoring in context of the Circumpolar Biodiversity Monitoring Programme; see CAFF (2009-2011 Work Plan), at 2, CAFF (Progress Report), at 8 additionally see Koivurova (2009), at 54 and 53 and Bastmeijer, at 89. As a result in March 2011, a background paper was released on Arctic protected areas monitoring, which *inter alia* holds a graphical display of designated protected areas within the Arctic and how they should be monitored; see for details CAFF (Circumpolar Protected Areas Monitoring). The 2011-2013 Work Plan (see CAFF (2011-2013 Work Plan)) does not hold any significant addition in this respect, but mainly refers to protected areas in relation to the Circumpolar Biodiversity Monitoring Programme (CBMP) as referred to *supra* in 6.2.2.3. a. i. (ii). Furthermore the 2013-2015 Work Plan does in this context not bring about a shift in

ii. Goal II

"Promote the participation of local and indigenous people in the development and implementation of policies and programs relating to the conservation of arctic biological diversity and the sustainable use of biological resources."[1050]

As indigenous peoples possess valuable knowledge on Arctic ecosystems, as they have been living within and from the Arctic for many years, passing traditions and cultural values, including sustainable use of resources, from one generation to the next, it is important to include such knowledge into measures, laws and regulations aimed at biological diversity conservation and sustainable use of resources.[1051] Consequently according to *goal II* of the CAFF Co-operative Strategy closer cooperation with indigenous communities and other local inhabitants ought to be established in respect to designating and managing protected areas as well as planning and implementing conservation and management strategies and action plans outside of such areas.[1052]

iii. Goal III

"Develop and improve public education and awareness programs that promote the conservation of arctic biological diversity and the sustainable use of biological resources."[1053]

Finally *goal III* of the Co-operative Strategy emphasizes the necessity to improve public education and awareness raising in respect to biodiversity conservation and sustainable use of resources, as only widespread knowledge on the status of species, habitats and ecosystems as well as on their threats and possible impacts in respect to ecological, social and economic well-being, will provide for adequate action on all levels of society.[1054]

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perspective, but rather focus keeps on being given to further advancements (especially as regards implementation) of both the Arctic Biodiversity Assessment (ABA) and the Circumpolar Biodiversity Monitoring Programme (CBMP); see CAFF (2013-2015 Work Plan), esp. at 3-4.

1050 CAFF (Co-operative Strategy), at 16.
1051 See additionally *supra* in 3.2.2.3.
1052 See CAFF (Co-operative Strategy), at 16 para. 2.13.
1053 Ibid., at 17.
1054 See ibid., at 17 para. 2.14.

b. Strategic Plan for the Conservation of Arctic Biological Diversity

In order to make the implementation of the goals addressed in a. feasible, CAFF developed the Strategic Plan for the Conservation of Arctic Biological Diversity, which is serving as the framework for CAFF's work plans.[1055] The Strategic Plan is based upon five priority objectives of the Co-operative Strategy, which are the following:[1056]

- Enhancement of **monitoring** efforts in respect to Arctic biodiversity to detect changes in the environment and evaluate the effectiveness of conservation measures already in place, while monitoring priority will be given to species, populations, habitats and ecosystems that are of greatest ecological, cultural, social, economic or scientific value to the region. The establishment of the Circumpolar Biodiversity Monitoring Programme under CAFF is hence based upon this first objective.
- Secondly, CAFF ought through its work to support and implement **conservation measures** to protect and conserve genetic resources, species (especially such that are endangered) and their habitats.
- Closely linked to this second objective is the third, as it is aimed at protecting species, their habitats and ecosystems as a whole, through the establishment of **protected areas**. As already referred to *supra* in a. i. (iii) CAFF has supported protected area designation by developing the Circumpolar Protected Areas Network (CPAN).
- As stated *supra* in a., equally as important to protect the Arctic in its entirety, is the development of conservation strategies and programs for **areas outside of protected areas**. In this context CAFF's main objective lies in assessing threats to biodiversity outside of sites designated protected area status. Consequently, the joint AMAP/CAFF research project on the implications of climate change upon the Arctic ecosystems (ACIA)[1057] is one of the results of objective 4 of the Strategic Plan.

1055 See ibid., at 18 and CAFF (STRATEGIC PLAN), at 2; the Strategic Plan was initially intended as a guideline for the period of 1998 to 2003. It is, however, together with the biennial work plans still the guiding framework for CAFF's activities; see CAFF (2009-2011 WORK PLAN), at 1.

1056 See for the following CAFF (STRATEGIC PLAN), at 4 to 9.

1057 See *supra* in fn 968 (part II).

- Finally objective 5 is urging CAFF to advance the integration of thoughts on biodiversity conservation and sustainable use of natural resources into social and economic sectors by **raising awareness** and providing the necessary **information** to the general public and decision-makers to allow for integrated policy-making. The Arctic Biodiversity Assessment, as referred to above in a. i. (i), and the various reports issued by CAFF since it's establishment under Arctic Environmental Protection Strategy serve this aim.[1058]

Additional to these five objectives, which have in greater detail already been elaborated *supra* in respect to the Co-operative Strategy, the Strategic Plan lists four guiding principles, which are inherent in all of CAFF's effort. They are:[1059]

- *"The involvement of indigenous and local peoples and the use of traditional ecological knowledge":* Conservation measures can only be successful if they are supported by those that are primarily affected by them, which are usually local or indigenous peoples living in a specific area or relying on resources that ought to be conserved and managed. Furthermore, as indigenous peoples depend upon the environment they live in, not only for their nutritional but also for their cultural and social benefit and possess traditional knowledge in respect to protecting and conserving biodiversity and using natural resources in a sustainable way, conservation measures must incorporate their interests and knowledge.
- *"The use of a broad, ecosystem-based approach to conservation and management":* As ecosystems are interlinked and do not make halt at any legal or political borders, protecting one specific area or species cannot adequately conserve the Arctic flora and fauna. Rather a holistic, multi-species approach and one that takes the linkages between ecosystems into account ought to be applied in order to effectively protect and conserve the Arctic. In respect to ecosystem-based management, CAFF has, albeit on a limited spacial scale, supported the application of an integrated ecosystem approach in respect to the management of natural resources within the Russian Arctic as it in cooperation with the Russian Federation initi-

1058 See e.g. CAFF (Arctic Flora and Fauna), CAFF (Biodiversity Trends) and for details on these reports see *supra* in 2.3. and 3.2.1., 3.2.2., 4.4.4. and 4.5.2.2. g.

1059 See on the following CAFF (Strategic Plan), at 3 and 4.

ated a Global Environment Facility project, ECORA, which was aimed at applying an integrated ecosystem management approach to conserve biodiversity and minimize habitat fragmentation in three selected model areas of the Russian Arctic.[1060] ECORA will be addressed in greater detail *infra* in respect to national initiatives undertaken to manage climate change induced Arctic risks.

- *"Co-operation with other conservation initiatives to minimize duplication and to increase effectiveness":* Protection and conservation of the Arctic is essential to all Arctic Nations and the international community as whole, especially due to the Arctic's value within the global climate system. As threats for Arctic ecosystems are widespread and stem from locations both within and outside of the Arctic, cooperation and the development of joint conservation programs and strategies between Arctic and non-Arctic states, as well as international organizations and NGOs is necessary, to accomplish an effective conservation of Arctic ecosystems.
- *"Effective communication with respect to CAFF programs":* The effectiveness of proposed conservation measures depends on the acceptance by the general public and decision-makers, who are responsible for implementing them. Consequently education and raising awareness is paramount in all of CAFF's activities.

Considering the objectives outlined in the Co-operative Strategy and the Strategic Plan, CAFF's work is very much reflective of the framework as established under the Convention on Biological Diversity, including it's principles regarding the application of the ecosystem approach and the precautionary principle.[1061] Yet, concrete implementation of the former in practice under CAFF has so far only taken place in the Russian Arctic through the establishment of ECORA.[1062] Furthermore coordination of legal initiatives in conserving Arctic biodiversity on a holistic level has suffered from the fact that the Circumpolar Protected Areas Network project has come to a halt in 2004. Rather CAFF's work has shifted from management to assessment priorities.[1063] Nevertheless, as scientific research and monitoring provide the

1060 See para. 9 of the Barrow Declaration, para. 12 of the Inari Declaration, para. 6 of section 7 "Biodiversity Conservation" of the Reykjavik Declaration, CAFF (Progress Report), at 8–9 and CAFF (ECORA), at 1.
1061 Accord. CAFF (Framework), at 3.
1062 See for details *infra* in 6.3.3.1.
1063 Accord. Koivurova (2009), at 58 who draws similar conclusions for the Arctic Council in gen-

grounds for informed, integrated management policies, projects such as the Circumpolar Biodiversity Monitoring Programme and the Arctic Biodiversity Assessment are, although legally less incisive, important factors in addressing climate change induced Arctic risks. Consequently, as CAFF's work is advancing protection of biological diversity and sustainable use of Arctic resources in a cooperative way it plays an important role in pan-Arctic assessment and management of climate change induced Arctic risks.

6.2.2.4. Emergency Prevention, Preparedness and Response (EPPR)

The Working Group on Emergency Prevention, Preparedness and Response (EPPR) was established as a measure within the AEPS *"to provide a framework for future cooperation in responding to the threat of environmental emergencies"*[1064]. As due to climate change, navigation and development activities within the Arctic started to increase, possible unexpected negative ramifications for the environment, such as oil spills and discharges of other harmful substances, may become more likely. Furthermore, the special abiotic conditions in the region and a lack of infrastructure make the Arctic much more vulnerable to emergencies than locations in more temperate climates.[1065] The EPPR's objective is thus to coordinate and harmonize policies, strategies and measures aimed at preventing accidental pollution on land or on sea, allow for the establishment of a notification system and a risk assessment/analysis program, enhance cooperation for mutual aid in case of an accident as well as in research for new technologies and methods to address such accidents, and encourage the exchange of information on administrative and legislative measures and policies addressing environmental emergencies.[1066] Additionally in 2004 the EPPR working group's mandate was expanded to include natural disasters.[1067] Consequently the working group is

eral; see Koivurova (2010), at 120, Koivurova (Arctic Council), at 3 and Koivurova & Hasanat, at 71, cf. Dresser, at 518 (holding that the Arctic Council due to its legally non binding character *"has remained strictly a communication and information-sharing forum"*).

1064 Para. 15 of the Rovaniemi Declaration.

1065 See Arctic Council (EPPR Strategic Plan of Action), at 1 note 1.2 as well as (in the Strategic Plan's updated form) EPPR (Strategic Plan 2013), at 1 note 1.2.

1066 See for details AEPS, in para. 8.1, sub-para. i), ii), iii), iv), vii) and viii) and para. 2 of the Nuuk Declaration, para. 6 of the Inuvik Declaration, para. 9 of the Alta Declaration, paras. 22 and 23 of the Iqaluit Declaration, para. 10 of the Barrow Declaration, section 6 "Emergency Prevention Preparedness and Response" of the Reykjavik Declaration and section 7 "Emergency Prevention Preparedness and Response" of the Salekhard Declaration. And see furthermore <http://eppr.arctic-council.org> (last visited: 09.07.2014).

1067 See section 6 "Emergency Prevention Preparedness and Response" of the Reykjavik Declaration.

now concerned with providing the means to adequately address environmental threats from accidental release of pollutants and radionuclides as well as negative ramifications from natural disasters.[1068]

This mandate is also reflected in the EPPR Strategic Plan of Action, which lists four objectives and strategic priorities for the working group:[1069]

- **Risk definition:** As the goal of the EPPR is to adequately prevent and respond to Arctic environmental risks resulting from man-made or natural catastrophic occurrences, it is necessary to identify these risks in order to determine the measures required to reduce them to an acceptable level.
- **Prevention:** Given the special climatic conditions within the Arctic and the general lack of response capacities and infrastructure in the region, prevention measures are invaluable in reducing Arctic environmental risks. As a consequence the EPPR i.a. conducts and supports projects determining best practices for preventing accidents resulting in environmental emergencies.
- **Preparedness and response:** In case accidents cannot be prevented, the necessary expertise and infrastructure must be in place to adequately respond to environmental emergencies. In this context contingency plans, guidelines, manuals and brochures as well as training and exercise programs are required. This includes capacity building by encouraging the exchange of knowledge (including such of indigenous peoples), while taking account of international regimes pertaining to emergencies already in place (e.g. the International Convention for the Safety of Life at Sea or the International Convention on Oil Pollution Preparedness, Response and Co-operation).[1070]
- **Information sharing:** Finally, cooperation and communication between Arctic actors (governments, indigenous peoples as well as other stakeholders) is vital in adequately reducing risks resulting

1068 See Arctic Council (EPPR Strategic Plan of Action 2010), at 1 note 1.2 as well as (in the Strategic Plan's updated form) EPPR (Strategic Plan 2013), at 1 note 1.2 and for a list on current EPPR projects see Arctic Council (Working Groups), at 23-27.

1069 See on the following Arctic Council (EPPR Strategic Plan of Action 2010), at 3–6 and EPPR (Strategic Plan 2013).

1070 See *supra* in 5.3.2. As the EPPR does not have the mandate or ability to act personally in case of an emergency, but rather provides assistance to member states in dealing with it, the EPPR has been criticized to be rather dysfunctional; see VanderZwaag, et al., at 148–149.

from environmental emergencies in the polar North. As a consequence the EPPR i.a. encourages synergies between the different Arctic actors in scientific research, the development of best practices and the conduct of environmental impact assessments.

Since, as was stated *supra* in 5.3.2., accidental pollution shall, in order to limit the scope of this thesis, not be further elaborated on, this brief overview of the EPPR working group shall suffice. Yet, it ought to be noted, that in terms of assessing climate change induced Arctic risks the EPPR is playing a significant role, albeit on a limited scale as it refers only to accidental emergencies and natural disasters and does not include negative ramifications that can be directly linked to initiating activities carried out deliberately and may threaten the Arctic ecosystems. Addressing such activities in a circumpolar context hence lies with the mandate of the other Arctic Council working groups, especially the Conservation of Arctic Flora and Fauna (CAFF) and the Protection of the Arctic Marine Environment (PAME).

Finally, the EPPR's involvement in developing and implementing the Arctic Search and Rescue Agreement and the Arctic Marine Oil Pollution, Preparedness and Response Agreement is noteworthy, which are the two first legally binding acts established under the auspices of the Arctic Council.[1071]

6.2.2.5. Protection of the Arctic Marine Environment (PAME)

The Protection of the Arctic Marine Environment working group (PAME) was established under the Arctic Environmental Protection Strategy (AEPS) as a working group *"to take preventive and other measures directly or through the competent international organization regarding marine pollution in the Arctic irrespective of origin"*[1072]. Consequently under the AEPS, PAME was in accordance with part XII of UNCLOS to address all sources of marine pollution within the Arctic, to foster participation in international instruments relevant to marine protection and take the necessary measures to comply with the strictest international standards within these instruments.[1073] Furthermore, the working group was obliged to support international organizations in developing mandatory standards pertaining to envi-

1071 See *supra* in 6.2.2. and Emergency Prevention Preparedness and Response Working Group (Arctic & Emergencies), at 10, Emergency Prevention Preparedness and Response Working Group (2011 meeting report), at 18, Emergency Prevention Preparedness and Response Working Group (2012 workshop report), at 6 and 16.

1072 Para. 14 of the Rovaniemi Declaration.

1073 See AEPS, in para. 7 i), ii) and iv).

ronmental protection from accidental pollution and to conduct monitoring activities within the Arctic Monitoring and Assessment Programme (AMAP).[1074]

Following these mandates, several projects, guidelines and reports were developed by PAME under the Arctic Environmental Protection Strategy and remained effective within the scope of the Arctic Council: These are *inter alia* the Regional Programme of Action on marine pollution from land-based activities (RPA), the Arctic offshore oil and gas guidelines, the Arctic marine shipping assessment (AMSA) and work undertaken in cooperation with the International Maritime Organization in establishing e.g. the Polar Code.[1075]

Additionally in respect to the RPA, PAME has supported the development of a country specific National Plan of Action for the Protection of the Arctic Marine Environment within the Russian Arctic (Russian NPA-Arctic).[1076] As this is a country specific measure, it will be addressed in greater detail *infra* in 6.3.

From the perspective of governing climate change induced Arctic risks affecting the Arctic Ocean, however, the Arctic Marine Strategic Plan (AMSP)[1077] of 2004 and its follow up program, the Arctic Ocean Review Project 2009-2013 (AOR)[1078] deserve greater attention. In 2002 the Ministers of the Arctic Nations agreed that a *"more coordinated and integrated strategic approach to address the challenges of the Arctic coastal and marine environment"* was needed and consequently required the development

1074 Ibid., at. 34 paras. v) and vi).

1075 See para. 6 of the Inuvik Declaration, para. 9 of the Alta Declaration, paras. 24 and 26 of the Iqaluit Declaration, para. 11 of the Barrow Declaration, para. 5 of the Inari Declaration, paras. 3 and 6 of section 5 "Protecting the Arctic Marine Environment" of the Reykjavik Declaration, para. 3 of section 8 "Protection of the Arctic Marine Environment" of the Salekhard Declaration and paras. 1, 4, 9 and 10 of the Tromsø Declaration; and see for details Arctic Council (RPA), PAME (AMSA), PAME (Oil and Gas Guidelines) and *supra* in 5.3.2.3. as well as PAME (Work Plan 2013-2015), at 6 and Arctic Council (Working Groups), at 29-36 for a list of current PAME projects.

1076 See para. 25 of the Iqaluit Declaration, para. 5 of the Inari Declaration and para. 4 section 8 "Protection of the Arctic Marine Environment" of the Salekhard Declaration. Note that the Inari Declaration is referring to the *"National Plan of Action for the Protection of the Marine Environment from Anthropogenic Pollution in the Arctic Region"*, while the Russian NPA-Arctic Program was initially called *"Russian Programme of Action for the Protection of the Arctic Marine Environment from Land-based Activities"* in the Iqaluit Declaration.

1077 PAME (AMSP).

1078 See for details PAME (AOR), *The Arctic Ocean Review Project*, and furthermore immediately *infra* in 6.2.2.5.

of *"a strategic plan for protection of the Arctic marine environment under leadership by PAME"*.[1079]

This plan, the AMSP, was adopted at the Reykjavik Ministerial Meeting, at which the Ministers of the Arctic States also endorsed and called for application of its underlying principle: An ecosystem-based management approach to the management of the Arctic marine environment.[1080] Consequently the aim of the AMSP is to *"[r]educe and prevent pollution in the Arctic marine environment, [c]onserve Arctic marine biodiversity and ecosystem functions, [p]romote the health and prosperity of all Arctic inhabitants [and] [a]dvance sustainable Arctic marine resource use"*.[1081] Achieving these four goals requires the application of a holistic approach, that takes ecological, social and economic factors into account. In this context AMSP defines the ecosystem-based management approach, as an approach that *"requires that development activities be coordinated in a way that minimizes their impact on the environment and integrates thinking across environmental, socio-economic and sectoral realms"*[1082].

Consequently the AMSP, in proposing a methodology in applying an ecosystem approach to the Arctic marine environment, suggests that first ecosystems need to be identified, monitored and reported on, so as to better understand their functions and processes as well as to gain insight on the natural and human activities putting them at risk. Secondly based on these findings an environmental impact assessment ought to be conducted, which will allow for the adoption of an integrated management plan that in turn eventually influences policy decisions.[1083]

Strategic actions to be taken under the AMSP thus *inter alia* include conducting research and monitoring initiatives, as well as their comprehensive assessment, advancing the implementation of international and regional agreements pertaining to the marine environment as well as reviewing their status and adequacy periodically, promoting the application of an ecosystem approach to management, fostering the cooperation between governments, indigenous peoples and international organizations to this aim, and raising

1079 Para. 5 of the Inari Declaration.
1080 See para. 4 of section 5 "Protecting the Arctic Marine Environment" of the Reykjavik Declaration.
1081 PAME (AMSP), at 3.
1082 Ibid., at 8.
1083 Ibid., at 9 (also providing a graphical overview of the suggested ecosystem-based approach to oceans management).

awareness as well as supporting education to include local and indigenous inhabitants in the decision-making process.[1084] It is noteworthy that the AMSP in this context suggests to *"analyze the applicability of a regional seas agreement to the Arctic"*[1085].

At the Ilulissat meeting in May 2008 the five Arctic littoral states, however, explicitly agreed that there was *"no need to develop a new comprehensive international legal regime to govern the Arctic Ocean"* as UNCLOS provides a solid foundation for responsible management of the Arctic marine environment.[1086] While at the Tromsø Ministerial Meeting it was noted that *"increased marine access and navigation in the Arctic Ocean call[ed] for the development and implementation of suitable national and international regulations (...) to advance (...) [inter alia] marine pollution prevention"*[1087] at the same meeting the findings of the Ilulissat Declaration were reaffirmed. In any case there seems currently to be no impetus of the eight Arctic Nations to in any way advance the establishment of a legally binding regional seas agreement as suggested by the AMSP.

In respect to the application of an ecosystem approach to management the AMSP further suggests the following specific actions to be taken:[1088]

- Identification of large marine ecosystems (LMEs)[1089] within the Arctic based on best available ecological information.
- Identification of elements that can serve as key indicators pertaining to environmental and socio-economic factors within the Arctic marine ecosystems.
- Promotion of pilot projects that demonstrate the application of an ecosystem approach to management.

In this context PAME has developed a working map of 17 Arctic large marine ecosystems[1090] and in 2007 established a LME Expert Group to support

1084 Ibid., at 11-13.
1085 Ibid., at 11.
1086 Para. 4 of the Ilulissat Declaration, as cited *supra* in fn 974 (part II).
1087 Para. 2 of section 3 "Arctic Marine Environment" of the Tromsø Declaration.
1088 See on the following PAME (AMSP), at 11.
1089 LMEs are large marine spaces, *"encompassing coastal waters from river basins and estuaries to the seaward boundary of continental shelves and the outer margins of coastal currents"*; Sherman Kenneth, at 47, U.S. Department of Commerce, at 7, Skjoldal & Misund, at 211, Rothwell & Stephens, at 463.
1090 See <http://pame.is/images/03_Projects/EA/LMEs/LME_2013.jpg> (last visited: 09.07.2014); note that the original map was updated in 2013; see for details PAME (LMEs

the assessment and management of these large marine ecosystems.[1091] As the LME methodology is based on ecological, rather than legal or political boundaries, it allows for the assessment and management of entire ecosystems, instead of specific national areas as in the case of areas under national jurisdiction designated protected area status. This holism is also reflected in the five-modul indicator approach applied under the LME methodology, which requires assessment and management initiatives within large marine ecosystems to focus on five interlinked topics: productivity (1), fish and fisheries, marine birds and marine mammals (2), pollution and ecosystem health (3), socio-economic conditions (4) and governance (5).[1092] Additionally these sectoral modules are complemented by cross-cutting issues such as climate change and biodiversity, which ought to be taken into account as well when assessing and managing large marine ecosystems.[1093] The implementation of this 5 module LME methodology was one of the main tasks within the PAME 2009 to 2011 work plan and in this context two pilot projects were initiated within the Beaufort Sea LME and the West Bering Sea LME to test the large marine ecosystems approach in practice.[1094] Results of these projects are still pending.

The application of an ecosystem-based management approach to managing the Arctic Ocean according to the Arctic Marine Strategic Plan was furthermore topic of a joint project between PAME and the Sustainable Development Working Group (SDWG), which was initiated by Norway in 2006 and culminated in a report in 2009 on Best Practices in Ecosystem-Based Oceans Management in the Arctic (BePOMAR).[1095] The project's objective was *"to present the concepts and practices the Arctic countries have developed for the application of an ecosystem-based approach to oceans management"*[1096] in order to draw lessons for an effective application of the ecosystem approach in respect to managing the Arctic Ocean or in other words to develop *best practices* on ecosystem-based oceans management.

Revision).

1091 See PAME (Ecosystem Approach), at 1.

1092 See for details ibid., at 1 and 4 and U.S. Department of Commerce, at 2, Sherman Kenneth, at 52 and for details 53-57.

1093 See PAME (Ecosystem Approach), at 4.

1094 See PAME (Work Plan 2009-2011), at 3 and PAME (Ecosystem Approach), at 5. The implementation of an ecosystem approach to management through large marine ecosystem designation was also one of the main objectives under the PAME 2011-2013 and continues to be so under the PAME 2013-2015 work plan; see PAME (Work Plan 2011-2013), at 7 and PAME (Work Plan 2013-2015), at 10.

1095 Norsk Polarinstitutt, esp. at 5.

1096 Norsk Polarinstitutt, at 8.

To this end the BePOMAR project addressed two questions:[1097]

1. Which practices and approaches have proven useful in effectively protecting the Arctic marine environment and the sustainable use thereof?
2. What are the main obstacles and success elements in respect to applying an ecosystem approach to oceans management?

These questions were posed within seven case studies conducted in Canada, Denmark (Greenland), Finland, Iceland, Norway, Russia and the United States.[1098] The overall conclusion of the BePOMAR project was that while all of the examined Arctic States have addressed the ecosystem approach in one way or the other (either by developing, or by already implementing it), the approaches taken vary on a case by case basis. In this context ecosystem-based oceans management is either undertaken from a holistic stance, including all aspects of ocean use, or it is sectoral in scope, pertaining e.g. exclusively to fisheries.[1099] Based upon the case studies conducted, the SDWG and PAME working groups have identified several core elements to ecosystem-based ocean management. They are:[1100]

- The geographical scope of ecosystems is defined by ecological criteria.
- The development of scientific and other knowledge in respect to understanding ecosystem functions, processes and interactions with other ecosystems.
- The application of best available scientific and other knowledge to manage human activities.
- The application of an integrated, multidisciplinary and adaptive approach, that manages the ecosystem from a holistic point of view instead of a single-species, sectoral approach and takes ecosystem changes into account.

1097 See ibid.
1098 Ibid.
1099 Ibid., at 110.
1100 See on the following ibid., at 111. Note that the following bullet points are reproducing the core elements as identified by SDWG and PAME in a shortened and less complex form.

- The establishment of a comprehensive framework providing explicit conservation standards, targets and indicators in order to facilitate responses to ecosystem changes.
- The development of trans-boundary arrangements to address ecosystem issues across national borders.

Finally, considering these core elements the SDWG and PAME working groups identified based upon the case studies conducted the following *best practices* on ecosystem-based oceans management, which were endorsed at the Tromsø Ministerial Meeting in 2009:[1101]

- **Flexible application:** As ecosystems, as well as the threats affecting them, vary, there is no single method for ecosystem-based management. Consequently the application of the ecosystem approach to oceans management must remain flexible, which requires ecosystem management to be based upon best available scientific data and the improvement of cooperation and coordination of measures conducted (not only between stakeholders and other interested parties within a specific nation state but also across political boarders). Furthermore humans are to be recognized as ecosystem components and biological diversity conservation ought to be valued as an important element in ensuring the long term delivery of ecosystem services.
- **Integrated and science-based decision making:** As effective ecosystem-based management is dependent on science and other knowledge, cooperation in scientific research and monitoring and exchange of relevant information pertaining to Arctic marine ecosystems is paramount, so as to provide for informed and more flexible decision making, that incorporates traditional ecological knowledge. Furthermore effective ecosystem-based policies require coordination between all levels of governments and cooperation across sectors.
- **National commitments:** Effective implementation of an ecosystem-based approach to oceans management is dependent upon national commitments to conservation and sustainable use of resources. Inter-agency cooperation is required to support the coordination of the ecosystem-based management approach at the national level, so as to harmonize domestic laws promoting the ecosystem

1101 See para. 11 of section 3 "Arctic Marine Environment" of the Tromsø Declaration and on the following see ibid., at 111-112.

approach with such reflective of regional and international management efforts. In this context legislation and enforceable policies providing governments with strategic directions and establishing an overall framework for ecosystem-based management implementation are required.

- **Area based and trans-boundary approaches:** The identification and protection of units within ecosystems (e.g. by protected area designation or networks of such areas) are central to identify management priorities and maintain ecosystem structures and functions. Furthermore, as ecosystems do not make halt at any legal or political borders, international cooperation (e.g. through existing regional management bodies or the development of new collaborative efforts) is necessary to effectively apply the ecosystem-based approach to oceans management.
- **Stakeholder participation:** Stakeholder participation and such of other Arctic residents is important in encouraging the application and achieving compliance with ecosystem-based conservation measures, as understanding and support grows through public participation.
- **Adaptive management:** With threats, such as climate change, which entail a high degree of uncertainty, adaptive management strategies are required to be included in effective ecosystem-based management, so as to quickly adapt to changes within the marine ecosystems. This requires for flexible mechanisms and the setting of targets and thresholds, against which ecosystem health can be measured.

Considering these best practices, in essence the findings of the BePOMAR project reflect the core principles as established under the Convention on Biological Diversity and hence are proof of the application of the Malawi principles in practice.[1102] Yet of course, as the best practices identified by the SDWG and the PAME working groups provide a summery of approaches undertaken within the seven Arctic Nations the studies were conducted in, it would be too far fetched to say that the ecosystem approach as established under the Convention on Biological Diversity is comprehensively implemented within any of the eight Arctic States, even more so, as the scope of

1102 See for details *supra* in 4.5.2.

the BePOMAR project was limited to oceans management, rather than being as holistic in scope as the CBD's approach. Nevertheless the best practices identified may help to adopt and implement the ecosystem approach (at least in respect to oceans management) within Arctic Nations on a more comprehensive scale and as such ought to be seen as a helpful guideline in effectively governing climate change induced Arctic risks. In this context one of the PAME actions to be undertaken during the 2009-2011 work period was to examine how the conclusions of BePOMAR might be successfully applied within the Arctic States and how these activities can be coordinated with activities in response to the PAME large marine ecosystems (LME) approach.[1103]

As already mentioned *supra*, another comprehensive PAME project has been conducted, as a follow up to the Arctic Marine Strategic Plan (AMSP). As one of the strategic actions to be taken under the AMSP is the periodical review of the status and adequacy of international and regional agreements and standards applicable to the Arctic marine environment,[1104] in 2009 PAME proposed to conduct an Arctic Ocean Review (AOR). The AOR was aimed at reviewing the global and regional measures on conservation of the marine environment and sustainable use within the Arctic currently in place (Phase I) and based upon these findings was to analyze possible gaps and provide appropriate options to fill them (Phase II).[1105] The project, which was led by Canada, Iceland, Norway, Russia and the United States, was based on a multi-year schedule, with the Phase I report having been issued at the Ministerial Meeting on May 12, 2011 in Nuuk, Greenland and a final report pertaining to Phase II having been released at the 2013 Ministerial Meeting in Kiruna, Sweden.[1106]

Finally, it ought to be mentioned, that the Arctic Marine Strategic Plan is currently under review, as the findings of the Arctic Council working groups *"indicate that most strategic actions of the AMSP have been completed or are progressing according to plan"*[1107]. Consequently *"it is timely (...) to update and expand, as relevant, the AMSP (2004) to secure that the future marine management of the Arctic marine environment is coordinated be-*

1103 See PAME (Work Plan 2009-2011), at 3.
1104 See action 7.3.4. *supra* in fn 1084 (part II).
1105 See for details PAME (AOR), at 2–3, PAME (Work Plan 2011-2013), at 25–28 and *The Arctic Ocean Review Project*, at 3.
1106 See PAME (AOR), at 3 and 4, *The Arctic Ocean Review Project* and PAME (AOR Final Report).
1107 PAME (Work Plan 2011-2013), at 34.

tween the working groups, with the objective to [effectively implement] integrated ocean management through an ecosystem-based approach"[1108]. Hence, the update of the AMSP to be concluded by 2015 is aimed at providing *"the building blocks towards more coordinated and integrated approaches and support policy decisions at the local, national, regional and at the international levels"* in this respect.[1109]

6.2.2.6. Sustainable Development Working Group (SDWG)

Sustainable Development was one of the core issues right from the start of pan-Arctic cooperation through the Arctic Environmental Protection Strategy (AEPS).[1110] However, a specific working group addressing issues of sustainable development within the Arctic was not established until the founding of the Arctic Council.[1111] The Sustainable Development Working Group's (SDWG) mandate is to advance issues of sustainable development as reflected in the Arctic Council's Sustainable Development Programme (SDP), such as health of indigenous peoples and other Arctic inhabitants, education, resource management, environmental and protection of cultural values, as well as economic improvements, with the aim of developing a sustainable future for the Arctic.[1112] In this context a Sustainable Development Action Plan (SDAP)[1113] has been developed as a tool to implement the Sustainable Development Programme and assess the progress made in respect to sustainable development within the circumpolar North.[1114]

While contributions in implementing the Sustainable Development Programme through the Sustainable Development Action Plan are required from all Arctic Council working groups, the SDWG's mandate has predomi-

1108 Ibid.
1109 Ibid. and for further details PAME (Work Plan 2013-2015), at 9 and 21-24.
1110 See for details on the AEPS *supra* in 6.2.1.
1111 The SDWG working group was formally adopted at the first Ministerial Meeting of the Arctic Council in Iqaluit in 1998; see para. 9 of the Iqaluit Declaration; However under the AEPS the Task Force for Sustainable Development and Utilization was formed to address issues of sustainable development; see para. 2 of the Nuuk and paras. 3 and 5 of the Inuvik Declaration and for details VanderZwaag, et al., at 152–153, Koivurova & VanderZwaag, at 149–150, Tennberg, at 95–97.
1112 See paras. 6, 7 and 10 of the Iqaluit Declaration and para. 1 of section 3 "Human Development in the Arctic" of the Reykjavik Declaration and Arctic Council (SDP), at 1, Arctic Council (SDP Framework), at 2.
1113 Arctic Council (SDAP).
1114 See para. 6 of section 3 "Human Development in the Arctic" of the Reykjavik Declaration and for a current list of SDWG projects see Arctic Council (Working Groups), at 39-43.

nantly taken the social and economic dimension of sustainable development into account and hence has primarily been concerned with topics such as health, education, eradication of poverty, gender equality, sustainable use of resources, establishment of infrastructure and information technologies,[1115] rather than with ecological issues.[1116] These issues are extensively covered by the other Arctic Council working groups, predominantly by the Conservation of Arctic Flora and Fauna (CAFF) and the Protection of the Arctic Marine Environment (PAME). Yet, ecological factors are, albeit on a more limited scale, also included into projects conducted by the SDWG: At the Salekhard Ministerial Meeting the SDWG was requested to identify and share expertise and best practices capable of facilitating adaptation to climate change, which resulted in a report on Vulnerability and Adaptation to Climate Change in the Arctic, as issued in 2009.[1117] Additionally, in respect to the management of natural and living resources, especially in context of the Arctic Ocean, the SDWG has proposed to *"pay particular attention to the development of new projects and activities that relate to the ecosystem approach and implementation of integrated management concepts"* as the new challenges emerging within the Arctic, including climate change, *"require that the management of resources is based on a holistic perspective"*.[1118] It is in this context that the joint project of SDWG and PAME, Best Practices in Ecosystems Based Oceans Management (BePOMAR)[1119] ought to be seen.

6.2.3. Conclusion

As has been shown the initiatives established under the Arctic Environmental Protection Strategy (AEPS) and the Arctic Council allow for close cooperation and coordination of national measures especially in respect to sustainable development and environmental protection within the Arctic. Consequently the Arctic Council has served as a forum to develop and test holistic methodologies such as the ecosystem approach in practice and hence plays a significant role in assessing and managing climate change induced Arctic risks.[1120] Yet, due to the fact that the Arctic Council is not based upon any

1115 See Arctic Council (SDWG Work Plan), at 1–2 and at 3-5 for detailed projects of the SDWG.
1116 Cf. Arctic Council (SDAP), at 6.
1117 See para. 7 section 1 "Climate Change in the Arctic" of the Salekhard Declaration and for details on the report SDWG (Climate Change).
1118 See Arctic Council (SDWG Work Plan), at 4 and 5.
1119 For details see *supra* in 6.2.2.5.
1120 See in this context especially *supra* in 6.2.2.3. and 6.2.2.5.

legally binding rules, but – with the exception of the Arctic Search and Rescue Agreement and the Agreement on Arctic Marine Oil Pollution, Preparedness and Response[1121] – rather relies on soft law declarations and regulations, if and in what way the ecosystem approach or the precautionary principle are implemented within the eight Arctic Nations, is primarily dependent upon their will to recognize the information gathered within the Arctic Council working groups and to comply with the recommendations made by them.

Nevertheless this soft law approach, as it is more flexible and provides for integrated management by including indigenous peoples in an incomparable way, decisively altered the setting within the circumpolar North, which before the adoption of the Arctic Environmental Protection Strategy was seen as a region of conflict rather than cooperation.[1122] Against this backdrop the AEPS as well as the Arctic Council have promoted pan-Arctic cooperation and, although in general – except for the recent Arctic Search and Rescue Agreement and the Agreement on Arctic Marine Oil Pollution, Preparedness and Response – not providing for any legally binding and enforceable regulations in that context, have had an influence on Arctic States' assessment and management of the Arctic ecosystems and the risks they are affected by.

Furthermore, as the adoption of the Arctic Search and Rescue Agreement and the Agreement on Arctic Marine Oil Pollution, Preparedness and Response shows, the Arctic Council may provide the base for establishing mandatory regulations in respect to Arctic environmental protection and conservation from an ecosystem perspective in the future. To date, however, no legally binding agreement concerning this matter exists across the Arctic, which ultimately results in reliance upon Arctic States to adopt and implement effective tools to governing climate change induced Arctic risks, such as the ecosystem approach. The following paragraph will thus address, how Arctic Nations are responding to Arctic Council and global initiatives pertaining to assessing and managing climate change induced Arctic risks on a domestic level.

1121 See *supra* in fn 986 and 993 (part II).
1122 See for details *supra* in 6.2.1. and 6.2.2.

6.3. National Arctic Strategies

As has been shown *supra* in 6.1, due to the lack of a comprehensive legally binding treaty pertaining to the Arctic ecosystems, how risk assessment and management of climate change induced Arctic risks affecting these ecosystems is conducted within the circumpolar North is primarily dependent upon the approaches chosen by the eight Arctic Nations. This holds true even more in consideration of the zonal division of the Arctic marine environment supported by UNCLOS, which is the main hard law regime applicable to the Arctic Ocean.[1123] Other regimes, such as the international conventions established under the International Maritime Organization[1124] or those of a regional scope, such as the Convention for the Protection of the Marine Environment of the North-East Atlantic[1125], do not compensate the Law of the Sea Convention's shortcomings in this respect, as they are limited in spatial and/or sectoral scope and they do not take specific Arctic circumstances into account, as e.g done by article 234 of UNCLOS. On the other hand regional projects that are more reflective of these peculiarities and are also more comprehensive in scope, such as those conducted by the Arctic Council working groups,[1126] are primarily of soft law character and thus are not providing for any strict legally enforceable guidelines for decision-makers dealing with climate change induced Arctic risks.

Ultimately Arctic governance, including the assessment and management of climate change induced risks, is in large parts dependent upon initiatives taken by the eight Arctic States to advance the international and regional legal regime applicable to the Arctic and to comply with the soft law regulations established under the Arctic Environmental Protection Strategy and the Arctic Council.[1127]

Within recent years the Arctic Nations have in this respect established individual strategies pertaining to the high North.[1128] As addressing these strategies in a comprehensive way and for all Arctic Nations would go too far, the following paragraphs will only provide information on domestic policies and

1123 See *supra* in 5.3., esp. 5.3.1.2.
1124 See for details *supra* in 5.3.2.
1125 See for details *supra* in 6.1.1.
1126 See for details *supra* in 6.2.2.
1127 See for details *supra* in 5.2-5.5., 6.1. and 6.2.
1128 As of 2014 all Arctic States have established specific Arctic policies. They are available at <http://www.arctic-council.org/index.php/en/document-archive/category/12-arctic-strategies> (last visited: 11.07.2014).

regulations that pertain to the assessment and/or management of climate change induced risks within the Arctic, especially in regards to the precautionary principle and the ecosystem approach. The list of initiatives presented is by no means supposed to be exhaustive, however. Rather it shall provide an exemplary overview of domestic advancements undertaken – if any – in respect to adopting and establishing a comprehensive, integrated and ecosystem-based approach. For this purpose Arctic policies and legislation of Canada, Norway, Russia, the United States and the European Union shall be considered in greater detail subsequently.

6.3.1. Canada

Canada's Foreign Policy in respect to the circumpolar North, which was adopted in 2000 identifies four overarching objectives relating to security issues, state sovereignty, geopolitics and sustainable development in the Canadian Arctic.[1129] In context of the latter, Canada's policy recognizes the protection of *"the vulnerable circumpolar ecosystem from environmental degradation and transboundary effects"* to be an issue, which requires international cooperation.[1130] These objectives were reaffirmed in Canada's Northern Strategy of 2009, which establishes four priority areas in respect to the Arctic: Sovereignty, social and economic development, environmental protection and northern governance.[1131] In 2010 these priorities were further elaborated on in a Statement on Canada's Arctic Foreign Policy[1132], which held that Canada's *"vision for the Arctic is a stable, rules-based region with clearly defined boundaries, dynamic economic growth and trade, vibrant Northern communities, and healthy and productive ecosystems"*[1133]. In implementing the "environmental pillar" of the Northern Strategy, Canada will according to it's Statement *inter alia* focus on *"promoting an ecosystem-based management approach with Arctic neighbours and others"* and on *"contributing to and supporting international efforts to address climate change in the Arctic"*.[1134] Canada's Arctic policy was and is thus characterized by a strong focus on strengthening international cooperation within the circumpolar North but also among stakeholders, especially through the Arc-

1129 See Department of Foreign Affairs and International Trade, at 10.
1130 Ibid., at 8.
1131 See for details Government of Canada (Northern Strategy), at 2 and for details 9-36.
1132 Government of Canada (Statement).
1133 Ibid., at 2.
1134 Ibid., at 4, 16, 18 and 19.

tic Council, including in environmental matters.[1135] Since cooperation is a prerequisite for integrated management, as supported by the ecosystem approach, Canada's Arctic policy provides for a good starting point in establishing a pan-arctic, ecosystem-based strategy, as identified as one of the country's main focal points by the Statement of 2010.

6.3.1.1. Domestic Legislative Action Pertaining to Marine Environmental Risk Governance

Canada was early on reflective of the fragility of Arctic ecosystems and the need to maintain them for socio-economic benefits: Conservation and protection of the Arctic marine environment from anthropogenic interference was an issue as early as in 1985, when the Arctic Waters Pollution Prevention Act (AWPPA) was adopted.[1136] The Act is aimed at providing for sustainable development, by bridging economic interests and such of local inhabitants, especially indigenous peoples, as well as at preserving the *"peculiar ecological balance that (...) exists in the water, ice and land areas of the Canadian arctic"*.[1137] Given this pioneer role in addressing Arctic environmental issues as well as in acknowledging the need for international and national cooperation in this context, it is not surprising, that Canada was the first country in the world to adopt a comprehensive oceans management legislation:[1138] On January 31, 1997 the Canadian Oceans Act[1139] entered into force, which explicitly refers to both, the precautionary principle as well as the ecosystem approach.

The Act holds in its preamble that Canada considers *"conservation, based on an ecosystem approach, [to be] of fundamental importance to maintaining biological diversity and productivity in the marine environment"* and hence *"promotes the wide application of the precautionary approach to the conservation, management and exploitation of marine resources in order to protect these resources and preserve the marine environment"*. These two principles are further elaborated within the main body of the Act in Part II referring to the Oceans Management Strategy. Article 30 of the

1135 See Department of Foreign Affairs and International Trade, at 11, 18 and 19, Government of Canada (Northern Strategy), at 34–36, Government of Canada (Statement), at 16, 17, 23 and 24.

1136 See for details *supra* in 5.3.1.1. c.

1137 See the preamble of the AWPPA, as cited *supra* in fn 232 (part II).

1138 See The Aspen Institute, at 69 and Government of Canada (OAP), at 6.

1139 *Oceans Act (consolidated text as of April 1, 2014)*, 1996, S.C. 1996, c. 31 [hereinafter Oceans Act].

Oceans Act holds in this context, that the *"national strategy [for the management of estuarine, coastal and marine ecosystems in Canadian waters is to] be based on the principles of (...) sustainable development (...), the integrated management of activities in estuaries, coastal waters and marine waters"* under Canadian jurisdiction and *"the precautionary approach that is, erring on the side of caution"*.[1140] While the term *"ecosystem approach"* is not used within the main body of the Act, article 30 paragraph (b) in conjunction with article 31 of the Oceans Act clearly reflects this notion by holding that the Canadian Minister of Fisheries and Oceans, *"in collaboration with other ministers, boards and agencies of the Government of Canada, with provincial and territorial governments and with affected aboriginal organizations, coastal communities and other persons and bodies, including those bodies established under land claims agreements, shall lead and facilitate the development and implementation of plans for the integrated management of all activities or measures in or affecting estuaries, coastal (...) and marine waters that form part of Canada or in which Canada has sovereign rights under international law"*. What such an integrated management plan entails is made clear by subsequent provisions, e.g. article 35, which refers to the development of marine protected areas.

a. Ocean Action Plan

Based on the Oceans Act Canada adopted an Oceans Action Plan (OAP) in 2005,[1141] which succeeded the 2002 Ocean's Strategy[1142] and acknowledges that *"without a strategy to more effectively manage (...) [the] oceans and address (...) challenges [arising therein], there will be continued environmental degradation and lost economic and employment prospects"*[1143]. In order to address these environmental and socio-economic issues, the OAP is based upon four interconnected pillars:[1144] International leadership, sovereignty and security (1); Integrated oceans management for sustainable development (2); health of the oceans (3); and ocean science and technology (4).

In respect to the second pillar, Canada recognizes that often *"goals and objectives for decision-making are not clear nor integrated across sectors*

1140 Arts. 29, 30 paras. (a), (b) and (c) of the Oceans Act.
1141 Government of Canada (OAP).
1142 See for details Government of Canada (Ocean's Strategy).
1143 Government of Canada (OAP), at 4.
1144 Ibid. at 5.

and they are not always grounded in sustainable practices, based on sound science that considers both current and cumulative impacts"[1145]. A new regime to ocean governance, that follows a holistic methodology, is based on sound scientific and traditional knowledge, that includes all stakeholders, operates across sectors and calls for the application of ecosystem-based conservation and protection measures (e.g. the designation of marine protected areas[1146]), as supported by the Oceans Act is required to counteract these problems.[1147]

b. Large Ocean Management Areas: The Beaufort Sea Example

To achieve the goals of the Oceans Act and the Oceans Action Plan (OAP) in practice, Canada developed a phased approach within its OAP, by which the initiating phase of integrated management planning was to focus on five priority areas, within which science-based management tools for advancing and implementing an ecosystem-based management could be tested and applied.[1148] Among the identified five Large Ocean Management Areas (LOMAs) there is currently only one located in the Arctic, the Beaufort Sea, which is situated in the Canadian western Arctic and falls within the Inuvialuit settlement region.[1149] Integrated oceans management subject to articles 30 paragraph (b) and 31 of the Oceans Act, will thus have to respect the specific regulations pertaining to aboriginal rights in the Beaufort Sea area according to the Inuvialuit Final Agreement.[1150] In this context the intent of the Beaufort Sea integrated oceans management plan *"is to consider all users of the marine environment, as well as the interactions among human*

1145 Ibid. at 7.

1146 See for further information in respect to Canadian marine protected area (MPA) designation Canada's Federal MPA Strategy, that emphasizes on the building of MPA networks; GOVERNMENT OF CANADA (MPA), at 8 and 10-11 on the guiding principles for implementation, including the ecosystem approach and the precautionary principle.

1147 See GOVERNMENT OF CANADA (OAP), at 8 and 9 and for further details on marine protected areas at 17.

1148 See ibid. at 5 and 13-15.

1149 See ibid., at 14 and NORSK POLARINSTITUTT, at 85-86 and 88; the Inuvialuit Settlement Region is an area managed by an agreement between the federal government and the aboriginal residents of the region; in case of the Inuvialuit settlement region the land claim has been settled by the Inuvialuit Final Agreement, which *inter alia* grants participatory rights to the Inuvialuit in respect to wildlife and land management; see *inter alia* paras. 7.(82), 14(2) and 14(4) of *The Inuvialuit Final Agreement As Amended (consolidated version)*, April, 2005, BYERS, at 80-82 and for general remarks pertaining to Canadian land claim agreements: NORSK POLARINSTITUTT, at 84.

1150 See ibid. and BEAUFORT SEA PARTNERSHIP, at 2 and 5, NORSK POLARINSTITUTT, at 88.

activities and between those activities and the marine environment" and in doing so to maintain ecosystem health and resilience, while creating sustainable economies and communities within the Beaufort region.[1151] To achieve this goal an integrated oceans management plan for the Beaufort Sea was developed in three stages: Definition and assessment of the area (1), involvement of stakeholders (2) and the development of the plan itself (3).

The first stage included the gathering of scientific and traditional knowledge on environmental and socio-economic processes within the Beaufort Sea, which culminated in the issuing of the Ecosystem Overview and Assessment Report and the Social, Cultural and Economic Overview and Assessment Report.[1152] Based on these reports and various consultations with interested parties, the integrated oceans management plan for the Beaufort Sea was adopted in 2009 and covers four overall themes:[1153] Governance (1), social, cultural and economic issues (2), traditional and local knowledge (3) and ecosystem (4). In addressing these topics the plan is aimed at establishing a balance between socio-economic and environmental objectives, while including local and indigenous peoples in governing and implementing the plan, as well as integrating their knowledge into decision-making processes, complementary to science based research and monitoring programs.[1154]

To implement these objectives a Regional Coordination committee (RCC) was founded in 2006, which is to allow for a collaborative approach between the various stakeholders both on a federal as well as on a local/aboriginal level.[1155] The RCC is complemented by the Beaufort Sea Partnership (BSP), which provides a forum for information sharing and collaboration, so as to further cooperation in respect to activities within the Beaufort Sea and to enhance effectiveness by averting equal efforts in the Large Ocean Management Area.[1156] Furthermore an effective implementation of the Beaufort Sea integrated oceans management plan is dependent upon a reporting system of all participating stakeholders, so as to assess and review their compliance with the plan, as well as on a regular update of the plan addressing such compliance issues and newly emerging management needs and priorities.[1157]

1151 Beaufort Sea Partnership, at 5, 8 and 18.
1152 See ibid. at 9, Norsk Polarinstitutt, at 86 and 88 and for details Cobb, et al.
1153 See Beaufort Sea Partnership, at 11–12 and accord. The Aspen Institute, at 71.
1154 See for details, Beaufort Sea Partnership, at 13–18.
1155 See ibid. at 7 and 20.
1156 See ibid.
1157 See ibid., at 23.

Given that to date there exists only one plan covering the Beaufort Sea, integrated ocean management in the area is a work in progress. It will take years to effectively apply such a comprehensive approach to oceans management, leading to any tangible results and it will remain to be seen what conclusions might be drawn for other Arctic regions from the Beaufort Sea example.[1158]

As the Beaufort Sea poses some controversy in regards to maritime delimitation between Canada and the United States,[1159] cooperative efforts in this respect – and hence the application of a comprehensive strategy to manage the sea, such as the ecosystem approach – are all the more valuable. While the delimitation issues have not been settled as of mid 2014, conservation and protection of the Beaufort Sea ecosystems is advanced and the implementation of the ecosystem approach is facilitated by cooperative measures taken in Canada and the U.S. through the designation of the Beaufort Sea as large marine ecosystem (LME) under the Arctic Council PAME working group LME pilot project.[1160] This shows that unresolved marine sovereignty disputes do not essentially hamper the application of the ecosystem approach. Instead the implementation of a holistic strategy will guarantee that the marine ecosystems are maintained, in spite of unsettled delimitation disputes and at the same time, because it requires cooperation between all stakeholders, including across borders, can advance the delimitation process as it engages the disputing parties into diplomatic talks.

6.3.1.2. Domestic Legislative Action Pertaining to Biodiversity and the Protection of Species and their Habitat

While other Canadian legislative efforts shall not be addressed here in greater detail, it is noteworthy, that in respect to domestic law reflective of the precautionary principle and the ecosystem approach, there exist other legislative endeavors that are in support of these principles. The precautionary principle is e.g. explicitly mentioned in Canada's Environmental Assessment Act (CEAA), as one of the guiding principles when deciding upon the permissibility of a specific activity, and the ecosystem approach (or multi-species approach) may be adopted when establishing a recovery strategy

1158 Accord. King, at 305 and Norsk Polarinstitutt, at 91.

1159 See e.g. Baker, at 69–70, Oude Elferink (Arctic Maritime Delimitations), at 190–194, van Pay, at 75–76, Byers, at 56 et seq. and on the issue of maritime sovereignty disputes within the Arctic see *supra* in 3.2.2.2.

1160 See *supra* in 6.2.2.5.

for a listed wildlife species under the Species at Risk Act.[1161] In a broader context these legislative developments are to be seen in respect to Canada's ratification of the Convention on Biological Diversity in 1992, upon which in 1995 a Canadian Biodiversity Strategy was established.[1162]

The Strategy refers *inter alia* to the necessity to advance ecological management on a integrative and cooperative basis, which in essence mirrors the principles considered under the ecosystem approach: *"[Ecological management] is defined in the Strategy as the management of human activities so that ecosystems, their structure, composition and function, and the processes that shaped them can continue at appropriate temporal and spatial scales. Ecological management requires an understanding of ecosystems and the impacts and implications of human activities."*[1163]

While the Biodiversity Strategy does not hold an explicit reference to the ecosystem approach, this shortcoming was amended through the National Biodiversity Outcomes Framework, which was adopted in 2006 and complements the Canadian Biodiversity Strategy.[1164] The Framework addresses three interlinked questions (what?, why? and how?) as regards biodiversity conservation in Canada.[1165] The first question establishes four biodiversity objectives. They are: reducing human impacts and restoring damaged ecosystems, so as to maintain healthy and diverse ecosystems, that are capable of providing goods and services for human well-being (1), the conservation and protection of species that are viable to ecosystems processes and functions (2), maintaining genetic resources so as to build ecosystem resilience and provide for their adaptive capacity (3) and to use natural resources in a sustainable way (4).[1166] In answering the question on how to attain these objectives, the Framework refers to the ecosystem approach and adaptive management and divides the management approach into four steps: Assessment, planning, conducting management measures and monitoring them.[1167]

1161 See art. 4 para. 1, sub-paras. (b) and (g) and para. 2 of the *Canadian Environmental Assessment Act (consolidated text as of July 6, 2012)*, 2012, S.C. 2012, c. 19 and art. 41 para. (3) in conjunction with art. 37 para. (1), as well as art 67 in conjunction with art. 65 of the *Species at Risk Act (consolidated text as of March 8, 2013)*, 2002, S.C. 2002, c. 29.

1162 See for details Minister of Supply and Services and Prip, et al., at 139–152.

1163 Minister of Supply and Services, at 16.

1164 See for details *A Biodiversity Outcomes Framework for Canada*, and Prip, et al., at 140–141.

1165 See *A Biodiversity Outcomes Framework for Canada,* at 5.

1166 See ibid., at 6.

1167 See ibid., at 7.

This brief overview of Canadian legislative efforts shows, that especially in regards to the marine environment, the ecosystem approach has been acknowledged as an effective tool for sustainable management and biodiversity conservation. In this respect Canada's domestic efforts within recent years to include the ecosystem approach into binding domestic law and based thereon to adopt and implement such an approach within specific areas (e.g. the Beaufort Sea) are supporting the assessment and management of climate change induced Arctic risks from a holistic perspective, at least in the context of risks affecting the Arctic Ocean.

6.3.2. Norway

Norway has been a pioneer in taking precautionary action and adopting and implementing the ecosystem approach. The country's strong focus on environmental protection, especially in respect to the high North is emphasized not least in the Norwegian Government's High North Strategy, as issued in 2006, in which the government stresses that *"[w]e will take environmental and climate considerations into account in everything we do"* and furthermore that *"Norway intends to be a leading nation as regards environmental policy and will play a long-term and credible role as a steward of the natural and cultural heritage of the High North".*[1168]

In 2009 the Strategy was updated under the title *"New Building Blocks in the North – The next Step in the Government's High North Strategy",* which focuses on 7 action points to be achieved within the next 10 to 15 years: The development of knowledge on climate change and the Arctic environment (1), monitoring, emergency response and maritime safety (2), offshore, on-shore and infrastructure development of the Norwegian Arctic (3, 4, 5), as well as sovereignty issues (6) and such pertaining to indigenous peoples (7).[1169] In this context *inter alia* research and monitoring related to the Arctic environment and climate change, as well as close cooperation on an international and regional scale pertaining to Arctic interests (especially in a bilateral relationship with Russia as well as with indigenous peoples) are identified as priority areas in the government's high North efforts.[1170] Fur-

1168 See Norwegian Ministry of Foreign Affairs (Strategy), at 5.

1169 See Norwegian Ministry of Foreign Affairs (Building Blocks), at 7.

1170 See for details ibid., at 8-13, 37, 40-41, 44, 50, 73-74, 84-85; in respect to research and monitoring initiatives Norway *inter alia* established the Centre for Ice, Climate & Ecosystems (ICE), as well as the Svalbard Integrated Arctic Earth Observing System (SIOS); see for more information <http://www.npolar.no/en/research/ice/> and <http://www.sios-

thermore Norway has developed and continues to develop an environmental framework for biodiversity conservation, climate change mitigation and adaptation as well as the management of natural resources, especially of the Norwegian marine environment, including its Arctic areas.[1171]

6.3.2.1. Domestic Legislative Action Pertaining to Marine Environmental Risk Governance

In 2002 the Parliamentary Report No. 12[1172] was adopted on *"protecting the riches of the seas"*, which suggested the development and adoption of a *"long-term, comprehensive policy for the protection of the marine and coastal environment"*[1173] of Norway. According to the Report, the Norwegian government's intentions lie with developing *"tools and processes which help lay the foundations for an overall policy on the marine environment, i.e. a policy where the sum of all influences is assessed on the basis of what is known about the structure of the ecosystem, the way in which it functions and its condition"*[1174]. As stressors to the Norwegian ecosystems, such as pollution, exploitation of resources and other anthropogenic interferences have been predominantly assessed and managed in isolation, the Norwegian government is promoting the establishment of *"a future system of management that will be ecosystem-based and that will extend across all sectors"*.[1175]

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svalbard.org> (last visited: 12.07.2014)

1171 See for details Norwegian Ministry of Foreign Affairs (Strategy), at 45–46 and for Norwegian legislation in this context see e.g. *Act of 29 May 1981 No. 38 Relating to Wildlife and Wildlife Habitats (Lov om viltet*, May 29, 1981, *Act of 15 June 2001 No.79 Relating to the Protection of the Environment in Svalbard (Lov om miljøvern på Svalbard)*, June 15, 2001, *Act of 17 December 2004 No. 99 Relating to Greenhouse Gas Emission Allowance Trading and the Duty to Surrender Emission Allowances (Lov om kvoteplikt og handel med kvoter for utslipp av klimagasser)*, Dec. 17, 2004, *Act of June 6 2008 No. 37 Relating to the Management of Wild Living Marine Resources (Lov om forvaltning av viltlevande marine ressursar)*, June 6, 2008 [hereinafter Marine Resources Act (Havressurslova)], *Act of 19 June 2009 No. 100 Relating to the Management of Biological, Geological and Landscape Diversity (Lov om forvaltning av naturens mangfold)*, June 19, 2009 [hereinafter Nature Diversity Act (Naturmangfoldloven)]. Please note that the English translations provided are for informational purposes only and therefore are not regarded as authentic texts; these translations are made available by the Faculty of Law Library of the University of Oslo online at <http://www.lovdata.no/info/lawdata.html> (last visited: 12.07.2014).

1172 Det Kongelige Miljøverndepartement (Royal Ministry of the Environment) (2002).

1173 See ibid., at 7.

1174 Ibid., at 9.

1175 See ibid., at 9 and 16.

To achieve the goal of having clean seas that are rich in marine life, the Norwegian government thus acknowledges the necessity to adopt a *"plan for total and integrated management of [the] maritime and coastal areas based on the ecosystem approach (...) in order to ensure that the accumulated [anthropogenic impact] on the environment in the long term is not greater than what the structure of the ecosystems, the way in which they function and their biological diversity can tolerate"*[1176]. In developing such a plan Norway is implementing international and regional provisions promoting the application of the ecosystem approach, such as the Convention on Biological Diversity or the Convention for the Protection of the Marine Environment of the North-East Atlantic.[1177]

In this context the ecosystem approach as applied by the Norwegian government is understood as a management approach to the seas, which *"involves integrated management of human activities based on the dynamics of the ecosystems. The goal is to achieve sustainable use of resources and goods derived from the ecosystems and to preserve their structure, modus operandi and productivity"*[1178].

As an initiating step in adopting and implementing the ecosystem approach the Norwegian government launched an initiative for the development of an integrated management plan in respect to the marine environment of the Barents Sea and the sea areas off the Lofoten Islands.[1179] This Plan[1180] was adopted in 2006 and is aimed at providing *"a framework for the sustainable use of natural resources and goods derived from the Barents Sea and the sea areas off the Lofoten Islands (...) and at the same time maintain the structure, functioning and productivity of the ecosystems in the area"*[1181]. While an in depth examination of the Barents Sea-Lofoten Area Manage-

1176 Ibid., at 16 to 17.

1177 In respect to implementing the Convention on Biological Diversity through National Biodiversity Strategies and Action Plans (NBSAPs) Norway has developed an Environmental Policy, which does not refer to the ecosystem approach explicitly, but rather to ecosystem-based management in the context of the marine environment. See for details Norwegian Ministry of the Environment, at 22-23, 28 and 30 as well as *supra* in 5.4.1. and on the application of such an ecosystem-based management approach in practice subsequently.

1178 Det Kongelige Miljøverndepartement (Royal Ministry of the Environment) (2002), at 17.

1179 See ibid., at 19 and Winsnes & Skjoldal; note that the Barents Sea-Lofoten Island Management Plan covers parts of two large marine ecosystems, which according to Winsnes & Skjodal may require to realign the areas for the Norwegian Management Plan with the boundaries of the large marine ecosystems; see Winsnes & Skjoldal, at 244.

1180 Det Kongelige Miljøverndepartement (Royal Ministry of the Environment) (2006).

1181 Ibid., at 7.

ment Plan would be too extensive and thus shall not be provided here,[1182] in summary the plan describes the areas to be covered by the ecosystem-based management regime, as well as the international and national legal provisions applicable to them, such as UNCLOS, MARPOL 1973/1978 or the CBD.[1183]

Furthermore the plan outlines information on ecosystem stressors and in this context refers to the assessment of overall pressures and impacts (i.e. fisheries, petroleum activities, maritime navigation and external factors such as long-range trans-boundary pollution) as an important prerequisite in ensuring the effective application of an integrated, ecosystem-based management regime.[1184] Additionally the management plan sets specific goals for the Barents Sea-Lofoten area in respect to preventing and combating pollution, the sound management of fisheries and the conservation of biological diversity.[1185] To achieve these goals sufficient knowledge is required on ecosystem structure, functioning as well as on how ecosystems are affected by anthropogenic activities.[1186]

As ecosystems change on a temporal scale, however, this knowledge base will have to be continuously reviewed, in order to detect such changes in the status of ecosystems and respond to them appropriately. In this context further research initiatives as well as the development of an integrated monitoring system is supported by Norway.[1187] Based on the experiences gained from the Barents Sea-Lofoten Islands pilot project, in 2009 an integrated management plan was also adopted for the Norwegian Sea and an additional plan for the North Sea is to follow by 2015.[1188]

1182 For details see *supra* in fn 1180 (part II) and QUILLFELDT, ET AL.

1183 See for details DET KONGELIGE MILJØVERNDEPARTEMENT (ROYAL MINISTRY OF THE ENVIRONMENT) (2006), at 24–59, QUILLFELDT, ET AL., at 546 and 551; and for details on UNCLOS, MARPOL 1973/1978 and the CBD see *supra* in 5.3.1., 5.3.2.1. and 5.4.1.

1184 See for details DET KONGELIGE MILJØVERNDEPARTEMENT (ROYAL MINISTRY OF THE ENVIRONMENT) (2006), at 60-87, esp. note 5.6. at 75 et seq.

1185 See for details ibid., at 93-104 and furthermore at 126-133, determining specific action to be taken by the Norwegian government to prevent and reduce pollution and to safeguard biodiversity in the Barents Sea-Lofoten area.

1186 See ibid., at 105.

1187 See ibid., at 119-121 note 9.5. and at 123-124 note 9.8 and NORWEGIAN MINISTRY OF FOREIGN AFFAIRS (STRATEGY), at 46–47.

1188 See DET KONGELIGE MILJØVERNDEPARTEMENT (ROYAL MINISTRY OF THE ENVIRONMENT) (2009), esp. at 9 as proposed by DET KONGELIGE MILJØVERNDEPARTEMENT (ROYAL MINISTRY OF THE ENVIRONMENT) (2002), at 19. The Norwegian Sea Management Plan follows closely the topical framework as established under the Barents Sea-Lofoten Area Plan, by referring to the ecosystems and their status (including socio-economic issues) within the Norwegian Sea area (chapters 3 and 4), the impacts and stressors thereon (chapters 5 and 6) and by listing explic-

6.3.2.2. Recent Domestic Environmental Legislation

The growing attention in regards to ecosystem-based management, as well as the management plans built in this context, found support by Norway's legislation in recent years: In 2008 the Marine Resources Act and in 2009 the Nature Diversity Act were adopted, which entered into force on January 1, 2009 and February 1, 2011 respectively.[1189] Both Acts explicitly refer to the precautionary principle and the ecosystem approach.

a. Marine Resources Act

According to chapter 1, § 1 of the Marine Resources Act, wild living marine resources are to be managed in a sustainable and economically profitable way. To achieve this goal the Act in § 7 lists several guiding principles to be applied, *inter alia* the precautionary principle in paragraph a) and the ecosystem approach in paragraph b). Paragraph a) states that the precautionary principle has to be in accordance with international agreements and guidelines, which entails a reference to e.g. article 15 of the Rio Declaration or article 6 of the Fish Stocks Agreement. In respect to the ecosystem approach paragraph b) only holds, that habitats and biodiversity will have to be taken into account when applying such an approach. What this entails and how exactly the ecosystem approach ought to be implemented is, however, not further elaborated in the Act.

b. Nature Diversity Act

The Nature Diversity Act of 2009 does not provide for more clarity in this respect. According to chapter 1, § 1, the Act is aimed at protecting biological, geological and landscape diversity, as well as ecological processes through conservation and sustainable use, so as to maintain the environment as a basis for human activity, culture (including indigenous traditions, i.e. the Sami culture), health and well-being for current and future generations. The Act applies to Norwegian land and marine territory, with some exceptions for Svalbard, Jan Mayen and Norway's continental shelf, to which other provisions are applicable.[1190]

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it goals to be achieved and measures to be taken in order to implement the ecosystem-based management approach, as well as by referring to international and regional legal documents supporting this approach (chapters 7, 9 and 10).

1189 See for citations *supra* in fn 1171 (part II).

1190 In respect to Svalbard see the *Act of 15 June 2001 No.79 Relating to the Protection of the*

Chapter II of the Nature Diversity Act lists general provisions in respect to sustainable use and in this context refers to principles, which are to serve as guidelines in decision-making. According to § 7 in conjunction with § 8, official decisions that affect biological, geological or landscape diversity will have to be based on scientific and traditional knowledge on the population status of species, their range, ecological status of habitats and pressures thereon. Consequently the Act requires the gathering of scientific and traditional knowledge on ecosystems. If such information is lacking and there is a risk of serious or irreversible damage to biological, geological or landscape diversity, this lack of knowledge is not to be used as a reason for postponing or not introducing management measures.[1191] In this context Norway follows a rather strict precautionary principle, as it does not include any economic values as e.g. referred to in article 15 of the Rio Declaration or article 3 paragraph 3 of the UNFCCC.[1192]

In regards to the ecosystem approach § 10 of the Nature Diversity Act holds that any pressure on an ecosystem has to be assessed on the basis of the current or future cumulative environmental effects on the ecosystem. As a consequence the ecosystem approach is under the Nature Diversity Act applied in the context of assessment rather than management. Insofar, similar to the Marine Resources Act, the Nature Diversity Act does not entail any further elaborations on management measures to be taken in implementing an ecosystem approach, other than holding regulations on activities supporting it, such as the designation of protected areas.[1193]

Nevertheless both, the Nature Diversity Act as well as the Marine Resource Act legally strengthen the adoption and implementation of the ecosystem approach in Norway, e.g. through the establishment of integrated ecosystem-based management plans as already developed for the Barents Sea-Lofoten area and the Norwegian Sea. Furthermore as the Nature Diversity Act

Environment in Svalbard (Lov om miljøvern på Svalbard), June 15, 2001 [hereinafter Svalbard Environmental Act (Svalbardmiljøloven)], which is aimed at preserving the environment in Svalbard and for that reason holds regulations on the establishment of protected areas, the development of land-use plans and the issuing of permits for activities that have an environmental impact upon Svalbard, not covered by such plans; see chapter 1, §1, chapter III, chapter VI and chapter VII of the Svalbard Environmental Act. As regards Jan Mayen and the Norwegian continental shelf see *Act of 27 February 1930 Relating to Jan Mayen (Lov om Jan Mayen)*, Feb. 27, 1930 and *Act of December 17 1976 No. 91 Relating to the Economic Zone of Norway (Lov om Norges økonomiske sone)*, Dec. 17, 1976.

1191 See § 9 of the Nature Diversity Act.

1192 See for details *supra* in 4.4.3.

1193 See for details on protected land and marine areas chapter V of the Nature Diversity Act.

is not limited to marine areas, it allows for a more comprehensive approach in respect to ecosystem thinking, as the application of the ecosystem approach is not restricted on a spatial scale and hence will ultimately be more cross-sectoral. Yet as the approach in the Nature Diversity Act is not used as comprehensively as requested by the Convention on Biological Diversity, but rather is used as an assessment, instead of a management tool, precise legal grounds for an effective implementation of the approach in managing climate change induced Arctic risks are lacking.

Nevertheless it is evident that Norway has recognized the value of ecosystem functions and services for human populations and is in this respect continuously advancing more integrative (especially in regards to participatory rights of indigenous peoples) and comprehensive strategies to the management of anthropogenic activities and is also incorporating them into binding domestic law.[1194]

6.3.3. The Russian Federation

As most of the legal documents relevant to the Russian Arctic, are only available in Russian language, an in depth examination of Russian legislation in respect to the assessment and management of climate change induced Arctic risks is unfeasible. Nevertheless some insight on Russian practices in respect to the precautionary principle and the ecosystem approach can be gained from projects conducted under the auspices of the Arctic Council, such as Best Practices in Ecosystem-Based Oceans Management in the Arctic (BePOMAR) and the Integrated Ecosystem Management Approach to Conserve Biodiversity and to minimise habitat fragmentation in the Russian Arctic (ECORA).[1195]

The Russian Arctic consists of five large marine ecosystems, the Barents Sea, the Kara Sea, the Laptev Sea, the East Siberian Sea and the Chuckchee

1194 In regards to integrative management it has to be noted that Norway in 2003 adopted an Act holding participatory rights in respect to environmental issues. The *Act of 9 May 2003 No.31 Relating to the Right to Environmental Information and Public Participation in Decision-making Processes Relating to the Environment (Lov om rett til miljøinformasjon og deltakelse i offentlige beslutningsprosesser av betydning for miljøet)*, May 9, 2003 is insofar incorporating Norway's obligations under the Aarhus Convention into domestic law; see for details *supra* in 5.5.1 and in respect to the indigenous population of Norway, Norwegian Ministry of Foreign Affairs (Strategy), at 37–38.

1195 See for details *supra* in 6.2.2.3. and 6.2.2.5.

Sea.[1196] In respect to the management of these marine areas in holistic terms, however, not much progress has been made since the collapse of the USSR and the foundation of the Russian Federation in 1991. While the centralized management under the USSR regime did not allow for stakeholder involvement as suggested by the ecosystem approach, the socio-economic changes that were brought about by the downfall of the system shifted the focus of Russian legislation away from nature conservation.[1197] It is in this context not surprising that the Russian Marine Doctrine, which was adopted in 2001, is predominantly concerned with ensuring and safeguarding sovereignty over Russian maritime areas and maintaining freedoms of the high seas.[1198] Protection and conservation of marine ecosystems does insofar only play a marginal role in the Doctrine, which provides the foundation of the national marine policy.[1199]

Consequently, Russian regulation and legislation is currently lacking a reference to integrated management and more holistic methodologies, such as the ecosystem approach.[1200] A fact that is further enlightened by Russia's Arctic Policy, as issued in September 2008[1201], which predominantly focuses on social and economic development, military security and sovereign rights. While the policy addresses environmental protection and conservation, no reference is made to the need to manage Russian Arctic ecosystems comprehensively.[1202]

Yet, as human activities within the Russian Arctic marine areas (especially in the Barents region and in respect to the Northern Sea Route[1203]) are meant to increase in the future if the global warming trend continues, the existing sectoral approach to management will not adequately address climate change induced Arctic risks. In this respect the establishment of the Global Environment Facility project in cooperation with the Conservation of

1196 See Norsk Polarinstitutt, at 20.
1197 See ibid., at 22, cf. United Nations Environment Programme (Global Environment Facility Project Document), at 6 note 17 and on the devastating effect that large-scale economic activities conducted within the Russian Arctic during the USSR and after had on the environment see Andreeva, at 240, 242 and 249-250.
1198 See Norsk Polarinstitutt, at 29.
1199 See ibid., at 29 and 32.
1200 See ibid., at 35 and The Aspen Institute, at 76, cf. CAFF (ECORA), at 2.
1201 The Russian Arctic Policy is available at <http://www.scrf.gov.ru/documents/98.html> (last visited: 12.07.2014); a translation of the Policy is provided by the Arctic Governance Project; see The Arctic Governance Project.
1202 See for details ibid., at IV, para. 8, sub-para. c).
1203 See for details Norsk Polarinstitutt, at 23-28, esp. at 26.

Arctic Flora and Fauna (CAFF) working group on the integrated ecosystem management approach to conserve biodiversity and minimise habitat fragmentation in the Russian Arctic (ECORA) was a decisive advancement in drawing policy-makers' attention to holistic governance approaches.[1204]

6.3.3.1. Integrated Ecosystem Management Approach to Conserve Biodiversity and Minimise Habitat Fragmentation in the Russian Arctic (ECORA)

ECORA's objective was the conservation and sustainable use of biodiversity within the Russian Arctic and for that reason three model areas (Kolguev Island, Lower Kolyma River Basin and Beringovsky District) were selected within which integrated ecosystem management (IEM) strategies could be tested, adopted and eventually implemented.[1205] The model areas were chosen according to their significance for biodiversity, as well as their capacity and support from local and indigenous peoples to implement the ECORA project.[1206] The challenges within the model areas ranged from environmental damage due to oil pollution, loss of range-lands for reindeer, a lack of clean water and waste management (Kolguev Island) to the ineffective conservation of biodiversity and management of biological resources, as well as the absence of environmental education and the inclusion of traditional knowledge into decision-making (Kolyma River Basin and Beringovsky District).[1207]

Taking these challenges into account ECORA's purpose was to implement integrated ecosystem management strategies within the model areas by strengthening the working environment and the knowledge base upon which the strategies were to be applied as well as by developing specific action plans and strategies that were to be tested within pilot projects.[1208] To enable the adoption of the integrated ecosystem management strategies, several actions were taken within the model areas. They *inter alia* included:[1209]

1204 See also *supra* in 6.2.2.3. b. and CAFF (Lessons Learned), at 10.
1205 See CAFF (ECORA), at 2 and 4 and CAFF (Lessons Learned), at 6.
1206 See CAFF (ECORA), at 4.
1207 See for details ibid., at 4-8.
1208 See for details ibid., at 8-20.
1209 See for details ibid.

- the enhancement of regulatory, administrative and institutional frameworks
- the promotion of participatory possibilities for institutions and individuals in integrated ecosystem management
- the raising of awareness in respect to biodiversity and other environmental issues, including integrated ecosystem management through training programs or environmental education at schools
- the development of an information base in respect to the environmental and socio-economic conditions within the model areas by e.g. assessing the status of key species, such as reindeer and undertaking community-based monitoring

Based upon this framework ECORA supported the development of integrated ecosystem management strategies and action plans, which contained information on the status of the ecosystems (including environmental and socio-economic issues) as well as their services and functions. Furthermore these strategies and plans were comprised of conservation and management objectives and targets to be attained by legislation and regulation in support of integrated ecosystem management plans, by the involvement of stakeholders and by capacity building.[1210]

As effective implementation of integrated ecosystem management is dependent upon the functioning of the strategies and action plans developed, these will have to be monitored and evaluated to allow for modification if necessary. To this aim – and to identify some early results in integrated ecosystem management, which will again trigger further participation and continuous support for ecosystem management – several pilot projects were initiated within the model areas, including the development of a clean water and waste management on the Kolguev Island, a waterfowl harvest regime and sustainable reindeer breeding in the Kolyma River Basin and the establishment of clusters of protected areas within the Beringovsky District.[1211]

In 2007 ECORA underwent a review, which resulted in the finding that outreach must further be strengthened by mainstreaming integrated ecosystem management into economic sectors and by promoting education at schools and for indigenous and local peoples.[1212] Furthermore, due to the global

1210 See ibid., at 20 and CAFF (Lessons Learned), at 19-45
1211 See for details CAFF (ECORA), at 20-25 and CAFF (Lessons Learned), at 19-45.
1212 See CAFF (ECORA), at 26-27.

threat of climate change, the question was raised on how ECORA could help in addressing these challenges. In this context CAFF approved to advance further projects within the Russian Arctic pertaining to the assessment of climate change impacts on biodiversity and indigenous peoples within the Russian Arctic as well as climate change adaptation in biodiversity management.[1213] While ECORA was undoubtedly promoting the application of the ecosystem approach within the Russian Arctic, it remains to be seen to what extent the pilot projects undertaken under ECORA will advance ecosystem-based management strategies on a more comprehensive level within the Russian Arctic in the future, especially in terms of addressing climate change induced Arctic risks.

6.3.3.2. National Plan of Action for the Protection of the Arctic Marine Environment (Russian NPA-Arctic)

As has been referred to *supra*, Russia has furthermore, in correspondence to PAME's Regional Programme of Action for the Protection of the Arctic Marine Environment from Land-based Activities (RPA), supported the establishment of a National Plan of Action for the Protection of the Arctic Marine Environment (Russian NPA-Arctic).[1214] The RPA, and consequently also the Russian NPA-Arctic, are implementation efforts in respect to the UNEP Global Program of Action (GPA) on the Protection of the Marine Environment from Land-based Activities and are thus aimed at identifying and assessing threats to the marine environment from land-based pollution, and pursuant to this establishing priorities and management strategies to address these threats.[1215] The Arctic Council RPA in this context acknowledges *"that land-based sources of pollution located both within and outside of the Arctic, represent the major source of pollutants to the Arctic marine environment"* and that as a result there is a *"need for integrated environmental management approaches (e.g. ecosystem-based management (...)) to address land-based sources of pollution at international, regional and national levels (...)"*.[1216]

As a consequence, the Russian NPA project, which was based upon the principles outlined under the GPA and the RPA was an important undertaking

1213 See ibid., at 27-28.
1214 See *supra* in fn 1076 (part II) and for details United Nations Environment Programme (Global Environment Facility Project Document).
1215 See *supra* in 6.1.1.
1216 Arctic Council (RPA), at 2 para. 1.3 and additionally paras. 1.10 and 6.7.

in guiding the Russian Federation towards more effective environmental conservation measures within the Russian Arctic and in using its resources in a sustainable way.

6.3.3.3. National Biodiversity Strategy and Action Plan (NBSAP)

Additionally in implementing the Convention on Biological Diversity, the Russian Federation adopted a National Biodiversity Strategy and Action Plan (NBSAP) in 2001, which lists the transition to sustainable development as the driving objective within biodiversity conservation in Russia.[1217] In this context, conservation of biodiversity is viewed as being not restricted to ecological values, but rather, by being achieved on a *"socio-ecosystemic level"* as comprising socio-economic and environment components.[1218] Consequently the Russian Strategy acknowledges that conservation of biological diversity should be *inter alia* based on the ecosystem approach, which is understood to be derived from *"the concept that all biological systems are inseparably connected with their environment and with one another, and that naturally free-living organisms exist only as members of ecological communities and ecosystems"*[1219]. This terminology does not depict all aspects of the ecosystem approach, as elaborated under the Convention on Biological Diversity through the Malawi Principles.[1220] Yet, the Russian Strategy shows that Russia has recognized the inter-linkages between socio-economic and environmental values and is committed to produce new legislation to protect and conserve Russian biodiversity in general (including the incorporation of the ecosystem approach) and in respect to Arctic ecosystems in particular.[1221]

Consequently, while Russia is in terms of adopting and incorporating the precautionary principle or the ecosystem approach into domestic law currently lagging behind other Arctic States, such as Norway or Canada,[1222] Arctic environmental conservation and protection has been recognized as one of the main challenges to Russia and accordingly new environmental strategies necessary to address these challenges appropriately, are being main-

1217 Ministry of Natural Resources of the Russian Federation, at 13.
1218 Ibid.
1219 Ibid., at 15.
1220 See for details *supra* in 4.5.2.2.
1221 See Ministry of Natural Resources of the Russian Federation, at 27-28 and 46.
1222 See for details *supra* in 6.3.1. and 6.3.2. and in regards to Russia's relationship to the ecosystem approach CAFF (Lessons Learned), at 11.

streamed into the Russian government as well as the public through projects such as ECORA or the Russian NPA-Arctic. These advancements are further supported by the development of the Strategic Action Program (SAP) for Protection of the Russian Arctic Environment of 2009, which is based upon the Russian NPA-Arctic Project and explicitly refers to the precautionary principle and the ecosystem approach as its guiding principles and sets explicit targets for the year 2020 in preserving and protecting the Russian Arctic environment and in eliminating negative impacts thereon from economic and other anthropogenic activities.[1223]

6.3.4. The United States of America

On January 9, 2009 the Bush administration released a Presidential Directive in respect to the Arctic region.[1224] Directive NSPD-66/HSPD-25 lists several Arctic policy issues pertaining to national security, pan-Arctic cooperation, integrated decision making, scientific research and monitoring, sustainable use of natural resources and biodiversity conservation.[1225] In respect to the latter, the Directive acknowledges that *"increased human activity is expected to bring additional stressors to the Arctic environment, with potentially serious consequences for Arctic communities and ecosystems"*[1226]. As *"high levels of uncertainty [exist] concerning the effects of climate change and increased human activity in the Arctic",* but decisions will have *"to be based on sound scientific and socioeconomic information, Arctic environmental research, monitoring and vulnerability assessment are [considered] top priorities"* under the Directive.[1227]

In this context it ought to be mentioned that U.S. federal agencies are subject to the National Environmental Policy Act (NEPA) obliged to conduct environmental impact assessments and to consider environmental values in their planning and decision-making.[1228] Furthermore section 201 of NEPA requires the President to annually report on environmental quality to Congress, and for that reason established a Council on Environmental Quality

1223 See Ministry for Economic Development of the Russian Federation, at 4, 11 and 21-26.
1224 *National Security Presidential Directive and Homeland Security Presidential Directive*, Jan. 9, 2009 [hereinafter NSPD-66/HSPD-25].
1225 See sec. III, para. A. sub-paras. 1-6 and for details paras. B-H of NSPD-66/HSPD-25.
1226 Sec. III, para. H, sub-para. 1 of NSPD-66/HSPD-25.
1227 Sec. III, para. H, sub-para. 2 NSPD-66/HSPD-25.
1228 See sec. 102 paras. (A)-(C) of *National Environmental Policy Act of 1969 (as amended on Dec. 31, 2000),* 42 U.S.C. 4321 [hereinafter NEPA].

(CEQ), which is to gather the necessary information and to advise and assist the President in his task.[1229]

Finally, Directive NSPD-66/HSPD-25, to foster implementation of its policy, requires the responsible federal agencies to *inter alia "[c]ontinue to identify ways to conserve, protect and sustainably manage Arctic species and ensure adequate enforcement presence to safeguard living marine resources"* and in this context *"[p]ursue marine ecosystem-based management in the Arctic"*.[1230]

In May 2013 the United States issued a new Arctic strategy under the Obama administration.[1231] The US Arctic Strategy focuses on three priority issues: National security, environment and international cooperation.[1232] In regards to environmental issues, the Strategy requires a responsible stewardship within the Arctic region and as such emphasizes on precautionary and *"science-informed decisionmaking"* as well as on the *"integration of economic, environmental, and cultural values"* when managing Arctic resources. Furthermore the Strategy acknowledges that responsible Arctic stewardship requires profound knowledge on environmental changes affecting the Arctic and therefore calls for a *"holistic earth system approach"* when gathering such information.[1233] As a consequence the US Arctic Strategy promotes a comprehensive, ecosystem-based approach when addressing Arctic interests.

6.3.4.1. Domestic Legislative Action Pertaining to Marine Environmental Risk Governance

Inspite of the mentioned strategic focal points pertaining to the Arctic being reflective of a holistic approach, the issue of ecosystem-based management has been of much debate within the U.S. in recent years, especially in respect to the marine environment. In this context advancements have been made in developing and implementing an ecosystem approach, both from a

1229 See secs. 201, 202 and 204, paras. (1), (2) and (5)-(8) of NEPA.
1230 Sec. III, para. H, sub-para. 6, b. and d. of NSPD-66/HSPD-25.
1231 *National Strategy for the Arctic Region*, May 10, 2013 [hereinafter US Arctic Strategy]; the application of the Strategy is supported by its Implementation Plan, which was released in January, 2014. See for details: *Implementation Plan for the National Strategy for the Arctic Region*, Jan. 2014 (i.a. focusing on risk assessment, at 12 and ecosystem based management, at 14-15).
1232 See ibid., at 5-10.
1233 See ibid., at 7 and 8.

legislative as well as an executive stance within the United States: In 2000 the U.S. Congress passed the Oceans Act of 2000[1234], whose purpose was *"to establish a commission"* on ocean policy, which would be responsible for making *"recommendations for [a] coordinated and comprehensive national ocean policy"* reflective of marine environmental protection, sustainable use of marine resources and knowledge gathering (especially on the role of the oceans in respect to climate change).[1235] In this context the U.S. Commission on Ocean Policy issued their final – and very extensive – report, *An Ocean Blueprint for the 21st Century*, in September 2004.[1236]

While an in depth analysis of the report would go beyond the scope of this thesis, some remarks ought nevertheless to be made: The report *inter alia* as an overarching topic addresses ecosystem-based management as an important ingredient for establishing a sound ocean policy, as such an approach requires to in combination consider social, cultural, economic and ecological factors.[1237] Consequently the Commission finds that *"policies governing the use of the U.S. ocean and coastal resources must become ecosystem-based, science-based, and adaptive"*[1238]. In this context the Commission also refers to the precautionary principle, as a guideline for management under scientific uncertainty and recommends – in contrast to a strict version of the precautionary principle – the *"adoption of a more balanced precautionary approach that weighs the level of scientific uncertainty and the potential risk of damage as part of every management decision"*[1239]. Accordingly *"scientific uncertainty (...) should neither prevent protective measures from being implemented nor prevent uses of the ocean"*[1240]. Rather an action may be conducted if the uncertainty and the potential damage resulting therefrom is low, while proceeding with the activity is inadvisable if the scientific uncertainty and the prospect of an irreversible damage occurring is high.[1241]

1234 *An Act to establish a Commission on Ocean Policy, and for other purposes*, Aug. 7, 2000, S.2327 [hereinafter Oceans Act of 2000].
1235 See sec. II, paras. 3, 4 and 5 of the Oceans Act of 2000.
1236 See US Commission on Ocean Policy.
1237 See for details US Commission on Ocean Policy, at 63–67.
1238 Ibid.
1239 Ibid., at 65.
1240 Ibid.
1241 See ibid., at 65-66.

While the precautionary principle suggested in the Commission's report is not as strict, it nevertheless, in a for the U.S. rather unusual way, builds in a margin of safety when managing the marine environment without referring to cost-effectiveness.[1242]

According to section 4 of the Oceans Act of 2000, based upon the reports and recommendations issued by the Commission, the U.S. President will have to *"submit to Congress a statement of proposals to implement or respond to the recommendations for a coordinated, comprehensive, and long-range national policy for the responsible use and stewardship of ocean and coastal resources for the benefit of the United States"*. This task was fulfilled in 2004, when the Bush administration issued its U.S. Ocean Action Plan, which mainly focused on the gathering of the necessary knowledge to manage marine resources sustainably and on an ecosystem-based management approach as proposed by the Commission on Ocean Policy.[1243]

This policy approach was eventually reflected in Congress, when in January 2007 Bill H.R. 21, a draft for an Oceans Conservation, Education, and National Strategy for the 21st Century Act, was introduced by the House of Representatives into the 110th Congress and continued to be debated during the 111th Congress.[1244] H.R. 21 did, however, not pass congressional debates. In its initial form as debated during the 1st session of the 110th Congress, the bill explicitly referred to both, the precautionary principle as well as the ecosystem approach. Section 4 paragraph 23 of H.R. 21 defines the term "precautionary approach" as an *"approach used to ensure the health and sustainability of marine ecosystems for the benefit of current and future generations, in which lack of full scientific certainty shall not be used as a justification for postponing action to prevent environmental degradation"*.

1242 See for details *supra* in 4.4.3. and 4.4.4.

1243 See for details Norsk Polarinstitutt, at 102–103, Best, et al., at 13; With the development of the U.S. Ocean Action Plan under the Bush Administration the Oceans Act of 2000 expired in 2004; see Best, et al., at 13.

1244 It is noteworthy, that while H.R. 21 *inter alia* was based upon the conclusions of the Commission on Ocean Policy, it was not supported by the Bush administration. See for details Morello (2007), at 1. The bill was re-introduced to the 111th Congress on January 6, 2009; see <http://thomas.loc.gov/home/thomas.php> (last visited: 01.08.2014); see for the Bill's text: *H.R. 21, 110th Congress, 1st Session, To establish a national policy for our oceans, to strengthen the National Oceanic and Atmospheric Administration, to establish a national and regional ocean governance structure, and for other purposes*, Jan. 4, 2007 [hereinafter H.R. 21 under 110th Congress] and *H.R. 21, 111th Congress, 1st Session, To establish a national policy for our oceans, to strengthen the National Oceanic and Atmospheric Administration, to establish a national and regional ocean governance structure, and for other purposes*, Jan. 6, 2009 [hereinafter H.R. 21 under 111th Congress].

Section 101 on a national oceans policy then further refers to the precautionary principle, by holding that *"in the case of incomplete or inconclusive information as to the effects of a covered action on United States ocean waters or ocean resources, decisions shall be made using the precautionary approach to ensure protection, maintenance, and restoration of healthy marine ecosystems"*[1245].

This wording was not incorporated into H.R. 21 under the 111th Congress. In fact the term precautionary approach or principle was omitted altogether. Instead, section 101 paragraph (a), sub-paragraph (2), (D) of H.R. 21 in its amended form holds that *"the lack of scientific certainty should not be used as justification for postponing action to prevent negative environmental impacts. In cases in which significant threats to marine ecosystem health exists, the best of the available science should be used to manage ocean waters, coastal waters, and ocean resources in a manner that gives the greatest weight to the protection, maintenance, and restoration of the marine ecosystem health"*. This form of the precautionary principle, as well as the initial reference in H.R. 21 during the 110th Congress mirror the European understanding of the precautionary principle, as they do not refer to any economic valuations.[1246] In respect to the ecosystem approach, Bill H.R. 21 refers in both, its initial version under the 110th, as well as in its amended version, under the 111th Congress, to *"ecosystem-based management"*. In consideration of the reports issued by e.g. the Commission on Ocean Policy, *"a more comprehensive and integrated ecosystem-based management approach to address current and future ocean and coastal challenges"* is advocated in H.R. 21 and further defined in section 4 paragraph 14 of the Bill.[1247] According to this paragraph, the

> *"term "ecosystem-based management" means an integrated approach to management that (...) considers the entire ecosystem, including humans; (...) has as its goal the maintenance of ecosystems in a healthy, productive, and resilient condition so that they can provide the services humans want and need; (...) accounts for the interactions among species, activities, and sectors of management; (...) considers the cumulative impacts of different sectors; (...) emphasizes the protection of ecosystem structure, function-*

1245 Sec. 101 para. b), sub-para. (2), (C) of H.R. 21 under 110th Congress.
1246 See in this context *supra* in 4.4.3. and 4.4.4. and KOGAN, at 132.
1247 See sec. 2 para. (3), sub-para. (a) and sec. 3 para. (6) of H.R. 21 under 110th Congress.

> *ing, and key processes; (…) is place-based in focusing on a specific ecosystem and the range of activities affecting it; (…) explicitly accounts for the interconnectedness within systems, recognizing the importance of interactions between many target species or key services and other non-target species; (…) acknowledges interconnectedness among systems, such as between air, land, and sea; and (…) integrates ecological, social, economic and institutional perspectives, recognizing their strong interdependence".*

Furthermore the Bill refers to the assessment part related to ecosystem-based management in section 405 and holds in this context that *"[e]cosystem-based management will require development of an ocean information system comprised of a set of information management tools and products capable of integrating and disseminating information essential for informed decision-making"*[1248].

Bill H.R. 21 as debated during the 111th Congress, in general incorporates these issues – albeit less extensive – and slightly changes the definition of an ecosystem-based management to the following:[1249]

> *"The term "ecosystem-based management" means an integrated approach to management that (…) considers the entire ecosystem, including humans, and accounts for interactions among the ecosystem, the range of activities affecting the ecosystem, and the management of such activities; (…) aims to maintain ecosystems in a healthy, productive, sustainable, and resilient condition so that they can provide the services humans want and need; (…) emphasizes the*

1248 Sec. 405 para. (a), sub-para. (1) of H.R. 21 under 110th Congress. In respect to ecosystem-based assessment see also bill *S.858, 111th Congress, 1st Session, To protect the oceans and Great Lakes, and for other purposes*, April 22, 2009 [hereinafter S.858] (e.g. sec. 304 para. (a) and sec. 305 para. (a), sub-para. (3) of S.858), which was introduced in the 1st session of the 111th Congress in 2009, but did not pass congressional debates. Furthermore note that there are other articles throughout H.R. 21 referring to ecosystem-based assessment and management; e.g. sec. 201 para. (c), sub-paras. (2) and (9), sec. 204, paras. (a) and (b), sec. 206 para. (b), sub-para. (2), sec. 302 para. (b), sub-para. (6), sec. 303, sec. 401 para. (3) (referring to large marine ecosystems), sec. 402 para. (a), sub-para. (4), sec. 403 para. (b), sub-para. (5), sec. 404 paras. (a), (c), (f) and (b), sub-para. (1) of H.R. 21 under 110th Congress.

1249 Sec. 4 para. 8 of H.R. 21 under 111th Congress; see additionally in respect to ecosystem-based assessment and management e.g. sec. 3 para. (3), sec. 202 para. (b), sec. 206 para. (b), sub-para. (2), (A), sec. 303 para. (b), sub-para. (1) and (2), (E) of H.R. 21 under the 111th Congress.

> *protection of ecosystem structure, function, patterns, and important processes; considers the impacts, including cumulative impacts, of the range of activities affecting an ecosystem that fall within geographical boundaries of the ecosystem; (...) explicitly accounts for the interconnectedness within an ecosystem, such as food webs, and acknowledges the interconnectedness among systems, such as between air, land, and sea; and (...) integrates ecological, social, economic, and institutional perspectives, recognizing their strong interdependences."*

As Bill H.R. 21 failed in congressional debates, it remains to be seen if U.S. legislation will in the future lead to a domestic law calling for the implementation of the precautionary principle and the ecosystem approach as explicitly as suggested by Bill H.R. 21.

6.3.4.2. Domestic Executive Action Pertaining to Marine Environmental Risk Governance

From an executive stance, under the Obama administration, progress has been made to adopt and apply the ecosystem approach in practice, though. On June 12, 2009 President Obama submitted a Memorandum[1250] to the heads of the executive departments and agencies, stating that in order *"to succeed in protecting the oceans, coasts, and Great Lakes, the United States needs to act within a unifying framework under a clear national policy, including a comprehensive, ecosystem-based framework for the longterm conservation and use of [its] resources"*[1251].

In order to develop such a framework and policy, by means of the Memorandum an Interagency Ocean Policy Task Force to be governed by the Council on Environmental Quality (CEQ) was established,[1252] whose final recommendations were issued on July 19, 2010. These recommendations recognize that the U.S. marine environment is challenged by a variety of stressors (including climate change) and that by *"applying the principles of ecosystem-based management (in which (...) ecological, social, economic, commerce, health, and security goals [are integrated], and (...) humans [are recognized] as key components of the ecosystem and healthy ecosystems as*

1250 See OBAMA (MEMORANDUM).
1251 Ibid., at 1.
1252 See ibid., at 1 and 2.

essential to human well-being) and adaptive management (whereby (...) management actions [are routinely assessed] to allow for better informed and improved future decisions) in a coordinated and collaborative approach, the Nation can improve its response to environmental, social, economic, and security challenges"[1253].

Consequently, under the policy established by the Task Force, decision-making will have to be guided by the precautionary principle and *"[h]uman activities that may affect ocean, coastal, and Great Lakes ecosystems [will have to] be managed using ecosystem-based management and adaptive management, through an integrated framework that accounts for the interdependence of the land, air, water, ice, and the interconnectedness between human populations and these environments. Management should include monitoring and have the flexibility to adapt to evolving knowledge and understanding, changes in the global environment, and emerging uses"*.[1254] Monitoring initiatives, scientific research and assessments, as well as the gathering of traditional knowledge are hence a guiding principle in implementing the ocean policy.[1255]

Furthermore, in order to make the policy feasible in practice, the Task Force suggests to establish a National Ocean Council (NOC), which would be appointed with the task to ensure the policy's effective implementation.[1256] In this context, emphasis would have to be given to the establishment of comprehensive, integrative and ecosystem-based management (e.g. through coastal and marine spatial planning[1257]) especially in respect to addressing climate change and the changing conditions in the Arctic.[1258]

The Task Force recommendations were by means of Executive Order of July 19, 2010 adopted by President Obama and the National Ocean Council was established based thereon.[1259] Currently the NOC is, under inclusion of public interests, underway in preparing strategic action plans on nine priority

1253 The White House Council on Environmental Quality (Final Recommendations), at 14.
1254 See ibid., at 16.
1255 See ibid., at 16 and 17.
1256 See for details, ibid., at 20-23.
1257 Coastal and marine spatial planning *"is a comprehensive, adaptive, integrated, ecosystem-based and transparent spatial planning process, based on sound science, for analyzing current and anticipated uses"* of marine areas, so as to limit conflicting sectoral uses and reduce environmental impacts; ibid. at 41. See for details ibid., at 41-76 and The Aspen Institute, at 47–63, Diamond, at 394, Roberts, at 227.
1258 See The White House Council on Environmental Quality (Final Recommendations), at 28 and for further details at 32-37 and 39-40.
1259 See Obama (Executive Order 2010), secs. 1 and 4.

topics including ecosystem-based management, climate change adaptation and changing conditions in the Arctic.[1260]

In terms of adopting and implementing an ecosystem-based approach to the management of marine ecosystems it furthermore ought to be noted, that the United States has under the auspices of the U.S. Department of Commerce or more precisely its National Oceanic and Atmospheric Administration (NOAA) established the large marine ecosystem (LME) program, which since 1984 has been focusing on developing and applying an ecosystem-based approach to the assessment and management of marine resources and their environment and is now also one of the focal points under the Arctic Council's PAME working group.[1261]

6.3.4.3. Domestic Environmental Risk Governance Outside of the Marine Sector

Outside of the marine area, ecosystem-based management has found attention across sectors, e.g. in respect to climate change adaptation. By Executive Order of October 5, 2009 the Interagency Climate Change Adaptation Task Force was required to publish within one year a report through the Chair of the Council on Environmental Quality on recommendations for making policies and practices of federal agencies compatible with the national climate change adaptation strategy, as being developed by the Task Force.[1262]

1260 See <http://www.whitehouse.gov/administration/eop/oceans/sap> (last visited: 13.07.2014); Currently preliminary plans on the nine identified priority topics exist, which were drafted in consideration of public input. In this context to reach out to the public in order to establish an Arctic Strategic Action Plan, the National Ocean Council *inter alia* held a webinar on April 19, 2011. The video to the webinar is available at <https://accap.uaf.edu/?q=webinar/what-does-national-ocean-policy-mean-arctic-region> (13.07.2014).

1261 See for details U.S. Department of Commerce, at 2, Tromble, at 302-303 and 307 and *supra* in 6.2.2.5. This approach is legally supported by the *Magnuson-Stevens Fishery Conservation and Management Act, To provide for the conservation and management of the fisheries, and for other purposes*, 1976 (As amended by the Magnuson-Stevens Fishery Conservation and Management Reauthorization Act (P.L. 109-479) of 2006), 16 U.S.C. 1801 [hereinafter MSFCMA], which includes ecosystem thinking, e.g. by means of sec. 406 para. 109-479, sub-para. (f) of the MSFCMA.

1262 See Obama (Executive Order 2009), sec. 16 and The White House Council on Environmental Quality (Progress Report), at 14. Note that in 2011 the Interagency Climate Change Adaptation Task Force issued a progress report on federal action undertaken to make the country more resilient to climate change. See for details *Federal Actions for a Climate Resilient Nation.*

The recommendations *inter alia* list several guiding principles, which should be considered when designing and implementing climate change adaptation strategies. Among them are the building of partnerships between stakeholders across sectors, the application of risk assessment and management tools to address climate change and the integration of ecosystem-based approaches into adaptation strategies, so as to reduce vulnerability and enhance resilience of ecosystems in respect to climate change.[1263] Following a congressional request *"to develop a strategy to assist fish, wildlife, plants, and associated ecological processes in becoming more resilient, adapting to, and surviving the impacts of climate change"*[1264], such a holistic approach to climate change adaptation was developed by the Council on Environmental Quality and the Department of the Interior's U.S. Fish and Wildlife Service.[1265]

In respect to establishing an ecosystem approach that not only focuses on one specific area but is more multidimensional in scope, it furthermore ought to be noted that the Endangered Species Act (ESA) is supportive of applying the ecosystem approach on a wide range, as its focus lies not only with establishing the means to protect a listed species itself, but also the ecosystems it is dependent on, which can include marine, as well as terrestrial areas that may be experiencing threats from a variety of stressors across sectors.[1266] Yet, as has been shown *supra*[1267], to date the U.S. is rather reluctant to derive any binding legal requirements in this context from the ESA.

Nevertheless it ought to be noted, that the U.S. is gradually being more reflective of the ecosystem approach, both from a legislative as well as an executive stance and is under these circumstances also reconsidering its perspective on the precautionary principle. As H.R. 21 has not passed congressional debates, however, the U.S. domestic law is currently lacking an explicit

1263 See The White House Council on Environmental Quality (Progress Report), at 21-22 and 43.

1264 House of Representives, at 77.

1265 See *National Fish, Wildlife and Plants Climate Adaptation Strategy,* esp. at 3. Note that the U.S. Fish and Wildlife Service has in 2010 also released a report on goals and objectives to address the effects of accelerating climate change; see for details U.S. Fish and Wildlife Service (Strategic Plan), esp. at 19-30 and for further details on the Climate Adaptation Strategy see <http://www.wildlifeadaptationstrategy.gov/index.php> (last visited: 13.07.2014).

1266 See sec. 2, sub-sec. (b) of ESA, as cited *supra* in fn 852 (part II) and for details *supra* in 6.1.2.1.

1267 See for details *supra* in 6.1.2.1.

binding regulation calling for the adoption and implementation of the ecosystem approach and/or the precautionary principle, comparable to laws e.g. in force in Canada or Norway. Additionally the implementation of the strategies being developed based on Executive Orders to adopt and enforce such an approach is still a work in progress. Yet, as the inclusion of ecosystem thinking into decision-making processes has been recognized as a necessity not only in respect to adequately assessing and managing marine areas, but – especially through the recommendations of the Interagency Climate Change Adaptation Task Force – on a more comprehensive scale, the United States' current undertakings are important advancements in effectively addressing climate change induced Arctic risks.[1268]

6.3.5. The European Union

The European Union cannot be considered an Arctic organization, as most of its member countries are not situated within the Arctic. Yet, three EU member states (Denmark, Finland and Sweden), as well as two participants of the closely related European Economic Area Agreement[1269] (Iceland and Norway) are Arctic Nations. Furthermore as Arctic ecosystems are linked to other ecosystems, outside of the Arctic, decisions made within the EU, especially in respect to long-range trans-boundary pollutants or the marine environment, essentially also have an impact on the Arctic. It is therefore worthwhile to analyze the European Union's stance as regards the Arctic and even more so relating to the assessment and management of climate change induced risks.

6.3.5.1. European Parliament Resolution on Arctic Governance

In 2008 the European Parliament adopted a resolution on Arctic governance in which it held that *"the UN Convention on the Law of the Sea (...) was not formulated with specific regard to the current circumstances of climate change and the unique consequences of melting ice in the Arctic Seas"* and that *"as [the Arctic] was never expected to become a navigable*

1268 Note in this context furthermore that the Obama administration has released a comprehensive plan to address climate change issues, such as carbon pollution, climate change adaptation and the use of clean energy sources in June 2013. For details of the Climate Action Plan see Executive Office of the President and for additional information on the United States' current advancements in regard to climate change see <http://www.whitehouse.gov/administration/eop/ceq/initiatives/resilience> (last visited: 13.07.14).

1269 *Agreement on the European Economic Area*, May 2, 1992, 3.1.1994 O.J. (L 1) 3.

waterway or an area of commercial exploitation" "specifically formulated multilateral norms and regulations" pertaining to the region are lacking.[1270] Consequently the European Parliament expressed its concern regarding the *"effects of climate change on the sustainability of the lives of the indigenous peoples"* as well as of Arctic marine mammals and *"underline[d] the significance (...) the Arctic [has] for the global climate [system]"*.[1271] As a result the Parliament stressed the need for establishing an EU Arctic policy that *inter alia* would address *"options for a future cross-border political or legal structure that could provide for the environmental protection and sustainable orderly development of the region (...)"*[1272].

In this context the European Commission transmitted a communication to the European Parliament and the European Council regarding Arctic matters on November 11, 2008 in which it elaborated on EU interests and possible measures to be taken by EU institutions and member states to protect and preserve the Arctic and its inhabitants, promote sustainable use of resources and enhance cooperative governance in the high North.[1273]

In this respect the European Commission identifies as key objectives of a European Arctic policy climate change prevention, mitigation and adaptation, which *"should be complemented by developing a holistic, ecosystem-based management of human activities, ensuring that the latter are administered in a sustainable way, integrating environmental considerations at all levels"*[1274]. This calls *inter alia* for coordinating efforts in respect to the Arctic environment between the EU and the Arctic States as well as other stakeholders involved, for conducting environmental impact assessments prior to decision-making within the EU, for long-term monitoring, scientific research and assessments of the ecosystems' status and trends and for applying the precautionary principle when managing the Arctic environment.[1275]

1270 European Parliament (Arctic Governance), paras. C. and F.
1271 Ibid., paras. 1, 3 and 6.
1272 Ibid., para. 7, sub-para. (d).
1273 See Commission of the European Communities (COM (2008) 763 final), at 3.
1274 Ibid.
1275 See ibid., at 4-6 and 10.

6.3.5.2. European Council Conclusion on Arctic Issues

Following the Commission's communication the European Council adopted conclusions on Arctic issues on December 8, 2009 in which it *inter alia* referred to addressing climate change impacts upon the Arctic within the framework of the United Nations Framework Convention on Climate Change, to supporting sustainable development for indigenous peoples, to enhancing the conduct of environmental impact assessments, to conserving biological diversity within the Arctic e.g. by establishing marine protected areas[1276], to promoting scientific research and monitoring initiatives and to managing Arctic marine resources from an ecosystem perspective and in consideration of the precautionary principle.[1277] In respect to the management of the marine environment, the Council furthermore *"notes that in the implementation of the [European Union's] Integrated Maritime Policy special attention will be paid to the Arctic"*[1278].

6.3.5.3. Marine Strategy Framework Directive (MSFD)

In support of this maritime policy, which was adopted in 2007, the European Parliament and the Council developed a Marine Strategy Framework Directive (MSFD)[1279] that became binding upon member states on June 17, 2008. The Directive is aimed at achieving and maintaining *"good environmental status in the marine environment by the year 2020 at the latest"*[1280]. For that purpose EU member states are to take all necessary measures and

1276 In respect to establishing protected land and marine areas the EU has adopted the *Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora*, May 21, 1992, 22.7.1992 O.J. (L 206) 7 [hereinafter Habitats Directive], which allows for the development of a network of special areas of conservation (Natura 2000); see art. 3 para. 1 of the Habitats Directive and furthermore art. 3 para. 2, sub-para (a) (on protected areas) and art. 4 paras. 1 and 2 (on special protection areas) of the *Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds*, Nov. 30, 2009, 26.1.2010 O.J. (L 20) 7 [hereinafter Birds Directive]. Additionally see COMMISSION OF THE EUROPEAN COMMUNITIES (COM (2006) 216 FINAL), at 6, CLIQUET, ET AL., at 163–166.

1277 See for details COUNCIL OF THE EUROPEAN UNION (CONCLUSION 2009), at 2–3 paras. 1, 2 and 5-10.

1278 Ibid., at 3 para. 10. This statement is also supported by para. 42 of the MSFD as cited *infra* in fn 1279 (part II). See for details on the maritime policy, COMMISSION OF THE EUROPEAN COMMUNITIES (COM (2007) 575 FINAL).

1279 *Directive 2008/56/EC of the European Parliament and of the Council of 17 June 2008 establishing a framework for community action in the field of marine environmental policy (Marine Strategy Framework Directive)*, June 18, 2008, 25.6.2008 O.J. (L 164) 19 [hereinafter Marine Strategy Framework Directive (MSFD)].

1280 Art. 1 para. 1 of the MSFD.

adopt and implement domestic marine strategies so as to *"protect and preserve the marine environment"* and *"ensure that there are no significant impacts on or risks to marine biodiversity, marine ecosystems [or] human health (...)"*.[1281] According to article 1 paragraph 3 of the MSFD the strategies developed will have to *"apply an ecosystem-based approach to the management of human activities, ensuring that the collective pressure of such activities is kept within levels compatible with the achievement of good environmental status and that the capacity of marine ecosystems to respond to human-induced changes is not compromised, while enabling the sustainable use of marine goods and services by present and future generations"*. Furthermore, while not explicitly referred to in the main body of the Directive, actions taken by EU member states, should also be based on the precautionary principle as held in article 191 paragraph 2 of the EC Treaty.[1282]

As the Directive influences domestic regulations in respect to the management of the marine environment, it ultimately requires its member states (including those that are Arctic Nations) to adopt and implement a marine strategy that is reflective of an ecosystem-based management approach and of the precautionary principle. As such the MSFD has a direct influence on the assessment and management of climate change induced Arctic risks, albeit on a limited scale, as it only pertains to marine ecosystems.

6.3.5.4. European Parliament Report on a Sustainable EU Policy for the High North

As regards the development of a European Arctic Policy, the European Parliament in December 2010 released a Report on a sustainable EU policy for the High North[1283]. The Report addresses focal points such as maritime transport, the management of natural resources, climate change and envi-

1281 Art. 1 para. 2, sub-paras. (a) and (b) of the MSFD.

1282 See paras. 27 and 44 of the preamble to the MSFD and *supra* in fn 204 (part I).

1283 European Parliament (2009/2214(INI)); the report was adopted with small amendments on January 20, 2011; see European Parliament (P7_TA(2011)0024) (the amendments refer to the inclusion of a new paragraph 58 which *"[n]otes that scientific data clearly demonstrates that the Arctic ecosystem is currently going through massive climate-related changes and that this situation requires that a precautionary and scientifically robust approach be taken to any future development in the Arctic"* and in this respect *"calls for further scientific studies within the framework of a multilateral agreement to be completed in order to inform international understanding of the Arctic eco-system and decision-making thereon before any further major development goes ahead".)*

ronmental pollution, sustainable socio-economic development and Arctic governance.[1284] In this context the Parliament underlines the importance of conducting environmental impact assessments in respect to concrete projects and programs to be carried out in the Arctic, notes that a precautionary and scientifically robust approach ought to be taken to any future development in the region and hence calls for further scientific studies on the Arctic ecosystems, insists on relying upon the precautionary principle when managing fish stocks in the Arctic, and considers the value of marine protected areas in Arctic marine environmental conservation.[1285]

Furthermore the Report *"[r]ecognises that the effects of the melting ice and milder temperatures are [not only causing threats to Arctic ecosystems but] are also creating opportunities for economic development in the (...) region"*[1286]. As a result the European Parliament *"recommends applying ecosystem-based management principles to consolidate ecological scientific knowledge with social values and needs"* and further emphasizes on the establishment and implementation of such an *"all-encompassing ecosystem-based approach"* similar to the EU's Integrated Maritime Strategy or Norway's Barents Sea-Lofoten Area Management Plan in order to effectively deal *"with the multiple challenges facing the Arctic related to climate change, shipping, environmental hazards and contaminants, fisheries and other human activities (...)"*.[1287] In its concluding remarks the Parliament *inter alia "[c]alls on the Commission, in negotiating bilateral agreements, to take account of the fact that the sensitive Arctic ecosystems must be protected, the interests of the Arctic population, including its indigenous population groups, must be safeguarded and the natural resources of the Arctic must be used sustainably, and calls on the Commission to be guided by these principles in relation to all activities"*[1288].

Following this previous work the European Parliament adopted a resolution on the EU strategy for the Arctic in March 2014.[1289] From a precautionary principle and ecosystem approach perspective especially relevant are paragraphs 38-41 of the resolution: Paragraph 38 explicitly calls for precautionary measures in regards to Arctic fisheries and refers to the development of

1284 See European Parliament (2009/2214(INI)) at 7-14, paras. 9-55.
1285 See ibid. at 8 and 10, paras. 16, 22 and 23 and European Parliament (P7_TA(2011)0024) para. 58.
1286 European Parliament (2009/2214(INI)) at 11, para. 31.
1287 Ibid., at 11 and 12, paras. 31 and 41.
1288 Ibid., at 15, para. 57.
1289 See European Parliament (P7_TA(2014)0236).

protected areas, in particular *"around the North Pole outside the economic zones of the coastal states"*. Furthermore the European Parliament *"[c]alls for the EU to make all possible efforts to ensure a sustainable reconciliation between economic activities and viable socio-ecological and environmental protection and development, in order to safeguard wellbeing within the Arctic"*[1290] and in this context demands more profound advancements *"in the areas of eco-system-based management"*[1291].

From this brief overview it becomes clear that the European Union has not only developed a strong focus on ecosystem-based management, especially in respect to its marine policy within recent years, but also on the Arctic in more general terms.[1292] While the EU is not an Arctic Nation and therefore has no member status within the Arctic Council its direct influence upon the region is considerably limited.[1293] Yet, as several Arctic Nations are also EU or EFTA member states, in forming a European Arctic Policy the EU has unmistakeably an influence upon Arctic ecosystems. This is even more accurate in considering that many of the threats facing the Arctic (e.g. long-range trans-boundary pollutants) are stemming from locations far beyond the Arctic Circle and often from EU countries. Reflecting Arctic issues within the European Union's environmental policy (especially in regards to climate change and marine environmental protection) will thus ultimately also benefit the management of climate change induced Arctic risks. Furthermore, the EU is a decisive contributor to Arctic research and as such also directly influences the assessment of such risks.[1294]

1290 Ibid., para. 40.
1291 Ibid., para. 41.
1292 Note that the Arctic plays a vital role in the EU's Northern Dimension, which – on a more limited spatial scale – establishes a base for cooperation on *inter alia* economic development, environmental protection and scientific research between its partners, the EU, Iceland, Norway and the Russian Federation. See for details European External Action Service, at 1 and 5. Furthermore regarding the latest developments in the EU's Arctic Policy see <http://eeas.europa.eu/arctic_region/index_en.htm> (last visited: 14.07.2014).
1293 Note however, that the EU applied for Observer status within the Arctic Council, which was in general accepted at the Council's Ministerial Meeting in Kiruna in 2013, but is awaiting a final decision; see para. 6 of section 4 "Strengthening the Arctic Council" of the Kiruna Declaration, Council of the European Union (Conclusion 2014), at 2 para. 5 and *supra* in fn 961 (part II).
1294 See European Parliament (2009/2214(INI)) at 15 para. 58 and for details Priebe, at 92 and 94.

6.3.6. Conclusion

As the above exemplary overview on some initiatives undertaken in light of risk governance within Canada, Norway, Russia, the United States and the European Union show, the precautionary principle and the ecosystem approach are not applied in unison across the Arctic.

This tendency is supported when taking a look at the other four Arctic Nations not explicitly referred to above: Sweden and Finland do not border the Arctic Ocean, they do have, however, some experience in managing the Baltic Sea Area from an ecosystem perspective in application of the precautionary principle under the Helsinki Convention.[1295] Additionally ecosystem thinking is introduced into domestic law through the Convention on Biological Diversity, the Convention for the Protection of the Marine Environment of the North-East Atlantic and – as both Finland and Sweden are members to the European Union – by the Marine Strategy Framework Directive.[1296] As a consequence the two Scandinavian countries in their Arctic Strategies *inter alia* refer to the fragility of the Arctic environment, which is affected by climate change and human activities related thereto and thus focus on sustainable management of natural resources that takes economic, social, cultural and environmental aspects into account as well as on cooperation on the governance of Arctic risks with other actors in the region, predominantly through the Arctic Council.[1297] In this context the countries aim at supporting Arctic research on a national, regional and international scale.[1298] Fur-

1295 See art. 3 para. 2 of the Helsinki Convention, First Joint Ministerial Meeting of the Helsinki and the OSPAR Commission and *supra* in 6.1. and 6.1.1.

1296 See for details *supra* in 5.4.1., 6.1.1. and 6.3.5. In respect to the Convention on Biological Diversity note that both, Sweden and Finland have subject to art. 6 para. a of the CBD adopted National Biodiversity Strategies and Action Plans (NBSPAs); for details on the Swedish NBSPA see Ministry of Sustainable Development (following a holistic approach to biodiversity, while not explicitly referring to the ecosystem approach; see at 12 and 20) and on the Finnish NBSPA see *Saving Nature for People* (holding that the ecosystem approach is already being applied in Finland through various projects, e.g. in respect to water resources and in the forestry sector; see at 31 and 116) and *Biodiversity Essential to Life* (*inter alia* referring to the ecosystem approach in the context of the planning of restoration measures to address climate change; see at 38). As regards Finland's and Sweden's relationship with the European Union, both countries strive to increase the Union's input on the Arctic region; see for Finland: Prime Minister's Office Finland (Strategy 2010), at 44 and Prime Minister's Office Finland (Strategy 2013), at 46-47 and 61 and for Sweden: Regeringskansliet (Government Offices of Sweden), at 18.

1297 See for Finland: Prime Minister's Office Finland (Strategy 2010), at 8-10, 13-15, 37, as well as Prime Minister's Office Finland (Strategy 2013), at 12, 27, 38, 44 and 51 and for Sweden Regeringskansliet (Government Offices of Sweden), at 19, 27-28, 31.

1298 See for Finland: Prime Minister's Office Finland (Strategy 2010), at 13, as well as Prime

thermore in relation to biodiversity conservation, Finland explicitly refers to the ecosystem approach, by stating that this approach *"must be applied in the planning of the utilisation of northern areas and their natural resources"*[1299].

Similar conclusions pertain to Iceland, which is also a member to the Convention for the Protection of the Marine Environment of the North-East Atlantic and has adopted an ecosystem-based management regime for fisheries.[1300] In its Arctic Policy of 2011[1301] Iceland refers to twelve principles pertaining to climate change, environmental issues, natural resource management, navigation, social development and pan-Arctic cooperation, including the involvement of indigenous peoples in the decision-making process and the promotion of scientific research programs in the region.[1302] In this context principle 8 requires the Icelandic government to *"use all available means to prevent human-induced climate change and its effects in order to improve the wellbeing of Arctic residents and their communities. [Furthermore according to this principle the country] will concentrate its efforts fully on ensuring that increased economic activity in the Arctic region will contribute to sustainable utilisation of resources and observe responsible handling of the fragile ecosystem and the conservation of biota"*. As regards Arctic cooperation Iceland stresses the role of the Arctic Council and in this context embraces the possibility for the development of legally binding agreements under the auspices of the Council, similar to the Arctic Search and Rescue Agreement and the Agreement on Arctic Marine Oil Pollution, Preparedness and Response.[1303]

In contrast, in Greenland, mainly due to insufficient scientific data on the ecosystems and the fact that only very recently a national strategy[1304] had

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Minister's Office Finland (Strategy 2013), at 23-26 and for Sweden Regeringskansliet (Government Offices of Sweden), at 27-28, 39-40.

1299 Prime Minister's Office Finland (Strategy 2010), at 16 and c.f. Prime Minister's Office Finland (Strategy 2010), at 39; Sweden does not go that far, however refers under its strategy for biodiversity conservation to the necessity to establish networks of protected areas and the development and adoption of ecosystem-based management of marine resources.

1300 See for details Norsk Polarinstitutt, at 58–59; furthermore it ought to be noted that Iceland in 2009 submitted an application to become a member to the European Union. Membership would not only make EU directives applicable to Iceland, but also broaden the EU's influence in Arctic matters; see The Government of Iceland and for further information <http://europe.mfa.is> (last visited: 14.07.2014).

1301 Althingi.

1302 See for details ibid., esp. the commentary to the Parliamentary Resolution at 3 et seq.

1303 See ibid., at 1, principle 1.

1304 See Ministry of Foreign Affairs.

been adopted pertaining to the Arctic and incorporating an ecosystem-based management approach in respect to living resources[1305], integrated ecosystem-based management plays no, or if at all, a marginal role in practice so far.[1306] Yet, while natural resources are still being predominantly managed under a single-species approach, Greenland has focused on involving stakeholders and as such is following an integrated management methodology, which is a decisive prerequisite in applying the ecosystem approach.[1307]

Additionally research projects undertaken by the Greenland Institute of Natural Resources, such as the ECOGREEN project in the context of the International Polar Year from 2007-2008[1308], or the designation of the West and the East Greenland Shelf as large marine ecosystem under the Arctic Council PAME working group[1309] support the establishment and implementation of an ecosystem approach in Greenland. Furthermore the national strategy of Denmark, Greenland and the Faroe Islands, may advance legislative action in favor of the ecosystem approach, as it addresses the fragility of the Arctic environment and hence calls for sustainable development and use in relation to the exploration and exploitation of mineral and living resources, biodiversity, ecosystem services as well as shipping (and consequently supports the adoption of a mandatory Polar Code).[1310] As regards the exploitation of living resources the Strategy explicitly requires the adoption of an ecosystem-based management approach as well as of the precaution-

1305 See for details ibid. at 31-32.

1306 See Norsk Polarinstitutt, at 76 and 78; on November 20, 2006 Greenland adopted an Act on Commercial and Research-Related Use of Biological Resources (see for an English translation: *Greenland Home Rule Parliament Act no. 20 of November 20th 2006 on Commercial and Research-Related Use of Biological Resources*). While stating in part 1, para. 1, subpara 1) that the Act aims at *"exploring biological resources in accordance with the Convention on Biological Diversity"* the Act does not refer to the ecosystem approach or the precautionary principle, but rather holds detailed regulations on the issuing of licenses. Also note that while the Convention on Biological Diversity was adopted by Denmark to be applicable also to Greenland and the Faroe Islands, these regions are in respect to nature conservation governed by their home rule (note in this context that in 2009 Denmark passed an *Act on Greenland Self-Government*, June 12, 2009 (Act no. 473), furthering independence of Greenland). Consequently the Danish National Biodiversity Strategy and Action Plan (NBSPA) does not apply to Greenland. See for details on the Danish Strategy *Danish National Biodiversity and Action Plan*, esp. at 9.

1307 See Norsk Polarinstitutt, at 76–78; cooperation with stakeholders and other Arctic Nations as regards the management and utilization of natural resources and environmental protection is also required under the national strategy; see Ministry of Foreign Affairs, at 10.

1308 See for details Andreasen, Bianchi, et al., at 7 and <http://www.natur.gl/index.php?id=762&L=3> (last visited: 14.07.2014).

1309 See for details *supra* in 6.2.2.5.

1310 See for details Ministry of Foreign Affairs, at 16, 18, 24, 31-32, 50.

ary principle.[1311] In this context a sound scientific base is needed, which is why the Strategy also calls for the adoption of *"scientifically based monitoring (…) in the Arctic with the involvement of its citizens"*[1312]. Scientific research furthermore plays a role in the context of climate change adaptation and mitigation and as a consequence (along with the use of local and traditional knowledge) is strongly supported by the Strategy.[1313]

In conclusion, while the precautionary principle and the ecosystem approach are incorporated to some degree within all Arctic Nations, legal support for these principles is far from unison. And even in countries where explicit references to these principles exist within domestic legislation, such as Norway or Canada, the ecosystem approach is restricted on a spatial scale, as it predominantly is concerned with the marine environment.[1314] As the fisheries sector was one of the first areas to adopt and apply an ecosystem-based management approach,[1315] expanding this approach to other marine sectors is a reasonable implication. Yet, effective assessment and management of climate change induced Arctic risks requires a long-term, adaptive, integrated and ecosystem-based approach to gathering and assessing knowledge and to managing human activities based thereon.[1316] Such a holistic approach should not be limited to the marine environment, albeit that the Arctic Ocean is of central concern to the eight Arctic Nations, especially as regards climate change induced Arctic risks.

1311 See ibid., at 31-32.
1312 Ibid., at 32; see in this context also at 46, calling for research, monitoring and assessment programs in order to protect the Arctic nature and environment. In this context a risk analysis pertaining to the maritime environment in and around Greenland shall be initiated by 2014.
1313 See ibid., at 35, 36, 44.
1314 See for details *supra* in 6.3.1. and 6.3.2.
1315 See *supra* in 5.3.3.2. and 6.1.2.3.
1316 See *supra* in 4.5.4. and 4.6.

7. Conclusion: The Current Legal Regime to Governing Climate Change Induced Arctic Risks

Climate change has lead to the emergence of a new kind of risks: Instead of being easily assessable and thus easily manageable, risks resulting from climate change entail a great amount of uncertainty, complexity and ambiguity, which makes governing such risks a challenging endeavor. Climate change induced risks, as they are understood for this thesis, refer to risks that have both a natural as well as an anthropogenic component.[1317] From a natural or ecological point of view, climate change induced risks affecting the Arctic refer to those risks stemming directly from alterations in climate as a natural phenomenon, e.g. sea level rise, permafrost thaw or changes in weather patterns.[1318] Climate change induced risks that are indirectly related to climate change, on the other hand are those that are of anthropogenic origin, i.e. human activities, that enhance climate change (e.g. the release of greenhouse gases) or activities that are a result of changing climatic conditions and may further threaten the ecosystems (e.g. increases in shipping, tourism, oil and gas activities and exploitation of natural resources previously unattainable).[1319] As the governance of such risks requires to be aware of the uncertainty, complexity and ambiguity involved, due to the fact that still very little is known about the Arctic ecosystems in general and the impact of climate change thereon in particular,[1320] the main question is what approach to risk assessment and management may be the most feasible in this context.

The classical approach to risk governance is the cost-benefit analysis, which is based upon the premise, that the expected negative outcome of a certain risk can be evaluated on the one hand, and the expected costs to manage such outcome on the other.[1321] This will then help decision-makers to decide if and if so in what way a certain risk shall be tackled. As the cost-benefit analysis is highly dependent on sufficient scientific data that allows for a clear assessment of a risk, based upon which the economically most appro-

1317 See *supra* in 1.2. and 5.3.2.
1318 See *supra* in 2.3.
1319 See for details *supra* in 3.2.2.3. and 3.3.
1320 See for details *supra* in 4.2.
1321 See on the following and for details on the cost-benefit analysis *supra* in 4.3. and 4.4.4.

priate management option can be chosen, this classical risk governance approach fails, where data lacks or is incomplete. Climate change induced risks, however, due to the uncertainties, complexities and ambiguities inherent in the natural phenomenon of climate change and the Arctic ecosystems affected therefrom, do not provide for a solid scientific background to make an uncontested application of the cost-benefit analysis feasible. In fact because of the uncertainties, complexities and ambiguities involved, applying the cost-benefit analysis when governing climate change induced risks, may lead to unfavorable outcomes, as specific risks may not be adequately managed, because the costs for their management outweigh the benefit of such management at the time risk governance decisions are being made. However, where uncertainties exists, it is often difficult if not to say impossible to clearly analyze in monetary terms whether or not an adverse result is of such a significance that it would justify regulation. Risks regarded as benign due to a lack of scientific data at the time they are to be managed therefore may be ignored in application of the cost-benefit analysis. As a consequence cost-benefit analysis may be applicable in some instances – where enough scientific data exists – when governing climate change induced risks, but from an overall perspective this classical approach to risk governance fails to adequately address the uncertainties, complexities and ambiguities intrinsic to climate change and the risks related thereto.

Consequently such new environmental risks demand an equally new approach to their assessment and management. In the past couple of decades the precautionary principle has in this context emerged to be a risk governance tool, that explicitly takes uncertainties into account.[1322] In the light of being better safe then sorry, the precautionary principle opts for taking precautionary action even at a lack of clear scientific proof. Or in other words, where not enough scientific data can be procured to assign any monetary values to a certain risk, and hence cost-benefit analysis becomes unfeasible, the precautionary principle nevertheless calls for action to avert any potential negative ramifications, especially where there are threats of serious or irreversible damage to ecosystems. The precautionary principle is thus tailor made for providing a guideline when governing newly emerging environmental risks, such as climate change induced risks.

Additionally, climate change induced risks, which affect ecosystems in their entirety and have a trans-boundary character, require a more holistic ap-

1322 See on the following and for details on the precautionary principle *supra* in 4.4.

proach to their governance – one that takes ecosystems as a whole, including human interests, into account. In supporting the assessment and management of ecosystems on a comprehensive scale, the Convention on Biological Diversity has adopted an ecosystem approach to their management, which combines thoughts on ecology, economy and sociology.[1323] Climate change induced risks are broad in scope and often have long lasting effects, entailing many uncertainties and complexities and thus require long term, flexible and adaptive management options, that are precautionary in substance and take the ecosystem as a whole, as well as adjacent or otherwise connected ecosystems into account.[1324] The ecosystem approach combines these ecological elements, while at the same time including socio-economic interests when governing ecosystems. As a consequence while not a risk governance tool *per se*, the integrative, adaptive and comprehensive character of the ecosystem approach is well suitable to address climate change induced risks.

In an overall perspective it becomes evident, however, that existing legal regimes applicable in terms of governing climate change induced risks on a global as well as on a regional (including domestic) scale,[1325] are either lacking explicit references to the precautionary principle or the ecosystem approach, mainly because they predate the Rio Earth Summit and therefore such ecologically valuable, sustainability conscious and holistic methodologies had not been developed yet. Or they do refer to any or both of the principles, but in doing so are restricted to a specific sector (e.g. fisheries) or spatial scope (e.g. marine environment).

The ecosystem approach established within the framework of the Convention on Biological Diversity or the approach considered under the Arctic Council's Conservation of Arctic Flora and Fauna working group are much broader in this context.[1326] However, as the approach in this holistic formulation is not incorporated within any international or regional convention, to date no legally binding definition of the principle exists, to effectively guide scientists, decision-makers and other stakeholders in adopting and implementing such a comprehensive approach and fostering more concerted action in this context.[1327] Regional soft law initiatives, on the other hand, which

1323 See for details on the ecosystem approach *supra* in 4.5.
1324 See *supra* in 4.5.4.
1325 See for details *supra* in 5. and 6.
1326 See for details *supra* in 4.5.2. and 6.2.2.3.
1327 See *inter alia supra* in 4.5.1., 5.6. and 6.1.4.

support pan-Arctic cooperation and hence would aid in the establishment and implementation of a holistic principle, lack the necessary binding effect and as a result leave the questions if and how to adopt and implement the ecosystem approach across the Arctic to the discretion of domestic activities.[1328]

Where the approach has been incorporated within national law, however, legislators seem to be reluctant to address its precise meaning and therefore only refer to the term, without providing for any legally binding guidance on how to adopt and implement it in practice.[1329]

Furthermore, the ecosystem approach is – unlike the precautionary principle – usually not referred to in connotation with environmental risk assessment and management,[1330] which leads to restrictions pertaining to risk terminology, as well as to the application of the ecosystem approach itself: The term risk is in an environmental context often used in connection to pollution preparedness and response, hence referring to accidental pollution.[1331] This notion, however, leads to a misconception of risk. Risk is a mental concept that refers to the probability of a negative outcome that is causally connected to a certain initiating activity or event.[1332] In many cases this activity is a deliberate, anthropogenic action. Hence, to limit risk governance methodologies to accidental pollution is inadequate, as every human activity, be it deliberate or not, under given uncertainties may result in negative ramifications for ecosystems.

Environmental impact assessment (EIA) is one important element in addressing these uncertainties and reducing risks.[1333] Environmental impact assessment, however, does only require to carry out an impact assessment prior to conducting any activities. How this assessment is undertaken, i.e. based on a single-species approach or more comprehensively, is on the other hand dependent upon the question whether an ecosystem-based approach to risk assessment is applied. Furthermore environmental impact assessment, does of course, not answer the question on how to manage a certain risk.

1328 See *supra* in 6.2.3.
1329 See e.g. on the ecosystem approach as incorporated within binding domestic law in Canada and Norway, *supra* in 6.3.1. and 6.3.2.
1330 Among the very few exceptions are Bianchi, et al., at 8, Fletcher, at 114 and 122.
1331 See in this context *supra* in 5.3.2. and 6.2.2.4.
1332 See for details *supra* in 1.2.
1333 See for details *inter alia supra* in 5.5.2.

In terms of climate change induced risks it has been made clear *supra*,[1334] that the Arctic is facing a variety of threats, either due to climate change itself as a natural event, or anthropogenic activities enabled by it. After all without climate change, many activities conducted within the Arctic today or bound to be undertaken in the future, would not take place, as they are directly dependent on the changing climatic conditions in the polar regions, since e.g. the melting of sea ice makes economic activities more feasible. To adequately address these risks a comprehensive approach to their assessment and management is needed, which can be found in the ecosystem approach. It therefore would be inadequate to withhold such an approach from application in the area of risk governance.

In considering the findings of part II of this thesis it stands to reason, that addressing climate change induced risks adequately requires a new legal regime, as the existing rules and regulations applicable to the governance of these risks often do not provide for a clear reference to the ecosystem approach (as well as to the precautionary principle, which forms an integral part thereof[1335]), are hardly comprehensive in scope, in most cases lack specific legally binding obligations to adopt and implement such approaches and do not refer to them in terms of risk assessment and management.[1336] Yet, the existing hard and soft law rules and regulations on a global as well as on a regional (including domestic) scale provide a good starting point in establishing a pan-Arctic integrated, adaptive, precautionary and ecosystem-based approach to assessing and managing climate change induced risks. As a consequence, the following, final, part of this thesis will, based on the previous findings in part I and II of this thesis, aim at developing a legal proposal for a comprehensive Arctic ecosystem approach to the assessment and management of climate change induced risks and consider such an approach's implications and benefit for the Arctic and beyond.

1334 See *inter alia supra* in 2.3. and 3.2.2.
1335 See *supra* in fn 279 (part I).
1336 See for details *supra* in 4.5.4., 4.6., 5.6., 6.2.3 and 6.3.6.

Part III: Effective Legal Governance of Climate Change Induced Risks in the Arctic Ecosystems – A New Legal Approach

Reflecting on the theoretical background and the existing legal regime applicable to the governance of climate change induced risks affecting the Arctic ecosystems as referred to in parts I and II, the third part of this thesis will draw conclusions for the effective assessment and management of such risks.

Accordingly, the subsequent chapters will summarize the main elements of a good governance approach to newly emerging environmental risks and based thereon will propose the establishment of a pan-Arctic agreement in order to provide for an adequate solution to the legal governance of climate change induced risks affecting the region's ecosystems. Furthermore attention will be drawn to the potential benefit of such an Arctic legal initiative for the rest of the world.

8. Legal Governance of Ecosystem Risks Within the Arctic and Beyond

As as has been shown *supra,*[1] effectively assessing and managing climate change induced Arctic risks requires a holistic methodology, such as the ecosystem approach, that addresses uncertainties by incorporating adaptive management procedures and applying the precautionary principle. Yet, under the current legal regime, the ecosystem approach is applied – if at all – only within specific sectors or on a limited spatial scale.[2] Consequently, the approach is – as currently adopted and implemented in practice – rather fragmented. Additionally, as of today no universal and legally binding definition of the approach exists, that would provide for a clear framework for scientists, decision-makers and stakeholders when developing and implementing such an approach.[3]

This ought to be seen as a shortcoming, especially in respect to climate change induced Arctic risks, as the ecosystem approach is a feasible tool to manage the Arctic ecosystems across borders in an ecologically sustainable way, while at the same time taking economic and societal interests into consideration. An effective implementation of the ecosystem approach would result in the maintenance of ecosystem functions and services, that are responsible for sustaining human well-being within and beyond the Arctic.[4] The climate system as we know it, e.g. is dependent on intact Arctic ecosystems, as the existence of ice within the region is a decisive factor in forming the global climate.[5] Additionally, because the ecosystem approach is aimed at maintaining ecosystem functions and services, which can contribute to addressing global climate change (e.g. carbon storage and carbon cycle) as well as at promoting ecosystem resilience, consequently making the ecosystem less vulnerable and providing for better adaptation to change, it is also an important asset in climate change adaptation.[6] The current fragmentation and the lack of a multilateral legal definition of the approach, however, are incapable of providing for reliable action that would lead to a satisfacto-

1 See *inter alia supra* in 4.5.4.
2 See *supra* in 5.6., 7. and for details in 5. and 6.
3 See *supra* in 4.5.2.1.
4 See *inter alia supra* in 4.5.2.2. d., 4.5.3. and 4.5.4.
5 See *supra* in 3.2.2.2.
6 See *supra* in fn 631 (part II) and IUCN (PROGRAMME 2009-2012), at 13 and 28.

ry result for the Arctic in its entirety.[7] Given these circumstances, the goal of the following chapters is to develop a legal regime for the establishment and implementation of an Arctic ecosystem approach, that could serve as guidance for scientists, policy-makers and stakeholders when addressing climate change induced Arctic risks.

8.1. Hard Law or Soft Law?

Before addressing the potential content of a legal regime for an Arctic ecosystem approach, the decision must be made whether such an approach should have the shape of hard or soft law. Both regimes have their advantages as well as disadvantages: While a soft law approach allows for greater flexibility, because amendments and law making in general are not the result of an as tedious process as it is the case with hard law, soft law rules and regulations are not legally binding and therefore often shortcomings in implementation can be perceived.[8] For example the *Guidelines for Environmental Impact Assessment (EIA) in the Arctic* have due to their soft law character only had little influence in practice.[9]

Ultimately a circumpolar legal regime for the adoption and implementation of an ecosystem approach within the Arctic, is only as strong as the rules it is based upon.[10] As has been shown *supra* in 6.2., the ecosystem approach has been endorsed on a soft law scale on a variety of occasions. Yet this has not led to a comprehensive, pan-Arctic recognition of this methodology. While some Arctic States have incorporated ecosystem thinking into their domestic legislation, especially as regards their marine environment,[11] and it can be expected that other Arctic Nations will follow suit, state practice is not unison and hence hampers an effective assessment and management of transboundary environmental issues, such as climate change induced Arctic risks, which demand concerted action.

Consequently clear guidance for policy-makers, stakeholders, scientists and other interested groups in Arctic climate risk assessment and management, that will lead to a circumpolar, ecosystem-based approach to governing climate change induced Arctic risks, ought to be sought in hard law, rather

7 See for details *supra* in 4.5.1., 5.6. and 7.
8 See for details on hard and soft law *supra* in fn 209 (part I) and 6., 6.1., 6.2. and 6.2.3.
9 See *supra* in fn 932 (part II).
10 Accord. Baker, at 61.
11 See *supra* in 6.3.

than soft law. However, as the current international and regional hard law regime does not or only in parts incorporate the ecosystem approach,[12] a new legal agreement, explicitly addressing this topic, is the reasonable implication. Such an agreement will have to be stringent enough to provide clear guidance to scientists, decision-makers, stakeholders and other parties concerned when addressing the question on how to govern climate change induced Arctic risks, while at the same time allowing for enough room for the adoption of specific domestic legislation in this respect according to the states' needs and capacities. This is especially important in regards to the setting of economic incentives to encourage national compliance with the ecosystem approach.[13]

Furthermore, as many uncertainties regarding the Arctic ecosystems, the climate system and climate change prevail, a legal regime for an Arctic ecosystem approach will have to be flexible enough to adapt to change. Too strict a normative definition will thus impede on the implementation of such an approach, instead of supporting it. Nevertheless, while many possibilities to implement the ecosystem approach in practice exist, a certain framework is needed to prevent conflicting activities within the Arctic Nations and to foster pan-Arctic developments in this respect. For the following analysis it will thus be presumed that governing climate change induced Arctic risks is suited best by the establishment of a circumpolar legally binding Framework Agreement on the Establishment and Implementation of an Ecosystem Approach within the Arctic.[14]

That such a hard law agreement is legally and politically feasible is made evident by the recent developments under the auspices of the Arctic Council: The establishment of an Arctic Search and Rescue Agreement and an Agreement on Arctic Marine Oil Pollution, Preparedness and Response, which were adopted at the Nuuk Ministerial Meeting in May 2011 and the Kiruna Ministerial Meeting in May 2013 respectively, shows, that if political will exists, the Arctic Council can serve as a platform for circumpolar law making, not only within a soft but also hard law realm.[15] That the will to protect the Arctic ecosystems and to include ecosystem thinking into scientific and legislative decision making would actually be present, is evidenced by the fact

12 See for details *supra* in 5. and 6.1.
13 See in this context furthermore *infra* in 8.2.1.3.
14 See in this context also Fritz, at 279–280 (stating, that global and complex environmental problems are addressed best by a *"framework convention and protocol approach"*).
15 See for details *supra* in 6.2.2.

that the preservation of the Arctic environment has been of concern to the Arctic Nations from the outset of pan-Arctic cooperation under the Arctic Environmental Protection Strategy and has also dominated the work of the Arctic Council, especially within the Conservation of Arctic Flora and Fauna and the Protection of the Arctic Marine Environment working groups.[16] Additionally the ecosystem approach has been identified on the domestic level of some Arctic Nations as an important tool in addressing environmental conservation and protection.[17] In the opinion of the present author the time would therefore be ripe to propose a circumpolar, legally binding Framework Agreement on the Establishment and Implementation of an Ecosystem Approach to Governing Climate Change Induced Arctic Risks, as outlined subsequently.

8.2. A Framework Agreement on the Establishment and Implementation of an Ecosystem Approach to Governing Climate Change Induced Arctic Risks

Formed as a holistic methodology, the ecosystem approach enables addressing every aspect of an ecosystem. As was shown *supra,*[18] however, the approach has in practice so far only had influence on a limited, sectoral scale, predominantly in the context of the assessment and management of marine resources, such as fisheries. The Arctic ecosystem approach advocated here, presumes a broader approach, similar to the one established under the Convention on Biological Diversity (hereinafter CBD)[19].[20] In fact the conservation and protection of biological diversity, as supported by the CBD's ecosystem approach, is intrinsically linked to climate change adaptation and hence to the governance of climate change induced Arctic risks.[21] Yet, because the ecosystem approach encompasses entire ecosystems, it not only relates to the conservation of biological diversity in general, or the sustainable management of specific species and their habitats in particular, as envisaged by the CBD, but can also aid in attending to issues that are more anthropogenic

16 See for details *supra* in 6.2.1. and 6.2.2., esp. 6.2.2.3. and 6.2.2.5.
17 See for details *supra* in 6.3.
18 See *supra* in 4.5., 5. and 6.
19 As cited *supra* in fn 86 (part I).
20 See for details *supra* in 4.5.2. and 5.4.1.
21 See *supra* in fn 631 (part II).

in character, such as risk governance.[22] So far, however, the ecosystem approach has hardly been directly linked to risk assessment and management.[23] Given the impact climate change and related human activities have or can have on the Arctic ecosystems, this notion ought to be reconsidered.

The important factor as regards climate change induced risks, is that climate change – and hence the risks it entails – encompasses both a natural, as well as an anthropogenic element.[24] As a natural phenomenon climate change and its possible adverse effects on ecosystems, such as sea level rise and habitat depletion, can in general not be prevented, because the initiating natural event eludes human capacities to influence it. Consequently, in such a situation, anthropogenic activities are to focus on outcome-focused adaptation and mitigation, rather than outset-oriented decision making.[25]

The anthropogenic element of climate change differs in this respect, as human activities can either influence the natural phenomenon entailing risks (i.e. by releasing anthropogenic greenhouse gases into the atmosphere, which will enhance climate change) or as a result of climate change can promote additional ecosystem risks due to alterations in behavior (e.g. by increasing shipping and oil and gas activities that put Arctic ecosystems under further pressure). As these human induced activities can be influenced at their outset, outcome *and* outset-oriented mitigation efforts are feasible and recommended.[26]

This needs some clarification: The last mentioned activities do not directly enhance climate change, but rather ought to be seen as a result of global warming, because it facilitates many activities and hence triggers opportunities, previously unattainable. These anthropogenic actions *per se* are – while undoubtedly connect to global climate change – not the main objective of climate change adaptation and mitigation efforts. Yet, understood in a broader context, which the notion climate change induced risks is aiming for, adaptation and mitigation means any activity intended to help preventing, abating or coping with any risk related to climate change.

22 See for details *supra* in 4.5.2.4.
23 See *supra* in 7.
24 See on the following *supra* in the preface to this thesis and in 1.2., 4.6. and 5.3.2.
25 See *supra* in 1.2.
26 Mitigation in this context refers to both, initiatives taken to lessen negative ramifications from human activities (outcome-focused mitigation), as well as preventing any such adverse impacts from occurring (outset-oriented mitigation; e.g. reducing the release of anthropogenic greenhouse gases, which is enhancing climate change). See in this context also supra in 1.2.

Climate change adaptation and mitigation understood in this context, can be aided by the ecosystem approach from both, an ecological as well as an anthropogenic stance, because it supports ecosystem services, functions and resilience helpful in addressing climate change itself[27] and also tends to anthropogenic impacts upon ecosystems, derived therefrom.[28] It must be considered, however, that if the ecosystem approach is understood solely in connection with climate change induced Arctic risks, it will fall short where anthropogenic activities become an issue that are not directly or indirectly linked to climate change. Yet, due to the uncertainties in the matter, it can be assumed that almost every human action endangering the Arctic ecosystems can in one way or the other be connected to climate change and therefore should – from a precautionary perspective – be managed appropriately, i.e. by applying the ecosystem approach. The following proposal for a Framework Agreement for an Arctic ecosystem approach, will therefore focus on governing climate change induced Arctic risks and hence include – contrary to the ecosystem approach's usual deployment – risk assessment and management considerations.

8.2.1. The Ecosystem Approach Triad

When seeking to establish a legally binding framework for an ecosystem approach to governing climate change induced Arctic risks, it is necessary to outline the approach's main elements first. In doing so the following paragraphs will mainly summarize the findings provided in part I and II of this thesis and, where necessary, make some additions in order to clearly outline the elementary principles of the ecosystem approach in relation to risk assessment and management, so as to based thereon propose a pan-Arctic, ecosystem-based legal framework to governing climate change induced risks.

As has been shown *supra*[29] the ecosystem approach combines ecological, economic and social interests with an unequaled simplicity. While each of these three components are closely interlinked and therefore a holistic strategy to their assessment and management as provided for by the ecosystem approach is required, each criterion features unique aspects that demand a more detailed analysis. Consequently, the following paragraphs are address-

27 See *supra* in 8. and fn 631 (part II).
28 See for details on the ecosystem approach *supra* in 4.5.
29 See for details *supra* in 4.5.

ing each element of the ecosystem approach triad separately. As has been already stated, it ought to be kept in mind, however, that the approach is based on the interconnections between these three criteria and hence overlaps are inevitable. Nevertheless, for the purpose of simplification the trichotomy shall be retained in the subsequent paragraphs.

8.2.1.1. The Ecological Element

The first element of the ecosystem approach is concerned with the protection of the ecological components of an ecosystem, i.e. its species, their habitat and the intrinsic functions and processes ecosystems provide. From an ecological stance ecosystem protection is thus closely linked to the conservation and preservation of biological diversity e.g. under the framework of the Convention on Biological Diversity.[30] Intact ecosystems do, however, not only contribute to fulfilling the CBD's objectives, but also are through vital processes such as the global carbon cycle or the functioning as carbon sinks, instrumental in climate change adaptation and thus correspond to the objectives of the United Nations Framework Convention on Climate Change.[31] Consequently, maintaining ecosystems at levels, which allow for their proper functioning, is essential in addressing climate change induced Arctic risks and is the predominant objective of the ecosystem approach. Consideration will thus have to be given to preventing human activities from interfering with the ecosystems' operational capability and where such interference has already taken place, focus ought to be directed at restoring depleted ecosystems.

In practice maintaining ecosystem health and integrity can be achieved through a variety of options. Within a legal realm most prominent are the obligation to conduct Strategic Environmental Assessments (SEA) and Environmental Impact Assessments (EIA) prior to carrying out any activity, in order to avert or reduce potential negative results from human activities upon the environment and the designation of marine or terrestrial protected areas.[32]

While SEA is applied to policies, plans and programs – and thus requests an assessment of the environment and potential effects thereon at a very early

30 See for details *supra* in 4.5.2. and 5.4.1.
31 See for details Secretariat of the Convention on Biological Diversity (Climate Change Mitigation and Adaptation), at 51 and *supra* in 5.2.4., 8. and fn 631 (part II).
32 See in this context also *supra* in 5.3.2.4., 5.4.1., 5.4.3., 5.5.2. and fn 633 (part II).

stage in the decision-making process, EIA is conducted in respect to a specific activity for which respective policies, plans and programs already exist.[33] Consequently, SEA is not primarily concerned with the concrete activity resulting in the end, but rather with finding the ecologically most feasible out of several options to design a policy, plan or program. Strategic Environmental Assessment will thus contribute to the development of specific environmentally sound activities, that can further be controlled through Environmental Impact Assessments. Hence, in combination SEA and EIA should at least in theory effectively prevent any negative ramifications for ecosystem functions and processes from occurring due to human activities. However, in practice biological diversity, which as has been shown is one of the main contributors to healthy and intact ecosystems, is often not adequately accounted for during the assessment processes.[34] In the light of the ecosystem approach, SEA and EIA activities, will thus have to become more holistic in scope, which calls for new standards in environmental assessments.

Furthermore, to guarantee that important ecosystem components, such as biological diversity, are considered at the earliest stage possible when the conduct of human activities that may result in adverse effects for the ecosystem is an issue, SEA and EIA ought to be applied in combination. A lack of introducing Strategic Environmental Assessment into the domestic legislative and planning process, will hamper the effective assessment and management of ecosystem risks, such as climate change induced Arctic risks. An Arctic ecosystem approach will thus have to call for both holistic SEA as well as EIA activities in response to human activities to be planned or to be conducted within the region.

As has already been stated, when it comes to maintaining ecosystem health, integrity and ultimately resilience, making ecosystems more adaptable to change, including such from global warming, in practice a strong focus lies upon the designation of terrestrial or marine protected areas.[35] Many of the multilateral environmental agreements (MEAs) either explicitly or implicitly do support the establishment of such areas: Article 192 in conjunction with article 194 paragraph 5, article 196 and article 211 paragraph 6, sub-paragraph a of UNCLOS, articles 2 and 8 paragraphs (a) to (c) and (e) of the CBD, article 2 paragraph 1 of the Ramsar Convention, article II paragraph 1

33 See Kolhoff, et al., at 125 and 141 and *supra* in 5.5.2.
34 See Rajvanshi, et al., at 156, Slootweg (Biodiversity-inclusive SEA), at 206, ten Kate & Inbar, at 190.
35 See accord. Fritz, at 312 and for details *inter alia supra* in 5.3.2.4., 5.4.1. and 5.4.3.

of the CMS and article 4 of the World Heritage Convention.[36] Additionally MARPOL 1973/1978 entails several provisions on the designation of special and emission control areas, subject to section B of regulation 15 and 34 of Annex I as well as regulation 5 of Annex V and regulation 14 paragraphs 3 and 4 of Annex VI, respectively.[37]

Furthermore the classification of specific parts of ecosystems as requiring protection beyond the general conservation measures applied, is also supported by a variety of legally non binding initiatives, such as the Particularly Sensitive Sea Areas Guidelines, the Man and the Biosphere Programme, the Johannesburg Plan of Implementation[38] and the Convention on Biological Diversity's Strategic Plan for Biodiversity for the period of 2011 to 2020.[39] In addition these international legal measures are complemented by regional and national approaches, e.g. under the OSPAR Convention, the Polar Bear Agreement or Norway's Nature Diversity Act and the European Union's Habitat and Birds Directives.[40]

In spite of these multiple approaches, as of today protected areas account only for a small part of the Earth's surface, with about 1.6 % being situated in marine and about 12.7 % in terrestrial areas.[41] As the designation of protected land and marine areas is one of the main contributors to (in a precautionary way) conserving biological diversity, responsible for intact ecosystems and the maintenance of their functions and services, effective implementation of the ecosystem approach requires the establishment of further such areas,[42] especially in vulnerable marine regions, such as the Arctic Ocean. That the classification as marine protected area under domestic legislation is, however, insufficient under the ecosystem approach, was already

36 For a citation of the conventions see *supra* in fn 86 and 127 (part I) as well as fn 427, 428 and 664 (part II).
37 See for details *supra* in 5.3.2.1. and 5.3.2.4. c.
38 See the Johannesburg Plan of Implementation, section IV, para. 32, sub-para. c. in *Report of the World Summit on Sustainable Development*, Aug. 26 - Sept. 4, 2002 (A/CONF.199/20), which holds that marine protected areas are to be established *"consistent with international law and based on scientific information, including representative networks by 2012"*.
39 See for details *supra* in 5.3.2.4., 5.4.1. and 5.4.3.3.
40 See for details *supra* in 6.1.1., 6.1.2.1., 6.3.2.2. b. and fn 1276 (part II).
41 See *supra* in fn 34 (part II).
42 Accord. COP 7 Decision VII/28, para. 1, available at <http://www.cbd.int/decision/cop/?id=7765> (last visited: 16.07.2014); the Decision *inter alia* adopts the Programme of Work on Protected Areas (PoWPA), whose aim it is to help in the establishment and maintenance of protected terrestrial and marine areas by promoting a network of such areas; see section II, para. 6 of the PoWPA, as annexed to Decision VII/28.

pointed out *supra*.[43] The designation process has to be more trans-boundary in scope, so as to include a larger spatial scale, instead of limiting the assignment of protected area status to specific land or marine areas within the jurisdiction of one specific state.[44] Furthermore protected area designation has in light of the ecosystem approach to reach beyond national jurisdiction.[45] The fragmented zonal approach, *inter alia* advocated by UNCLOS, is incapable of addressing ecosystem risks adequately. The assignment of marine protected areas beyond national jurisdiction, i.e. in high sea areas, is thus of vital importance to guarantee the protection of the marine environment as a comprehensive system with all the functions and services it entails.

In practice, however, only few examples exist of designation efforts regarding trans-boundary protected areas, or such beyond national jurisdiction. The most prominent measure for the Arctic region is the OSPAR Network of Marine Protected Areas as referred to in greater detail *supra* in 6.1.1. Additionally – while not of specific relevance to the Arctic – the recent Mura-Drava-Danube Agreement, signed by Austria, Croatia, Hungary, Serbia and Slovenia on March 25, 2011, ought to be mentioned, as it is proof that if political will exists, trans-boundary protected area designation can be effectively transferred into practice.[46] The Mura-Drava-Danube UNESCO transboundary Biosphere Reserve is the world's first five-country protected area. Given the fact that in the case of the Arctic, the Arctic Council provides a forum for cooperation in regards to environmental protection and efforts have already been undertaken in this regard through the Circumpolar Protected Areas Network,[47] the establishment of trans-boundary protected areas or networks of such areas is certainly feasible and would greatly benefit the fulfillment of the Strategic Plan for Biodiversity under the Convention on Biological Diversity[48]. An Arctic ecosystem approach will hence have to focus on trans-boundary protected areas and such beyond national jurisdiction as an important asset in maintaining ecosystem health and integrity and hence addressing ecosystem risks, such as climate change induced Arctic risks, which affect the Arctic comprehensively.

43 See *supra* in 5.6.
44 See in this context also COP Decision X/31, paras. 5 and 6, available at <http://www.cbd.int/decision/cop/?id=12297> (last visited: 16.07.2014).
45 See also ibid., para. 22.
46 See for details WWF (Mura-Drava-Danube) and WWF (Europe's Amazon).
47 See for details *supra* in 6.2.2.3., esp. in a. i. (iii).
48 See *supra* in 5.4.1.

8.2.1.2. The Social Element

The ecosystem approach differs from other strategies aimed at environmental conservation in respect of its inclusion of mankind into the concept: While the usual measures undertaken to protect and conserve the environment are mainly eco-centric, the ecosystem approach combines ecological and anthropogenic interests, that is to say social as well as economic concerns.[49]

As the ecosystem approach can only be effectively implemented if all stakeholders are involved into the decision-making process and if it is applied across sectors, the social element of the ecosystem approach is concerned with balancing the differing interests and worldviews of these actors.[50] Where e.g. varying land use regimes exist among stakeholders and across borders, the ecosystem approach will have to tend to these conflicting interests and find solutions satisfactory for all parties involved by providing an integrated management approach. Accordingly, in the context of sovereignty disputes pertaining to the Arctic Ocean, the ecosystem approach may aid in balancing the conflicting interests among the Arctic Nations, as stakeholder cooperation is an indispensable prerequisite in effectively implementing the approach and – equally – in settling maritime delimitation controversies. As has been shown *supra* by means of the Beaufort Sea large marine ecosystem, trans-boundary cooperation in ecosystem-based management aimed at ensuring ecosystem health and integrity is possible, in spite of existing sovereignty disagreements and can ultimately benefit diplomatic talks required to resolve the pending questions as regards maritime delimitation.[51] In any case the application of the ecosystem approach, albeit contrary to the zonal strategy of UNCLOS,[52] does in no way prejudice sovereignty issues and how they are to be solved, but rather can provide a basis to their resolution.

In practice, gaining legitimacy for a holistic, ecosystem-based management regime, can be derived from integrated management, as advocated by principle 12 of the Malawi Principles, i.e. an early involvement of all stakeholders and across all sectors into the decision-making process.[53] This entails a notion of equity, as all parties interested should be equally provided the opportunity to participate in both risk assessment as well as risk management.

49 See *supra* in 4.5.1.
50 Accord. Garrelts & Flitner, at 15.
51 See for details *supra* in 6.3.1.1. b.
52 See for details *supra* in 5.3.1., esp. 5.3.1.2.
53 See for details *supra* in 4.5.2.2. l.

In recent years, e.g. the benefit of incorporating traditional (environmental) knowledge (TEK) and/or local knowledge into risk assessment was recognized and these sources of knowledge were identified as a valuable addition to scientific information and data gathered e.g. through scientific research and monitoring procedures.[54] To facilitate integrated management, however, capacity building[55] is required, that is e.g. providing the necessary infrastructure for indigenous and local inhabitants to participate in the decision-making process. Consequently, as the Arctic, due to its remoteness, is in this context still a developing region, an Arctic ecosystem approach will have to focus on providing the necessary legal, institutional, technical and educational means to enable integrative assessment and management of climate change induced Arctic risks.

In respect to the Arctic, integrated management especially calls for the involvement of indigenous peoples when assessing and managing Arctic ecosystems, e.g. through community-based monitoring.[56] Legally, the inclusion of indigenous peoples in environmental protection and conservation measures is prominently referred to in article 22 of the Rio Declaration[57], which holds, that *"[i]ndigenous people and their communities (...) have a vital role in environmental management and development because of their knowledge and traditional practices. [Consequently] [s]tates should (...) enable their effective participation in the achievement of sustainable development."* Additionally article 8 paragraph (j) of the Convention on Biological Diversity holds that contracting parties ought to *"respect, preserve and maintain knowledge, innovations and practices of indigenous and local communities embodying traditional lifestyles relevant for the conservation and sustainable use of biological diversity and promote their wider application with the approval and involvement of the holders of such knowledge, innovations and practices (...)"*. In this context, Arctic cooperation un-

54 See in respect of incorporating indigenous knowledge art. 8 para. (j), art. 17 para. 2 and art. 18 para. 4 of the CBD and for details *supra* in 4.5.2.2. l., 4.5.2.3., 5.3.3.2. b. iii., 6.2.2. esp. fn 940, 950, 952 and 1026 (part II) and 6.3.1., 6.3.2. and 6.3.4. Also see the *Policy 52.06 Traditional Knowledge*, Feb. 5, 2005 [hereinafter Traditional Knowledge Policy] of Canada's Northwest Territories, in which the government of these territories explicitly *"recognizes that aboriginal traditional knowledge is a valid and essential source of information about the natural environment and its resources, the use of natural resources, and the relationship of people to the land and to each other"*; art. 1 of the Traditional Knowledge Policy. Additionally for a general analysis of the meaning and value of traditional knowledge see Tennberg, at 74–75.

55 See *supra* in fn 332 (part I); 4.5.2.3. b.

56 See *supra* in 6.2.2.3.

57 As cited *supra* in fn 184 (part I) and referred to in greater detail in 5.1.5.

der the Arctic Environmental Protection Strategy as well as the Arctic Council has advocated the inclusion of indigenous groups right from the start.[58] Consequently, the Council provides a forum not only for cooperation among states, sectors and local stakeholders, but also the indigenous inhabitants of the Arctic and as such establishes a basis for effectively applying the social element of the ecosystem approach within the region.

Another important aspect of the social element of the ecosystem approach is human well-being. As the ecosystem approach includes societal interests, management options to be taken ought to be aware of satisfying basic human needs and shall under no circumstances lead to the degradation of such needs.[59] However, maintaining the ecological facets of ecosystems, e.g. through biodiversity conservation, will ultimately result in human benefits, as intact ecosystems provide the goods and services responsible for human well-being.[60] Consequently, most often fostering ecological and societal well-being are mutually intertwined. Nevertheless the social element of the ecosystem approach requires, similarly to strategic environmental assessments or environmental impact assessments in an ecological context, assessments to be undertaken in regards to societal needs. Hence, in applying the ecosystem approach a management option may only be feasible if it will result in the desired quality of life for the human population, while at the same time meeting the ecological attributes aimed for.[61] E.g. the establishment of a protected area intended to conserve biological diversity within a specific region, which will support ecosystem health and resilience, cannot be desirable under the application of the ecosystem approach, if it will hamper traditional land use rights and as a result infringe on social and cultural livelihood. An ecosystem approach for the Arctic, developed to address climate change induced Arctic risks, will thus have to include ecological, as well as social indicators when assessing ecosystem risks and how they are to be effectively managed.

58 See *supra* in 6.2.1. and 6.2.2.
59 See Garrelts & Flitner, at 70 and Kofinas & Chapin, at 74.
60 See *inter alia supra* in 4.5.2.2. d. and 4.5.4. as well as *infra* in 8.2.1.3.
61 Accord. United Nations Environment Programme & Global Programme of Action for the Protection of the Marine Environment from Land-based Activities, at 22.

8.2.1.3. The Economic Element

In addition to the social element, addressed above, the ecosystem approach encompasses economic interests pursued by decision-makers, stakeholders and other interested parties, which are to be attended to in an anthropogenic context of ecosystem management. In reality environmental and economic targets often clash, as short term economic gain is regularly linked to unsustainable management of natural resources. The ecosystem approach can bring about a paradigm shift in this respect by pointing out the profound connections between environmental and economic concerns.[62] Ecosystems require protection not only in an ecological or social context (i.e. for environmental, cultural and recreational reasons), but also from an economic stance: Intact ecosystems provide economically valuable goods and services,[63] responsible for human well-being, which – if not sustainably managed – may lead to market deterioration, as the functioning of the economic system is by and large dependent upon the natural resources ecosystems supply and thus ultimately on the intrinsic processes and functions of ecosystems, underlying the development of these resources. It is also in this context that the ecosystem approach allows for a solution to the discrepancies between the strictest versions of the cost-benefit analysis and the precautionary principle, as it combines ecological interests with economic valuation when managing ecosystems and addressing risks they are affected by.[64]

Yet, many goods and services ecosystems provide, are to date either undervalued, or have no financial value at all.[65] As a consequence, conservation measures conducted following an economic impetus, predominantly focus on protecting and preserving those ecosystem goods and services that are economically valuable and enable a short term economic gain and financially equitable solutions.[66] Thus, instead of holistic, long-term management strategies being applied, in practice short-term, single species and often unsustainable approaches prevail. Overcoming such discrepancies requires redesigning the economic system, especially as regards economic incentives,

62 See for details *supra* e.g. in 4.5.2.2. d. and 4.5.4.
63 See *inter alia supra* in fn 302 (part I).
64 See *supra* in 4.4.4. and 4.5.2.2. d. and for details on the cost-benefit analysis and the precautionary principle in 4.3. and 4.4.
65 See Forest Trends, et al., at 2, cf. IUCN (Economic Incentives), at 2 (in respect to valuing biodiversity) and *supra* in 4.5.2.2. d.
66 See *supra* in 4.5.2.2. d.

by adequately incorporating environmental management objectives.[67] To this aim it is however, first and foremost important to identify the various goods and services ecosystems provide, so as to – in a next step – value their importance within an economic realm.

According to the Millennium Ecosystem Assessment, which was concluded in 2005 and whose purpose was to produce *"an integrated assessment of the consequences of ecosystem change for human well-being and to analyze options available to enhance the conservation of ecosystems and their contributions to meeting human needs"*[68], ecosystem services can be grouped into the following four categories:[69]

- **Provisioning services:** Those services are the products people derive from ecosystems for their own livelihood, such as food, water, fuel, fiber and genetic resources. Provisioning services, are the actual ecosystem goods that usually possess an economically measurable value and hence are of primary concern in an economic context.
- **Regulating services:** Regulating services refer to the benefits gained from those functions within ecosystems responsible for regulating ecosystem processes, such as climate regulation, natural hazard regulation, water purification and waste treatment as well as human disease control. Intact ecosystems will not only guarantee the supply of the above mentioned ecosystem goods (i.e. provisioning services) in the long term, but will also provide protection against natural events, such as floods, droughts and erosion, aid in climate change adaptation as well as mitigation and keep the climate system at a stable level. Additionally, healthy ecosystems facilitate water pu-

67 Ibid. and IUCN (PROGRAMME 2009-2012), at 34, as well as c.f. IUCN (ECONOMIC INCENTIVES), at 2.

68 MILLENNIUM ECOSYSTEM ASSESSMENT, at 26.

69 See on the following, ibid. at 27 and 29, UNITED NATIONS ENVIRONMENT PROGRAMME (ECOSYSTEM MANAGEMENT PROGRAMME), at 5–8, ASH, ET AL., at xi, in great detail CHAPIN, at 31–48 and SLOOTWEG (INTERPRETATION OF BIODIVERSITY), at 38, SLOOTWEG & MOLLINGA, at 94, 96 and 122 (providing a detailed list of ecosystem services) (who suggest a fifth service, the so called *carrying services*, which refer to the fact that intact *"[e]cosystems provide space, a substrate, or backdrop for human activities";* SLOOTWEG & MOLLINGA in this context refer to W.T. DE GROOT; see DE GROOT, at 232); note in this context that the Economics of Ecosystems and Biodiversity (TEEB) initiative does not refer to supporting services, but instead applies the notion of habitat services; see for details DE GROOT, ET AL., at 25, ELMQVIST, ET AL., at 77. And see for examples of the four categories of ecosystem services: WORLD RESOURCES INSTITUTE, ET AL., at 4–5, DE GROOT, ET AL., at 26 and <http://www.teebweb.org/resources/ecosystem-services> (last visited: 16.07.2014).

rification, waste management, and control the spreading of diseases, *inter alia* through the filtering and detoxifying functions of soils and wetlands.

- **Supporting services:** Those services are the essence of every ecosystem and life in general, as they are the necessary prerequisite for all other ecosystem services. Supporting services e.g. include the production of vital organic compounds through photosynthesis (primary production), the production of oxygen and the formation of soil.
- **Cultural services:** Cultural services are the non-material benefits that can be obtained from ecosystems, such as spiritual enrichment, intellectual and cultural development, as well as recreation.

While for provisioning – and to some extent also cultural (e.g. in terms of recreation and eco-tourism[70]) – services a specific economic value can be attributed, because ecosystem goods are incorporated into markets, such economic valuation proves more difficult for regulating and supporting services, which is why they are commonly neglected in an economic context.[71] From an ecosystem perspective, however, the maintenance of these services is fundamental, as they provide the vital processes and functions of ecosystems, from which economically valuable ecosystem goods are derived. In the light of ecosystem-based management and sustainability, the economic system will thus have to tend to these services, if the economically valuable provisioning and cultural services are to be maintained in the long term. As a consequence, this reorientation in economics, requires the valuation of ecosystem goods and services, previously not incorporated into markets, so as to attribute a measurable economic value to them, which will facilitate their inclusion into the economic system.[72] Furthermore, economic support for maintaining ecosystem integrity will have to be achieved by the setting of

70 According to Chapin *"cultural and nature-based tourism constitutes 3-10 % of the gross domestic product in advanced economies and up to 40% in developing economies"*; see Chapin, at 48 and Heal, at 61–62 and for an economic valuation of marine recreational activities such as whale watching and diving by means of three indicators (participation, expenditure and employment) see Cisneros-Montemayor & Sumaila; also more generally see Elmqvist, et al., at 79.

71 Accord. Chapin, at 31 and 43, Pushpam & Wood, at 2, Barbier, at 32 and more general Kosoy, et al., at 222; an exception in this context is carbon sequestration for which under the Kyoto Protocol a market has been established by means of tradable carbon emission permits. See for details *supra* in 5.2.4. and Heal, at 73-74 and 78.

72 See in this context also *supra* in 4.5.2.2. d.

incentives, that are accredited from an ecological as well as a socio-economic perspective.

Remarkable about the human species is, that if something has got a value, people tend to go great lengths to protect it. On the other hand, things that are undervalued or are not recognized to have any value at all, will receive less attention. Value of course is not an exclusively economic concept, as people can attribute a value to ecological goods and services for their aesthetic, spiritual, cultural or recreational benefit, rather than their direct economic implications.[73] Yet, in order to trigger a change in the economic system towards ecosystem-based and sustainable management not only of specific natural resources, but ecosystems as a whole, an economic valuation of all the services provided by these ecosystems is required. Or as KOLHOFF ET AL. put it, it is necessary *"to translate effects into clear impacts on the decision makers' priorities and interests"* by means of transforming ecological components (such as biodiversity) *"into values for stakeholders (...) that decision makers can understand and relate to".*[74] Such valuation, however, is difficult to ascertain.

As more knowledge is being obtained about ecosystems, their functions, processes and services, responsible for human well-being, mainstreaming ecosystem thinking into business is in light of sustainable development becoming a growing concern. It is against this backdrop that the Economics of Ecosystems and Biodiversity (TEEB)[75] initiative was launched in 2007 and the World Business Council for Sustainable Development (WBCSD) presented it's Guide to Corporate Ecosystem Valuation[76] in April 2011.

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73 Note that ecological components of ecosystems (e.g. biodiversity) are also commonly attributed an *"intrinsic value"*, which is detached from human interest; see in this context also para. 1 of the preamble of the CBD, as cited *supra* in fn 86 (part I). In addressing the economic element of the ecosystem approach, however, such intrinsic value is meaningless, as economic valuation is dependent upon what kind of value people associate with a specific ecosystem good or service. See accord. SLOOTWEG (INTERPRETATION OF BIODIVERSITY), at 26, BRONDIZIO, ET AL., at 162, cf. SCHOLES, ET AL., at 124 and on intrinsic value in general AGAR, at 4, RØNNOW-RASMUSSEN & ZIMMERMAN, at xiii, ROXBEE COX, at 105, HUNTER, ET AL., at 987.

74 KOLHOFF, ET AL., at 153.

75 TEEB was launched as a joint initiative of the European Commission and Germany as a response to a proposal by the G8+5 Environmental Ministers at a meeting in Potsdam in 2007. See TEEB (INTERIM REPORT), at 9, TEEB (POLICY MAKERS), at 2. Under TEEB a variety of reports have been issued ever since. They are available at <http://www.teebweb.org/our-publications> (last visited: 16.07.2014). See also *supra* in fn 305 and 307-309 (part I).

76 WORLD BUSINESS COUNCIL FOR SUSTAINABLE DEVELOPMENT.

TEEB's aim is to *"promote a better understanding of the true economic value of ecosystem services and to offer economic tools that take proper account of this value"*[77]. Similarly the Guide to Corporate Ecosystem Valuation is intended to allow for *"better-informed business decisions by explicitly valuing both ecosystem degradation and the benefits provided by ecosystem services"*[78].

Ecosystems may be valued in qualitative, quantitative or monetary terms;[79] however, not every valuation scheme is equally as feasible for all ecosystem goods and services. Furthermore, as economic valuation is reliant on the data procured in respect to a specific ecosystem during the assessment stage, it is impossible to value ecosystem services in their entirety.[80] However, where sufficient information on ecosystem functions, processes and services exist, a quantitative or – based upon this – a monetary assessment may be suitable.

Quantitative assessments refer to numerical data pertaining to a specific ecosystem service, without valuing that service in precise financial terms. Consequently, it is not the effective financial gain or loss, that is expressed by assessing ecosystem services quantitatively, but rather such assessment will require the gathering of specific numbers pertaining to the ecosystem service, which will then allow to draw conclusions on its value (e.g. the number of people visiting national parks, the quantity of sequestered carbon, or

77 TEEB (INTERIM REPORT), at 9.

78 WORLD BUSINESS COUNCIL FOR SUSTAINABLE DEVELOPMENT, at 9.

79 See also on the following TEEB (INTERIM REPORT), at 33, KETTUNEN, ET AL., at 54–55, WORLD BUSINESS COUNCIL FOR SUSTAINABLE DEVELOPMENT, at 25, BRINK, ET AL. (NATURAL CAPITAL), at 94 (stating that qualitative, quantitative and monetary information is important in valuing ecosystem services), UNAI, ET AL., at 196-204 and 229-231, 233 (referring to valuation methods, including benefit transfer, which is understood as the transfer of an existing estimate of the value of an ecosystem onto one that yet ought to be valued), VAN BEUKERING & SLOOTWEG, at 307 (referring to the quantification of ecosystem services) and at 313-319 (listing different techniques for an economic, monetary valuation of ecosystem services); accordingly GOWDY & SALMAN, at 203–204 and KOSOY, ET AL., at 223–226 cf. SCHOLES, ET AL., at 138. Note that depending on the information available a valuation may be undertaken in qualitative or quantitative terms, while the latter points to the possibility to assign a clear number and for the former numerical data is lacking. In this context monetary valuation ought to be seen as a form of valuation within quantitative assessments. Furthermore it must be noted that there exist a variety of methods to value ecosystem services in economic terms. These economic principles shall not be addressed here in greater detail, however. For more information on economic values see e.g. BARBIER, at 48–49, CATO, at 58, HEIN, at 35–37, KETTUNEN, ET AL., at 243–246, WHITE, ET AL., at 139–140; in this context also see KUMAR, ET AL., at 292 (who advocate the application of a combination of approaches when valuing ecosystem goods and services and provide an assessment of valuation methods).

80 See e.g. TEEB (INTERIM REPORT), at 33.

the number of catches from a specific fish stock under a given fisheries regime).[81]

Monetary assessments, on the other hand allow attributing a specific financial value to the implications a given ecosystem service may have (e.g. estimating the financial gain or loss upon the fisheries sector a decline or increase in fish stocks would result in).[82] While for provisioning services such monetary valuation is often suitable, as they are traded on markets, regulating, supporting and cultural services generally do not have a market price.[83] If enough information on processes and functions intrinsic to these services exist, a quantitative valuation may still be feasible. If on the other hand – as is often the case – uncertainties prevail, it will become necessary to value ecosystem services qualitatively, i.e. in terms of their importance for the socio-economic system (e.g. regarding the social benefits from recreation or health benefits from clean air), without making a clear reference to numerical data.[84] Supporting services e.g., that are prerequisites for maintaining

81 See KETTUNEN, ET AL., at 54, WHITE, ET AL., at 133–134, TEEB (INTERIM REPORT), at 33, WORLD BUSINESS COUNCIL FOR SUSTAINABLE DEVELOPMENT, at 26 as well as *supra* in fn 79 (part III).

82 See ibid.

83 See TEEB (INTERIM REPORT), at 34, FITTER, ET AL., at 20, but see GOODSTEIN, ET AL., at 19–22 (estimating the costs of a loss of regulating services due to changes in the Arctic cryosphere and in this context assessing an economic cost of $ 61-371 billion annually due to the loss of Arctic regulating services, i.e. the melting of sea ice, albedo feedback change and permafrost thaw; such monetary valuation may raise the question if a traditional risk governance approach (i.e. cost-benefit analysis) can be applied to effectively govern climate change induced risks whenever monetary assessments are being made. The broad range of such valuation shows, however, that due to uncertainties, a clear monetary estimate is still impossible to be assigned; (see on similar terms PITT, at 396). From a strict traditional risk governance approach (i.e. cost-benefit analysis) such valuation would as a consequence fail to provide adequate guidance in if and how to govern specific climate change induced risks within the Arctic ecosystems appropriately, even more so as in the example presented above only regulating services are valued and hence such valuation lacks a holistic scope. Yet, the numbers attest that maintaining the Arctic's ecosystems in their current state would in an overall perspective be economically beneficial and hence would – also from a strict cost-benefit stance – require a proactive governance approach in protecting Arctic ecosystems against climate change induced risks, as advocated by the precautionary principle; see in this context also *supra* in fn 244 (part I). It is again in this context that the value of the ecosystem approach to the governance of climate change induced risks can be seen, as this approach combines economic valuation (including precise monetary estimates) with ecological and social interests and as such allows for resolving the discrepancies between the strictest versions of the cost-benefit analysis and the precautionary principle; see for details *supra* in 4.4.4., 4.5.4. and 4.6;

84 See WHITE, ET AL., at 133–134, KETTUNEN, ET AL., at 54 (in this context referring to non-numerical valuations of ecosystem services, e.g. *"benefits to mental and physical health, social benefits from recreation, benefits related to security and broader well-being"*), WORLD BUSINESS COUNCIL FOR SUSTAINABLE DEVELOPMENT, at 25–26; note that the Guide for Corporate Ecosystem Valuation suggests to primarily conduct a qualitative assessment when ecosystem ser-

provisional services, are thus, under a *qualitative assessment* to be considered much valued.

In summary the economic valuation of ecosystem goods and services is a complex undertaking, dependent upon the available ecosystem information. Hence only for a small portion of ecosystem goods and services clear monetary values can be attributed. The rest eludes such an assessment, either because no market price can be assumed (e.g. in the case of "public goods" such as spiritual enrichment)[85] or because too little is known about the service and the implications for the economic system it entails. Yet, no monetary valuation is needed to understand that if ecosystem are being depleted this might cause tremendous costs for society, due to the loss of provisional and regulatory services that support human well-being and livelihood.[86] Consequently the overarching aim of the economic element of the ecosystem approach ought to be seen in including ecosystem services into economic thinking by making them economically valuable, irrespective of the parameter applied (i.e. qualitative, quantitative or monetary assessment). An ecosystem approach for the Arctic will thus have to provide the impetus on establishing such assessments, e.g. in line with the Guide to Corporate Ecosystem Valuation.

As has been shown, ecosystem valuation helps to include ecological aspects into the economic system and therefore will necessarily bring about a change within that system, towards a more eco-centric focus. In supporting such a change and influencing the economic actors to this aim, the economic as well as the legal system can set incentives and establish measures to keep human actions ecologically and sustainably sound.[87] The development of such positive incentive measures are e.g. explicitly fostered by article 11 of the CBD, which holds that *"[e]ach Contracting Party shall, as far as possible and as appropriate, adopt economically and socially sound measures that act as incentives for the conservation and sustainable use of components of biological diversity"*. The Conference of the Parties to the Conven-

vices are to be valued, in order to discern priority ecosystem services. Based on the information gathered from such a valuation, a quantitative and if enough data is available, a monetary assessment may be carried out.

85 See e.g. Barbier, at 32, TEEB (interim report), at 35 and *supra* in fn 69 and 83 (part III).

86 Accord. TEEB (interim report), at 37–38.

87 Accord. Heal, at 125 and 129-130 (pointing out that the setting of economic incentives is a good way to achieve a certain reaction without having to hope for such conduct by relying on moral and ethical reasoning of mankind or a regulatory system, that tries to achieve the said reaction through penalization if the hoped for conduct does not occur).

tion on Biological Diversity has in this context encouraged parties and other governments *"to promote the design and implementation, in all key economic sectors, of positive incentive measures for the conservation and sustainable use of biodiversity that are effective, transparent, targeted, appropriately monitored, cost-efficient as well as consistent and in harmony with the [CBD] and other international obligations, and do not generate perverse incentives(...)"*[88]. Such perverse incentives can develop due to market failures and distortions as well as laws, policies and institutions that support ecosystem and biodiversity degradation through incentives (e.g. subsidies, taxes and fines) that do not or not appropriately take ecological considerations into account.[89] Positive incentive measures *inter alia* include:[90]

- **Subsidies:** Subsidies provided by governments for specific economic activities are often resulting in negative ramifications for ecosystems, as they on the one hand create an advantage for consumers or producers through supplementing their income or lowering their costs, but by doing so may result in the discrimination of sound environmental practices and hence produce perverse incentives.[91] Such harmful subsidies ought to be in the light of the ecosystem approach removed, or redesigned in order to foster an ecologically sound and sustainable use of resources.
- **Payments for Ecosystem Services (PES):** PES are voluntary payments provided for an ecosystem service or the land use likely to maintain that service.[92] These payments are aimed at establishing

88 Decision X/44, para. 10, available at <http://www.cbd.int/decision/cop/?id=12310> (last visited: 16.07.2014).

89 See for details IUCN (Economic Incentives), at 5–6, Organisation for Economic Co-operation and Development, at 25-26 and 47.

90 Rajvanshi & Mathur lists additional economic incentives and measures that may be suitable for fostering ecosystem conservation and protection, such as grants, funds and property rights. See for details on the following Rajvanshi & Mathur, at 271–278, Montini, at 169, Hettich, at 148-149, United Nations Environment Programme (Economic Instruments), at 24-25 and 28 and IUCN (Economic Incentives), at 7–8.

91 See TEEB (interim report), at 48, Garrelts & Flitner, at 49 and for details United Nations Environment Programme (Economic Instruments), at 79–80, Brink, et al. (Subsidies), at 263 et seq. and Secretariat of the Convention on Biological Diversity (Incentive measures), at 7 and 10 (referring to perverse incentives in respect to subsidies but also to others, such as land use laws as well as environmental policies and regulations that may cause negative results for ecosystems).

92 See Simpson & Vira, at 245, Garrelts & Flitner, at 49, Fitter, et al., at 20, United Nations Environment Programme & Intergovernmental Committee for the Protection of the World Cultural and Natural Heritage, at 2, Wunder, at 3, Bennett, at 417, Brink, et al. (Benefits), at 182, cf. Organisation for Economic Co-operation and Development, at 38 and 39 (refer-

monetary incentives to achieve environmentally sound practices, especially where ecosystem services cannot be conserved e.g. through the establishment of protected areas.[93] PES can work not only within a domestic, but also on an international scale.[94] An example is the Clean Development Mechanism under the Kyoto Protocol, which fosters emission reduction projects within developing countries through the financial support of Annex I countries.[95] However, in implementing PES in practice, a disadvantage may be that payments are not required to be made until sellers actually deliver the ecosystem goods and services paid for, which can be years or decades after the initial work has begun.[96]

- **Polluter Pays Principle:** Another way to achieve compliance with environmentally sound practices, is the application of the polluter pays principle, i.e. the polluter is required to pay for the damage caused, either by being held responsible for paying the actual costs of clean-up and restoration projects or by bearing punitive damages, assigned through court order.[97]
- **Market-based Approaches:** Additionally incentives for ecologically sound and sustainable economic activities can be derived from the establishment of new markets and market-based approaches, such as emission trading (i.e. tradable permits), eco-tourism or certification and eco-labelling for products produced organically and in

ring to the minimum payment those responsible for maintaining the ecosystem service are willing to accept and the maximum payment the beneficiary of the service is willing to pay; consequently any payment in between these two levels should lead to greater ecosystem service protection) and for a list of payment types see FOREST TRENDS, ET AL., at 6.

93 See TEEB (INTERIM REPORT), at 48, FOREST TRENDS, ET AL., at 10; While PES are especially beneficial in areas, where conservation measures such as protected area designation cannot be applied, PES can also be used to foster the protection of species and their habitat through the establishment of such areas; see FOREST TRENDS, ET AL., at 28.

94 See TEEB (INTERIM REPORT), at 49.

95 See for details *supra* in 5.2.4.; accord. ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT, at 94.

96 See FOREST TRENDS, ET AL., at 15 and additionally ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT, at 73–74 (referring to the "green bond" mechanism by which governments can fund PES now, but delay the payment until the service is delivered).

97 See TEEB (INTERIM REPORT), at 49, SEILER (1997), at 133, BEYERLIN & MARAUHN, at 58, HUNTER, ET AL., at 484, BHAT, at 384, KOIVUROVA (2014), at 24 and for a legal definition of the polluter pays principle see principle 16 of the Rio Declaration, as cited *supra* in fn 184 (part I). An implication of the polluter pays principle can also be seen in requiring the actors conducting activities that may be harmful to ecosystems, to pay a bond or deposit, which will financially cover potential damages, before the activity is being carried out; see IUCN (ECONOMIC INCENTIVES), at 11.

a sustainable way.[98] Also, taxes and fees paid for ecosystem degradation in the sense of the polluter pays principle, as well as payments for ecosystem services (PES) can be categorized as market-based incentives.[99]

- **Benefit-identification and sharing:** Ecologically sound practices can be furthermore achieved through better understanding and sharing the benefits derived from ecosystem services. If stakeholders and policy-makers do not know what benefits ecosystems provide, they will not support their conservation. Ecosystem valuation, as referred to above, is thus helpful in identifying economic benefits and hence establishing economic incentives guiding the way towards ecologically sound and sustainable management of ecosystems. Additionally, it is important to have local and indigenous communities partake in the benefits arising from ecosystem goods and services being supplied within the region they inhabit.[100] The designation of a protected area e.g. will not be met with appreciation from local and indigenous citizens, if they present a hindrance to their own economic development, rather than a financial gain. If on the other hand such communities will have the chance to participate in the revenues gained from such protected areas, approval and support for conservation measures and ecologically sound practices will be much more likely. Furthermore, fostering community based management will help protecting ecosystem services, through the establishment of cooperative efforts between the public actors benefiting from specific ecosystem services.[101]

98 See TEEB (INTERIM REPORT), at 50–51, SIMPSON & VIRA, at 244, RAJVANSHI & MATHUR, at 277–278, BRINK, ET AL. (BENEFITS), at 231–241, HETTICH, at 149, SECRETARIAT OF THE CONVENTION ON BIOLOGICAL DIVERSITY (INCENTIVE MEASURES), at 16, UNITED NATIONS ENVIRONMENT PROGRAMME (ECONOMIC INSTRUMENTS), at 25-26, 56-57 and 66, IUCN (ECONOMIC INCENTIVES), at 9 and 11, SIMPSON & VIRA (critically assessing product certification) and furthermore *supra* in 5.2.4.

99 See *supra* in 8.2.1.3. and SIMPSON & VIRA, at 243–245, RAJVANSHI & MATHUR, at 272, HEAL, at 148, BRINK, ET AL. (BENEFITS), at 214 (on taxes, charges and fees) and UNITED NATIONS ENVIRONMENT PROGRAMME (ECONOMIC INSTRUMENTS), at 26-27 and 51 (additionally referring to fees charged for entering protected areas).

100 See TEEB (INTERIM REPORT), at 52, SECRETARIAT OF THE CONVENTION ON BIOLOGICAL DIVERSITY (INCENTIVE MEASURES), at 17.

101 See SIMPSON & VIRA, at 241, BERKES, ET AL., at 138 and KOFINAS, at 93–94 and BERKES, ET AL., at 141 (referring to co-management, rather than community based management, but in essence promoting the same ideas, as effective ecosystem governance demands cross-scale interactions among institutions, organizations, communities and their actors).

As these examples show, a variety of economic incentives and measures exist, aimed at achieving ecologically sound practices considerate of the ecosystem approach. Consequently there is not one solution to accomplish this goal. In implementing the economic element of the ecosystem approach, states will thus have to be given enough flexibility to chose whichever option is the most feasible and cost-effective, while still resulting in the desired social and ecological outcome, elaborated on *supra* in 8.2.1.1. and 8.2.1.2. An Arctic ecosystem approach, will hence have to provide mere guidelines for ecosystem valuation and the setting of economic incentives, rather than stringent rules.

8.2.2. Assessing and Managing Climate Change Induced Arctic Risks Under the Ecosystem Approach

The analyzed ecosystem triad mentioned *supra* in 8.2.1. is intrinsic to the ecosystem approach. Assessing and managing climate change induced Arctic risks under this methodology will hence have to consider the ecological, social and economic aspects referred to above and incorporate them into risk assessment and management strategies. In this context the aim of the following paragraphs is to link risk governance to the ecosystem approach, by presenting specific features of risk assessment and management to be referred to under such an approach.

8.2.2.1. Risk Assessment

Risk governance starts with assessing an initiating activity or event, i.e. with the gathering of scientific data, assessing the relevant information and evaluating the risk based thereon.[102] Once the assessment is complete a decision upon whether or not risk management is feasible will have to be made. On a preliminary stage it is necessary to set the goals to be achieved through risk governance and determine the spatial scale within which assessment procedures shall be undertaken. Consequently an Arctic Ecosystem Approach Framework Agreement aimed at assessing and managing climate change induced Arctic risks will have to define the spatial scope to which the agreement is applicable (i.e. the Arctic) as well as its objectives, that is to say the assessment and management of climate change induced Arctic risks from an ecosystem perspective.

102 See on the following *supra* in 1.3.

As has been shown *supra* in 8.2.1.1. and 8.2.1.2. the ecosystem approach requires the inclusion of all stakeholders at the earliest stage possible.[103] According to Slootweg & Mollinga four categories of stakeholders can be identified:[104]

- **Beneficiaries:** Beneficiaries are the target group of a policy, plan, program or project aimed at maintaining ecosystem health and integrity and hence supporting the supply of ecosystem services and functions, human well-being depends upon. Beneficiaries can either be direct (as in the case of local and indigenous inhabitants directly benefiting from a specific ecosystem service, whose maintenance is ensured by a particular management regime; e.g. fishers that are dependent upon the continuous supply of fish stocks) or distant (as in the case of foreign tourists that enjoy the cultural services provided by an ecosystem).
- **Affected people:** Affected people are those social groups that are – unlike beneficiaries – not a target group of a specific policy, plan, program or project but are nevertheless deliberately or undeliberately affected by changes in the ecosystem addressed.
- **(Organized) stakeholders:** What the term stakeholder usually refers to is the general public who has an interest in knowing about potential changes within their direct or indirect environment, as well as a wide variety of organizations and groups, either governmental or non-governmental that are responsible for managing a specific ecosystem, its services or parts thereof and addressing the needs of affected people and the natural environment the ecosystem consists of.
- **Future generations:** Finally, as future generations can be affected by decisions made today, their assumed needs and interests ought to be taken into consideration as well, when making a decision.

In terms of assessing climate change induced Arctic risks some additional remarks to this categorization seem in place: While the classification chosen by Slootweg & Mollinga is referring to the maintenance of ecosystem services rather than to the assessment and management of risks, stakeholder involvement is an important aspect in risk governance, even if not addressed

103 See also *supra* in 4.5.2.2., esp. principles 1 and 12 of the Malawi Principles.
104 See on the following Slootweg & Mollinga, at 99–100.

under the ecosystem approach, as decisions made based upon the risk assessment provided, will in order to be effective require the support of the people, groups and organizations directly or indirectly affected by their outcome.[105] It is thus advisable to include all potential stakeholders into the risk governance procedure and in that context the categorization provided above is helpful in identifying the potential actors that ought to be involved.

However, as the management of climate change induced Arctic risks demands an assessment of the possible negative results being of human *and* natural origin,[106] stakeholders in this context cannot only be identified as those people, groups and organizations affected by man made activities or benefiting from policies, plans, programs and projects pertaining to these activities, but also as those that are directly or indirectly affected by an initiating natural event, *in casu* climate change. In this context, the inclusion of stakeholders seems reasonable not only where human activities are concerned and ecosystem degradation resulting therefrom ought to be prevented, but also where adaptation and mitigation efforts are undertaken to address climate change itself. Briefly put, stakeholder involvement in assessing and managing climate change induced Arctic risks under the ecosystem approach, requires the integration into the decision making process of all people, groups and organizations to be potentially affected by climate change and human activities linked thereto emerging within the Arctic.

As stakeholder involvement is important in gaining support for the risk management option chosen, it is furthermore advisable to include stakeholders into the decision making process at the earliest stage possible. The more profoundly stakeholders are involved, the stronger the support for managing a specific risk in a certain way will be.[107] As a result, stakeholder involvement ought not to be restricted to risk management.

During risk assessment stakeholder involvement can e.g. take the form of data gathering: As referred to *supra* in 8.2.1.2. the inclusion of traditional environmental and/or local knowledge into ecosystem assessments has been identified as a valuable addition to the collected scientific information. Consequently in implementing the ecosystem approach,[108] risk assessment

105 See also *supra* in 1.5. and Aven & Renn, at 181–182 (who refer to a similar categorization of stakeholders as Slootweg & Mollinga (see *supra* in fn 104 (part III), but in respect to risk and provide a list of requirements to be met for effective stakeholder involvement).

106 See on the definition of climate change induced risks *supra* in 1.2.

107 See in this context also *supra* in 4.2.2. and 4.5.2.2. a.

108 See in this context principle 11 of the Malawi principles as referred to *supra* in 4.5.2.2.

strategies will have to be integrative in scope and thus will have to allow for incorporating other than science based sources of knowledge into the assessment.

As regards the data content, an ecosystem-based risk assessment will have to be rather broad in scope, since the more details are known about a specific ecosystem, its functions, services and linkages to other ecosystems as well as the drivers of change (i.e. climate change and/or the human activities derived therefrom)[109] and the ecological and socio-economic impacts thereof,[110] the more legitimate the decisions made based upon this information will be. From an ecosystem perspective, well-informed decision making thus in a *first step* requires the gathering of information on the status quo of the ecosystem as well as the drivers of change determined and their manifested impacts. In guiding the gathering of such data it may proof rewarding to list specific research activities and observations to be conducted (e.g. in referring to the assessments carried out under the Circumpolar Biodiversity Monitoring Programme[111]) within an Ecosystem Approach Framework Agreement for the governance of climate change induced Arctic risks, similar to the list provided in Annex I to the Vienna Convention[112].

Furthermore, as the information the assessment and ultimately the management of climate change induced Arctic risks is based upon, ought to reflect the best scientific evidence available, the data gathered should be based on the involvement of a wide range of professionals from various sectors and subject to peer review,[113] in order to discern common scientific beliefs and grounds existing at a specific date and to identify inconsistencies therein,

109 Drivers of change can be either directly or indirectly affecting ecosystems. Direct drivers of change are e.g. climate change, pollution, over-exploitation of natural resources and changes in land use. Indirect drivers of change result from demographic, economic, sociopolitical or cultural changes, as well as from the development of new technologies and the gathering of new scientific knowledge. See for details Nelson, at 74–76, IUCN (programme 2009-2012), at 11–18, de Groot, et al., at 31–32.

110 See accord. e.g. Slootweg & Mollinga, at 103 and 111, Ash, et al., at 12–13, United Nations Environment Programme (Ecosystem Management Programme), at 12, Aven & Renn, at 93 and 102 (referring in the context of socio-economic assessments to *concern assessments* and listing a variety of assessment methods in this regard) and for questions that may be asked in relation to the assessment of socio-economic concerns see Smit, et al., at 3.

111 See for details *supra* in 6.2.2.3. a. i. (ii).

112 See for details *supra* in 5.2.3. and accord. Reese (Synthese), at 413 (stating in respect to assessment programs undertaken in response to climate change, that legal minimum standards are required pertaining to the scope, depth and form of the assessments and how the results of such assessments are to be synthesized).

113 See accord. Rosenberg & Sandifer, at 23 and 25.

which will allow for an adaptive approach, by reviewing and – if necessary – modifying management initiatives in place.[114] Consequently, an Ecosystem Approach Framework Agreement for the Arctic should legally support multilateral assessment projects such as the Circumpolar Biodiversity Monitoring Programme that coordinates scientific information, traditional environmental and local knowledge from a variety of international as well as domestic research sources and the Arctic Biodiversity Assessment (ABA), that compiles such information and hence facilitates the identification of the best scientific evidence available.[115] In essence what is needed is the development of a network of information resources, i.e. the establishment of a clearing-house mechanism, as e.g. required by the Convention on Biological Diversity.[116]

It is important to note, that although the more information can be gathered, the easier it will be to appropriately manage risks and find support for a specific risk management option chosen, complete knowledge is under the precautionary principle not a prerequisite.[117] Hence best available scientific evidence does by no means aspire to be comprehensive scientific knowledge, but the term rather refers to most broadly supported scientific information available at a given period of time. Consequently the application of the precautionary principle implies an adaptive approach to management,[118] as management activities chosen, may require alterations once new scientific information (or indigenous and local knowledge for that matter) become available.

In a *second* and *third step* an assessment and evaluation of the knowledge obtained will have to be undertaken,[119] which will allow for the identification of possible future scenarios for the ecosystem and its potential risks, given the identified circumstances. This includes assessing ecosystem services and providing a valuation for them, so as to determine the benefit of these services and what may be lost if the ecosystem is being degraded and its services cannot be maintained.[120] The assessment should eventually conclude in an overarching ecosystem report, providing the scientific data, traditional

114 See in this context also *supra* in 1.3. and fn 208 (part I), 4.5.2.1., 4.5.2.2. i., 4.5.2.3. c. and f.
115 See for details *supra* in 6.2.2.3. a. i.
116 See art. 18 para. 3 of the CBD and Decision X/15, esp. its Annex, which is available at <http://www.cbd.int/decision/cop/?id=12281> (last visited: 16.07.2014).
117 See for details on the precautionary principle *supra* in 4.4.
118 See *supra* in fn 208 (part I).
119 See for details *supra* in 1.3.
120 See for details on ecosystem services and their valuation *supra* in 8.2.1.3.

environmental and local knowledge, their assessment and suggestions on the relevancy of the identified climate change induced risk,[121] based upon which a decision will have to be made regarding risk management.

8.2.2.2. Risk Management

Once the risk assessment has come to completion, risk management activities may be undertaken, depending on the outcome of the assessment.[122] It is in this context however important to note, that managing climate change induced Arctic risks requires making decisions under uncertainty, complexity and ambiguity.[123] An assessment conducted in an uncertain, complex and ambiguous framework in application of the precautionary principle cannot aspire to be all encompassing, but rather will have to provide enough data and a evaluation thereof to make risk management feasible.[124] It is of course difficult to discern when enough knowledge exists for risk management to be practicable. Guidance will in this context have to be sought in the characteristics of a given risk, i.e. it's magnitude or irreversibility.[125]

In any case if the scientific data gathered, as well as traditional environmental and local knowledge point to the conclusion that a specific risk may be irreversible, it is under the assumption of *"to be better safe then sorry"* necessary to take precautionary measures to protect and conserve the ecosystem, even if no comprehensive information on the ecosystem exists.[126] This will result in a stronger focus on the ecological, rather than the socio-economic element of the ecosystem approach,[127] at least until further knowledge can be procured that will present more profound information on the ecosystem and the potential impacts of (anthropogenic) drivers of change thereon, which will allow for the inclusion of social and economic interests into the decision-making process. Consequently, while the ecosystem approach does in general not state a preference for one or the other element of its triad, by applying the precautionary principle, priority may be given to ecological aspects in case the procured information deems a certain risk intolerable due to its characteristics, e.g. it's magnitude or potential irreversibility.[128] An

121 See for details in general terms *supra* in 1.3.
122 See for details on general terms regarding risk management *supra* in 1.4.
123 See for details *supra* in 4.2.
124 See for details on the precautionary principle *supra* in 4.4.
125 See for details *supra* in 4.4.4.3.
126 See for details *supra* in 4.4.
127 I.e. *"in dubio pro natura";* see *supra* in fn 176 (part I).
128 See additionally for details *supra* in 4.4.4.3.

Arctic Ecosystem Approach Framework Agreement will have to take this into account.

Furthermore stakeholder involvement does not only play a role in respect to risk assessment as referred to above, but even more so when it comes to risk management.[129] Integrated management should allow for stakeholders to be included into the decision-making process at the earliest stage possible. As a result they ought *inter alia* to be granted the possibility to participate in the development of plans and programs and to be consulted when an environmental impact assessment is conducted in respect to a specific human activity, as e.g. required by articles 8 and 9 of the SEA Protocol and article 2 paragraphs 2 and 6, as well as article 3 paragraph 8 of the Espoo Convention.[130] It is in this context important to note, that the inclusion of stakeholders necessitates that the information gathered on a specific ecosystem is made available to all parties concerned, so that based upon the data shared, well-informed integrated decisions can be made. Outreach initiatives, such as education at schools and for indigenous and local inhabitants, may proof to be helpful in this respect and should hence be promoted under an Arctic Ecosystem Approach Framework Agreement, as they e.g. similarly are by the Aarhus Convention.[131]

While integrated management is often primarily of domestic concern, the ecosystem approach requires some consideration in this respect: As ecosystems are not restricted to legal and political borders, stakeholder involvement should be trans-boundary in scope, as e.g. elaborated subject to article 2 paragraph 6 and article 3 paragraph 8 of the Espoo Convention. In case of the Arctic such multilateral integrated management may be achieved through pan-Arctic consultation processes under the auspices of the Arctic Council.[132] Consequently an Arctic Ecosystem Approach Framework Agreement may provide the legal means to establish participatory rights across domestic borders. Following such a proposal a state wishing to conduct an activity entailing a risk for the Arctic ecosystems, would have to consult not

129 See *supra* in 1.4., 1.5. and c.f. 4.5.2.2. a., k. and l.

130 See in this context also art. 3 paras. 3 and 9 and more detailed arts. 6-8 of the Aarhus Convention, which allow for public participation in decision-making. For details see *supra* in 5.5.1. and 5.5.2.

131 See art. 3 para. 3 and arts. 4 and 5 of the Aarhus Convention and for details *supra* in 5.5.1. Note in this context the role the Arctic Council Indigenous Peoples' Secretariat (IPS) is playing in involving the Council's Permanent Participants into its work; see *supra* in fn 958 (part II).

132 See for details on the Arctic Council *supra* in 6.2.2.

only with its people, organizations and other interested and affected groups, but also with those of the other Arctic Nations, by means of a consultation process to be conducted under the auspices of the Arctic Council.

From a socio-economic perspective the management of climate change induced Arctic risks under the ecosystem approach furthermore requires the establishment of incentives, as referred to in greater detail *supra* in 8.2.1.3. As a variety of economic incentives and measures exist, aimed at achieving ecologically sound practices considerate of the ecosystem approach, it is necessary to provide a certain flexibility when such incentives are established. Yet, to be effective from an ecosystem perspective, i.e. within a pan-Arctic regime, such incentives will have to be applicable across borders. Consequently, while the setting of domestic incentives is no less important (e.g. in the case of an unsustainable use of local resources), an Arctic Ecosystem Approach Framework Agreement will also have to foster the setting of transnational economic incentives in order to keep human actions ecologically sound and sustainable within the entire circumpolar North, especially as regards the conservation and preservation of trans-boundary ecosystem services, such as fisheries or climate regulation. To effectively implement such incentives it may be required to establish a specific pan-Arctic task force or working group under the auspices of the Arctic Council, which would be mandated with funding and supervising transnational incentives, as well as coordinating established domestic incentives.

In terms of implementing the ecological element of the ecosystem approach, the management of climate change induced Arctic risks is in practice *inter alia* relying on the establishment of protected land and marine areas, which will aid in maintaining ecosystem health and integrity, ultimately making ecosystems more resilient and adaptable to change and hence will provide for socially and economically valuable goods and services.[133] As referred to in greater detail *supra* in 8.2.1.1. most often protected area designation is, however, either limited in spatial scope or lacking completely.[134]

Consequently, an Arctic Ecosystem Framework Agreement will in managing climate change induced Arctic risks have to foster trans-boundary protected area designation and management as well as the establishment of marine

133 Note in this context, that while the maintenance of protected areas is often costly, the social and economic gain that can be derived from intact and healthy ecosystems due to protected area designation is worth much more; see accord. GRAVESTOCK, ET AL., at 282.

134 See in this context also *supra inter alia* in 5.3.2.4., 5.4.1. and 5.4.3.

protected areas beyond national jurisdiction in order to achieve a less fragmented approach to Arctic environmental conservation.

From an ecological perspective it is furthermore noteworthy, that biodiversity conservation ought to be seen as one of the key factors in implementing the ecosystem approach, as ecosystems, their functions and services are dependent upon the maintenance of biological diversity.[135] In this context in recent years the approach of *biodiversity offsets* has gained attention. While to date no universally accepted definition of the term exists, biodiversity offsets can be understood as activities, aimed at mitigating negative results from human activities upon the ecosystem, while the focus lies on achieving "no net biodiversity loss" or a "net biodiversity gain".[136] The idea is to counterbalance (i.e. offset) anthropogenic impacts upon biodiversity, e.g. through compensation measures. Consequently biodiversity offsets are to be seen as *ultima ratio* in ecosystem conservation and protection, as the primary goal ought to be to avoid, minimize or mitigate (in the sense of restoring degraded ecosystems or gradually reducing the impact thereon) negative ramifications from human activities affecting biodiversity.[137] Many of the management options referred to above, such as the establishment of protected areas or economic incentives help in offsetting impacts upon biodiversity or a loss thereof, and as such can be seen as tools to be applicable under the biodiversity offset approach.[138] Consequently, while such an approach certainly deserves further examination, it shall not be elaborated here in greater detail, as it is by and large encompassed by the ecosystem approach suggested in this thesis. It is, however, necessary to keep in mind the close connection between biodiversity maintenance and ecosystem health and resilience and therefore indispensable to include biodiversity aspects when assessing and managing climate change induced Arctic risks. An Arctic Ecosystem Approach Framework Agreement will have to take this into consideration.

Risk management options fostered by an Arctic Ecosystem Approach Framework Agreement, such as the establishment of protected areas and the setting of economic incentives to manage climate change induced Arctic risks, are in their implementation first and foremost dependent on political

135 See also *supra* in 8.2.1.1.

136 See Rajvanshi & Mathur, at 256–257, Hansjürgens, et al., at 310, Business and Biodiversity Offset Programme, at 4 and 8.

137 See Rajvanshi & Mathur, at 266–267 and Darbi, et al., at 23.

138 See for details Rajvanshi & Mathur, at 268–278 and on biodiversity banking as an offset strategy Shearing, at 60.

will of the member states to comply with the rules provided by such an agreement. Effective compliance entails two prerequisites: The intent to be bound by the rules laid out within the Framework Agreement and the financial and institutional capacities on a domestic level to implement these rules. To support and ensure compliance the Arctic Council could serve as a transnational institution, whose mandate would be to supervise the implementation efforts undertaken by the eight Arctic States and if needed to provide the necessary remedies, e.g. by issuing fees for non-compliance, which could in turn *inter alia* be used for funding transnational economic incentives, capacity-building, circumpolar risk assessment projects and integrated, cross-sectoral and trans-boundary management activities. Furthermore the Council could support training programs and education, as well supervise the issuing of regular compliance reports and monitoring and review initiatives in regards to the implementation of the ecosystem approach across the Arctic.

Also the Council could – in the form of a specific judicial body or commission to be instituted based on the Ecosystem Approach Framework Agreement – take up the role of an advisory board and tribunal in dispute settlements regarding the assessment and management of climate change induced Arctic risks. Furthermore the Arctic Council may provide access to justice through the development of a pan-Arctic court of law or another independent and impartial body, in case participatory rights of Arctic inhabitants assigned by the ecosystem approach are being infringed. This of course would require changes within the current institutional and legal structure of the Arctic Council.[139] While such changes might not be met with immediate approval from every Arctic Nation, they are in the opinion of the present author a vital prerequisite for applying the ecosystem approach in unison across borders within the entire Arctic and as a consequence for the effective management of climate change induced Arctic risks, which will benefit all Arctic Nations from an economic, social and ecological perspective, as well as regions beyond the circumpolar North. Yet, as the development of the legally binding Arctic Search and Rescue Agreement[140] and the Agreement on Arctic Marine Oil Pollution, Preparedness and Response[141] over a relatively short period of time shows, if the circumstances demand it, the Arctic Nations are willing to break new ground within the institution of the Arctic

139 See for details on the Arctic Council *supra* in 6.2.2.
140 As cited *supra* in fn 986 (part II).
141 As cited *supra* in fn 993 (part II).

Council.[142] Climate change and the risks it induces will only become more pressing upon the region throughout the next couple of years and centuries. To argue that the time is not ripe for addressing these risks adequately would hence go amiss. Consequently, recent ecological, economic and social developments in the Arctic provide a strong impetus for reconsidering not only the role of the eight Arctic Nations within the circumpolar North, but also the future of the Arctic Council.

A stronger focus on hard law and judicial matters within the Council for the benefit of implementing an integrative, holistic and ecosystem-based approach to managing climate change induced Arctic risks can in this context be deemed a desirable goal to be attained by all Arctic Nations, as their economic, social and ecological well-being ultimately hinges on the vigor such an approach is applied with. Alternatively, a stronger implementation of the ecosystem approach across the Arctic might also be achieved outside of an Arctic scope e.g. through the involvement of the Permanent Court of Arbitration, based in The Hague. In 2001 Optional Rules for Arbitration of Disputes Relating to Natural Resources and/or the Environment[143] were adopted and allow for dispute resolution by arbitrators experienced in natural resources and environmental law and the involvement of scientific experts[144] regarding disputes pertaining to environmental matters between states, international organizations, and the private sector if so appointed by the respective parties.[145] While primarily designed to fill the lacunae in existing multilateral environmental agreements regarding environmental arbitration, an appointment of the Court through a pan-Arctic Framework Agreement on the ecosystem approach, might effectively aid in implementing such an approach across the Arctic, especially in cases where parties outside of the Arctic region are involved.

142 See for details *supra* in 6.2.2. and 6.2.3.

143 *Optional Rules for Arbitration of Disputes Relating to Natural Resources and/or the Environment,* June 19, 2001 [hereinafter Environmental Arbitration Rules]; additionally in 2002 Optional Rules for Conciliation of Disputes Relating to Natural Resources and/or the Environment came into force, which allow parties to settle their environmental disputes by including a *"third person, or a panel of persons"* in attempting to reach an amicable settlement of the dispute; see art. 1 para 1 of the *Optional Rules for Conciliation of Disputes Relating to Natural Resources and/or the Environment*, April 16, 2002.

144 See art. 8 para. 3 and art. 27 of the Environmental Arbitration Rules.

145 See Introduction, para. (i) and art. 1 para. 1 of the Environmental Arbitration Rules.

8.2.3. A Draft Framework Agreement on the Establishment and Implementation of an Ecosystem Approach to Governing Climate Change Induced Arctic Risks

Due to climate change induced risk being characterized by a high degree of uncertainty, complexity and ambiguity as well as by having trans-boundary, long-lasting and often irreversible impacts upon ecosystems, adequately governing such risks requires a holistic methodology, such as the ecosystem approach.[146] While an effective implementation of this approach would aid in maintaining Arctic ecosystem functions and services, that are responsible for sustaining human well-being within and beyond the Arctic,[147] under the current legal regime the ecosystem approach is not applied comprehensively within the circumpolar North and a universal and legally binding definition of the approach that would provide for guidance in its development and application is to date lacking.[148] As a consequence adequately governing climate change induced Arctic risks requires the establishment of legal rules and regulations capable of addressing these shortcomings.

In developing such a legal regime, however, drawing from the findings presented above[149], a couple of considerations are necessary: A circumpolar legal regime for the establishment and implementation of an ecosystem approach to govern climate change induced risks is only as strong as the rules it is based upon.[150] Soft law approaches in this context exist both on a global as well as on a regional scale.[151] Their impact on governing climate change induced Arctic risks, however, has remained mediocre at best.[152] Given these circumstances the development of a legally binding agreement, helping Arctic States and other interested actors to establish and implement the ecosystem approach across the Arctic, i.e. in a concerted and cooperative way, so as to adequately assess and manage climate change induced Arctic risks for the benefit of the circumpolar North as well as regions beyond the Arctic

146 See for details *inter alia supra* in 1.2., 4.4.4.3., 4.5.4., 4.6., 7. and 8.
147 See *inter alia supra* in 4.5.2.2. d., 4.5.3. and 4.5.4.
148 See *supra* in 4.5.2.1., 7. and for details in 5. and 6.
149 See *supra* in 8.1., 8.2.1. and 8.2.2.; note that the following rules and regulations of the Draft Framework Agreement are based on the findings summarized above and addressed more extensively in part I and II of this thesis. Where an explicit reference is lacking, the proposed articles presented *infra*, thus correspond to the elaborations made *supra*, esp. in 4.4., 4.5., 6.2.2., 7., 8.1., 8.2.1. and 8.2.2.
150 See *supra* in 8.1.
151 See for details *supra* at various occasions in 5. and more specifically in 6.2.
152 See for details *supra* in 6.2. and 8.1.

Circle,[153] certainly seems reasonable. Furthermore regarding the uncertainties that exist pertaining to the Arctic ecosystems, the climate system and climate change, such an agreement ought to be flexible enough to adapt to change. Too strict a normative definition will thus impede on the implementation of an ecosystem approach, rather than supporting it. Yet a certain framework is needed to prevent conflicting activities among Arctic Nations and support pan-Arctic action-taking in establishing and implementing an ecosystem approach to govern climate change induced Arctic risks.[154]

As a consequence, the aim of the following paragraph is to propose a legally binding Draft Framework Agreement on the Establishment of an Ecosystem Approach to Governing Climate Change Induced Arctic Risks, and by doing so to incorporate the findings on the ecosystem approach in general and risk assessment and management related thereto in particular, presented in greater detail above in 8.2.1. and 8.2.2. In addition to the Draft Framework Agreement for better understanding a commentary, outlining the text's rational shall be provided subsequent to its draft articles.

153 On the value maintaining the Arctic ecosystems and protecting them against climate change induced risks has for regions beyond the high North see *inter alia supra* in 3.2.2.2., 6.2.2.3. b. and furthermore *infra* in 9.

154 See *supra* in 8.2.

Draft Framework Agreement on the Establishment and Implementation of an Ecosystem Approach to Governing Climate Change Induced Arctic Risks

THE PARTIES TO THE AGREEMENT

RECALLING principles 1, 2, 6 and 13 of the Declaration of the United Nations Conference on the Human Environment,

RECALLING paragraph 5 of the preamble to the Rio Declaration on Environment and Development and article 7 of the Rio Declaration on Environment and Development,

RECALLING article 15 of the Rio Declaration on Environment and Development,

RECALLING decision V/6, decision VII/11 and decision X/2 of the Conference of the Parties to the Convention on Biological Diversity, especially the Malawi principles and the Strategic Plan for Biodiversity elaborated therein,

In this context also RECALLING the UNESCO Man and the Biosphere Programme, as a useful tool in implementing the Convention on Biological Diversity and maintaining biological diversity,

RECALLING the World Charter for Nature and the Brundtland Report, which lay the pathway for new legal responses to species and ecosystem protection,

RECALLING section IV of the Johannesburg Plan of Implementation,

FURTHER RECALLING the United Nations General Assembly Report on the work of the United Nations Open-ended Informal Consultative Process on Oceans and the Law of the Sea at its seventh meeting (A/61/156),

Also RECALLING the IMO Guidelines for the Designation of Special Areas and the Identification of Particularly Sensitive Sea Areas and the FAO Code of Conduct for Responsible Fisheries,

CONSIDERING that maintaining ecosystem health and integrity is mutually intertwined with societal and economic well-being,

In this context RECALLING the findings of the Millennium Ecosystem Assessment, which reflected on the consequences of ecosystem change to human interests and needs,

Recognizing that intact ecosystems provide economically valuable goods and services, responsible for human well-being,

Also recognizing that ecosystem health, integrity and resilience can reduce risks from climate change and are intrinsically linked to the conservation of biological diversity,

Affirming the need to protect, preserve and improve the state of the Arctic environment and to ensure sustainable and environmentally sound development within the circumpolar North, while considering the needs of indigenous peoples and hence recalling the Arctic Environmental Protection Strategy and the cooperative and ecosystem-based work conducted under the auspices of the Arctic Council and within its working groups, especially the Protection of the Arctic Marine Environment (PAME) and the Conservation of Arctic Flora and Fauna (CAFF),

In this context recalling the findings of the Seventh Ministerial Meeting of the Arctic Council in Nuuk on May 12, 2011 and of the Eighth Ministerial Meeting of the Arctic Council in Kiruna on May 15, 2013,

Furthermore recalling the Vision for the Arctic, as adopted following the first round of eight successive chairmanships of the Arctic Council,

Reaffirming the need to further strengthen the role of the Arctic Council to ensure effective pan-Arctic cooperation in environmental matters and sustainable development in the region,

Recognizing that the Arctic is put under stress by a variety of impacts related to climate change, which are of both, anthropogenic as well as of natural origin,

Recognizing that these climate change induced risks require cooperation in assessment and management across borders and domestic sectors,

Further recognizing that climate change induced risks cannot be adequately managed by traditional risk management approaches, as they entail high uncertainties and complexities, especially in regards to Arctic ecosystems,

Aiming thereby to enhance integrative, ecosystem-based risk governance, that is precautionary in scope and leaves room for adaptation,

Have agreed as follows:

Part A: General

Article 1 Definitions

For the purpose of this Agreement,

1. "Arctic" means the land and maritime region under the jurisdiction of the eight Arctic States and those waters of the Arctic Ocean lying beyond domestic jurisdiction.

2. "Arctic States" are those countries whose territories expand beyond the Arctic Circle (66° North), i.e. Canada, Denmark (in respect to Greenland), Finland, Iceland, Norway, the Russian Federation, Sweden and the United States of America.

3. "Capacity building" refers to the continuous process of establishing human, scientific, technological, organizational, institutional and resource capabilities within a country. Capacity building therefore *inter alia* requires the financial means and the development of the infrastructure and organizations necessary to foster the establishment and implementation of an Arctic ecosystem approach.

4. "Clearinghouse mechanism" describes an information, communication and cooperation system that provides for a network of information resources, knowledge sharing and scientific and technical cooperation between the Parties to this Agreement and other relevant actors.

5. "Climate change induced risks" means any negative impacts upon the Arctic ecosystems directly or indirectly related to climate change.

   a. Climate change induced risks directly related to climate change, are those of natural origin, such as sea level rise, permafrost thaw or changes in weather patterns.

   b. Climate change induced risks indirectly related to climate change are such of anthropogenic origin, i.e.

      i. Human activities enhancing climate change and therefore fostering climate change induced risks of natural origin, e.g. the release of anthropogenic greenhouse gases;

ii. Human activities supported by the changing conditions within the Arctic due to climate change, which in turn result in further impacts upon the ecosystems, such as risks stemming from oil and gas activities, shipping, exploitation of natural resources and tourism.

6. "Compliance" means the fulfillment by the Parties of their obligations under this Agreement and any amendments to it.

7. "Drivers of change" means natural or human-induced factors that change ecosystems. Their impact can be either direct or indirect;

a. Indirect drivers of change, are those natural events or human activities indirectly affecting ecosystems, e.g. population growth or changes in the economic system.

b. Direct drivers of change, are those natural events or human activities directly affecting ecosystems, e.g. climate change, habitat depletion, over-exploitation of natural resources and pollution.

8. "Ecosystem" means a dynamic complex of plant, animal, micro-organism and human communities and their non-living environment interacting as a functional unit.

9. "Ecosystem Approach" means an integrated approach for the assessment and management of climate change induced risks within the Arctic, that

a. considers Arctic ecosystems in their entirety, including humans, and takes into account the interactions within them as well as with adjacent or otherwise connected ecosystems, their drivers of change and the management thereof;

b. aims to maintain the Arctic ecosystems in a healthy, productive, sustainable and resilient condition, so that they can continue to provide the functions and services human well-being, including that of indigenous peoples, depends upon;

c. therefore emphasizes the protection of ecosystem structures, functions, patterns and important processes, intrinsic to the Arctic ecosystems;

d. integrates ecological, social and economic elements and emphasizes their interconnectedness in aiming for ecosystem-based assessment and management of climate change induced risks.

10. “Ecosystem-based assessment” refers to any assessment initiative (i.e. the gathering of information and an assessment as well as an evaluation thereof) in application of the ecosystem approach.

11. “Ecosystem-based management” means any management initiative taken in application of the ecosystem approach.

12. “Ecosystem goods and services” means those services and products humans derive from ecosystems, i.e.

a. Provisioning services, such as food, water, fuel, fiber and genetic resources, that people derive from ecosystems for their own livelihood;

b. Regulating services, such as climate regulation, natural hazard regulation, water purification and waste treatment, that are benefits derived from specific ecosystem functions responsible for regulating ecosystem processes;

c. Supporting services, such as the production of oxygen or the formation of soil, which are the necessary prerequisite for all other ecosystem services;

d. Cultural services, such as spiritual enrichment, intellectual and cultural development and recreation, that are non-material benefits derived from ecosystems.

13. “Environmental impact assessment” means the procedure for evaluating the likely impact of a proposed human activity upon an ecosystem.

14. “Integrated approach” means an approach that is accounting for the interests of all stakeholders, by involving them in the decision making process pertaining to the assessment and management of climate change induced risks.

15. "Stakeholder" means *inter alia*

a. Any organization, person or group of people benefiting from a specific management plan, project, program or policy aimed at managing climate change induced risks in order to maintain Arctic ecosystem health and integrity and hence contributing to human well-being.

b. Any organization, person or group of people being otherwise affected by ecosystem changes due to climate change induced risks, including future generations.

16. "Precautionary approach/principle" means an approach according to which management measures should in favor of maintaining ecosystem health and resilience be taken, even if not all ecosystem aspects and the impacts thereon, including such of climate change induced risks, are thoroughly understood. Hence, where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing measures to prevent ecosystem degradation. The choice of management measures to be taken shall be in favor of those measures that are most cost-effective, while being equally as effective in precautionary terms as other precautionary measures available.

17. "Vulnerable region" means any area that is more than others affected by climate change induced risks and therefore requires special preservation and conservation measures.

Article 2 OBJECTIVE

The objective of this Agreement is the adequate management of climate change induced risks within the Arctic. For that reason each Party shall in accordance with their capacities take all appropriate action to adopt and enforce the ecosystem approach, subject to the relevant provisions of this Agreement, within their jurisdiction and foster the application of such an approach in areas beyond domestic jurisdiction.

Commentary

Climate change is responsible for the emergence of new risks, that are both natural as well as anthropogenic in character and may – if not adequately attended to – profoundly impact upon the Arctic ecosystems. A change in these ecosystems may eventually lead to a tipping point, where negative ramifications (e.g. loss in ecosystem goods and services, alterations in weather conditions and habitat fragmentation) could be felt not only within the Arctic but also far beyond the circumpolar North. As a consequence appropriate action is required to maintain the Arctic ecosystems and foster their health and resilience, making them less vulnerable against climate change and the risks it entails.[155]

Article 2 of the Draft Framework Agreement on the Establishment and Implementation of an Ecosystem Approach to Governing Climate Change Induced Arctic Risks provides the legal base for taking such action. Climate change induced risks are broad in scope and often have long lasting effects, entailing many uncertainties and complexities. Furthermore they require long term, flexible and adaptive management options, that are precautionary in substance and take the ecosystem as a whole, as well as adjacent or otherwise connected ecosystems into account.[156] The ecosystem approach combines these aspects and hence provides a feasible risk governance tool in the light of new environmental threats, such as climate change induced Arctic risks.[157]

Adopting and enforcing such an approach is fostered by article 2 of the Draft Framework Agreement. Consequently parties are obliged to take all necessary action – given their respective capacities – to establish and implement the ecosystem approach within their sovereignty (e.g. by means of domestic legislation and the development of ecosystem-based management plans for terrestrial and marine spaces within their jurisdiction) as well as in regions beyond domestic borders. The exact content of this duty is elaborated in the subsequent articles, provided in Part B, C and D, respectively, of the Draft Framework Agreement.

155 See for details *supra* in 2.3., 3.2.2., 3.3. and 8.2.
156 See *supra* in 4.5.4.
157 See for details on the ecosystem approach *supra* in 4.5. and 8.2.1.

Part B: Assessment of Climate Change Induced Risks

Article 3 Spatial Scope

1. This Agreement applies in accordance with article 1 paragraph 1 to all land and marine areas situated within the Arctic (hereinafter the Arctic ecosystems).

2. All relevant scientific, traditional and local information gathered related to the assessment of climate change induced risks within the Arctic, shall pertain to the spatial scope of the Arctic ecosystems.

3. Where information concerning adjacent or otherwise connected ecosystems is relevant for the assessment and management of climate change induced risks within the Arctic, the information gathered shall not be restricted to data referring to the Arctic ecosystems subject to article 3 paragraph 2 of this Agreement.

Commentary

While climate change is not restricted to the Arctic region and as a consequence the risks it entails may not only negatively affect the circumpolar North, governing climate change induced risks ought to be especially relevant where impacts are felt most severely, i.e. within the polar ecosystems, such as the Arctic.[158] Consequently the spatial scope of the Draft Framework Agreement is by means of article 3 paragraph 1 generally limited to the Arctic, i.e. subject to article 1 paragraph 1 of the Draft Framework Agreement to all land and marine regions under the jurisdiction of the eight Arctic States and those waters of the Arctic Ocean lying beyond domestic borders.[159] Such a restriction is reasonable, as effective risk governance in light of climate change, requires a comprehensive assessment and management of risks, which would become unfeasible in practice if the spatial scope of the region to be assessed and managed is too wide.

158 For details on the impact of climate change upon the Arctic see *inter alia supra* in 2.3.
159 See regarding the definition of the Arctic also *supra* in 3.1.

In order to support data gathering and the assessment as well as the evaluation thereof, article 3 paragraph 2 of the Draft Framework Agreement limits assessment initiatives to the geographical scope of the Arctic, as outlined in article 1, unless subject to article 3 paragraph 3, additional information pertaining to adjacent or otherwise connected ecosystems is required to adequately assess and manage climate change induced risks within the Arctic.

Following such an approach article 3 does provide for a minimal threshold for parties regarding information gathering. They are thus obliged – but not restricted – to gather all relevant scientific, traditional and local data related to the assessment of climate change induced risks pertaining to the Arctic and if necessary for a comprehensive assessment of such risks, also beyond this spatial scope.

Article 4 Gathering of Information

1. In order to provide the information for assessing and managing climate change induced risks, the Parties shall individually or jointly initiate and conduct research on the status quo of the Arctic ecosystems and their drivers of change. Due consideration shall be given to existing programs relevant in this context.

2. Research conducted subject to paragraph 1 shall concern, but not be limited to

a. Services, goods, functions and processes of the Arctic ecosystems;

b. Interactions with adjacent or otherwise connected ecosystems;

c. The status quo of biotic and abiotic elements of the Arctic ecosystems, such as species, habitat and climate;

d. Direct and indirect impacts upon the Arctic ecosystems resulting from climate change;

e. Direct and indirect impacts upon the Arctic ecosystems deriving from modifications of the ecosystems due to anthropogenic activities within the Arctic;

f. Socio-economic impacts related to changes within the Arctic ecosystems.

Commentary

While article 3 sets the spatial scope for assessing climate change induced risks within the Arctic, articles 4 to 10 of the Draft Framework Agreement establish the technical and legal framework for such assessments. In this context article 4 provides regulations regarding the first pillar of risk assessment, the gathering of scientific data.[160]

In order to manage climate change induced risks appropriately, comprehensive information pertaining to the ecosystems and the risks they face is needed. Research – both on a national as well as on a transnational scale – is thus required to gather all relevant information.

To guide parties in their undertaking of information gathering, article 4 paragraph 2 of the Draft Framework Agreement provides for a (not conclusive) list of research areas, pertaining to the status quo of the Arctic ecosystems (paragraphs a to c) as well as their drivers of change (paragraphs d to f).[161]

Furthermore, as the gathering of information on the Arctic ecosystems has for many years been a focal point under the Arctic Council and its working groups, especially the Conservation of Arctic Flora and Fauna (CAFF), research and monitoring programs established in that context may provide for useful data in assessing and, based thereon, managing climate change induced risks.[162] As a consequence according to article 4 paragraph 1 of the Draft Framework Agreement due consideration shall be given to existing programs relevant in gathering data on Arctic ecosystems and their drivers of change, e.g. the Circumpolar Biodiversity Monitoring Programme (CBMP) or the Arctic Biodiversity Assessment (ABA).[163]

Article 5 Scientific Data

1. The scientific data upon which the assessment and consequently the management of climate change induced risks is subject to article 4 based upon, shall consist of the best scientific evidence available.

160 See *supra* in 1.3.
161 See for details *supra* in 2.3., 3.2.2., 8.2.1.3. and 8.2.2.1.
162 See *supra* in 6.2.2.
163 See for details *supra* in 6.2.2.3. a. i. (i) and (ii).

2. In supporting the gathering of the best scientific evidence available, a multi-disciplinary approach shall be applied, which involves professionals of all disciplines and sectors relevant to the management of climate change induced risks.

3. The data gathered shall be subject to peer review, in order to discern common scientific beliefs and grounds existing at a specific date on a specific matter pertaining to the Arctic ecosystems and the management of climate change induced risks. Such review shall be undertaken at regular intervals, so as to ensure that assessments are always based on the best scientific evidence available.

4. The scientific data obtained in accordance with article 4, can be subject to domestic, regional or international research projects and programs. The individual findings of this research shall be collected and communicated in timely manner and to all relevant stakeholders. In this context a clearing-house mechanism shall be established, which shall provide for a constant pan-Arctic flow of information between decision-makers, scientists, stakeholders and other interested parties in order to bridge potential knowledge gaps until final assessment reports subject to article 10 of this Agreement become available.

Commentary

Good risk management not only requires comprehensive, but also qualified data. As a consequence article 5 of the Draft Framework Agreement imposes certain qualifications upon the information gathered subject to article 4. According to article 5 paragraph 1, the scientific data upon which the assessment and ultimately the management of climate change induced risks shall be based upon must fulfill the *"best scientific evidence available"* criteria.

In order to guarantee that these requirements are met by the information gathered upon individual or joint research activities conducted by parties, article 5 paragraphs 2 to 4 require specific action to be taken when data is being collected: Paragraph 2 refers to a *"multi-disciplinary approach"*, which shall guarantee the comprehensiveness of the information obtained. Climate change and the risks it entails are touching upon a variety of scientific and academic fields. As a consequence when gathering information pertaining thereto, all professionals of all disciplines and sectors relevant to the

management of climate change induced risks shall be involved in procuring said data.

Furthermore, as even within a specific discipline, views may not be unanimously shared, the data gathered ought to be subject to peer review.[164] Article 5 paragraph 3 in this context requires such reviews to be undertaken at regular intervals. Due to this wording, the article provides somewhat of an open time frame. However the term is given a more precise meaning when it is read in conjunction with article 19 paragraph 6 of the Draft Framework Agreement, which holds that scientific meetings ought to be convened at least biannual under the auspices of the Arctic Council in order to provide for a platform for discussions and information sharing, with the goal to discern the best scientific evidence available.

Additionally article 5 paragraph 4 of the Draft Framework Agreement takes into account, that a variety of individual and collective research activities on a domestic, regional or even global level may lead to a multitude of information,[165] that – in order to discern the best scientific evidence available – ought to be shared among decision-makers, scientists, stakeholders and other interested parties so as to bridge knowledge gaps until assessments are finalized. The article in this context suggest the establishment of a clearing-house mechanism, which is defined by article 1 as an *"information, communication and cooperation system, that provides for a network of information resources, knowledge sharing and scientific and technical cooperation between the Parties (...) and other relevant actors"*. Such information sharing may be achieved by means of web based information platforms, such as the Arctic Portal[166], the Arctic Biodiversity Data Service[167] or the Arctic Council's and its working groups' websites.

164 See *supra* in 8.2.2.1.

165 Note, that while art. 5 para. 4 of the Draft Framework Agreement does not explicitly refer to information gathered by existing pan-Arctic research and monitoring initiatives (e.g. the Circumpolar Biodiversity Monitoring Programme), such programs must nevertheless be given due consideration, as subject to para. 4, information is to be *"obtained in accordance with article 4"*.

166 The website is available at <www.arcticportal.org> (last visited: 18.07.2014).

167 The website, which is currently in its initial stages, is available at <http://www.abds.is/> (last visited: 18.07.2014).

Article 6 INTEGRATED ASSESSMENT

1. Rules and regulations adopted based on this Agreement shall provide for integrated assessments of the Arctic ecosystems and the risks they are affected by.

2. The Parties shall integrate domestic and pan-Arctic stakeholders across sectors as early into the decision-making process as possible, e.g. by means of stakeholder hearings or roundtables.

3. Stakeholders shall be involved as appropriate in every stage of risk assessment, including the assessment and valuation of ecosystem goods and services.

4. Special consideration shall be given to the involvement of indigenous peoples and local inhabitants. Traditional and/or local knowledge shall be incorporated into risk assessment as a valuable source of information pertaining to the Arctic ecosystems and their drivers of change additional to the scientific data gathered. All information and data gathered shall be given equal emphasis in the assessment.

5. Data gathering and assessments shall be conducted at the lowest appropriate level. The Parties shall support community-based assessment, e.g. by aiding in the establishment of community-based monitoring programs.

Commentary

Due to the uncertainties, complexities and ambiguities inherent to climate change induced risks, as well as their broad scope, which calls for holistic risk governance, it is more than with other risks vital to involve stakeholders into risk assessment and management, in order to render the decision making process more transparent and ultimately achieve greater acceptance for the outcome by all parties affected.[168] In applying the ecosystem approach to risk governance, integrated risk assessment and management thus become pivotal. Article 6 of the Draft Framework Agreement takes this into account by (in paragraph 1) obliging states to adopt rules and regulations allowing for integrated assessments. What this means is made clear by paragraphs 2 to 5: It is required that all stakeholders, within and outside of the jurisdiction of a specific state party, are given the possibility to participate in the de-

168 See *supra* in 4.2. and 4.5.4.

cision-making process at the earliest stage possible, e.g. by means of stakeholder hearings or roundtables. To achieve the greatest acceptance for how the risks are going to be managed, integrated risk assessment preferably requires stakeholders to be involved in every stage of risk assessment, including such that pertains to ecosystem goods and services. Ecosystems provide for a variety of goods and services (such as food, shelter, production of oxygen and aesthetic benefits) that mankind depends upon.[169] What kind of benefits humans derive from specific ecosystems and what value they allocate to them is, however, a matter of individual choice. Consequently stakeholder involvement will guarantee that all interests are integrated into the decision-making process.[170] In this context especially relevant is the inclusion of indigenous peoples and local inhabitants, as referred to by article 6 paragraph 4.

Indigenous peoples and local inhabitants are those stakeholders likely to benefit from Arctic ecosystem goods and services the most. Equally as much they are those to be most profoundly affected by climate change induced risks. When assessing and valuing ecosystem services and goods provided by the Arctic as well as when governing climate change induced risks affecting its ecosystems, the closeness of indigenous and local inhabitants to the region and to its processes and functions constitute an unequaled source of information. Consequently, albeit not necessarily scientifically tested, that information must be given due consideration during the assessment stage.

Similarly paragraph 5 of article 6 to the Draft Framework Agreement obliges parties to facilitate decentralized data gathering and assessments, e.g. by means of establishing community-based monitoring programs, as this will not only provide for more comprehensive data and thus ultimately benefit in obtaining the best scientific evidence available, but also enhance the support for decisions made based upon such evidence.

Article 7 Adaptive Approach

1. The Parties shall apply an adaptive approach to the assessment of the Arctic ecosystems and climate change induced risks affecting them.

169 See for details *supra* in 8.2.1.3.
170 See in this context also principle 1 of the Malawi Principles, as referred to in greater detail *supra* in 4.5.2.2. a.

2. The emergence of new information and data shall lead to a review of information and data already gathered and of the assessment reports subject to article 10 based thereon.

3. To ensure that assessments are based on the newest information and data available, on-going monitoring initiatives shall be conducted, that will indicate alterations in the Arctic ecosystems and their drivers of change and constitute new knowledge on the matter.

Commentary

Climate change does not follow a clear cut, linear logic. And neither do the risks it entails. In fact climate change induced risks are due to the intrinsic uncertainties, complexities and ambiguities inherent to the matter, very hard to assess.[171] While the gathering of comprehensive data about the climate system, its changes and the risks stemming therefrom is to strive for, it is impossible to obtain complete knowledge about these issues. In fact if complete knowledge were to be obtained, it would make probability assumptions unnecessary altogether, rendering the development of risk governance tools, such as the one established by this Draft Framework Agreement, obsolete.[172]

However, in the case of climate change and its risks, as research continues and new scientific information and local and indigenous knowledge is being obtained, data procured at a certain point in time may be falsified or enhanced at any given moment. Article 7 of the Draft Framework Agreement meets these concerns, by integrating flexibility into risk assessment.

According to paragraph 1 parties are to apply an adaptive approach to the assessment of the Arctic ecosystems and the climate change induced risks affecting them. What this means is made clear by the subsequent paragraphs: In case new information and data is being obtained, information and data already gathered must be reviewed. In order to ensure that assessments are always based on the newest information and data available it is necessary to continuously monitor the Arctic ecosystems with regard to possible alterations therein. Parties thus must promote the establishment of new as well as maintain existing monitoring initiatives[173] and – in case new

171 See also *supra* in 4.1. and 4.2.
172 See for details *supra* in 1.2 and 4.2.
173 In this context due consideration may be given to existing regional monitoring projects like

data becomes available – must reconsider assessments undertaken and ultimately must initiate reviews of management plans based thereon that are already in place.

Article 8 Precautionary Principle

1. In assessing the gathered information and data on the Arctic ecosystems and their drivers of change and in evaluating the climate change induced risks based thereon, a precautionary approach shall be applied.

2. While the newest and best scientific evidence available as well as the most comprehensive indigenous and local knowledge shall provide the base for the development and issuing of an assessment report subject to article 10, conclusiveness shall not be a prerequisite.

Commentary

Climate change induced risks differ from other risks insofar as they are of a certain magnitude and significance, imply a high amount of uncertainty, are characterized by either irreversibility or long-lastedness and often are mentally unavailable at the time management options are to be chosen.[174] As a consequence a more cautious approach to their management is necessary. Such an approach, however, also manifests in risk assessment taken under uncertainty: In the case of climate change induced risks, absolute knowledge does not exist in regards to climate change and the risks it entails. Therefore such knowledge cannot be made a prerequisite for risk assessments as well as management plans based thereon.

Consequently article 8 of the Draft Framework Agreement supports the application of a precautionary approach to assessment, which means that while the newest and best scientific evidence available as well as the most comprehensive indigenous and local knowledge are to be aimed for, conclusiveness is no prerequisite.[175] Rather, the absence of clear evidence should not hamper taking action to avert a certain negative outcome. Consequently,

the Circumpolar Biodiversity Monitoring Programme, as established under the Arctic Council Conservation of Arctic Flora and Fauna (CAFF) working group. See for details *supra* in 6.2.2.3. a. i. (ii) and furthermore note art. 4 para. 1 and art. 5 para. 4 of the Draft Framework Agreement.

174 See *supra* in 4.4.4.3.

175 See for details on the precautionary principle *supra* in 4.4.

risk management activities taken subject to Part B of the Draft Framework Agreement will have to be based upon the best available scientific evidence and local or indigenous knowledge available at the time the management option is chosen.

However, while conclusiveness is no prerequisite for taking action, in the light of a precautionary approach, new information and knowledge obtained must necessarily lead to reviewing assessments and management plans adopted thereon. In this context emphasis must be given to the close link between article 7, which calls for the application of an adaptive approach, and article 8 of the Draft Framework Agreement.

Article 9 Assessment and Evaluation

1. Assessments of the Arctic ecosystems and the evaluation of climate change induced risks affecting them shall *inter alia* include

a. assumptions on future scenarios pertaining to the Arctic, while their probability shall be clearly indicated, using the following parameters:

i. for very high probability: *virtually certain*, if the probability is above 99% and *extremely likely*, if the probability is above 95%.

ii. for high probability: *very likely*, if the probability is above 90% and *likely*, if the probability is above 66%.

iii. for medium probability: *more likely than not*, if the probability is above 50% and *about as likely as not*, if the probability is between 33% and 66 %.

iv. for low probability: *unlikely*, if the probability is beyond 33% and *very unlikely*, if the probability is beyond 10%.

v. for very low probability: *extremely unlikely*, if the probability is beyond 5% and *exceptionally unlikely*, if the probability is beyond 1%.

b. assessments and valuation of ecosystem services, goods, functions and processes subject to article 4 paragraph 2, sub-paragraph a. of this Agreement in

i. *qualitative terms*, i.e. prioritizing the ecosystem services, goods, functions and processes according to their general value to the ecosystem, especially its economic component.

ii. *quantitative terms*, i.e. providing numerical data pertaining to the ecosystem services, goods, functions and processes without referring to precise monetary values.

iii. *monetary terms*, i.e. providing a monetary valuation of the loss or gain resulting from ecosystem services, goods, functions and processes.

2. The assessments and evaluations individually or jointly conducted by the Parties to this Agreement shall be collected in an assessment report subject to article 10.

Commentary

The second and the third pillar to risk assessment refer to assessing the relevant data and based thereon, evaluating the risks discerned.[176] Article 9 of the Draft Framework Agreement guides the assessment and evaluation process, by referring towards what aim assessments and evaluations shall be undertaken. Or in other words, article 9 paragraph 1 provides a framework for the perspective that shall be applied when assessing the data gathered on the Arctic ecosystems and the risks they are affected by and when evaluating these risks based thereon.

The article divides such assessments and evaluations in two categories: Data pertaining to the Arctic ecosystems in general, including its drivers of change (paragraph a) and data referring to Arctic ecosystem services, goods, functions and processes (paragraph b).

Based on the first category of data, assumptions shall be made regarding the likelihood of future scenarios manifesting themselves. The information gathered in application of articles 4 to 6 thus shall provide for probability assumptions pertaining to specific scenarios entailing risks, e.g. in relation to changes in weather patterns, migration of species, impacts of shipping and exploitation of natural resources such as gas and oil. Appointing the likelihood of a specific scenario emerging, subject to article 9 paragraph 1,

176 See *supra* in 1.3.

sub-paragraph a., i to v., will then help decision-makers to choose the adequate risk management option.[177] Risks deemed having a very high probability subject to sub-paragraph a., i. for example make risk management indispensable or even call for banning the risk altogether (by taking action against the initiating activity or event in such a manner that will eliminate all possible negative consequences). Compared to this, acceptable risks, i.e. such with a very low probability subject to sub-paragraph a., v. usually demand no risk managing efforts and tolerable risks, which are situated between high probability and low probability, require such efforts only to an extent considered necessary and economically feasible.[178]

The second category of data mentioned in article 9 refers to ecosystem goods and services, as well as the functions and processes of the Arctic ecosystems. Assessing and evaluating ecosystems in terms of the goods and services they provide, as well as the functions and processes intrinsic to them, helps risks managers to set priority targets in addressing risks, apart from future scenario assumptions. Ecosystem goods, services, functions and processes, that are much valued in that context deserve greater attention, in comparison to such that are of only subordinated interest.[179] Depending on the data available on ecosystem services, goods, functions and processes such valuation may be made in monetary, quantitative or qualitative terms.[180]

Consequently if future scenario assumptions point to the conclusion that Arctic ecosystems may be adversely affected in a way so as to negatively alter essential functions and processes and jeopardize the maintenance of valuable ecosystem goods and services they provide, such a risk demands timely and effective risk management initiatives.

Finally paragraph 2 of article 9 holds a reference to article 10, which addresses the compilation of the gathered and assessed data as well as based thereon of the evaluation of the risks discerned in an Assessment report.

177 See in this context *supra* in 1.3 and 1.4.
178 See for details *supra* in 1.3.
179 See on ecosystem goods, services, functions and processes, as well as their valuation *supra* in 8.2.1.3.
180 Ibid.

Article 10 Assessment Report

1. The objective of the assessment report is to provide the necessary information on the Arctic ecosystems and the climate change induced risks affecting them to policy makers, stakeholders and other interested and/or affected parties, in order to establish a base for sound risk management.

2. In following an integrated approach, the assessment report shall be made publicly available as appropriate and in an adequate timely and effective manner.

3. Pan-Arctic outreach may be guaranteed through a web-based information platform to be managed under the auspices of the Arctic Council.

Commentary

The information gathered and assessed and based thereon the evaluation of risks identified due to individual or joint assessment programs within the Arctic is only viable if such knowledge is made available to decision-makers, appointed with risk management. Therefore article 10 of the Draft Framework Agreement foresees the establishment of assessment reports, that shall provide for a comprehensive overview of the best scientific data and indigenous/local knowledge available, as well as an assessment and an evaluation thereof. Ultimately the report shall guarantee that all relevant data is collected, reviewed, assessed and evaluated subject to articles 4 to 9, so that a sound and commonly accepted (pan-Arctic) knowledge base exists, upon which informed decision-making regarding risk management is possible.

Paragraph 2 of article 10 in this context requires that the assessment report be made publicly available in an adequate and timely manner, so as to ensure transparency and provide the base for integrated risk management according to article 13 of the Draft Framework Agreement. To this aim paragraph 3 suggests the development of a web-based information platform to be managed under the auspices of the Arctic Council in order to make the reports readily available across the Arctic, without much delay.

In establishing such a platform, existing pan-Arctic websites, e.g. the Arctic Portal[181], the Arctic Biodiversity Data Service[182] or the Council's working group information sharing platforms, especially of the Arctic Monitoring

181 See *supra* in fn 166 (part III).
182 See *supr*a in fn 167 (part III).

and Assessment Programme (AMAP)[183], may be used for this purpose or serve as an example in developing new outreach tools.[184]

Finally it must be kept in mind, that the development of assessment reports according to article 10 may take some time. In application of the precautionary principle subject to articles 8 and 11, however, conclusiveness is no prerequisite for taking precautionary measures. Accordingly, action to avert potential negative impacts upon Arctic ecosystems that may cause serious or irreversible damage to them is required, even where not all ecosystem aspects and impacts thereon are thoroughly understood.[185] In this context the clearinghouse mechanism, as referred to in article 5 paragraph 4 of the Draft Framework Agreement, may help, as potential knowledge gaps can be bridged by a constant pan-Arctic flow of information until assessment reports subject to article 10 become available.

PART C: MANAGEMENT OF CLIMATE CHANGE INDUCED RISKS

Article 11 PRECAUTIONARY PRINCIPLE

1. The Parties to this Agreement shall apply a precautionary approach when managing climate change induced risks.

2. Measures should in favor of maintaining ecosystem health and resilience be taken, even if not all ecosystem aspects and the impacts thereon, including such of climate change induced risks, are thoroughly understood. Hence, where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing management measures to prevent ecosystem degradation.

3. In spite of existing uncertainties, the Parties to this Agreement shall undertake all necessary management options to prevent any negative ramifications upon the Arctic ecosystems occurring from climate change induced risks, especially in cases where the characteristics of a given risk, i.e. its magnitude or irreversibility, require immediate precautionary action.

183 See *supra* in 6.2.2.2.
184 Note that in this context providing the necessary information to indigenous peoples (i.e. the Arctic Council's Permanent Participants) may also be supported by the Arctic Council Indigenous Peoples' Secretariat (IPS); see *supra* in fn 958 (part II).
185 See art. 11 para. 2 of the Draft Framework Agreement.

4. In cases of high uncertainty priority shall be given to the ecological components of the Arctic ecosystems, i.e. the protection and the conservation of the Arctic natural environment from climate change induced risks. Human activities may resulting in or fostering climate change induced risks are to be refrained from, unless sufficient information exists to rule out any significant harm to the Arctic ecosystems from these activities.

Commentary

The special characteristics of climate change induced risks, such as high uncertainty, potential irreversibility and long-lastedness, in the light of being "better safe than sorry", require a precautionary approach to their management.[186] As a consequence article 11 paragraph 1 of the Draft Framework Agreement obliges parties to apply a precautionary approach to the management of climate change induced risks. What such an approach entails, is made clear by the subsequent paragraphs: Inconclusive information and knowledge about the ecosystems to be managed and the impacts thereon (including climate change induced risks) shall not hamper parties from taking management measures capable of preventing damage to the ecosystems. This, however, does not mean that it is imperative for precautionary measures to be taken in every instance where uncertainty prevails. Paragraph 2 and even more so paragraph 3 to article 11 of the Draft Framework Agreement hold a qualification in this regard: Following these paragraphs precautionary measures must be taken *"where there are threats of serious or irreversible damage"*, i.e. in cases where *"the characteristics of a given risks"*, that is to say *"its magnitude or irreversibility"* make precautionary action indispensable.[187] As a consequence, while parties are to adopt a precautionary approach to managing climate change induced risks in general and in this context are to take any measures necessary for preventing negative ramifications upon the Arctic ecosystems from occurring, they are left with somewhat of a discretion in how stringent such an approach is being applied, when the risks to be managed are deemed to be neither irreversible nor causing serious damage to the Arctic ecosystems.

On the other hand paragraph 4 to article 11 of the Draft Framework Agreement makes clear that in cases of high uncertainty a strong version of the

186 See *supra* in 4.4.4.3.
187 See also *supra* in 4.4.4.3.

precautionary principle shall be applied. That is to say that where existing data and knowledge is not sufficient to rule out irreversibility or serious damage to the ecosystems concerned, any human activities may resulting in fostering climate change induced risks shall be refrained from until more information is obtained by means of Part B of the Draft Framework Agreement.

It is not least here where the connection between article 11 and Part B of the Draft Framework Agreement can be seen. While a lack of scientific data and indigenous/local knowledge regarding the Arctic ecosystems and the risks they are threatened by, shall not postpone appropriate management options in order to build in a margin of safety, the precautionary principle is by no means irrespective of scientific information and/or indigenous and local knowledge.[188] In fact in cases where high uncertainties prevail, the principle calls for the gathering of more information and knowledge before any human activities (e.g. shipping, oil and gas activities) are being conducted that may severely damage the Arctic ecosystems.

Furthermore if newly gathered information and knowledge concludes that an originally accepted management plan is no longer feasible, as it would result in damaging effects to the ecosystems, such a plan ought to be revised immediately.[189] As a consequence, in application of the precautionary principle, decision-makers must continuously be aware of the information and knowledge obtained subject to Part B of the Draft Framework Agreement.

Article 12 *Adaptive Management*

1. If subject to article 7 of this Agreement new scientific information and/or traditional ecological and local knowledge are obtained, management options in progress shall be reviewed as appropriate and in an adequate timely manner, in order to prevent management gaps or adverse management activities.

2. Decision-making under uncertainty requires the Parties to this Agreement to apply adaptive ecosystem management options, i.e. such that are flexible and allow for amendments in an appropriate timely manner and focus on achieving long term benefits.

188 See also *supra* in 4.4.4.2.
189 See in this context also *infra*, regarding art. 12 of the Draft Framework Agreement.

Commentary

Article 12 to the Draft Framework Agreement refers to the risk management side to the adaptive approach applied during risk assessment subject to article 7. As information on Arctic ecosystems and climate change induced risks can hardly ever be conclusive, yet in light of the precautionary principle management action must be taken to avert any negative ramifications from such risks upon Arctic ecosystems,[190] a continuous revision of management plans adopted must be undertaken when new scientific information and/or indigenous and local knowledge become available.

As a consequence, paragraph 2 to article 12 points out, that the management options chosen must provide for enough flexibility to allow for fast changes whenever new data is obtained, which makes reviewing existing management plans necessary. Hence instead of rigid rules governing specific risks, management plans developed by parties in conjunction with Part C of the Draft Framework Agreement must allow for easy and timely amendments and may include somewhat of a discretion to decision-makers, so that management remains flexible. In practice such an adaptive approach therefore may demand regulatory measures to be taken on a decree, instead of a statutory level.[191] Alternatively management plans may list a variety of possible management options that can be chosen interchangeably, so as to react to new information and knowledge obtained in an appropriate way, and at the same time restrict decision-makers' discretion.

Furthermore, while risk management thus must remain flexible and open to alterations, according to paragraph 2 to article 12, focus at all times ought to be given to the achievement of long term benefits, i.e. management plans adopted are to be taken in light of a long term time frame. Ecosystem processes and functions, as well as climate change induced risks affecting them are designated by long-lastedness.[192] Adequate management thus calls for the adoption of long term management plans, which however must be flexible enough to allow for adaptation, because the more extensive the time frame, the more likely it is that changes in the ecosystems will occur or new data on them and the risks they are affected by will become available.[193] Article 12 of the Draft Framework Agreement is taking these aspects into ac-

190 See art. 11 of the Draft Framework Agreement.
191 Accord. JAECKEL, at 18.
192 See also *supra* in 4.4.4.3.
193 See in this context also principles 7 and 8 of the Malawi principles as referred to *supra* in 4.5.2.2.

count and as a consequence requires the parties to the Agreement to develop and implement ecosystem management plans that are focusing on long term benefits, but at the same time are flexible enough to adapt to changes, e.g. by foreseeing a variety of management options to be chosen within the management plan in case an option applied is no longer deemed feasible and by developing procedural measures, which enable fast and easy amendments to the management plan in existence.

Article 13 *Integrated Management*

1. Rules and regulations adopted based on this Agreement shall provide for integrated management of the Arctic ecosystems and the risks they are affected by.

2. The Parties shall integrate domestic and pan-Arctic stakeholders across sectors as early into the decision-making process as possible by *inter alia* granting the possibility to participate (e.g. by means of roundtables or hearings) in the development of plans and programs pertaining to the management of climate change induced risks and the Arctic ecosystems and to be consulted when environmental impact assessments are conducted in respect to a specific human activity.

3. Special consideration shall be given to the involvement of indigenous peoples and local inhabitants, e.g. by establishing and supporting community-based management.

4. Integrated management requires that the information gathered subject to Part B of this Agreement is made available to all stakeholders in an adequate timely manner. The Parties shall additionally to the clearinghouse mechanism and issuing of an assessment report subject to article 5 paragraph 4 and article 10 of this Agreement establish and foster outreach initiatives, such as eduction at schools and for indigenous and local inhabitants. Furthermore especially as regards community-based management, capacity building shall be supported, e.g. by providing for the necessary infrastructure, institutions and organizational structures to effectively conduct ecosystem-based management.

Commentary

Article 13 of the Draft Framework Agreement refers to the risk management side of article 6. Stakeholder involvement is one of the main ingredients of implementing the ecosystem approach to risk governance, as integrating all parties concerned into the decision making process will lead to more transparency and acceptance and result in more effective and equitable results to managing the Arctic ecosystems and the risks they are affected by.[194] Article 13 takes this into account by, in paragraph 1, obliging parties to set the necessary framework for integrated management.

What such integrated management entails is made clear in the subsequent paragraphs: In accordance with article 6 of the Draft Framework Agreement, paragraph 2 to article 13 requires stakeholders to be involved across sectors and as early as possible in the decision-making process. This especially concerns the development stage of management plans as well as environmental impact assessments (EIA).[195] While not explicitly mentioned the first line is a reference to strategic environmental assessment (SEA).[196]

The term *assessment* may lead to the assumption that paragraph 2 should be included in article 6, rather than article 13. However, SEA and EIA do concern the development of management plans and their analysis, respectively. As they call for assessments they naturally require the gathering of information as referred to in Part B of the Draft Framework Agreement. Yet in essence they provide for integrated management, rather than integrated assessment, which is why they are referred to in the risk management part of the Agreement. However, the transition between risk assessment and management is often fluent and both risk governance stages are closely intertwined, as assessments continue with management options in place, which may lead to adaptations to existing management schemes in the future, once new information and knowledge become available. SEA and EIA in this context mark somewhat of a link between risk assessment and risk management.[197]

Furthermore, similar to article 6 paragraph 4 of the Draft Framework Agreement, paragraph 3 to article 13 requires that special consideration may be

194 See in this context also the commentary to art. 6 of the Draft Framework Agreement and principles 1 and 2 of the Malawi principles as referred to *supra* in 4.5.2.2.
195 See for details *supra* in 5.5.2. and 8.2.1.1.
196 Ibid.
197 See for details on SEA and EIA, ibid.

given to indigenous and local inhabitants when management plans are developed and implemented. In this context parties are well advised to decentralize management to the lowest level appropriate. Integrated and transparent decision making will not result in efficient management of ecosystems and the risks they are affected by, if the assigned body lacks the knowledge and/or capacity to effectively implement the decision. Management *decisions* should thus be made by those who represent the communities of interest (e.g. indigenous people), while *management* itself should be undertaken by those with the capacity to implement the decisions.[198] Generally the closer the management is to the ecosystem, the greater are the responsibility, participation and use of local knowledge. Decentralized management systems thus may lead to greater efficiency and effectiveness in the management process.

Finally, sound integrated management is dependent upon the information gathered and how it is shared among stakeholders subject to Part B of the Draft Framework Agreement. Paragraph 4 to article 13 for that reason refers to the clearinghouse mechanism and the issuing of an assessment report, as required by article 5 paragraph 4 and article 10, and additionally holds that outreach initiatives, such as education at schools and for indigenous and local inhabitants shall be fostered. Furthermore to guarantee decentralized, i.e. community-based management, paragraph 4 to article 13 requires of parties to establish the essential technological, organizational and institutional infrastructure as well as to furnish the necessary resources to communities in order for them to have the required capacity to effectively implement management decisions.

Article 14 *Pan-Arctic Risk Management*

1. In effectively implementing the ecosystem approach, the Parties to this Agreement shall establish and foster pan-Arctic risk management, i.e. the management of the Arctic ecosystems and the risks they are affected by across domestic borders.

2. Parties wishing to conduct an activity entailing risks for the Arctic ecosystems shall in accordance with article 13 paragraphs 2 to 4 of this Agreement, prior to conducting the activity consult their national people, organizations and other interested and affected groups, as well as such of other Arctic

198 See *supra* in fn 294 (part I).

States. Such consultation shall be based on a proposal of the planned activity, information on its potential risks and an outline of the means and time frame for stakeholders to respond within the consultation process.

3. Domestic ecosystem-based management initiatives to be taken in response to climate change induced risks, shall be made publicly available across borders as appropriate and in an adequate timely manner. All stakeholders interested shall be given the opportunity to respond to the proposed initiative within a time frame to be specified in the proposal.

4. Pan-Arctic information-sharing and consultation processes shall be conducted under the auspices of the Arctic Council subject to Part D of this Agreement.

5. Where areas beyond national jurisdiction (i.e. the high seas of the Arctic Ocean) are concerned, pan-Arctic risk management according to paragraphs 1 to 4 of this article, shall extend to cooperation with interested non-Arctic states, organizations and stakeholders.

Commentary

Ecosystems do not make halt at domestic borders and neither do climate change induced risks affecting them. The trans-boundary scope of such risks therefore requires that ecosystems and the threats they face, in effectively implementing the ecosystem approach, are managed adequately not only within the jurisdiction of one particular Arctic State, but also on a pan-Arctic scale.

Article 14 of the Draft Framework Agreement takes this into account, by requiring risk management across state borders. While paragraph 1 outlines the framework for such pan-Arctic risk management, paragraphs 2 to 5 hold more concrete obligations: In accordance with integrated risk management subject to article 13 paragraphs 2 to 4, article 14 requires parties, wishing to carry out any activities may causing damage to Arctic ecosystems, to consult stakeholders within and beyond domestic borders, prior to conducting such activities. Or in other words, article 14 paragraph 2 obliges parties to carry out environmental impact assessments in a domestic as well as in a trans-boundary, pan-Arctic context.[199] The consultation process in this regard

199 See in this context also the commentary to art. 13 of the Draft Framework Agreement, as well as for details see *supra* in 5.5.2. and 8.2.1.1.

must include a proposal of the activity to be undertaken, as well as an assessment of its potential risks to the ecosystems and the time frame within which the public, organizations and other interested parties can respond to the planned activity.[200]

Similarly such consultation must furthermore subject to paragraph 3 to article 14 be carried out when ecosystem-based management initiatives in response to climate change induced risks are being established. Consequently paragraphs 2 and 3 to article 14 of the Draft Framework Agreement, serve the aim of finding broad support for activities and management plans across the Arctic and thus provide for the effective implementation of the ecosystem approach in regards to integrated management. To facilitate such management, information-sharing and consultation processes shall subject to paragraph 4 be conducted under the auspices of the Arctic Council. In this context the web-based information platform, as requested by article 10, may serve as a helpful tool, as it would guarantee that information can made readily available within a timely manner across borders, providing interested parties with the possibility to react to domestic planned activities and/or management schemes to be adopted.[201]

Finally paragraph 5 to article 14 of the Draft Framework Agreement extends the integrative decision making process on a spatial scale. Where areas beyond national jurisdiction, i.e. the high seas of the Arctic Ocean are concerned by a management plan or are potentially affected by domestic activities, consultation and cooperation must not be limited to Arctic States only, but rather will have to include interested non-Arctic states, organizations and stakeholders. In such cases the rules applicable to pan-Arctic integrated management and consultation processes will be equally relevant to risk management concerning areas beyond jurisdiction of one of the eight Arctic States.

200 See art. 14 para. 2 of the Draft Framework Agreement.
201 See in this context *infra* in art. 19 para. 8 of the Draft Framework Agreement.

Article 15 *ARCTIC BIOLOGICAL DIVERSITY*

In implementing the ecosystem approach, maintaining Arctic ecosystem health and integrity and fostering its resilience, the Parties to this Agreement shall when individually or jointly conducting any management activities subject to Part C of this Agreement incorporate measures to conserve Arctic biological diversity.

Commentary

In governing climate change induced risks, implementing the ecosystem approach will help to maintain Arctic ecosystem health and integrity as well as foster ecosystem resilience, which makes the region much more capable to cope with drivers of change, adversely affecting it.[202] A decisive factor in keeping ecosystems healthy and resilient is the protection and conservation of biological diversity and the plant and animal species forming such diversity.[203] As a consequence maintaining biodiversity must be an underlying goal whenever management plans to govern climate change induced risks are being developed and implemented.

In accordance with article 15 of the Draft Framework Agreement, domestic and pan-Arctic initiatives taken to manage the Arctic ecosystems and the risks they are affected by, thus must incorporate measures to conserve Arctic biological diversity, e.g. by setting incentives for *in situ* or *ex situ* conservation.[204]

Article 16 *INCENTIVES*

1. Subject to article 2 of this Agreement in undertaking all necessary action to maintain the Arctic ecosystems at a healthy and resilient level, at which they are capable to adapt to drivers of change and can provide economically valuable goods and services subject to article 9 paragraph 1, sub-paragraph b. of this Agreement, that are responsible for human well-being, the Parties shall as appropriate establish and enhance effective positive incentive measures and take all necessary action to remove existing harmful incentives and prevent the emergence of perverse incentives.

202 See *inter alia supra* in 5.4. and 5.4.1.
203 See *inter alia supra* in 5.4.1.
204 See for details *supra* in 5.4.; and on *in-situ* and *ex-situ* conservation fn 619 and 620 (part II).

2. In implementing paragraph 1, the Parties to this Agreement shall as appropriate within their jurisdiction by means of national legislation *inter alia* foster

> a. the removal of harmful subsidies, e.g. such that by supporting a specific producer or consumer lead to the discrimination of sound environmental practices;
>
> b. the establishment of payments for ecosystem services, i.e. payments provided for an ecosystem service or the land use likely to maintain that service;
>
> c. the implementation of the polluter pays principle; i.e. requiring the polluter to pay for the environmental damage caused;
>
> d. market-based approaches, i.e. the development of new markets or market-based approaches, such as emission trading, eco-tourism or certification and eco-labelling;
>
> e. the enhancement of benefit-sharing, i.e. allowing local and indigenous communities to partake in the benefits arising from ecosystem goods and services being supplied within the region they inhabit.

3. The list provided in paragraph 2 is not conclusive and the Parties to this Agreement are in accordance with article 2 of this Agreement free to choose the most feasible and cost-effective option in establishing and enhancing positive incentive measures within their jurisdiction.

4. The Parties shall furthermore support the establishment and enhancement of pan-Arctic positive incentive measures to be applied to cross-border ecosystem services and goods and ensure the coordination of domestic incentives chosen.

5. Consultation processes on and coordination of pan-Arctic and domestic positive incentive measures, as well as their funding, shall be supervised by a Working Group on Economic Incentives for Arctic Ecosystem Management to be established subject to part D of this Agreement.

Commentary

In the context of governing climate change induced risks the protection and conservation of Arctic ecosystems is vital, as intact and healthy ecosystems are much more capable to cope with biotic and abiotic changes caused by naturally and anthropogenically induced risks adversely affecting habitats and species and ultimately ecosystems in their entirety.[205] Hence effectively addressing climate change induced risks requires outset and outcome oriented risk governance:[206] From an outset based risk governance perspective, it is important to maintain intact ecosystems and their functions, so as to foster ecosystem health and resilience, which will make ecosystems more resistant to change and will allow for the continuous emergence of ecosystem goods and services, responsible for the well-being of mankind. Additionally, outcome centered risks governance, requires the restoration of already depleted ecosystems, as well as the protection and conservation of negatively affected plant and animal species.[207] Articles 16 and 17 of the Draft Framework Agreement tend to these issues, as they provide regulations on two important management measures to effectively implement the ecosystem approach: The setting of incentives and the designation of protected areas.

Article 16 paragraph 1 holds a general obligation in regards to the setting of positive incentives as well as the removal/prevention of perverse incentives, that do not adequately take ecological considerations into account and thus may negatively effect the ecosystems, making them more vulnerable to risks, such as those stemming from climate change.[208] In order to guide parties in this respect, paragraph 2 to article 16 lists several measures to be fostered through national legislation, e.g. the establishment of payments for ecosystem services and the removal of harmful subsidies. According to paragraph 3 this list is not conclusive and is in this respect intended as a mere guideline rather than a stringent rule. The functioning of incentives is by and large dependent upon economic and social realities in a given state. As a consequence while the Draft Framework Agreement requires parties to take incentive measures and remove existing harmful incentives and prevent them from emerging, the agreement bestows them with somewhat of a discretion in transferring article 16 to domestic legislation.

205 See *supra* in 5.4., 5.4.1. and 8.2.1.1., as well as art. 15 of the Draft Framework Agreement.
206 See for details on risk governance in the context of climate change induced risks *supra* in 1.2.
207 See *supra* in 5.4.
208 See also *supra* in 8.2.1.3.

Finally paragraph 4 to article 16 broadens the spatial scope of incentive measures: Arctic ecosystems are served best if measures taken to protect them and maintain their health and resilience are applied on a pan-Arctic scale. Also many ecosystem goods and services (especially regulating and supporting services) are trans-boundary in scope and hence require a holistic management.[209] In this context paragraph 4 to article 16, supports the development of pan-Arctic positive incentives and coordination of domestic incentives across borders. To that aim a special Working Group on Economic Incentives is being established by means of article 16 paragraph 5 in conjunction with article 22 of the Draft Framework Agreement. The duties and responsibilities of that working group will be addressed in greater detail subsequently.

Article 17 *Protected Areas*

1. The Parties to this Agreement shall within their jurisdiction encourage the establishment and effective management of protected areas, especially in vulnerable regions of the Arctic, to conserve the Arctic ecosystems and maintain their integrity and health, which make them more adaptable to drivers of change and which are responsible for ecosystem goods and services humans depend on.

2. Designation of protected area status in vulnerable regions in compliance with the precautionary principle subject to article 11, prohibits human activities to be conducted within such regions. Outside of areas defined as vulnerable regions human activities may be carried out in accordance with article 11 paragraph 4 of this Agreement.

3. The Parties to this Agreement shall furthermore individually or jointly and where appropriate in cooperation with non-Arctic states, organizations and stakeholders foster the identification and the development of protected areas subject to paragraph 1, beyond their national jurisdiction, i.e. in high sea areas of the Arctic Ocean.

4. Vulnerable regions expanding across domestic borders and/or beyond areas of national jurisdiction shall be given trans-boundary protected area status and networks of such areas shall be established.

209 See for details on ecosystem goods and services, ibid.

5. The designation of trans-boundary protected areas requires the Parties to this Agreement to individually or jointly and where necessary in cooperation with non-Arctic states, organizations and stakeholders initiate legislative action, i.e. the conclusion of special Agreements, laying out the main objectives and measures to be adopted in adequately conserving and protecting the area in question.

6. Agreements on the designation of trans-boundary protected areas shall conform to the objective of this Agreement according to article 2, especially the application of the ecosystem approach.

7. In accordance with paragraphs 1 and 3, due consideration ought to be given to the application of existing legal rules and regulations promoting the designation of protected areas within and outside of national jurisdiction, such as the Convention on Biological Diversity, the World Heritage Convention, the Ramsar Convention, the Man and the Biosphere Programme and Special Area/Emission Control Area or Particularly Sensitive Sea Area designation under the regime of the International Maritime Organization.

Commentary

As has been already elaborated in reference to articles 15 and 16 to the Draft Framework Agreement, adequately governing climate change induced risks requires the protection and conservation of Arctic ecosystems, as maintaining ecosystem health, integrity and ultimately resilience will make ecosystems more adaptable to biotic and abiotic changes caused by naturally and anthropogenically induced risks adversely affecting habitats and species and ultimately ecosystems in their entirety.[210] Furthermore maintaining ecosystems will guarantee the continuous supply of ecosystem goods and services, human well-being depends on.[211]

To achieve adequate ecosystem protection and conservation against risks, in practice a strong focus lies upon the designation of terrestrial or marine protected areas.[212] Article 17 encourages the establishment of such areas, especially in vulnerable regions of the Arctic, i.e. such that are more than others affected by climate change induced risks and therefore require special

210 See also *supra* in 8.2.1.1.
211 See *inter alia supra* in 4.5.2.2. d., 4.5.3., 4.5.4. and 8.
212 See e.g. *supra* in 5.3.2.4., 5.4.1., 5.4.3., 6.1.1., 6.2.2.3. a. i. (iii) and 8.2.1.1.

preservation and conservation measures.[213] In this context paragraph 2 to article 17, in application of the precautionary principle,[214] prohibits human activities in vulnerable areas given protected area status. In other areas such activities may be allowed, as long as sufficient information exists to rule out any significant harm to the Arctic ecosystems from these activities.[215]

Additionally article 17 specifically refers to areas beyond national jurisdiction. These regions, in comparison to areas within domestic borders, usually lack significant protection.[216] As a consequence the high sea areas of the Arctic Ocean for example are, apart from the general rules applicable to them as held in UNCLOS,[217] not adequately accounted for and thus would require a more profound protection. Article 17 in this context holds two paragraphs referring to such trans-boundary protected areas: In paragraph 3, parties are obliged to foster the identification and development of protected areas across domestic borders and beyond areas of national jurisdiction. This general rule is complemented by paragraph 4, which foresees the development of trans-boundary protected areas and networks of such areas, in case the regions expanding across domestic borders and/or beyond national jurisdiction are especially vulnerable. In this context paragraph 5 furthermore holds, that parties are to individually or jointly and where necessary in cooperation with non-Arctic states, organizations and stakeholders, take the necessary legislative action to establish trans-boundary protected areas. More specifically this means, that special Agreements on the designation of trans-boundary protected areas shall be concluded, which are to lay out the main objectives and measures to be adopted in order to effectively establish and govern trans-boundary protected areas. Regarding the content of such Agreements paragraph 6 holds, that they will have to conform to the objective of the Draft Framework Agreement, i.e. the adequate management of climate change induced risks within the Arctic under application of the ecosystem approach. Formal details are furthermore held in article 23, which will be referred to subsequently.

Finally, paragraph 7 to article 17 holds a reference to existing legal rules and regulations promoting the designation of protected areas within and outside of national jurisdiction, e.g. the Convention on Biological Diversity, the

213 See art. 1 para. 17 of the Draft Framework Agreement.
214 See in this context art. 11 of the Draft Framework Agreement, esp. paras. 1, 3 and 4.
215 See art. 17 para. 2 in conjunction with art. 11 para. 4 of the Draft Framework Agreement.
216 See *inter alia supra* in fn 432 (part II).
217 See for details *supra* in 5.3.1.

World Heritage Convention, the Ramsar Convention and the Man and the Biosphere Programme as well as the designation of Special Areas, Emission Control Areas and Particularly Sensitive Sea Areas subject to the regime as established by the International Maritime Organization.[218] As a consequence when designating protected areas within the Arctic due consideration must be given to these existing rules and regulations in order to take existing management schemes into account and prevent conflicting or overlapping management initiatives from occurring.

Part D: Implementation of an Arctic Ecosystem Approach

Article 18 *General*

The Parties to this Agreement shall individually and jointly take all appropriate measures to ensure compliance with the obligations set therein. This includes where appropriate technical as well as financial assistance and cooperation among the Parties. Furthermore they shall refrain from taking any measures which would compromise the effective implementation of the objectives subject to article 2 of this Agreement.

Commentary

The ecosystem approach is only an effective tool to manage Arctic ecosystems and climate change induced risks affecting them, if rules and regulations exist to guarantee its implementation. As a consequence Part D of the Draft Framework Agreement is concerned with implementing the Arctic ecosystem approach as established subject to Parts A to C.

Article 18 in this context holds a general obligation for parties to take appropriate measures either on a domestic or a pan-Arctic level, to ensure compliance with the Draft Framework Agreement. This includes technical and financial assistance as well as cooperation among parties, in order to guarantee that states with less capacities are capable to effectively implement the ecosystem approach within their jurisdiction and support its implementation across borders. In this context technical and financial assistance may be lent in relation to risk assessment (e.g. regarding research programs) and

218 See for details *supra* in 5.3.2.4., 5.4.1. and 5.4.3.

activities related to risk management (e.g. the conduct of strategic environmental assessments and environmental impact assessments)[219].

In effectively implementing the ecosystem approach parties must furthermore refrain from taking any activities that might compromise the objectives of the Agreement as held in article 2. These general obligations are specified more clearly in the subsequent articles 19 et seq.

Article 19 *Meetings of the Parties, Arctic Council*

1. The Parties to this Agreement shall meet at regular intervals to foster the establishment and implementation of the ecosystem approach subject to article 2 of this Agreement and to consider and resolve issues related thereto. The first meeting shall take place no later than one year after entry into force of this Agreement under the auspices of the Arctic Council, which shall in accordance with the following paragraphs serve as a forum for such meetings. Thereafter, the Parties to this Agreement shall meet annually, unless extraordinary meetings are deemed necessary. Further institutional and procedural rules required, shall be considered and adopted at the first Meeting of the Parties after entry into force of this Agreement.

2. At the Meeting of the Parties, the Parties to this Agreement shall *inter alia* review the progress made in implementing an Arctic ecosystem approach, exchange information regarding the experience gained on individual and joint measures taken under the present Agreement and foster the development of further legal and other measures to enhance compliance with this Agreement and to support the establishment and effective implementation of an ecosystem approach across the Arctic.

3. Implementation of this Agreement shall be supervised by the Arctic Council. The Parties to this Agreement shall towards this aim at regular intervals but not exceeding two years submit reports to the Compliance Committee as established according to article 20 on their joint or individual activities in application of this Agreement and leave them open for discussion at the annual Meeting of the Parties subject to paragraph 1.

219 See for details on SEA and EIA *supra* in 5.5.2. and 8.2.1.1.

4. In enhancing compliance, findings of a breach to the obligations provided within this Agreement, may also be presented to the Compliance Committee on behalf of non-governmental organizations, third countries and the public.

5. At the first Meeting of the Parties after entry into force of this Agreement the Parties shall consider and approve institutional and procedural mechanisms for sanctions (including monetary penalties) in case of non-compliance.

6. The Arctic Council shall serve as a forum for scientific reviews subject to article 5 paragraph 3 of this Agreement. Scientific meetings shall thus be convened under the auspices of the Arctic Council at regular intervals, but at least biannually, in order to provide a platform for discussions and information sharing as regards scientific, indigenous and local knowledge pertaining to the Arctic ecosystems and climate change induced risks.

7. Data gathered through individual research programs according to article 5 paragraph 4 of this Agreement and the findings of the assessment reports to be issued subject to article 10, shall as appropriate be made publicly available through the Arctic Council (i.e. under the auspices of the Standing Arctic Council Secretariat), e.g. through the Council's online platform or if necessary through other sources of outreach, such as print media.

8. The Arctic Council shall facilitate pan-Arctic cooperation, especially regarding information-sharing and consultation processes subject to article 14 of this Agreement. To this aim the Council's online platform may aid in conducting environmental impact assessments and in broadcasting management proposals across borders as well as allow for a timely response regarding them. Institutional and procedural mechanisms necessary to effectively enable pan-Arctic risk management subject to article 14 under the auspices of the Arctic Council shall be considered and approved at the first Meeting of the Parties after entry into force of this Agreement.

9. Furthermore the Arctic Council shall support the development of training and educational programs on a pan-Arctic level, so as to aid the personnel responsible for implementing the ecosystem approach on a domestic level.

Commentary

Article 19 paragraph 1 of the Draft Framework Agreement holds that in order to establish and implement the ecosystem approach across the Arctic in accordance with the Agreement's objective subject to its article 2, parties are to meet at regular intervals, especially to discuss and resolve any issues that may be arising from implementing the Draft Framework Agreement and establishing and adopting the ecosystem approach on a domestic and pan-Arctic scale, respectively.

To that purpose paragraph 1 holds, that the parties shall meet for the first time no later than one year after entry into force of the Draft Framework Agreement and after that annually, unless extraordinary meetings are deemed necessary. As further organizational questions may be arising (e.g. regarding the prerequisites for extraordinary meetings or the involvement of the Standing Arctic Council Secretariat subject to article 19 paragraph 7[220]), paragraph 1 to article 19, holds, that additional institutional or procedural regulations shall be considered at the first Meeting of the Parties after entry into force of the Agreement. The meetings are according to paragraph 1 to be convened under the auspices of the Arctic Council, whose role in implementing the Draft Framework Agreement is defined more specifically in paragraphs 3-9 to Article 19.

Article 19 paragraph 2 of the Draft Framework Agreement elaborates on some of the issues to be considered at the Meetings of the Parties. According to paragraph 2, these meetings shall *inter alia* serve as a platform to review progress made in implementing an Arctic ecosystem approach and to exchange knowledge gained in this context, as well as to foster additional (including legal) measures to make such an approach feasible in practice and ensure its implementation across the Arctic. In this context Article 19 paragraph 2 must be read in conjunction with article 19 paragraph 1, which in general terms holds that regular meetings shall be convened *"to foster the establishment and implementation of the ecosystem approach (...) and to consider and resolve issues related thereto"*, but does not provide for any guidance as to what this might entail.

In order to guarantee compliance with the Draft Framework Agreements it is not sufficient to rely solely on the will of parties to implement its obligations in accordance with article 18 of the Draft Framework Agreement.

220 The Secretariat was formally opened at the beginning of 2013; see *supra* in fn 984 (part II).

Rather some kind of supervision is necessary. To that purpose article 19 paragraph 3 assigns the Arctic Council with the task to overview implementation efforts by member states. The Council has been serving as a platform for pan-Arctic cooperation since it superseded the Arctic Environmental Protection Strategy in 1996.[221] As a consequence in the past 18 years the Arctic Council and its working groups have become a well established platform for scientific and sociological assessments pertaining to the Arctic, political meetings and for addressing legal issues, even in a hard law context. Hence it is only reasonable to use the existing organizational infrastructure to allow for supervision over compliance with the Draft Framework Agreement. However, the existing Arctic Council bodies and the functions they perform are hardly capable to warrant an effective implementation of the rules and regulations set therein. Some alterations and additions to the Council's mandate and its institutional framework may be necessary. Accordingly, paragraph 3 to article 19 holds that parties are to submit at regular intervals, but not exceeding two years, reports to a special Compliance Committee, which shall be established by means of article 20 of the Draft Framework Agreement and thus will be discussed in greater detail subsequently.

The supervision scheme adopted under the Draft Framework Agreement is twofold: Compliance through the filing of reports and compliance by means of sanctions. The first scheme is held in article 19 paragraphs 3 and 4, while the latter can be found in paragraph 5. Article 19 paragraph 3 says, that once the Compliance Committee took up its work, allowing for better supervision regarding the implementation of the Draft Framework Agreement, the parties are to submit reports on their joint or individual activities pertaining to the implementation of the Agreement. These reports will have to be filed to the Committee at regular intervals, but at least every two years and will then be open for discussion at the Meetings of the Parties, so as to allow for transparency among parties and for pan-Arctic information sharing regarding compliance.

Additionally according to paragraph 4, to enhance implementation, the Compliance Committee may be notified of a breach of the Draft Framework Agreement by information obtained from NGOs, third countries or the public. This paragraph is aimed at allowing parallel reports in order to assert that states do in fact comply with the obligations set out in the Agreement, and not just embellish their activities by means of official state reports.

221 See for details on the Arctic Council and its working groups *supra* in 6.2.2.

The reports system is a rather week tool to ensure effective compliance, however. If states are not willing to implement their obligations, stronger mechanisms are needed to ensure that the the duties established by the Agreement are met.

To this purpose article 19 paragraph 5 adopts a sanction system, which includes monetary penalties that may be applicable for a party in breach of an obligation set out within the Draft Framework Agreement. As such a system does currently not exist within the Arctic Council it will have to be established first. Paragraph 5 to article 19 in this context holds, that the adoption of a sanction system and the institutional and procedural mechanisms required to implement it, shall be discussed at the first Meeting of the Parties to take place after entry into force of the Draft Framework Agreement.

To allow for compliance with the Arctic ecosystem approach in addressing climate change induced risks it is, furthermore, necessary that comprehensive risk assessment is being conducted subject to Part B of the Draft Framework Agreement, which requires the sharing and evaluation of information obtained in this context. To this aim article 19 paragraphs 6 and 7 intend for the Arctic Council to serve as a forum for scientific meetings in accordance with article 5 paragraph 3 and to be responsible for the distribution of data gathered through individual research programs subject to article 5 and the findings of the assessment reports according to article 10.

In addition to allowing for comprehensive (and thus pan-Arctic) risk assessment, the Draft Framework Agreement in its article 14 paragraph 4 requires the Arctic Council to serve as a platform for pan-Arctic information-sharing and consultation processes as regards risk management. As ecosystems do not make halt at jurisdictional borders, effective ecosystem management is only feasible if applied across borders and beyond areas of national jurisdiction.

Paragraph 8 to article 19 in this context reaffirms the notion in article 14 paragraph 4 and suggests the Council's online platform to be used as a tool in pan-Arctic risk management, especially as regards consultation processes. As however the technical and procedural measures necessary to assist such information-sharing and consultation demand further elaboration, the Draft Framework Agreement does not go beyond a general obligation, but rather foresees that the specifics of institutional and procedural mechanisms necessary to effectively enable pan-Arctic risk management will have to be con-

sidered and approved at the first Meeting of the Parties after entry into force of the Draft Framework Agreement.[222]

Furthermore article 19 acknowledges in its paragraph 9 that implementing the ecosystem approach across the Arctic in adequately managing climate change induced risks, necessitates that those responsible for managing such risks possess the essential knowledge to effectively implement the ecosystem approach on a domestic level. Therefore paragraph 9 authorizes the Arctic Council to support the development of training and educational programs on a pan-Arctic level, so as to aid domestic personnel in the tasks appointed to them as regards the implementation of the Draft Framework Agreement.

Article 20 *Compliance Committee*

1. A Committee on the Compliance of the Framework Agreement on the Establishment and Implementation of an Ecosystem Approach to Governing Climate Change Induced Arctic Risks is hereby established.

2. The Compliance Committee shall be represented by 8 members, who are experts on ecological, social and economic matters relating to the Arctic ecosystems, sustainable development as well as risk assessment and management. They shall be elected by the Parties to this Agreement from among their citizens, having due regard to the need to ensure equitable geographical representation.

3. The initial election of the members of the Compliance Committee shall be conducted as soon as possible but no later than one year after the date of entry into force of this Agreement. The Parties to this Agreement shall submit their nominees to the Standing Arctic Council Secretariat in timely manner, but no later than six months after the date of entry into force of this Agreement. A list will be generated on all nominations and be presented to all Arctic States and the Arctic Council's Permanent Participants for election.

4. Elections of the members of the Compliance Committee shall be held at an ordinary or extraordinary Arctic Council Ministerial Meeting. Elected are those nominees who obtain two-third majority of the votes of the representatives of the Arctic Council Member States and the Council's Permanent Participants present and voting. In casting their votes these representatives shall give due regard to electoral preferences of other Parties to this Agree-

222 See art. 14 para. 4 in conjunction with art. 19 para. 8 of the Draft Framework Agreement.

ment subject to article 30 paragraph 2, as well as of stakeholders and other interested and affected states or organizations.

5. The members of the Compliance Committee shall be elected for a term of 2 years. They shall be eligible for re-election.

6. The Compliance Committee shall perform the functions necessary to foster compliance with the obligations set in this Agreement and thus promote the effective implementation of an ecosystem approach to govern climate change induced risks within the Arctic. Accordingly the functions of the Compliance Committee shall be:

> a. To review compliance by the Parties with their obligations under this Agreement, based on reports and submissions made subject to article 19 paragraphs 3 and 4 and article 20 paragraphs 7 and 8.
>
> b. To prepare a report on compliance to be presented at the annual Meeting of the Parties, as well as an executive summary thereof to be presented at the biennial Arctic Council Ministerial Meeting.
>
> c. To supervise the submission of reports by Parties subject to article 19 paragraph 3.
>
> d. To where appropriate in order to ensure compliance with this Agreement conduct inspections on measures undertaken in support of the present Agreement as well as such that might jeopardize the implementation of the objectives set out in article 2. Where non-compliance was detected, the Compliance Committee shall present these findings in the compliance report subject to paragraph 6, subparagraph b. to this article.
>
> e. To as appropriate examine compliance issues and make recommendations on how to enhance compliance and the effective implementation of the ecosystem approach across the Arctic.

7. Parties, third countries, non-governmental organizations or the public, becoming aware of non-compliance of Parties to the present Agreement may notify the Compliance Committee of potential infringements to the obligations set therein. Upon such notification the Committee shall inform the Party whose compliance is at issue within two weeks about the alleged violation. The Party may respond on the matter as soon as possible but no later than six months. Upon receiving such a reply and supporting information,

the Compliance Committee shall where appropriate make recommendations according to paragraph 6 sub-paragraph e. of the present article and inform about the compliance issue in the compliance report subject to sub-paragraph b.

8. Issues of non-compliance may also be presented to the Compliance Committee on behalf of a Party that concludes that in spite of its best intentions and exhaustion of all possible measures and resources, will not be able to fully comply with the obligations under the present Agreement. Upon such notification the Compliance Committee shall make recommendations according to paragraph 6 sub-paragraph e. of the present article and inform about the compliance issue in the compliance report subject to sub-paragraph b.

9. At the first Meeting of the Parties after entry into force of this Agreement the Parties shall consider and approve further institutional and procedural rules necessary for the functioning of the Compliance Committee.

Commentary

While the Arctic Council can serve as a platform to effectively implement the Draft Framework Agreement and supervise the adoption and implementation of an ecosystem approach to governing the Arctic ecosystems and climate change induced risks they are affected by, the Council in its current form is likely to prove inadequate to fulfill this task.[223] To this aim articles 20 to 23 of the Draft Framework Agreement establish three new bodies, that may enhance compliance with the obligations set within the Agreement.

Article 20 of the Draft Framework Agreement in this respect tends to the Committee on the Compliance of the Framework Agreement on the Establishment and Implementation of an Ecosystem Approach to Governing Climate Change Induced Arctic Risks (or short: Compliance Committee), which is established by means of paragraph 1. According to paragraph 2, the Committee is represented by eight members, which must follow two conditions:

1. They must be experts on ecological, social and economic matters relating to the Arctic ecosystems, sustainable development and risk governance. This condition tends to the fact that the Compliance

223 See also *supra* commentary to art. 19 of the Draft Framework Agreement.

Committee can only function properly,[224] if its members possess profound knowledge on ecosystem-based risk governance.

2. They must be nationals to the parties to the Draft Framework Agreement. As according to article 30 paragraph 2, non-Arctic states may accede to the Agreement and thus may become parties, this means that their citizens are eligible too, even if they are nationals to a country situated beyond the Arctic Circle. The only prerequisite the Agreement holds is that equitable geographical representation is warranted in deciding upon the Committee's members.[225]

Paragraphs 3, 4 and 5 to article 20 set out the details regarding electing the Committee's members: According to paragraph 3 the initial election (and therefore the formal constitution of the Compliance Committee) shall take place no later than one year after the Agreement has entered into force. To this aim the parties to the Agreement are obliged to submit their nominees within six months time after entry into force of the Draft Framework Agreement, to the Standing Arctic Council Secretariat, which has become operative in early 2013.[226] The nominees will then be collected on a list, which will be passed on to all Arctic States and the Arctic Council's Permanent Participants for election. As a consequence article 20 paragraph 3, excludes other (non-Arctic) members from electing the Committee's representatives; while non-Arctic states, which are party to the Agreement,[227] can thus nominate people from among their citizens to represent the Compliance Committee, they – in turn – cannot cast a vote.

According to paragraph 4 to article 20, elections are to be held at an ordinary or extraordinary Arctic Council Ministerial Meeting. By setting this task on the agenda of the Council's Ministerial Meetings, the Framework Agreement aims at incorporating the Compliance Committee into the existing Arctic Council institutional framework and allows for an adequate involvement of the Arctic Council's Permanent Participants in this context.

A nominee, obtaining two-third majority of the votes cast, will be elected. Only Arctic States and representatives of indigenous groups given Perma-

224 Especially relevant in this context is the issuing of recommendations, which requires deeper knowledge on ecosystem and risk governance matters; see art. 20 para. 6, sub-para. e of the Draft Framework Agreement.
225 See art. 20 para. 2 of the Draft Framework Agreement.
226 See *supra* in fn 984 (part II).
227 See in this context art. 30 para. 2 of the Draft Framework Agreement.

nent Participant status, are authorized to vote.[228] By this restriction, as well as by the fact, that elections are to be conducted in the context of Arctic Council Ministerial Meetings, the Agreement emphasizes on the role Arctic States and their citizens as well as the indigenous groups living within the circumpolar North and represented by the Council's Permanent Participants, play in governing climate change induced risks affecting the Arctic ecosystems.

However, article 20 paragraph 4, stresses, that preferences of other Parties to this Agreement (which includes non-Arctic states that acceded to the Agreement in accordance with article 30 paragraph 2, but are not eligible to vote and partake at the Ministerial Meetings[229]) as well as of stakeholders and other interested and affected states or organizations shall be given due consideration when votes are being cast. The members voted for, will be elected for a period of 2 years, with the possibility to be re-elected once that time frame has come to an end.[230]

Article 20 paragraph 6 to the Draft Framework Agreement sets out the Committee's functions. In general the Compliance Committee is required to perform all functions necessary to foster compliance with the obligations set in the Agreement i.e. the effective implementation of a pan-Arctic ecosystem approach to governing climate change induced risks. In more concrete terms this means that the Committee will have to review compliance, prepare compliance reports, supervise the submission of compliance reports to be issued by the parties, where necessary conduct inspections, and make recommendations on compliance issues.[231]

In order to allow for an effective implementation of the Agreement, the Compliance Committee must become aware of any breaches to its obligations. Such knowledge may be obtained through reports submitted by parties or inspections conducted by the Committee itself, as well as by means of

228 See for details on the Arctic Council's members *supra* in 6.2.2.

229 Note, however, that non-Arctic states that have become party to this Agreement subject to art. 30 para. 2, may be invited to Arctic Council Ministerial Meetings if they have been granted Observer status within the Council; see for details ibid.

230 See art. 20 para. 5 of the Draft Framework Agreement.

231 See for details art. 20 para. 6, sub-paras. a.-e. of the Draft Framework Agreement; note that compliance reports prepared by the Compliance Committee will have to be presented at the annual Meeting of the Parties, as well as at the biennial Arctic Council Ministerial Meeting in order to allow for effective supervision over compliance with the Agreement under the auspices of the Arctic Council and to influence the Council's future work in furthering the establishment and implementation of the ecosystem approach to adequately govern climate change induced risks affecting the Arctic ecosystems.

notifications of any such non-compliance by governments of state parties, third countries, NGOs or the public. [232] In the instance of the latter the Committee must inform the party, whose compliance is at issue, about the alleged violation within two weeks after the notification was received. The party then has six months time to respond to the matter, upon which the Compliance Committee will have to make recommendations and/or inform about the compliance issue in its compliance reports.[233]

In some cases a party may come to the conclusion that it is not able to fully comply with the obligations under the Agreement, no matter its good intentions to do so and exhaustion of all possible resources. In that case, according to article 20 paragraph 8 of the Draft Framework Agreement, such party may notify the Compliance Committee about its compliance issues, which will then make specific recommendations and inform about these issues in its compliance reports.[234]

As the effective establishment and functioning of the Compliance Committee subject to article 20 of the Agreement, may require additional institutional and procedural rules, paragraph 9 to article 20 holds that any such issues are to be considered at the first Meeting of the Parties after entry into force of the Agreement.

***Article 21** JUDICIAL COMMISSION*

1. A Judicial Commission on the Implementation of the Arctic Ecosystem Approach is hereby established.

2. The Judicial Commission shall be represented by 11 members, who are experts on ecological, social and economic matters relating to the Arctic ecosystems, sustainable development as well as risk assessment and management. They shall be elected by the Parties to this Agreement from among their citizens, having due regard to the need to ensure equitable geographical representation.

232 See art. 19 para. 3 and 4, as well as art. 20 para. 6, sub-para. a. and d. and para 7 and 8 of the Draft Framework Agreement.

233 See art. 20 para. 7 in conjunction with para. 6, sub-paras. b. and e. of the Draft Framework Agreement.

234 See art. 20 para. 8 in conjunction with para. 6, sub-paras. b. and e. of the Draft Framework Agreement.

3. The initial election of the members of the Judicial Commission shall be conducted as soon as possible but no later than one year after the date of entry into force of this Agreement. The Parties to this Agreement shall submit their nominees to the Standing Arctic Council Secretariat in timely manner, but no later than six months after the date of entry into force of this Agreement. A list will be generated on all nominations and be presented to all Arctic States and the Arctic Council's Permanent Participants for election.

4. Elections of the members of the Judicial Commission shall be held at an ordinary or extraordinary Arctic Council Ministerial Meeting. Elected are those nominees who obtain two-third majority of the votes of the representatives of the Arctic Council Member States and the Council's Permanent Participants present and voting. In casting their votes these representatives shall give due regard to electoral preferences of other Parties to this Agreement subject to article 30 paragraph 2, as well as of stakeholders and other interested and affected states or organizations.

5. The members of the Judicial Commission shall be elected for a term of 4 years. They shall be eligible for re-election.

6. The Judicial Commission shall perform the functions necessary to ensure the effective implementation of an ecosystem approach to govern climate change induced risks within the Arctic. Accordingly the functions of the Judicial Commission shall be:

> a. The settlement of disputes arising from the application or interpretation of this Agreement subject to article 27 paragraph 2 of this Agreement.
>
> b. The settlement of disputes arising from the application or interpretation of Agreements on Trans-boundary Protected Areas as established subject to article 17 paragraphs 4 and 5 of this Agreement.
>
> c. To function as an independent and impartial body for the trial of individual complaints by citizens to the Parties to this Agreement in respect to partaking in the decision making process in environmental matters subject to articles 6 and 13 of this Agreement.
>
> d. To advise the Parties to this Convention as regards the setting of positive economic incentives and to settle disputes arising from the failure to establish positive incentives or refrain from removing harmful incentives subject to article 16 of this Agreement.

7. At the first Meeting of the Parties after entry into force of this Agreement, the Parties shall consider and approve further institutional and procedural rules necessary for the functioning of the Judicial Commission.

Commentary

Article 21 addresses another institution among the three new bodies[235] to be established within the Arctic Council to provide for effective implementation of the ecosystem approach across the Arctic in order to adequately govern climate change induced risks: the Judicial Commission on the Implementation of the Arctic Ecosystem Approach.

The Commission is constituted by eleven members, who must fulfill the same requirements as the members of the Compliance Committee:

1. They must be experts on ecological, social and economic matters relating to the Arctic ecosystems, sustainable development and risk governance. This condition tends to the fact that the Judicial Commission, as well as the Compliance Committee, can only function properly,[236] if their members possess profound knowledge on ecosystem-based risk governance.
2. They must be nationals to the parties to the Draft Framework Agreement. As according to article 30 paragraph 2, non-Arctic states may accede to the Agreement and thus may become parties, this means that their citizens are eligible too, even if they are nationals to a country situated beyond the Arctic Circle. The only prerequisite the Agreement holds is that equitable geographical representation is warranted in deciding upon the Commission's members.[237]

The election process, subject to paragraphs 3 and 4 to article 21 is also congruent with the regulations pertaining to member election of the Compliance Committee.[238] Therefore what has been stated in the commentary to article 20 generally applies to article 21 too: According to paragraph 3 the initial election (and therefore the formal constitution of the Judicial Commis-

235 See the Draft Framework Agreement, art. 20 on the Compliance Committee, art. 21 on the Judicial Commission and art. 22 on the Working Group on Economic Incentives.
236 See in this context art. 21 para. 6, sub-paras. a.-d. of the Draft Framework Agreement.
237 See art. 21 para. 2 of the Draft Framework Agreement.
238 See *supra* in the commentary to art. 20; and on the regulations applicable, art. 20 para. 3 and 4 of the Draft Framework Agreement.

sion) shall take place no later than one year after the Agreement has entered into force. To this aim the Parties to the Agreement are obliged to submit their nominees within six months time after entry into force of the Draft Framework Agreement, to the Standing Arctic Council Secretariat, which has become operative in early 2013[239]. The nominees will then be collected on a list, which will be passed on to all Arctic States and the Arctic Council's Permanent Participants for election. As a consequence article 21 paragraph 3, excludes other (non-Arctic) parties from electing the Commission's members; while non-Arctic states, which are party to the Agreement,[240] can thus nominate people from among their citizens to represent the Judicial Commission, they – in turn – cannot cast a vote.

According to article 21 paragraph 4, elections are to be held at an ordinary or extraordinary Arctic Council Ministerial Meeting, so as to – analogous to the Compliance Committee subject to article 20 – effectively incorporate the Judicial Commission within the institutional framework of the Arctic Council and grant adequate participation rights in this context to Arctic indigenous groups as represented by the Council's Permanent Participants. A nominee, obtaining two-third majority of the votes cast, will be elected. Only Arctic States and representatives of indigenous groups given Permanent Participant status, are authorized to vote.[241] By this restriction, as well as by the fact that the Judicial Commission's members are elected at Arctic Council Ministerial Meetings, the Agreement emphasizes on the role Arctic States and their citizens, as well as indigenous groups living within the circumpolar North, play in governing climate change induced risks affecting the Arctic ecosystems. However, article 21 paragraph 4, stresses, that preferences of other parties to this Agreement (i.e. non-Arctic states that acceded to the Agreement subject to article 30 paragraph 2, but are not eligible to vote and to partake in Arctic Council Ministerial Meetings[242]) as well as of stakeholders and other interested and affected states or organizations shall be given due consideration when votes are being cast. The members voted for, will be elected for a period of 4 years, with the possibility to be re-elected once that time frame has come to an end.[243]

239 See *supra* in fn 984 (part II).
240 See in this context art. 30 para. 2 of the Draft Framework Agreement.
241 See for details on the Arctic Council's members *supra* in 6.2.2.
242 Note, however, that non-Arctic states that have become party to this Agreement subject to art. 30 para. 2, may be invited to Arctic Council Ministerial Meetings if they have been granted Observer status within the Council; see for details ibid.
243 See art. 21 para. 5 of the Draft Framework Agreement; a longer, 4 year time frame – in contrast to the 2 year period the members of the Compliance Committee are being elected for –

According to paragraph 6, the Judicial Commission is assigned to perform all functions necessary to ensure the effective implementation of an Arctic ecosystem approach in governing climate change induced risks. These functions include the settlement of disputes, the trial of individual complaints as regards integrated environmental decision making and advising the parties in respect to the setting of positive incentives as well as settling disputes in that context.[244]

Finally, as further institutional and procedural rules may be necessary for the effective establishment and functioning of the Judicial Commission, article 21 paragraph 7 holds that the adoption of such regulations are to be considered at the first Meeting of the Parties after the Draft Framework Agreement has entered into force.

Article 22 *Working Group on Economic Incentives*

1. A Working Group on Economic Incentives for Arctic Ecosystem Management is hereby established.

2. The Working Group shall perform the functions necessary for supporting the development of domestic and pan-Arctic positive incentives for Arctic ecosystem conservation and the application of the ecosystem approach within the Arctic, for their effective implementation and for coordinating domestic incentives established subject to article 16 paragraphs 2 and 3 of this Agreement.

3. The Parties to this Agreement shall at regular intervals but not exceeding two years, provide reports to the Working Group on the domestic incentives established.

4. The Working Group shall by the means of the domestic reports issued subject to paragraph 3 supervise activities of the Parties to this Agreement as regards incentive measures and based thereon advise the Parties to refrain from establishing or to remove existing harmful incentives. If necessary the Working Group shall make notice to the Arctic Ecosystem Approach Judicial Commission, which shall treat the matter according to article 21 paragraph 6 sub-paragraph d. of this Agreement.

is chosen here to allow proper functioning of the Commission, which by its purpose as a judicial body may be confronted with extensive and time consuming proceedings.

244 See for details art. 21 para. 6, sub-paras. a.-d. and arts. 6, 13, 15, 16 and 27 of the Draft Framework Agreement.

5. At the first Meeting of the Parties after entry into force of this Agreement, the Parties shall consider and approve further institutional and procedural rules necessary for the establishment and functioning of the Working Group on Economic Incentives, especially as regards the funding of economic incentives.

Commentary

Additionally to the Compliance Committee subject to article 20 and the Judicial Commission subject to article 21, the Draft Framework Agreement foresees the establishment of a third new body, within the Arctic Council framework: The Working Group on Economic Incentives.[245]

According to paragraph 2 to article 22, the Working Group is responsible for conducting all functions necessary to support the development of domestic and pan-Arctic positive incentives as well as to coordinate any such incentives taken subject to article 16 paragraphs 2 and 3, which will aid in Arctic ecosystem protection and conservation and form an important ingredient in applying the ecosystem approach across the Arctic.[246] In this context the state parties to the Draft Framework Agreement are required to issue reports to the Working Group on the domestic incentives taken at regular intervals, but at least every two years.[247] Based on these domestic reports, the Working Group will according to paragraph 4 to article 22 have to supervise incentive activities taken (including their funding[248]) and if necessary advise the parties to refrain from establishing or to remove existing harmful incentives. In this context the Working Group is given the possibility to notify the Judicial Commission about any such perverse incentives, which will then advise the parties on the issue.[249]

As with the Compliance Committee and the Judicial Commission, the proper establishment of the Working Group on Economic Incentives (e.g. defining its size and electing its members), may require further regulatory measures pertaining to institutional and procedural issues. As a consequence paragraph 5 to article 21 requires the parties to the Draft Framework Agree-

245 See art. 22 para. 1 of the Draft Framework Agreement.
246 See in this context *supra* in 8.2.1.3.
247 See art. 22 para. 3 of the Draft Framework Agreement.
248 See art. 16 para. 5 of the Draft Framework Agreement.
249 See art. 22 para. 4 in conjunction with art. 21 para. 6, sub-para. d. of the Draft Framework Agreement.

ment to consider the adoption of any such regulations at the first Meeting of the Parties after entry into force of the Agreement. In this context due regard may be given to the effective incorporation of the Working Group into the Arctic Council's institutional framework, which – in accordance with articles 20 and 21 of the Draft Framework Agreement – would require its formal constitution under an ordinary or extraordinary Arctic Council Ministerial Meeting.[250]

Article 23 *Agreements on Trans-boundary Protected Areas*

1. Agreements established bilaterally or multilaterally pursuant to article 17 paragraphs 4 and 5 of this Agreement, shall be deposited with the Government of XX or the Standing Arctic Council Secretariat, respectively.

2. Any dispute may arising between two or more Parties regarding the application or interpretation of the Agreements on Trans-boundary Protected Areas shall be subject to negotiations between the Parties involved in the dispute.

3. If the dispute cannot be resolved according to paragraph 2, it may be presented to the Judicial Commission subject to article 21 of this Agreement.

Commentary

Article 23 of the Draft Framework Agreement refers to the establishment of trans-boundary protected areas subject to article 17 paragraphs 4 to 6, according to which vulnerable regions that are trans-boundary in scope (i.e. expand across domestic borders and/or beyond areas of national jurisdiction) shall be given trans-boundary protected area status. Regarding the designation of such areas article 17 paragraph 5 requires parties to individually or jointly initiate legislative action, which is reflective of the objectives of the Draft Framework Agreement and hence supports the establishment and implementation of an Arctic ecosystem approach[251]. Such legislative action may result in the adoption of a special agreement laying out the main objectives and measures to be taken in adequately conserving and protecting the area to be designated trans-boundary protected area status.[252]

250 See art. 20 para. 4 and art. 21 para 4 of the Draft Framework Agreement.
251 See art. 17 para. 6 of the Draft Framework Agreement.
252 See art. 17 para. 5 of the Draft Framework Agreement.

The formal regulations pertaining to such an agreement are held in article 23 of the Draft Framework Agreement. According to paragraph 1, agreements on trans-boundary protected areas shall be deposited with the government of a country yet to be determined or as an alternative the Standing Arctic Council Secretariat, which has become operative in early 2013.[253] Consequently in case the Draft Framework Agreement is being adopted and is to enter into force, the parties would have to agree on where to deposit the trans-boundary protected area agreements subject to articles 17 and 23.

Furthermore article 23 paragraphs 2 and 3 hold regulations pertaining to dispute settlement regarding the application or interpretation of agreements on trans-boundary protected areas. The article follows a twofold approach in this context, by primarily leaving the responsibility to resolve the dispute to the parties involved and – in case this proves to be inadequate – by assigning this task to the Judicial Commission subject to article 21 of the Draft Framework Agreement.

Article 24 *FUNDING*

1. Unless otherwise agreed and with the exception of article 16 paragraph 5 and article 22 of this Agreement the Parties shall individually bear their costs arising from implementing this Agreement.

2. Implementation of this Agreement shall be subject to the availability of the necessary resources.

3. Where Parties are due to a lack of financial resources in breach of obligations under this Agreement joint funding for capacity building required for an effective implementation of an Arctic ecosystem approach shall be considered upon notification of the non-compliance subject to article 20 paragraph 6 sub-paragraph e. and paragraphs 7 and 8 of this Agreement. In this regard funding may be facilitated by the use of monetary penalties in accordance with article 19 paragraph 5. Institutional and procedural mechanisms necessary for joint funding shall be considered and approved at the first Meeting of the Parties after entry into force of this Agreement.

253 See *supra* in fn 984 (part II).

Commentary

A vital aspect in enabling the effective implementation of the Draft Framework Agreement across the Arctic is adequate funding. Article 24 tends to this issue, by primarily leaving the financial burden of implementing the Agreement to individual expenses by parties,[254] while due consideration must be given to the availability of resources.[255] Consequently although parties to the Agreement are generally obliged to fulfill the objective of article 2 by effectively implementing the obligations set out in the Draft Framework Agreement, this needs to be put into perspective depending on the financial, institutional and technological capacities available.

In that context paragraph 3 to article 24 holds that parties that are due to a lack of financial resources in breach of obligations under the Agreement, may be supported by means of joint funding for capacity building.[256] The sanctions system as to be established according to article 19 paragraph 5 may also aid in this respect, as the resources gained from monetary penalties may be used for funding capacity building of parties lacking the necessary resources. The parties are in this context subject to article 24 paragraph 3 required to elaborate on institutional and procedural questions regarding joint funding at the first Meeting of the Parties after entry into force of the Agreement and adopt any mechanisms related thereto necessary to allow for the adequate funding and hence effective implementation of the Draft Framework Agreement.

Article 25 *AMENDMENTS*

This Agreement may be amended by a written Agreement of all the Parties. An Amendment shall enter into force 90 days after the date on which the depository has received the last written notification through diplomatic channels that the Parties have completed the internal procedures required for its entry into force.

254 See art. 24 para. 1 of the Draft Framework Agreement.
255 See art. 24 para. 2 of the Draft Framework Agreement.
256 Art. 24 para. 3 requires that consideration of such joint funding be given in respect to a notification of non-compliance subject to art. 20 para. 6 sub-para. e. and paras. 7 and 8 of the Draft Framework Agreement. See for details *supra* in the commentary to art. 20.

Commentary

Article 25 regulates the process of amending the Draft Framework Agreement. Subject to the article an amendment is possible by a written agreement of *all* parties. Accordingly such amendment may enter into force 90 days after the depository obtained the last written notification, concluding that all parties have expressed their consent to be bound by the amendment in accordance with the domestic procedures necessary for its entry into force.[257]

Article 26 *Relationship with other Agreements*

1. The provisions of this Agreement shall in no way affect the rights or obligations of any Party deriving from any existing treaty, convention or agreement in force prior to the entry into force of this Agreement, except where the exercise of those rights and obligations would cause serious damage or threat to the Arctic ecosystems.

2. In relation to the United Nations Convention on the Law of the Sea nothing in this Agreement shall prejudice the rights and obligations as set forth in this Convention, especially as regards marine sovereignty claims within the Arctic Ocean.

3. Where possible, Memorandums of Understanding (MoU) regarding other agreements applicable to the Arctic ecosystems, shall be established, in order to promote closer cooperation between regional and international agreements and their institutions relevant for ecosystem-based assessment and management of climate change induced risks.

4. The provisions of this Agreement shall in no way affect the right of the Parties to adopt and enforce domestic rules, regulations and measures more stringent in applying the ecosystem approach, protecting the Arctic ecosystems and managing climate change induced risks.

257 See also art 29 of the Draft Framework Agreement and furthermore art. 39 in conjunction with arts. 11 and 14, as well as art. 78 of the VCLT, as cited *supra* in fn 265 (part II).

Commentary

While to date the ecosystem approach is not regulated in a legally binding, universal form,[258] the approach and/or some of the principles it encompasses have been ex- and implicitly endorsed in legal documents on a domestic, regional or global level.[259] As a consequence interference with the Draft Framework Agreement and other rights and obligations as set out in existing treaties, conventions or agreements already in force may be possible. Article 26 of the Draft Framework Agreement takes this possibility into account, by stating that provisions of the Agreement are in no way to affect established rights or obligations of parties under other treaties, conventions and agreements they have become members of, prior to the entry into force of the Draft Framework Agreement.[260] Article 26 paragraph 1 puts this notion in perspective, however, by holding that existing rights and obligations shall not be given such precedence if they are capable of seriously damaging or threatening the Arctic ecosystems and as such will undermine the Draft Framework Agreement's objective. As a consequence, any rights and duties assumed subject to treaties, conventions and agreements in force prior to the entry into force of the Draft Framework Agreement, must be carried out in consistency with the Agreement's objective. Furthermore due to the importance of the Law of the Sea Convention in governing the world oceans, including the Arctic Ocean, paragraph 2 to article 26 holds that the regulations set out in the Draft Framework Agreement do not prejudice the rights and obligations as set out in UNCLOS, especially concerning the establishment of marine sovereignty claims in the Arctic Ocean and the settlement of disputes arising therefrom.[261] This, however, does not preclude the application of article 26 paragraph 1 in relation to UNCLOS. Hence, the provisions of UNCLOS, especially pertaining to the protection and preservation of the marine environment as held in its Part XII,[262] must be applied consistently with the Draft Framework Agreement's objective.

Paragraph 3 to article 26 additionally acknowledges the necessity to promote closer cooperation by means of adopting memorandums of understanding[263] between regional and international agreements and their institu-

258 See *supra* in 4.5.2.1. and 4.5.4.
259 See for details *supra* in 4.5., 5. and 6.
260 See art. 26 para. 1 of the Draft Framework Agreement and art. 30 para. 2 of the VCLT, as cited *supra* in fn 265 (part II).
261 See for details on sovereignty disputes in the Arctic Ocean *supra* in 3.2.2.3.
262 See for details *supra* in 5.3.1.1.
263 See for an example of such MoUs the Memorandum of Understanding between NEAFC and

tions relevant for ecosystem-based assessment and management of climate change induced risks, as such cooperation will benefit the effective implementation of an Arctic ecosystem approach. Existing regional agreements and the institutions appointed to supervising their implementation may possess valuable insight in how to make such an approach effective in practice. Furthermore a closer cooperation and coordination of risk assessment and management measures across legal institutions, may prevent conflicting activities and foster valuable synergies in governing climate change induced risks.

Finally paragraph 4 to article 26 allows parties to the Draft Framework Agreement to adopt and enforce domestic rules, regulations and measures, that are more stringent in applying the ecosystem approach, protecting the Arctic ecosystems and managing climate change induced risks. As such the Draft Framework Agreement sets a minimal threshold below which parties are not to go and enables them to exceed the provisions set therein.

Article 27 *Settlement of Disputes*

1. Any dispute may arising between two or more Parties regarding the application or interpretation of this Agreement shall be subject to negotiations between the Parties involved in the dispute.

2. If the dispute cannot be resolved according to paragraph 1, it may be presented to the Arctic Council Judicial Commission subject to article 21 of this Agreement or to an arbitral tribunal, including the Permanent Court of Arbitration and the International Court of Justice.

Commentary

Article 27 of the Draft Framework Agreement tends to dispute settlement and in that context follows a twofold approach: Any disputes regarding the application or interpretation of the Draft Framework Agreement arising between parties may primarily be resolved by negotiations between the parties concerned.[264] In cases where such negotiations are not successful, however, the dispute may be presented to the Arctic Council Judicial Commission subject to article 21 or any other suitable arbitral tribunal. The Draft Frame-

the OSPAR Commission *supra* in fn 893 (part II).

264 See art. 27 para. 1 of the Draft Framework Agreement.

work Agreement refers to the Permanent Court of Arbitration and the International Court of Justice in this context.[265] This list, however, is meant as a mere suggestion, rather than being conclusive and the parties are free to choose the dispute resolution method they deem suitable the most for their purposes in effectively resolving the dispute and consequently allowing for the continuous compliance with the objective of the Draft Framework Agreement.

Article 28 *SIGNATURE*

This Agreement shall be open for signature at XX from XX to XX by all Arctic States.

Commentary

Article 28 of the Draft Framework Agreement sets out the specifics for when and where the Agreement will be open for signature. Location and time would have to be determined in the final version of the Agreement.

Article 29 *RATIFICATION, ACCEPTANCE, APPROVAL*

This Agreement shall be subject to ratification, acceptance or approval. Instruments of ratification, acceptance or approval shall be deposited with the Government of XX or the Standing Arctic Council Secretariat, respectively.

Commentary

In accordance with the domestic procedures necessary to become party to an agreement, the parties subject to article 29 of the Draft Framework Agreement may ratify, accept or approve of the Agreement, i.e. express their consent to be bound by it,[266] in order for it to become legally binding and enforceable. Instruments of ratification, acceptance or approval will have to be deposited with a government yet to be determined or the Standing Arctic

265 See on this issue also *supra* in 8.2.2.2.
266 See art. 2 para. 1, sub-para. b and arts. 11 and 14 of the VCLT, as cited *supra* in fn 265 (part II).

Council Secretariat, which was formally opened in early 2013.[267] Consequently in case the Draft Framework Agreement is being adopted and is to enter into force, the parties would have to designate the depositary in accordance with article 76 of the Vienna Convention on the Law of the Treaties.[268]

Article 30 *PARTIES, ACCESSION*

1. Parties to this Agreement shall be all Arctic States.

2. Other states interested in the implementation of the ecosystem approach may accede to this Agreement by invitation of any of the Parties to this Agreement. The instrument of accession shall be deposited with the depositary subject to article 32.

3. Parties to this Agreement may, where appropriate, seek cooperation with Non-Parties, including international and regional organizations, that may be able to contribute to the effective implementation of the ecosystem approach within the Arctic and the management of climate change induced risks.

Commentary

According to article 30 paragraph 1 to the Draft Framework Agreement primary parties to the Agreement are all Arctic States. However, because the ecosystem approach and the governance of trans-boundary environmental threats, such as climate change induced risks, are served best if addressed comprehensively and by involving all stakeholders, paragraph 2 allows the accession to the Agreement of non-Arctic states interested in the implementation of the ecosystem approach. Such states, however, may only accede to the Draft Framework Agreement by invitation of any state already party to the Agreement. As a consequence, as long as the eight Arctic States are not interested in allowing other, non-Arctic states, to accede to the Agreement, it will remain strictly regional in scope.

In this context some further remarks are necessary: The fact that according to article 30 paragraph 1, the Draft Framework Agreement is primarily open to signature and ratification/accession/approval by Arctic States mirrors the

267 See *supra* in fn 984 (part II).
268 See in this context also art. 32 para. 2 of the Draft Framework Agreement.

rights and obligations as set out in the previous articles: While the involvement of other states, organizations, the public (including indigenous groups) and any other stakeholders is upheld in the Agreement's provisions on various occasions and such an integrative approach is regarded as being essential in effectively adopting and implementing the ecosystem approach across the Arctic,[269] the Agreement nevertheless acknowledges, that the primary responsibility for the governance of climate change induced risks lies with state parties,[270] which in turn are responsible for ensuring that their citizens as well as organizations situated within their jurisdiction are in compliance with the rules and regulations they are bound by. Of course governing climate change induced risks, as a trans-boundary issue, are not solely of concern to the eight Arctic States, however. Allowing for involvement of other, non-Arctic states, subject to article 30 paragraph 2 of the Draft Framework Agreement, thus is certainly appropriate.

Yet, while the proposed Draft Framework Agreement allows for accession of non-Arctic states, it is still not exactly universal, but rather regional in scope. Climate change is undoubtedly a universal natural phenomenon, furthered by human activities in every part of the world. Equally as broad are the naturally or anthropogenically induced risks related thereto. Yet, the aim of the Draft Framework Agreement is to establish an ecosystem-based approach to governing the Arctic and the risks it is facing, so as to make the Arctic ecosystems more resilient against threats, such as climate change induced risks. The focus is thus on regional, rather than global initiatives. In reflecting upon the fact that climate change is an international phenomenon, however, and so are the risks it entails, the Draft Framework Agreement tries to attend to the universal scope of this problem, by granting non-Arctic actors the possibility to accede to the Agreement. In theory the Agreement is thus open for signature and ratification by all states interested in Arctic matters and their adequate management and hence an international agreement. However, as such accession may only be granted by means of formal invitation by any of the parties to the Agreement, in practice it is unlikely that the Agreement will find global resonance.

Furthermore, elections of the members of the Compliance Committee and the Judicial Commission, subject to articles 20 paragraph 4 and 21 paragraph 4 are a prerogative of the Arctic Council Member States and the Per-

269 See *inter alia* arts. 6, 13, 14, 17 para. 3, 19 para. 4, 20 paras. 3, 4 and 7 as well as art. 21 paras. 3 and 4 of the Draft Framework Agreement.

270 Accord. Reese (Herausforderungen), at 22 and 24.

manent Participants, which again upholds the regional character of the Agreement. No matter its global linkages, the Agreement is thus consequently to be seen as an effort to establish a regional framework to effectively govern climate change induced risks and as such may allow for guidance on developing (further) such legal measures on a broader, global scale.

Paragraph 3 to article 30, however, acknowledges the value of cooperating with non-parties so as to foster the effective implementation of the ecosystem approach within the Arctic and the management of climate change induced risks. While no clear obligation, this paragraph supports outreach to other states as well as international and regional organizations and institutions, that are not party to the agreement, but may prove to be helpful in achieving the objective of the Draft Framework Agreement subject to its article 2.

Article 31 *Entry into Force, Withdrawal*

1. This Agreement may be applied on a provisional basis by any signatory following the date of receipt of a written statement to the depositary holding the intent of the Party to do so.

2. This Agreement shall enter into force 30 days following the date on which six Arctic States have deposited their instrument of ratification, acceptance or approval with the depositary.

3. For any state acceding to this Agreement subject to article 30 paragraph 2, this Agreement shall enter into force in accordance with paragraph 2 or 30 days following the date on which the instrument of accession was received by the depositary, whichever is later.

4. Any Party may at any time withdraw from this Agreement by written notification to the Depositary at least six months in advance, specifying the effective date of the withdrawal. Withdrawal from this Agreement shall in no way affect its application among the remaining Parties.

Commentary

Article 31 holds regulations pertaining to the entry into force of the Agreement, as well as the possibility to withdraw from its obligations. Paragraph 1 allows in accordance with article 25 paragraph 1, sub-paragraph a of the Vi-

enna Convention on the Law of the Treaties, the application of the rules and regulations set out in the Draft Framework Agreement on a provisional basis until its entry into force. Parties to the Agreement may do so by notifying the depository by means of a written statement containing their wish to provisionally apply the Agreement prior to its entry into force.

According to paragraph 2, the Agreement will enter into force 30 days after the deposition of the instrument of ratification, acceptance or approval by six of the eight Arctic States. This provision is aimed at facilitating the entry into force of the Agreement, by lowering the number of necessary signatories, as not all Arctic States will have to become party to the Agreement for it to enter into force. At the same time, however, paragraph 2 emphasizes the role of Arctic States in establishing and implementing the ecosystem approach and governing climate change induced risks, as accession by non-Arctic states will not suffice for the Agreement to enter into force, even if more than six parties have become signatories to it. For non-Arctic states wishing to accede to the Agreement subject to article 30 paragraph 2 of the Draft Framework Agreement, the Agreement provides two different time frames for its entry into force: In case non-Arctic states accede to the Agreement prior to its entry into force, it will become binding upon such states once the Agreement has entered into force, i.e. 30 days after the deposition of the instrument of ratification, acceptance or approval by six Arctic States. Alternatively, in case the Agreement has already entered into force, by the time a non-Arctic state means to accede to it, it will become binding upon such parties, 30 days after their instrument of accession was received by the depositary.

Finally, paragraph 4 to article 31 holds specifics on withdrawing from the Agreement.[271] According to this paragraph any party may at any time withdraw from the obligations set out in the Agreement by means of a written notification to the depositary. This notification must be made at least six month prior to the date of withdrawal and such date must be specified in a written notification. While withdrawing from the Draft Framework Agreement is permitted, paragraph 4 makes clear that such action is in no way to affect the application of the Agreement among the remaining parties.

271 See in this context also art. 54 para. a and art. 78 of the VCLT, as cited *supra* in fn 265 (part II).

***Article 32** DEPOSITARY*

1. The original of this Agreement, done in English, shall be deposited with the Depositary. The Depositary shall transmit certified copies of this Agreement to all Parties.

2. The Government of XX shall be the Depositary to this Agreement.

Commentary

In concluding, article 32 holds in paragraph 1 that the original language of the Agreement is English and that it will be deposited with the depositary to be determined, subject to paragraph 2, once the draft is replaced by the final version of the Agreement. The depositary is furthermore responsible to transmit certified copies of the Agreement to all parties.[272]

8.3. Conclusion and a Look Forward: Ecosystem Approach Implementation Within the Arctic and Beyond

The Draft Framework Agreement and the preceding elaborations thereto presented above, provide a possible legal solution to the governance of one of the currently most pressing environmental problems within and beyond the Arctic: Global climate change.

From a circumpolar perspective, the effective governance of climate change induced risks is an admirable goal, since as has been shown, regional ecological, cultural, social and economic well-being now and in the future depend on the health and resilience of the Arctic ecosystems.[273] Furthermore, as some of the Arctic ecosystem functions and processes are responsible for maintaining the global climate system, the conservation and protection of the Arctic ecosystems against climate change induced risks, is an important task not only for the eight Arctic Nations, but rather mankind as a whole.[274]

272 See also arts. 76 and 77 of the VCLT.
273 See *inter alia supra* in 4.5.2.2. d., 4.5.3., 4.5.4. and 8.
274 See in this context also *supra* in 3.2.2.2., 3.2.2.3. and 4.1.

Consequently climate change and the natural and anthropogenic risks it entails are not an exclusive Arctic matter, but have implications far beyond the circumpolar North. Furthermore the Arctic ecosystems function somewhat as an early warning system, as their responses to climate change induced risks allow to draw conclusions for other regions of the world. The application of the ecosystem approach within the Arctic as a management response to climate change induced risks can thus provide valuable insight in managing other parts of the world in an ecologically sound and sustainable manner against the backdrop of climate change.

Seen from this perspective, the management of the Arctic ecosystems in the light of climate change and the Draft Framework Agreement proposed in this context *supra* could play an exemplary role in finding adequate solutions to transnational environmental problems, such as global warming. In implementing an Arctic ecosystem approach within and outside of national jurisdiction, the Arctic States could therefore set a benchmark for the future in the legal governance of ecosystem risks within and beyond the Arctic. Similar to the practical insight the implementation of the Convention for the Conservation of Antarctic Marine Living Resources (CCAMLR) provided for the effective management of fisheries,[275] an Arctic ecosystem approach Framework Agreement, as elaborated above, could serve as a guideline in managing ecosystem risks beyond the circumpolar North in the future. Lessons learned from applying the ecosystem approach within the Arctic could thus play a vital role in setting standards for the assessment and management of climate change induced risks emerging in other parts of the world.

Yet, the drawing of conclusion for regions beyond the Arctic has its limitations: What other regions often lack is an overarching body that fosters cooperation and thus can facilitate the effective implementation of the ecosystem approach. Within the circumpolar North such cooperation especially in environmental matters has been supported by the establishment of the Arctic Environmental Protection Strategy and the Arctic Council for quite some time now.[276] The Arctic Council together with its working groups has been serving as a forum to the eight Arctic States and their indigenous inhabitants for almost two decades and has in this context been able to gather valuable work experience. Furthermore the institution's mandate could be

275 See for details *supra* in 6.1.2.3.
276 See for details on the AEPS and the Arctic Council *supra* in 6.2.1. and 6.2.2.

quite easily expanded under the current regime to serve the needs of implementing the ecosystem approach on a comprehensive (i.e. pan-Arctic) scale more effectively. An initial impetus for strengthening the Arctic Council was already set, e.g. by establishing a Standing Arctic Council Secretariat, as suggested by the Nuuk Declaration of 2011,[277] which may – as indicated on several occasions within the Draft Framework Agreement above – serve the implementation of the proposed Framework Agreement on the Establishment and Implementation of an Ecosystem Approach to Governing Climate Change Induced Arctic Risks.

As the Arctic Council's mandate is limited to the Arctic region, it is *per definitionem* a forum for pan-Arctic issues. Problems such as climate change, however, that are trans-boundary in character and are not restricted to the circumpolar North, require that adequate action is taken to address them appropriately not only within, but also outside of the Arctic. The involvement of non-Arctic states in assessing and managing climate change induced Arctic risks should thus be given due consideration. The proposed Framework Agreement follows a rather cautious approach in this regard, as the parties to the agreement are allowed but not obliged to involve non-parties in implementing the ecosystem approach.[278] Draft article 30 paragraphs 2 and 3, however, are likely to better meet the Arctic States' interests and hence are a more realistic proposition, than a proposal would be, that would request the involvement of non-Arctic states on a more obligatory basis. Additionally, to bridge Arctic and non-Arctic concerns in governing climate change induced Arctic risks the Agreement provides non-Arctic states, as well as NGOs and the public with the possibility to have some influence on the establishment and implementation of an Arctic ecosystem approach by means of issuing reports subject to draft article 19 paragraph 4 and draft article 20 paragraph 7.

Yet with the adverse ramifications of climate change becoming more pressing and the interests of non-Arctic states in the high sea areas of the Arctic Ocean rising, it is questionable if the management of the Arctic ecosystems in the future can remain an exclusively Arctic matter and thus stronger involvement of non-Arctic states would become necessary.[279]

277 See *supra* in fn 984 (part II).

278 See art. 28 paras. 2 and 3 of the Draft Framework Agreement.

279 See in this context e.g. China's interest in participating in Arctic decision-making; Koivurova & Duyck, at 188, Schofield & Potts, at 479 and 481, as well as Nilsen (China's Arctic Interest); note in this context that as of May 2013 China has been granted Observer status within the Arctic Council; see for details *supra* in 6.2.2.

Taking this argument one step further, implementing the ecosystem approach within the Arctic may in the future bring about a paradigm shift not only for domestic legislation in regions situated beyond the Arctic, but also in international environmental law in general.

The current regime of public international law is – with some exceptions – as has been shown throughout this thesis, characterized by fragmentation.[280] A lot of this fragmentary approach stems from the traditional understanding of state sovereignty.[281] Within their jurisdiction states can – given their compliance with international law they are bound by – establish their own set of rules and regulations, including such pertaining to environmental issues. This fragmentation is further fostered by the myriad of bilateral and multilateral treaties addressing these issues. States that have not ratified such treaties or are not willing to comply with them, are – in the absence of stringent implementation mechanisms – primarily bound by their domestic legislation and the *"no harm"* rule as e.g. expressed within the Trail Smelter Arbitration, which has become customary environmental law.[282] The *"no harm"* rule is, however, not effective enough – and neither is exclusive domestic action – to adequately address trans-boundary environmental problems such as climate change. In this context, the term *"globalization"* which is commonly used to describe the socio-economic interlinkages between states, may also be apt when addressing today's environmental problems.

Newly emerging environmental issues, such as climate change, that are global in character, require – as has been shown in this thesis using the example of the Arctic ecosystems – a new approach to their management. The classical, fragmentary approach of state sovereignty, whose focus often lies with short term economic gain and hence is based on traditional risk governance methodologies, such as the cost-benefit analysis, in this context has proven to be inadequate.[283] The ecosystem approach, as a holistic principle, is less attentive to sovereignty issues and purely economic reasoning, but rather stresses cooperation, coordination and integration across sectors and

280 See *supra* in 5. and 6.

281 Accord. Fritz, at 295–297.

282 See Birnie, et al., at 137, Bratspies, at 153, Bhat, at 377, Leary & Pisupati, at 4, Hunter, et al., at 440 and 472; The "no harm" rule is prominently contained in principle 21 of the Stockholm Declaration and principle 2 of the Rio Declaration (as referred to *supra* in 5.1.1. and 5.1.5.) and has from these documents found way into a variety of legally binding conventions, such as the Convention on Biological Diversity by means of art. 3; see for an analysis of the *"no harm"* rule e.g. Beyerlin & Marauhn, at 39–46.

283 Accord. Fritz, at 296, cf. Sterio, at 231; see for details *inter alia supra* in 4.3., 4.6., 5.6. and 7.

domestic borders. Consequently, from an ecosystem perspective, state sovereignty is an antiquated and even adverse concept. Yet, it is utopistic of course, to assume that the strongly fought for sovereignty of states will be renounced eventually. An ecosystem approach that completely abolishes territorial sovereignty for the benefit of effectively managing ecosystems would thus hardly be met with approval, even if the loss of sovereignty would only concern environmental matters.

Nevertheless, as history shows,[284] the transfer of legislative powers to supranational organizations is feasible and should in light of effectively governing global environmental problems deserve greater attention, as trans-boundary environmental problems require holistic management approaches, which can be served best by the establishment of institutions whose mandate is equally as trans-boundary in scope. The development of such institutions would not mean, however, that domestic interests would play no or only a minor role in the management of the environmental problems concerned. Rather, in light of the ecosystem approach, the institutions established would have to delegate their mandates to the lowest levels possible and would have to integrate opinions and interests of stakeholders as appropriate in every decision-making process and legislative action.[285]

As such an approach would require a re-orientation in public international law, away from the classical state centered focus, towards a more comprehensive, supranational approach, it is difficult to foresee if the above mentioned paradigm shift is likely to happen. Ultimately, how strong the ecosystem approach is applied in practice is dependent upon the will of states to shift their focus away from exclusive domestic interests. Recent developments on an international level, such as the establishment of the Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES), whose aim it is to collect, synthesize and analyze information and data on biodiversity and ecosystems on a global scale,[286] show, however, that there is an in-

284 E.g. in case of the establishment of the European Union.

285 See in this context also *supra* in 4.5.2.2. a., b., k. and l.

286 See for details <http://ipbes.net/> (last visited: 19.07.2014); the first plenary meeting of the IPBES, whose aim was *"to determine modalities and institutional arrangements"* for the IPBES, was held in October 2011 in Nairobi, Kenya. These modalities and institutional arrangements were finalized at the IPBES' second plenary meeting in April 2012 in Panama City, Panama. See for details *Report of the first session of the plenary meeting to determine modalities and institutional arrangements for an intergovernmental science-policy platform on biodiversity and ecosystem services*, Oct. 10, 2011 (UNEP/IPBES.MI/1/8), esp. sect. I, paras. 1 and 7-14, Annex I and II (referring to the functions and operating principles of the Platform) and *Report of the second session of the plenary meeting to determine modalities*

terest in comprehensive, trans-boundary assessment and management of environmental issues.

Additionally, considering, that intact ecosystems are the foundation of human well-being and economic benefit and that they are best maintained by applying an ecosystem approach to their management,[287] states within and outside of the Arctic would in a long term perspective, certainly benefit from such a re-orientation. In this context, the establishment and implementation of a pan-Arctic ecosystem approach could provide the starting point for an assessment and management of ecosystem risks within and beyond the Arctic, that is capable of maintaining the Earth's ecosystems at levels necessary for the well-being of us all.

and institutional arrangements for an intergovernmental science-policy platform on biodiversity and ecosystem services, May 18, 2012 (UNEP/IPBES.MI/2/9), esp. sect. I, para. 1 and sect. IV as well as Appendix I (referring to the functions, operating principles and institutional arrangements of the Platform). Upon agreeing on these modalities the first formal meeting of the IPBES' Plenary (IPBES-1) took place in January 2013 in Bonn, Germany; see for details *Report of the first session of the Plenary of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services,* Jan. 31, 2013 (IPBES/1/12). In December 2013 the second formal meeting of the IPBE's Plenary (IPBES-2) was held in Antalya, Turkey; see for details *Report of the second session of the Plenary of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services*, Jan. 9, 2014 (IPBES/2/17).

287 See *inter alia supra* in 4.5.2.2. d., 4.5.3. and 4.5.4.

9. Concluding Remarks and Summary

The aim of this thesis was to provide a potential solution to the problem of climate change induced risks affecting the Arctic ecosystems, i.e. risks that have both, a natural as well as an anthropogenic connotation, as they refer to those risks stemming from alterations in climate as a natural phenomenon (e.g. droughts, floods and other extreme weather phenomena), as well as to those, which emerge due to human activities linked to climate change, either because climate change is supporting these activities,[288] or because the activities themselves enhance the natural phenomena, causing threats[289].[290]

In seeking a solution to the governance of climate change induced Arctic risks, this thesis elaborated on ways and means to assess and manage such risks in general and tried to find the most appropriate and feasible way as well as the legal background to do so. While a variety of risk governance methodologies exist,[291] the special character of climate change induced risks requires an approach that is capable of adequately addressing the high degree of uncertainty, complexity and ambiguity intrinsic to them, as well as the trans-boundary scope and the long-lasting and often irreversible impacts upon ecosystems such risks may entail.[292] Traditional risk governance approaches, such as the cost-benefit analysis in general fail to address these issues appropriately.[293] Consequently, the emergence of new environmental risk, such as climate change induced risks, requires an equally as novel governance approach towards them. In this context the adoption of a more cautious, as reflected in the precautionary principle[294], and holistic methodology, as envisaged by the ecosystem approach, was advocated in this thesis.[295]

288 E.g. an increase in shipping activities due to the melting of sea ice within the Arctic Ocean.
289 E.g. the release of anthropogenic greenhouse gases, which will add to the greenhouse effect and hence cause a rise in temperature; see for details *supra* in 2.2.2. and 2.2.3.
290 See on the definition of climate change induced risks *supra* in 1.2.
291 See for details *supra* in 4.3.-4.5.
292 See for details *inter alia supra* in 1.2., 4.4.4.3., 4.5.4., 4.6., 7. and 8.
293 See for details *supra* in 4.3.
294 See for details on the precautionary principle *supra* in 4.4.
295 See for details on the ecosystem approach *supra* in 4.5. and as regards the necessity of such an approach to the governance of newly emerging environmental risks furthermore *inter alia* in 1.2., 4.4.4.3., 4.5.4., 4.6., 7. and 8.

While effectively implementing the ecosystem approach (and through it the precautionary principle, which forms an integral part thereof[296]) would aid in maintaining Arctic ecosystem functions and services, that are responsible for sustaining human well-being within and beyond the Arctic and as such would adequately address climate change induced Arctic risks,[297] the current legal regime is lacking a universal and legally binding definition of this approach, that would provide for guidance in its development and application across the Arctic.[298] As a consequence, if at all, the approach is not applied comprehensively within the circumpolar North, but instead its establishment and implementation is characterized by fragmentation and sectoral advancements in this regard, that lack the necessary cooperative action.[299] Adequate governance of climate change induced Arctic risks therefore requires the establishment of legal rules and regulations capable of addressing these shortcomings.

Following such conclusions, this thesis proposed the development of a legally binding Framework Agreement on the Establishment of an Ecosystem Approach to Governing Climate Change Induced Arctic Risks,[300] which is – as a framework agreement – aimed at providing the necessary legal background to the eight Arctic States and other parties interested in governing climate change induced Arctic risks when establishing and implementing the ecosystem approach across the circumpolar North. While the Draft Agreement is pan-Arctic in scope, its development and implementation would prove reasonable not only to Arctic States, but also to countries situated beyond the Arctic Circle: For instance because of the vital role the Arctic ecosystems play in the global climate system and hence in the well-being of us all, their maintenance are of great importance not only to Arctic Nations.[301] Fostering the development and application of a pan-Arctic ecosystem approach, is hence in the interest of Arctic and non-Arctic states and other stakeholders alike.

296 See *supra* in fn 279 (part I).
297 See *inter alia supra* in 4.5.2.2. d., 4.5.3. and 4.5.4.
298 See *supra* in 4.5.2.1., 7. and for details on the international, regional and domestic legal regime pertaining to the Arctic in relation to the application of the ecosystem approach *supra* in 5. and 6.
299 See *supra* in 5.6. and 7.
300 See for details *supra* in 8., esp. 8.2.
301 See *supra* in 3.2.2. and fn 274 (part III).

Furthermore essential conclusions may be drawn from the establishment and implementation of such an agreement for the adequate governance of climate change induced risks in other parts of the world.[302] As such, if a legal initiative similar to the proposed Draft Framework Agreement were achieved in practice within the circumpolar North, the to date rather marginal role of the Arctic as being the largest remaining wilderness in the northern hemisphere, would have to be reconsidered in terms of the high North being a region that is exemplary in effective legal risk governance pertaining to newly emerging, trans-boundary, environmental threats, such as climate change induced risks. As a consequence, considering the profound impact climate change already has and probably will have in the future, it is to hope that an increasing focus will be drawn not so much to Arctic sovereignty claims, which have gained momentum in recent years,[303] but rather to the Arctic's role as a pioneer in the legal governance of climate change induced risks in order to maintain its ecosystems for the well-being of all species, including humans, within the circumpolar North and beyond.

302 See *supra* in 8.3.
303 See *supra* in fn 2 (part I) and 3.2.2.2 and 3.2.2.3.