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LIMITATIONS AND STRENGTHS OF ENVIRONMENTAL AGREEMENTS

Johnsen, K. I., Alfthan, B., Hislop, L., Skaalvik, J. F. (Eds). 2010. ***Protecting Arctic Biodiversity.*** United Nations Environment Programme, GRID-Arendal, www.grida.no

ISBN: 978-92-807-3054-8
DEWA Job Number: DEW/1259/N

Printed by Birkeland Trykkeri AS, Norway

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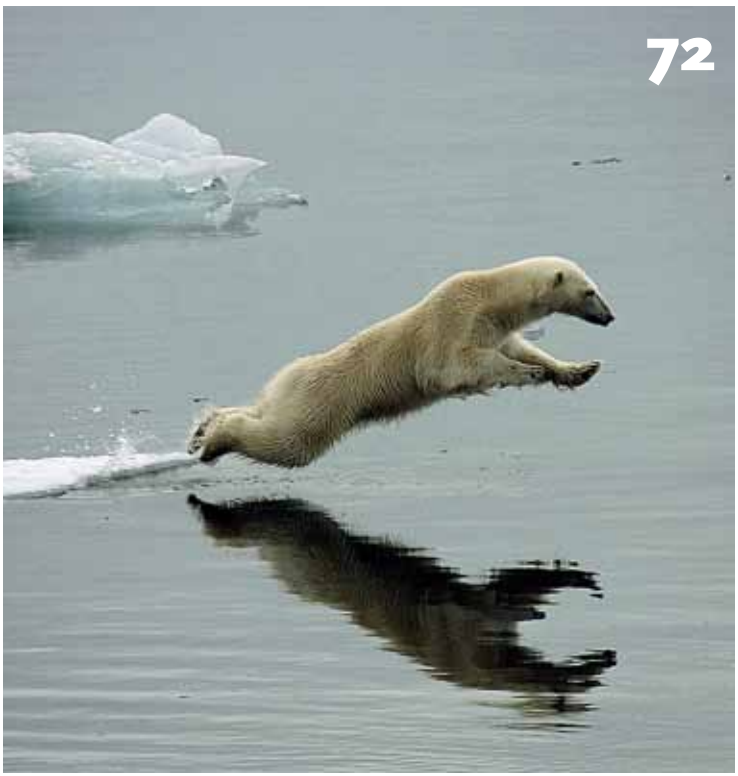
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Foreword

We are currently witnessing unprecedented change in the Arctic, which will have important and far-reaching consequences not only for the region itself, but for the rest of the world.

Evidence of a warming Arctic, and its associated consequences, is mounting and this year is no exception. Current warming in the Arctic atmosphere, oceans and on land is contributing to far-reaching and rapid change across the world's largest ecoregion.

One well-publicised impact of a warming on Arctic biodiversity is the loss of habitat for species dependent on sea ice, including polar bears. Yet this is but one of the most visible changes occurring across the Arctic. Other habitats that are critical for biodiversity, such as the tundra, have been disappearing over recent decades as a result of climate change.

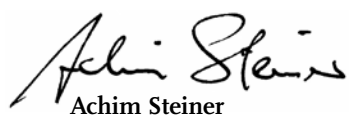
At the same time, habitat loss and fragmentation from infrastructure and industrial development, pollution and toxins, overharvesting, and invasive species infestations continue to have impacts on biodiversity in the region.

Changes in the abundance and distribution of certain species are also threatening traditional ways of life for Arctic peoples. The recovery of wild reindeer and caribou populations, which have declined by one-third since the start of this millennium, is not assured given current habitat loss and climate-related changes across the Arctic.

UNEP has singled out the Arctic for particular attention in order to address the growing concerns about the region's vulnerability. This report responds to the request by the participants to the Arendal Seminar in 2006, co-organised by UNEP/GRID-Arendal and the Standing Committee for Parliamentarians of the Arctic Region (SCPAR), to examine the limitations and strengths of existing environmental agreements for conserving and protecting Arctic biodiversity, and options for improvement. It makes an important contribution to the International Year of Biodiversity (IYB), at a time when the world is reflecting on achievements to reverse biodiversity loss.

The report makes four significant recommendations. These are (1) to strengthen investments in co-management and support to programmes of adaptation, (2) to increase the extent of protected areas in the Arctic, especially in the coastal zones and the marine environment, (3) to increase the monitoring of Arctic biodiversity and to further promote cooperation with non-Arctic states that share responsibility for Arctic migratory wildlife, and (4), that the Arctic Council work towards an even more progressive role in ensuring the protection and sustainable use of the living natural resources in the Arctic, similar to its efforts in combating long-range transboundary pollutants.

With a unique history of environmental cooperation within the Arctic Council, I remain convinced that Arctic states will continue to lead the way to address both Arctic and global issues that influence the future sustainable management in the Arctic. My hope is that this report will contribute to the process.



Achim Steiner
United Nations Under-Secretary General and Executive Director, United Nations Environment Programme

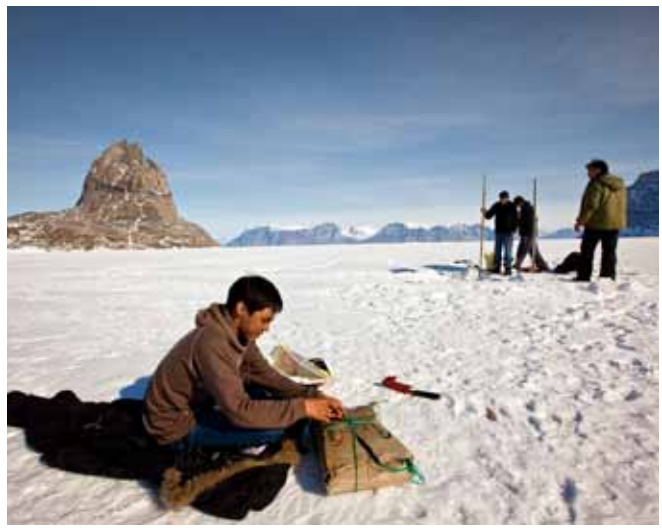
Executive summary

The Arctic region is characterized by some of the largest continuous intact ecosystems on the planet, but is facing increasingly larger threats. These threats include the full range of stressors known from other parts of the world, namely habitat loss and fragmentation from infrastructure and industrial development, chemical pollution, overharvesting, climate change and invasive species infestations. Many of these pressures are mainly globally driven, including climate change, long-range transported pollution and invasive species infestations. Others, such as harvesting and fragmentation are directly under Arctic governance, though often driven from demands outside of the Arctic region.

This report takes a broad view of existing multilateral environmental agreements (MEAs) and examines the role of the global environment in impacting and influencing the efficiency of Arctic MEAs in protecting biodiversity and in sustainable development.

The report identifies four major areas where the Arctic nations must strengthen further their funding, ambitions and activities, addressing both Arctic and global issues that influence the future sustainable management and development in the Arctic:

Firstly, **climate change is increasingly impacting Arctic biodiversity**. With low emissions originating from the Arctic itself, Arctic governance must focus primarily on increasing adaptation and resilience of wildlife, fisheries and societies in the Arctic, including through the promotion of indigenous knowledge. As the sources of greenhouse gas emissions are not actually located in the Arctic, the primary search for mitigative solutions needs to be outside the Arctic region.



The Arctic region should strengthen investments in co-management and in supporting programmes of adaptation. However, a coordinated global approach is needed with actions required at all levels.

Secondly, **Arctic nations need to substantially increase the extent of protected areas**, especially in the coastal zone as well as the marine environment. Currently, only a fraction of the marine environment is protected. Only a small part of this is adjacent to terrestrial protected areas, so crucial for Arctic ecosystems. There seems to be a consensus in the literature that existing MEAs are not being implemented to the full extent of their terms for the Arctic. It is difficult, therefore, to determine whether there are inherent problems within the substantive provisions of an agreement or whether a failure of political will, lack of resources and capacity, or other factors

are impinging on the effectiveness of MEAs. With this in mind, the protection of areas still remains one of the most effective tools available in management of Arctic resources, and so is the development of co-management programmes.

Thirdly, **increased monitoring of Arctic wildlife**, and especially of migratory species of birds and marine life, is strongly needed. Much of Arctic breeding wildlife spend their winters in habitats outside of the Arctic region and are severely impacted and threatened by harvest or habitat loss far beyond the Arctic. The Arctic Council's Circumpolar Biodiversity Monitoring Programme (CBMP) and Arctic Biodiversity Assessment (ABA) should address strongly the role of habitat loss and impacts on "Arctic" migratory species also outside of the Arctic, as many seasonal wintering grounds are located in (non-Arctic) developing countries with limited financial capacity. This also includes harvest of migratory wildlife. Many of the Arctic MEAs that have been most effective, such as the protection of polar bears, have been specific and targeted. The Arctic Council should play a more active role in supporting the development of specific conservation efforts of migratory Arctic wildlife with regard to binding agreements with such non-Arctic states, as a complement to existing global conventions. Non-Arctic states that share particularly high responsibility for migratory Arctic wildlife should be identified and prioritized for further collaboration on conservation efforts.

Fourth, **many MEAs are based on the understanding of the past** and may not be fully effective in protecting Arctic biodiversity in the coming decades where increasing exploration and receding sea ice will open up for new exploration of a wide range of terrestrial and marine natural resources. Many parts of the Arctic have previously been inaccessible to development. This is rapidly changing, and trade nations also outside of the Arctic region are increasingly interested in the Arctic for shipping, transport and exploration. Hence, the Arctic nations, with their long-standing history in the region, bear a particular role in understanding the fragile ecosystems of the Arctic. The Arctic Council should therefore provide an even more progressive role in ensuring and further supporting its work related to strengthened protection and sustainable use of natural resources in the Arctic. Further, cross-sectoral and interdisciplinary thinking by policy-makers, scientists, and other stakeholders is needed in order to efficiently address biodiversity loss. A holistic approach in dealing with the conservation of Arctic biodiversity could ensure governance systems and management practices that are resilient and quickly adaptable.

Introduction

In September 2006, a seminar on Multilateral Environmental Agreements and Their Relevance to the Arctic was organized by UNEP/GRID-Arendal and the Standing Committee for Parliamentarians of the Arctic Region (SCPAR), and co-sponsored by the Nordic Council of Ministers. This seminar built on the 7th Conference of the Parliamentarians of the Arctic Region in August 2006, at which there was a focus on the need for innovation in Arctic governance, including the possibilities and limitations of a binding legal regime for the Arctic. The objective of the Arendal Seminar was to identify gaps, challenges, and steps that could be taken to make the global multilateral environmental agreements (MEAs) more relevant to the Arctic and more useful in ensuring sound environmental governance and sustainable development.

The outcome was a set of recommendations that was submitted to the United Nations Environment Programme (UNEP), the SCPAR, the Arctic Council, the Nordic Council of Ministers, the governing bodies and secretariats of MEAs, and distributed widely to Arctic stakeholders.

Since the Arendal Seminar, there has been much discussion about the future and form of Arctic governance*. This new interest in how the Arctic is governed is being driven by the effects of climate change on multi-year sea ice cover, the possible opening of new sea routes, the potential for development of Arctic natural resources, and the effects these changes could have on the region's biodiversity.

The overall recommendation of the Arendal Seminar:

To support and cooperate on an audit to assess the effectiveness and relevance of MEAs in the Arctic and to examine the need and options for improving the existing regime, as well as the need and options for developing an Arctic Treaty or Arctic Framework Convention.

The questions raised by changes in habitat, species migration, alterations in plant distribution and the effects on human beings and their reliance on Arctic ecosystems are complex and are currently, a focus of the International Year of Biodiversity. While the Arendal Seminar raised many questions about the role of MEAs, there are new concerns and new questions that need to be answered if we are going to respond to the intricacies of rapid and unprecedented changes in the Arctic.

For this reason, it is useful to look at what has changed since the 2006 Arendal Seminar on MEAs, particularly with regard to advances in science regarding the state of Arctic biodiversity, the relevance of existing MEAs and their effectiveness and limitations. A key issue is the fact that the imminent threats to Arctic ecosystems are not coming only from activities or over-use in the Arctic but also from fundamental changes in ecosystems driven by global processes and activities in non-Arctic regions.

It is a daunting task to attempt to examine all of the MEAs that have a role in protecting and/or managing Arctic biodiversity. In preparation for the Arendal Seminar in 2006, summaries

* Examples include the Conference of Parliamentarians of the Arctic Region, the UN Treaty Event 2008, the Arctic Governance Project (www.arcticgovernance.org), the Aspen Dialogue and Commission on Arctic Climate Change, the European Parliament resolution of 9 October 2008 on Arctic governance, and WWF's work on reforming the marine Arctic governance.

of MEAs relevant to the Arctic were prepared, in some cases by the secretariat responsible for the MEA. These summaries are contained in the document entitled *Overview report: Multilateral Environmental Agreements and their relevance to the Arctic*.

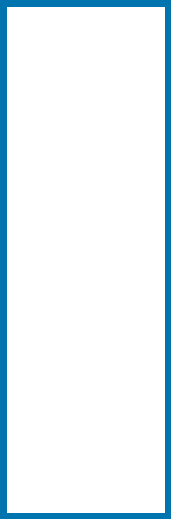
This report provides an analytical overview of information arising from scientific studies, programme initiatives and international collaboration in relation to biodiversity. It is presented in two main parts – the first an analytical overview, and the second a collection of case studies and stakeholder perspectives.

Part I is designed to frame discussions on Arctic biodiversity into the future. Chapter one describes the current status, trends and threats to Arctic biodiversity. It also explores the Arctic as a region and the various concepts through which the Arctic is viewed. Chapter two highlights the importance of Arctic biodiversity in the global context and identifies some of the challenges and efforts being made to improve our understanding of biodiversity. Chapter three sets out in some detail what multilateral environmental agreements are, and summarizes the relevance, strengths and weaknesses of existing MEAs in the context of biodiversity within the Arctic.

Recognising that the conservation of biodiversity in the Arctic will unlikely succeed without the effective participation of northern residents, including Indigenous Peoples, chapter four is devoted to the ecosystem approach as a promising strategy for conservation and sustainable use within the Arctic. Finally, chapter five critically analyses the main issues and barriers inherent to an assessment of the effectiveness of MEAs in the Arctic, and concludes by outlining major areas where Arctic nations should further strengthen their work.

Part II provides an "on-the-ground" context to the broader issues discussed in Part I. Each case study presents an objective, evidence-based overview (though not exhaustive) of the current status of species, the challenges and threats to its conservation and sustainable use, and the existing environmental agreements and regimes that relate to the species.

Also in Part II, five groups of stakeholders contribute their perspectives on biodiversity management and governance issues in the Arctic. Each stakeholder represents different interests within the Arctic – be it of local and Indigenous Peoples, decision-makers, or scientific advisory groups and international bodies.



PROTECTING ARCTIC BIODIVERSITY
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CHAPTER 1

Framing the discussion

Defining biodiversity

For the purposes of this report, the following definition adopted by the Convention on Biological Diversity (CBD) is used:

"Biodiversity" means the variability among living organisms from all sources including, inter alia, terrestrial, marine, and other aquatic ecosystems and ecological complexes of which they are a part: this includes diversity within species, between species, and of ecosystems.

"Ecosystem" means a dynamic complex of plant, animal, and micro-organism communities and their non- living environment interacting as a functional unit.

In examining Arctic biodiversity, it must be recognized that some natural forces, whether or not triggered by human activities, may now be at work in ways that could have fundamental impacts on Arctic biodiversity and Arctic ecosystems as they are today.

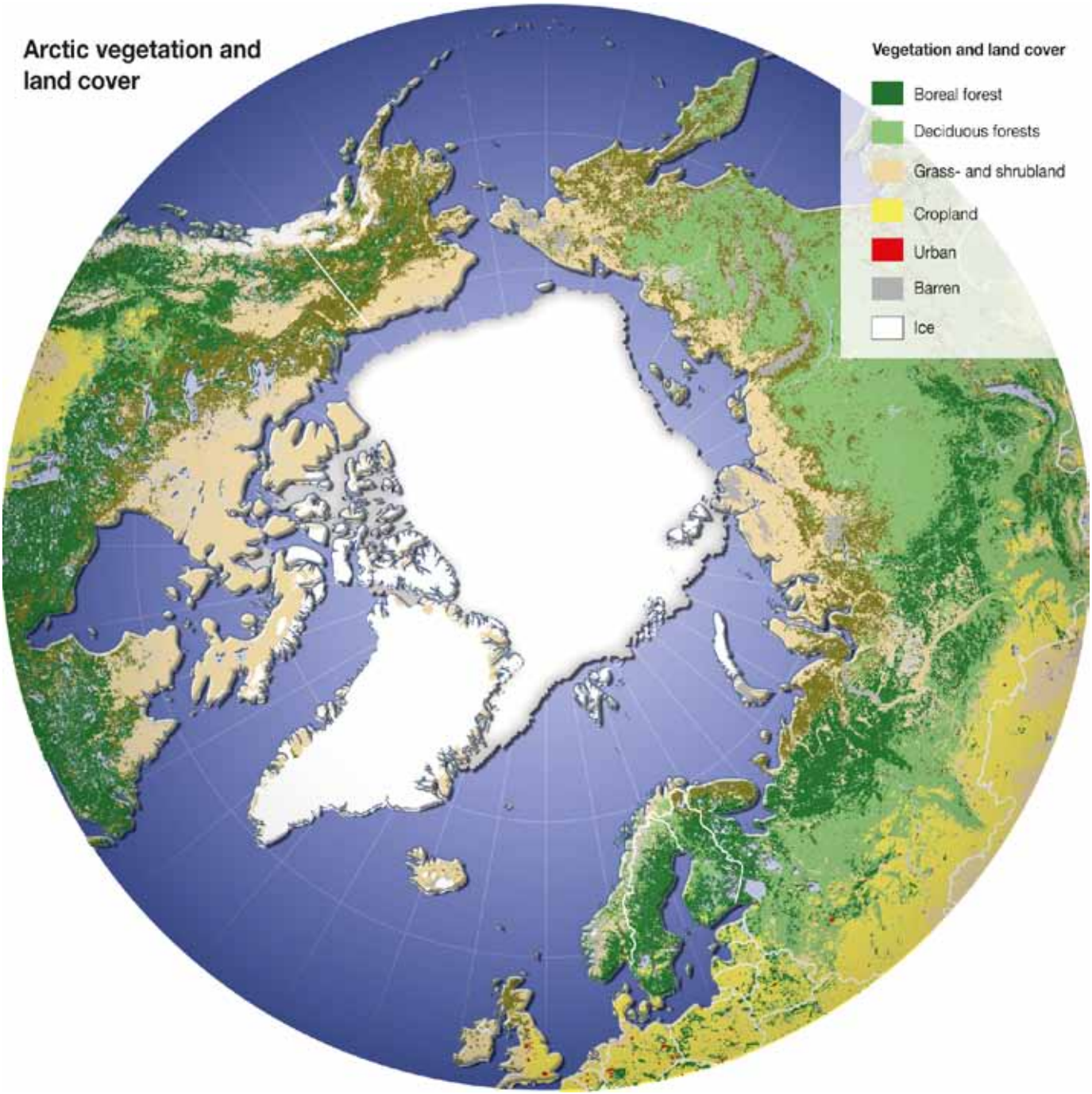
In attempting to assess the effectiveness of MEAs, it is necessary to clarify whether the objective is to preserve the status quo, slow the rate of change, or adapt to fundamental changes in ecosystems. Presumably, all three of these objectives underlie efforts to make MEAs effective tools in helping to protect Arctic biodiversity.

Defining the Arctic

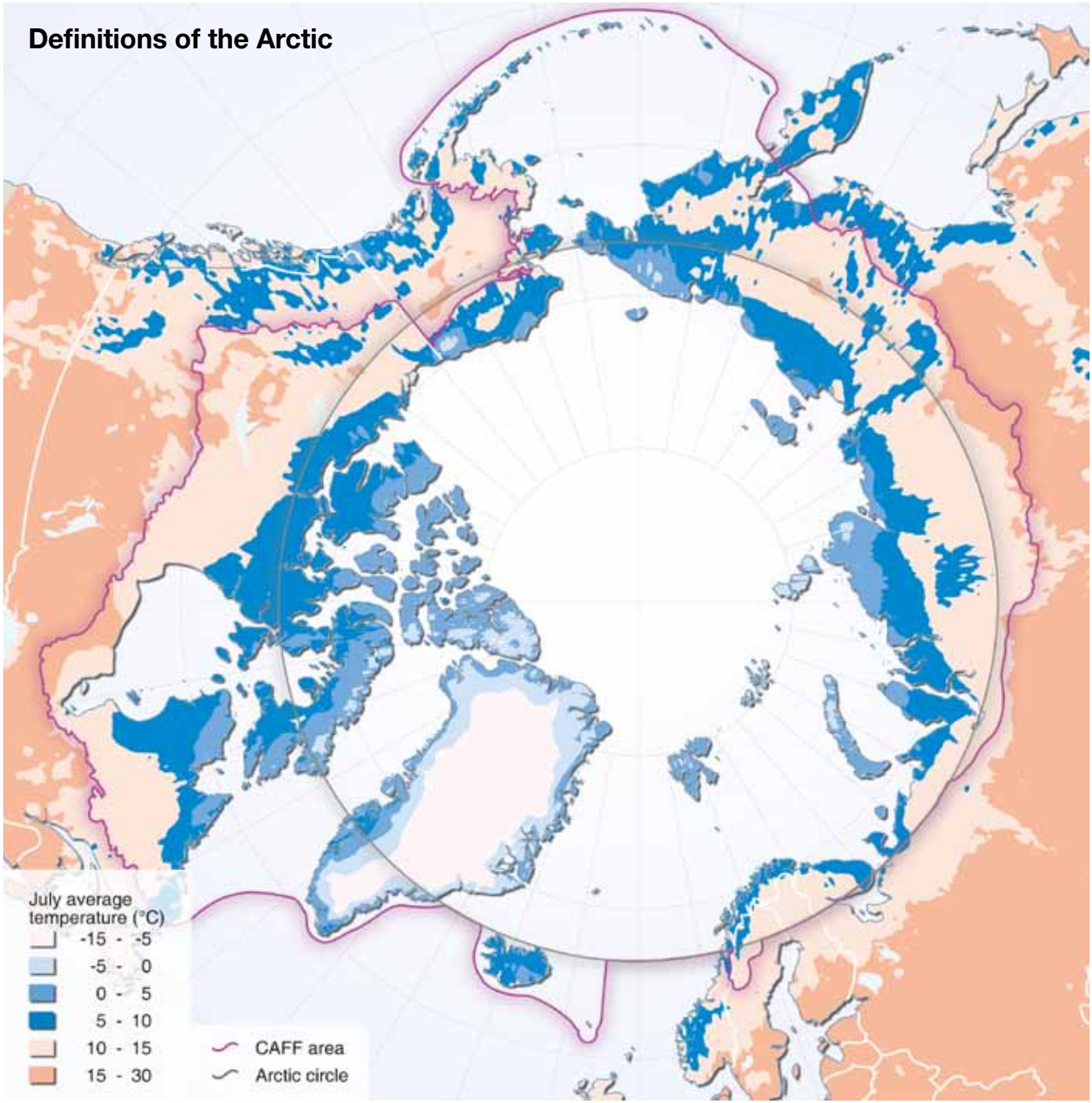
Further complicating any study of the effectiveness of MEAs in relation to Arctic biodiversity is determining what is meant by "Arctic". Unfortunately there is no single definition of the Arctic agreed upon among scientists, policy-makers, and inhabitants of the region. Furthermore, the implementation of MEAs in relation to the Arctic is highly dependent on national policies within the eight Arctic states of Canada, Denmark (Greenland and Faroe Islands), Finland, Iceland, Norway, Sweden, the Russian Federation and the United States of America (Alaska). The selection of case studies in Part II provides examples.

The Arctic and its natural resources – some facts and figures:

- The central feature of the Arctic is the Arctic Ocean. The Arctic Ocean has the widest continental shelf of all the oceans.
- With climate change, the Northwest Passage and the Northern Sea Route may become increasingly important navigation routes. Currently, however, a sparse network of air, river and land routes surround the Arctic Ocean[1].
- Boreal forests of the Arctic cover about 17% of the global land area, representing the largest natural forests in the world[1, p.34].
- Together with the Antarctic, the Arctic contains the largest freshwater resource on Earth[2, p.66].
- Seven of the world's ten largest wilderness areas are located in the Arctic region[2].
- The total catch of wild fish in the Arctic mounted to 7.26 million tonnes, or 10% of the world catch (2002 data)[1, p.33].
- Approximately 3.2% of the world's gold production comes from the Arctic[1, p.32].
- Arctic Russia produces 21% of the global gem-quality diamonds, while almost 15% of the world production is now being extracted from northern Canada[1, p.32].
- About 10% of the global oil production and 25% of the global gas production takes place in the Arctic[3].


Arctic vegetation and land cover
Vegetation and land cover
Boreal forest
Deciduous forests
Grass- and shrubland
Cropland
Urban
Barren
Ice

Definitions of the Arctic



Depending on how it is delimited, the Arctic is home to between four million[4] and nine million people[1], including Indigenous Peoples for whom the Arctic has been a homeland for thousands of years. Arctic communities differ in their lifestyles and livelihoods across the circumpolar region[4]. The economic and cultural significance of Arctic biodiversity to local and Indigenous Peoples of the region is particularly relevant to assessing the effectiveness of measures to preserve Arctic biodiversity.

Sustainable development of the Arctic

When considering measures to preserve biodiversity while pursuing sustainable development in the region, it is important to understand various competing perceptions of the Arctic and how these perceptions can influence the approaches to this challenge.

In this regard, the Arctic can also be analysed using four broad and often competing perceptions: Homeland, Laboratory, Frontier and Wilderness. Understanding the implications of these perceptions of the Arctic is relevant to the development and implementation of MEAs:

Homeland: Resource extraction, including traditional pursuits such as hunting, herding, fishing, trapping, and gathering remain important components of local and Indigenous cultures and economies. Understandably, for the people who know the region through this homeland conceptualization, there is some concern about the influences on their local and regional affairs by those who share one or more of the other three conceptualizations listed below.

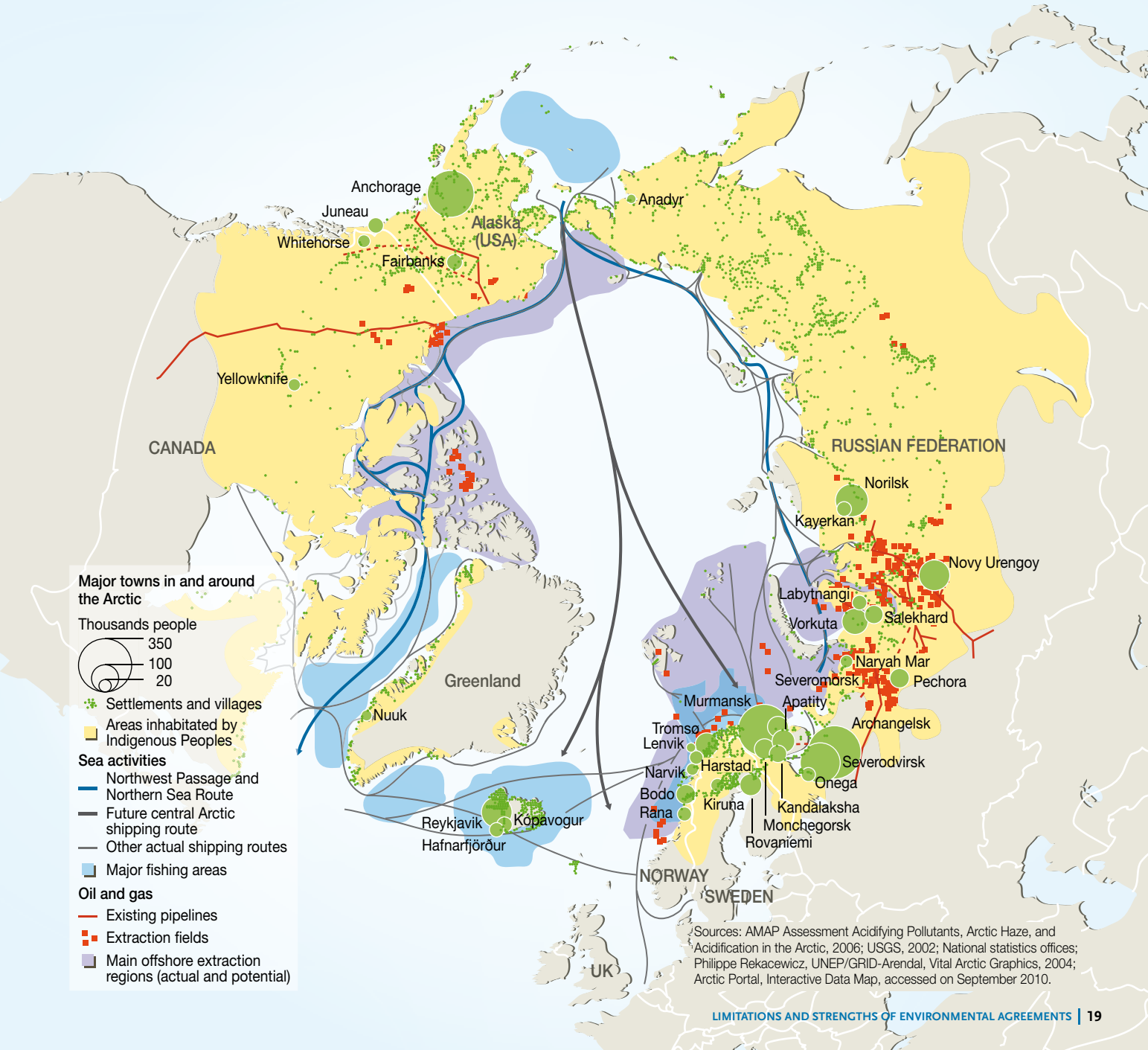
Laboratory: During the past few decades, the Arctic has increasingly become a laboratory for scientific research and cooperation, particularly since the establishment of the Arctic Council in 1996 and during the recent International Polar Year 2007–2008. The science lobby is powerful and persuasive in its dedication to preserving the laboratory conceptualization. Scientific information and knowledge are generally accepted as prerequisites for informed policy and law-making. There are many signs of increasing sensitivity in the science community to the homeland conceptualization of the Arctic, including the value of traditional and local knowledge.

Frontier: Perhaps the broadest and most complex of the conceptualizations is the frontier. Many national, commercial, international, and other interests appear to fall into this category. Conceiving of the Arctic as a 'frontier' to be developed and used is not always inconsistent with the other three conceptualizations noted here, but the powerful interests that come under this banner tend to make it predominant. The Frontierists perceive the Arctic as a region with many new opportunities for potential exploitation of important natural resources to feed national and global demands for energy, fresh water, and other renewable and non-renewable resources.

Wilderness: Alternatively, many environmental and conservation organizations, rooted mainly, but not exclusively, in towns and cities outside the Arctic, see the northern circumpolar region and its flora and fauna as 'wilderness' to be preserved in parks and protected areas. Proponents of this conceptualization also constitute a very powerful lobby and have occasionally experienced some difficulties reconciling their conceptualization with that of the Homelanders, and especially with that of the Frontierists.

The presence of an Arctic circle distinguishing the southern-most limit of the Arctic has tended to isolate the region even within the Arctic states, setting it aside as an issue that is often viewed apart from mainstream national and international affairs. This tendency can present challenges when it comes to addressing issues such as preservation of Arctic biodiversity. The initial response, perhaps understandably, is to conceive of Arctic-specific or Arctic-centred initiatives to be undertaken within the region; however there is also a rationale to take equally strong measures outside the Arctic in order to preserve biodiversity within the region.

Towns and industrial activities in the Arctic



Sources: AMAP Assessment Acidifying Pollutants, Arctic Haze, and Acidification in the Arctic, 2006; USGS, 2002; National statistics offices; Philippe Rekacewicz, UNEP/GRID-Arendal, Vital Arctic Graphics, 2004; Arctic Portal, Interactive Data Map, accessed on September 2010.

CHAPTER 2

The global importance of Arctic biodiversity

The Arctic contribution to global biodiversity is significant. Although the Arctic has relatively few species compared to areas such as the tropics, the region is recognised for its genetic diversity, reflecting the many ways in which species have adapted to extreme environment[2]. Hundreds of migrating species (including 279 species of birds, and the grey and humpback whales) travel long distances each year in order to take advantage of the short but productive Arctic summers[2].

In 2005, the Arctic Council's Arctic Climate Impact Assessment (ACIA)[5] provided an overview of Arctic challenges regarding biodiversity and climate change. The ACIA describes the Arctic's vulnerability to climate change and the role it plays in regulating the Earth's climate. As a result of global warming, the Arctic has changed dramatically during the past decade. According to scientific observations, the sea ice is retreating and thinning, the Greenland Ice Sheet is melting, and the permafrost is thawing[6]. The Arctic region is extremely vulnerable to climate change and its impacts. Over the next 100 years, climate change is expected to accelerate, contributing to major physical, ecological, social, and economic changes, many of which have already begun[5].

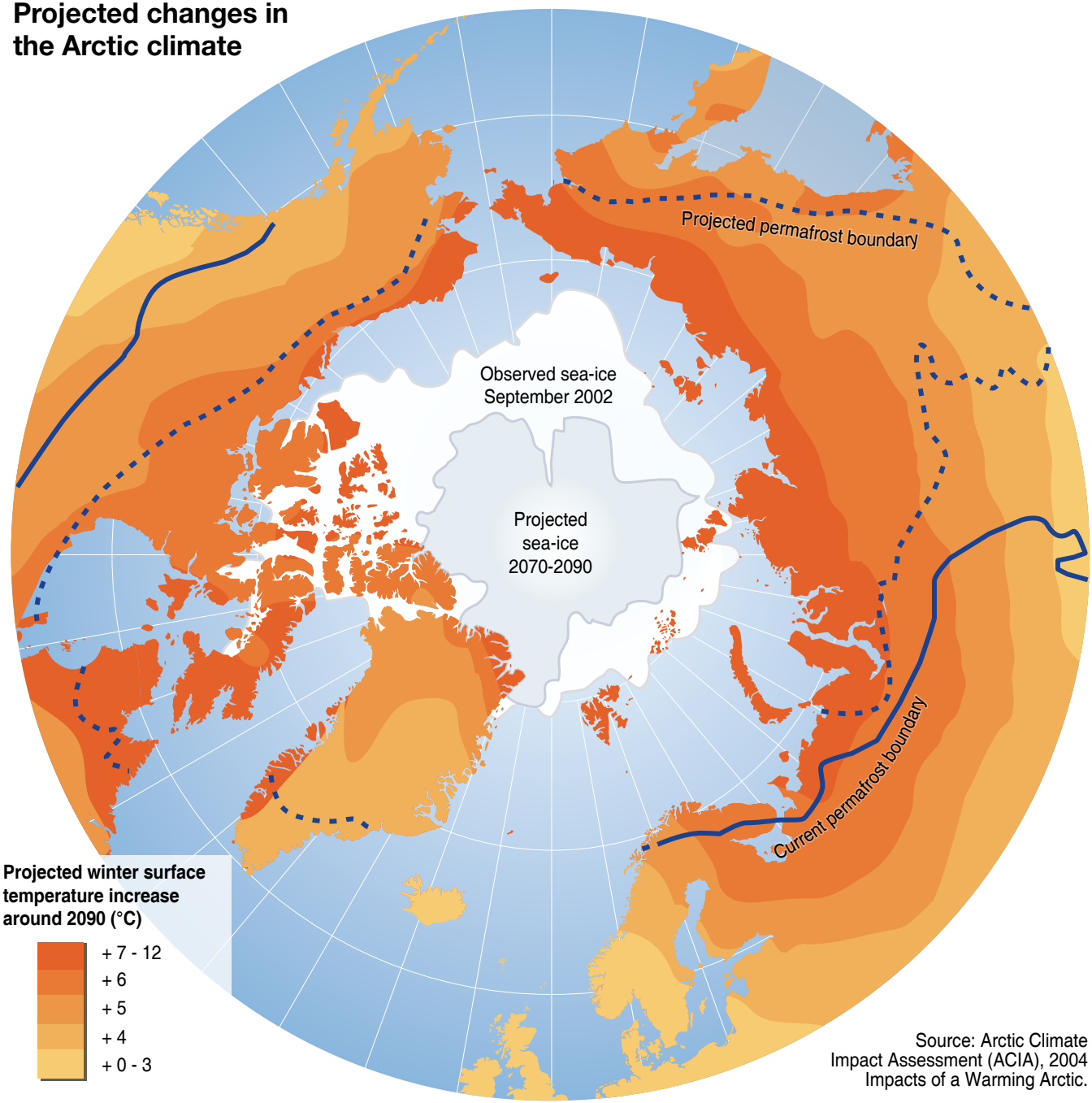
Some of the Arctic climate trends highlighted by the ACIA report include pronounced increases in temperatures, precipitation, thawing permafrost, and retreating summer sea ice.

In relation to Arctic biodiversity, the ACIA report predicted that:

- Arctic vegetation zones will shift, bringing wide-ranging impacts;
- Animal species diversity, ranges, and distribution will change;
- Reduced sea ice is very likely to increase marine transport and access to resources;
- Elevated ultraviolet radiation levels will affect people, plants, and animals;
- Multiple influences will interact to cause impacts to people and ecosystems.

The Arctic Council's Conservation of Arctic Flora and Fauna working group (CAFF) is an important component in assessing and monitoring Arctic biodiversity. CAFF provides information on status and trends in Arctic species and populations and has recently released the *Arctic Biodiversity Trends 2010: Selected Indicators of Change* report, which is the first output of the larger Arctic Biodiversity Assessment scheduled for completion in 2013. The report identifies some trends and stressors on Arctic biodiversity today, and confirms many of the predictions from the ACIA report. Climate change is emerging as the most far-reaching and significant stressor on Arctic biodiversity[7]. Over recent decades, some unique habitats for Arctic flora and fauna have been disappearing. There are, for example, early warning signs of decline in

Projected changes in the Arctic climate



Source: Arctic Climate Impact Assessment (ACIA), 2004 Impacts of a Warming Arctic.

species associated with sea ice, which provides a habitat for numerous Arctic species. On land, trees are beginning to encroach on the tundra ecosystem, and a number of plant communities, including species of grasses, sedges, mosses, and lichens, are being replaced by species from more southerly regions[7].

Populations of certain vertebrates in the Arctic are also declining. The Arctic Species Trend Index (ASTI), which has tracked vertebrate populations in the Arctic over the past 34 years, showed a 10 percent decline in terrestrial vertebrate populations[7]. Although the majority of Arctic species examined in the *Arctic Biodiversity Trends 2010* report are stable or increasing, some species of importance to humans are declining. Wild reindeer and caribou, for example, have declined by approximately one-third since their populations peaked in the 1990s and early 2000s[7].

Other stressors are also impacting Arctic biodiversity. Contaminants can affect Arctic biodiversity, through bioaccumulation in tissues, and can affect the reproduction and mortality of species. Although many so-called "legacy" persistent organic pollutants (POPs) are declining in the Arctic as a result of past bans and restrictions on use and emissions, their concentrations are still high enough to affect biodiversity. Some new POPs, such as polybrominated and perfluorinated compounds, and mercury*, are not yet regulated internationally and have the potential to travel and accumulate in Arctic food webs.The *Arctic Biodiversity Trends 2010* report also cites habitat fragmentation, industrial development and unsustainable harvest as continuing to have impacts[7]. Many Arctic Council reports and other scientific research publications contain a wealth of information on more conventional threats to biodiversity caused by contaminants, resource development pressures, shipping and transportation, and so on. (See Case Studies in Part II for further description of stressors and threats on Arctic biodiversity).

* See reference to the global mercury convention currently under negotiation in Chapter 3.

Despite the most recent efforts to improve the understanding of Arctic biodiversity trends and issues, information is currently insufficient, and available only in a piecemeal fashion and on an irregular basis[7]. Indeed, the *Arctic Biodiversity Trends 2010* report notes: *"Significant difficulties were encountered in preparing this report because most countries do not have internal long-term biodiversity monitoring programs. Where such programs do exist, the data collected is not consistent across the circumpolar region."*

Although efforts to monitor Arctic species exist, the lack of coordination, long-term commitment, integration and involvement of local people has resulted in weak linkages between monitoring and decision-making[2]. The ongoing work of the Circumpolar Biodiversity Monitoring Programme is another important initiative to improve data on key components of Arctic ecosystems. Numerous research results from the IPY 2007–2008 have been, or will be, published and new initiatives such as the Sustaining Arctic Observing Networks (SAON) and the Protection of the Arctic Marine Environment's (PAME) examination of Arctic legal instruments are being developed.

The Arctic is viewed as a barometer that is highly responsive to global processes. However, the effects are not unidirectional: change in the Arctic might also trigger changes in globally-important processes relating to ocean circulation and weather systems. Recent Arctic climate science indicates that climate change in the Arctic is already affecting the rest of the world through a number of feedbacks – namely atmospheric circulation; ocean circulation; ice sheets and sea-level rise; marine and land carbon cycle; and methane hydrate feedbacks[8]. In other words, the Arctic is a component of tightly-linked global biophysical, geopolitical, and socio-economic systems. The blurring of the line between the far north and the rest of the planet is a critical development that carries with it a range of important new considerations. Increasingly, there are concerns that climate change could produce impacts in the Arctic that overwhelm existing governance systems and adaptive capacity, not only in the Arctic, but in other regions of the globe.

CHAPTER 3

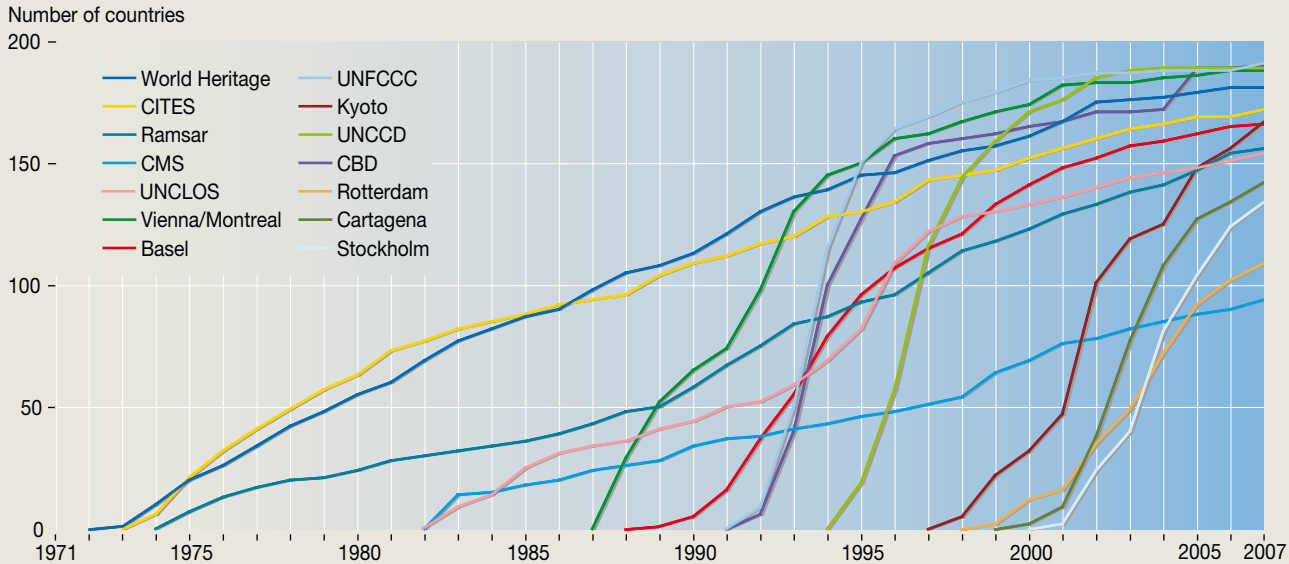
Multilateral environmental agreements for the Arctic

MEAs and biodiversity

MEAs are internationally agreed-upon measures to protect the environment and/or to promote sustainable development. It is generally recognized that MEAs require the engagement of stakeholders at all levels to make them truly effective. For the purposes of this report, the term MEA is intended to include conventions, protocols, and other related international agreements.

Although many MEAs are legally binding, some Arctic states consider MEAs and species agreements as soft law. The terminology of soft law and hard law can be controversial. Soft law is generally used in reference to commitments that are not legally binding, while hard law is used to refer to commitments that are legally binding. In international law, treaties, international agreements, and customary international law are usually considered to be hard law. However, the Convention on Biological Diversity, for example, recognizes that states have sovereign rights over their own biological resources and legal requirements are to be implemented in national legal frameworks. For some states, it is these national legal frameworks that provide the hard law dimension.

Ratification of multilateral environmental agreements



Source: UNEP, *Yearbook 2008*.

Today there are more than 500 international treaties and other agreements related to the environment. About two-thirds of these are regional in nature. Most MEAs have been negotiated since the United Nations Conference on the Human Environment (also known as the Stockholm Conference) in 1972[9]. Several global and regional MEAs are relevant to the Arctic. There also exist a few MEAs, which contain an exclusive Arctic scope, such as the Agreement on the Conservation of Polar Bears, signed by all Arctic nations that have polar bear populations, and the Agreement between the Governments of the United States and Canada on the Conservation of the Porcupine Caribou Herd.

The objectives, priorities, and levels of implementation of MEAs differ significantly from one agreement to another, even where an overall objective might be protection of biodiversity. The scope of biodiversity-related MEAs varies and includes:

- the conservation of individual species;
- migration routes and habitats;
- the protection of ecosystems;
- trade in species;
- safe transfer, handling, and use of living modified organisms;
- protected areas; and,
- sustainable use of biodiversity.

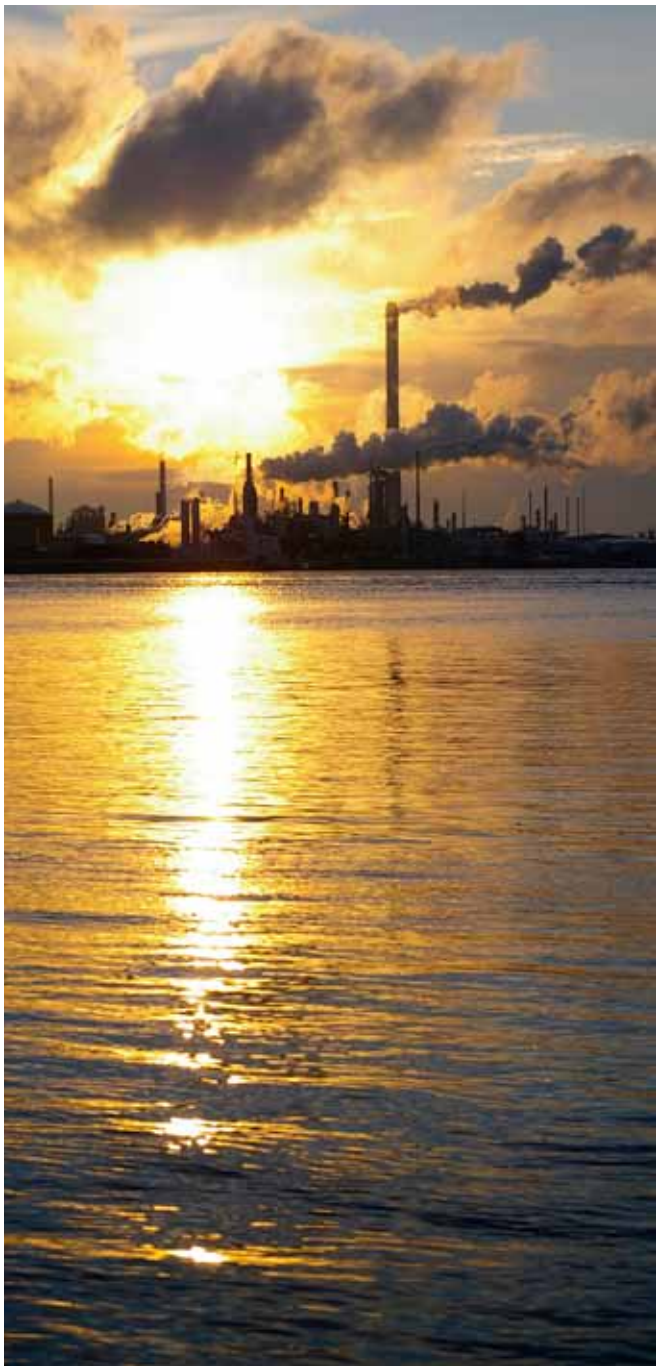
Under the Convention on Biological Diversity there is a working group set up under Article 8(j) which deals with Indigenous knowledge as it relates to the conservation and sustainable use of biodiversity.

Arctic-relevant MEAs

Important MEAs in the context of Arctic biodiversity include conventions such as:

- the Ramsar Convention on Wetlands;
- the Convention on Biological Diversity;
- the UNESCO Convention concerning the Protection of the World Cultural and Natural Heritage (WHC);
- the Convention on Migratory Species (CMS) and its associated agreements such as the Agreement on the Conservation of African-Eurasian Migratory Waterbirds (AEWA); and,
- the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).

Regional and/or species-specific agreements, such as the Bern Convention on the Conservation of European Wildlife and Natural Habitats, the International Convention for the Regulation of Whaling (ICRW), and the Agreement on the Conservation of Polar Bears, are also highly relevant to the conservation of Arctic biodiversity.



In order to get a more complete picture of MEAs that are relevant to biodiversity in the Arctic, it is also necessary to consider not only MEAs that have ecosystem services and biodiversity at their core, but also atmosphere conventions, land conventions, chemicals and hazardous wastes conventions, regional seas conventions and related agreements, as well as trade-related measures.

The Vienna Convention on the Protection of the Ozone Layer, the Montreal Protocol on Substances that Deplete the Ozone Layer, the United Nations Framework Convention on Climate Change and its Kyoto Protocol, and any successor agreements are all relevant to the protection of Arctic biodiversity in that they attempt to eliminate or stabilize anthropogenic emissions that interfere with the atmosphere and drive climate change which is altering Arctic habitats.

Similarly, the chemicals and hazardous wastes conventions, such as the Stockholm Convention on Persistent Organic Pollutants, are relevant to Arctic biodiversity as has been shown by the various assessments of Arctic contaminants conducted by the Arctic Monitoring and Assessment Programme (AMAP). The Global Programme of Action for the Protection of the Marine Environment from Land-based Activities (GPA) and the Arctic Council's Protection of the Arctic Marine Environment (PAME) working group are closely related to the chemicals-related conventions on issues such as agrochemicals, persistent organic pollutants, and heavy metals[9, p.14]. The global mercury convention, which will regulate both the use and emissions of mercury, for which negotiations began in Stockholm in June 2010 and expected to be ready for adoption in 2013, is also directly relevant to Arctic biodiversity.

The Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR) is also concerned with the prevention and elimination of pollutants as well as ensuring the sustainable use of the sea. While not strictly considered an MEA, the United Nations Convention on the Law of the Sea (UNCLOS) is a global agreement with a broad scope. In terms of Arctic biodiversity, Article 123 relating to Cooperation of

Summary table: MEAs and relevant international fora and their relevance to Arctic biodiversity[16]

Arctic-relevant MEAs and international fora	High and direct relevance	Medium Relevance
Legal: MEAs, including species agreements, and mechanisms for development of enhanced cooperation	• Agreement on the Conservation of African-Eurasian Migratory Waterbirds (AEWA) • Agreement on the Conservation of Polar Bears • Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR) • Convention on Biological Diversity (CBD) • Convention on Migratory Species (CMS) • Convention on Wetlands (Ramsar Convention) • International Convention for the Regulation of Whaling (ICRW) • United Conventions Law of the Sea (UNCLOS) • United Nations Framework Convention on Climate Change (UNFCCC) • Stockholm Convention on Persistent Organic Pollutants	• Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) • Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention) • World Heritage Convention (WHC)
International Organizations and Policy Forums	• Arctic Council • Barents-Euro Council (BEAC) • European Union – Northern Dimension Policy • World Trade Organization • United Nations Forum on Forests (UNFF) • International Maritime Organization (IMO)	• Council of Baltic Sea States (CBSS) • Conference of Arctic Parliamentarians (CPAR) • European Economic Area (EEA) • Nordic Council of Ministers (NCM) • Northern Forum

states bordering enclosed and semi-enclosed seas and Article 234 relating to Ice-covered areas, are particularly relevant.

It is well-documented that many of the stressors, which are having fundamental impacts on Arctic ecosystems, such as long-range transported air ollution and climate change, have very little to do with human activities in the Arctic region itself. Consequently, the conception of what is "Arctic-relevant" must be expanded, particularly where MEAs are concerned. Integration of efforts, including economic and trade measures (e.g., through the World Trade Organization), is required to address loss of Arctic ecosystem services and biodiversity. Sectoral or regional approaches alone are unlikely to have a major impact on the driving forces behind the potentially fundamental changes that are anticipated for Arctic ecosystems in the future. MEAs applicable to activities outside the Arctic region are, therefore, highly relevant to preserving Arctic biodiversity. Summaries of MEAs considered to be highly relevant to the Arctic can be found online within the Arendal Seminar *Overview report on Multilateral Environmental Agreements and Their Relevance to the Arctic*[10].

Implementation of MEAs

The 2001 UNEP report, entitled *International Environmental Governance: Multilateral Environmental Agreements (MEAs)*[9], which is derived from information submitted by twenty MEA Secretariats, provides a comprehensive analysis of the strengths and weaknesses of existing MEAs and puts forward recommendations and options for improving international environmental governance.

The existence of a comprehensive strategy, including objectives, priorities, specific activities, timetables, identification of partners, involvement of stakeholders, and budgets for implementation of an MEA, are often critical factors that bear on the effectiveness of an MEA.

The best approach for enhancing international environmental governance may be to focus on coordination among MEAs on substantial grounds and aim at "gradual improvements based on an analysis of needs and global benefits, rather than on new mechanisms that may not be practical to operationalize in the short term"[9, para. 142&149].

In order to increase the effectiveness of the implementation of existing MEAs, some cross-cutting priorities relevant to many MEAs include[9, p.12–13]:

- strengthening the capacities of parties or member states to meet their obligations or responsibilities under MEAs;
- enhancing membership of governments;
- public education and awareness;
- strengthened scientific basis for decision-making;
- strengthened international partnerships;
- mobilizing additional resources for implementing their respective MEAs;
- provision of financial assistance to Parties or member states related to transfer of technologies;
- the development and use of indicators;
- compliance and monitoring of implementation of the convention; and,
- enhanced participation of civil society.

There is need for closer cooperation between the core environmental conventions particularly for those MEAs within the cluster of biodiversity-related conventions. More work and greater attention needs to be directed at the harmonization of national reporting among MEAs[11,12].

Steps are being made in this direction. There are cooperative activities and joint programmes of work in areas of common interest amongst biodiversity-related MEAs – e.g., on migratory species (between the CBD and CMS, and between CMS and Ramsar) and on protected areas (between the CBD, WHC, Ramsar, and CMS). CBD and UNFCCC are cooperating through the Joint Liaison Group of the Rio Conventions, while CBD, CITES, CMS, Ramsar and WHC cooperate through the Biodiversity Liaison Group.

There is an increasing global effort to integrate biodiversity measures with climate change considerations. In 2009 the CBD Conference of the Parties (COP) Decision IX/16[13] urged parties to enhance integration of climate change considerations into their implementation efforts in relation to biodiversity. Also in 2009, the G8 Environment Ministers agreed in the Carta di Siracusa on Biodiversity to put in place measures "for climate change adaptation of natural and managed ecosystems, since spontaneous adaptation is not expected to be sufficient to reduce the impacts on biodiversity at all levels, or on vulnerable ecosystems, for long-term human well-being"[14]. A European Commission (EC) White Paper includes actions to address biodiversity loss and climate change in an integrated manner (see [15]), and many organizations and agencies, such as the European Environment Agency, are working on biodiversity and climate change indicators.

One example of efforts towards synergies between MEAs is the TEMATEA Project on Issues-Based Modules (www.tematea.org), which is a tool developed for streamlining the implementation of a number of biodiversity-related conventions and to promote coherence and synergies between MEAs at both the national and international level.

CHAPTER 4

The ecosystem approach – linking human and biodiversity needs

Protecting human and biodiversity needs

Protected areas are important for protecting representative units of global ecosystems and habitats as well as the world's threatened species. They provide ecosystem services and biological resources, and in some cases are also vehicles for protecting threatened human livelihoods or sites of great cultural and spiritual value[17]. Traditionally, protected areas were reserves set aside for the protection of ecosystems, habitats or landscapes, or a combination of these. In 1994, the International Union for Conservation of Nature (IUCN) published *Guidelines for Applying Protected Area Management Categories*, which were endorsed by the CBD COP in 2004. The Guidelines establish six categories of protected area management, based on primary management objectives.

Category I provides the highest levels of preservation for biodiversity, while Category VI mainly provides for the sustainable use of natural ecosystems.

Both IUCN and CBD acknowledge the legitimacy of different governance types of protected areas, including areas governed by Indigenous Peoples and local communities. The IUCN explains that "good governance of a protected area" can be understood as a governance system that responds to values of the concerned people and country, and that is reflected in legislation and practices[17].

CBD promotes nature and human well-being, recognizing that "biological diversity is about more than plants, animals and micro-organisms and their ecosystems – it is about people and our need for food security, medicines, fresh air and water, shelter, and a clean and healthy environment in which to live"[18]. This is also applicable in the circumpolar north where the natural world forms the basis of northern local and Indigenous Peoples' cultures and ways of life.

Most Arctic peoples are highly resilient* but the combined impacts of climate change and globalization creates new and unexpected challenges[19]. The changes brought about by a warming climate, industrial development, habitat fragmentation, loss of biodiversity, invasive alien species, and pollution can be severe and have unforeseen consequences for Arctic species and ecosystems, as well as for the peoples of the Arctic. Indigenous Peoples' livelihoods and economy are increasingly tied to distant

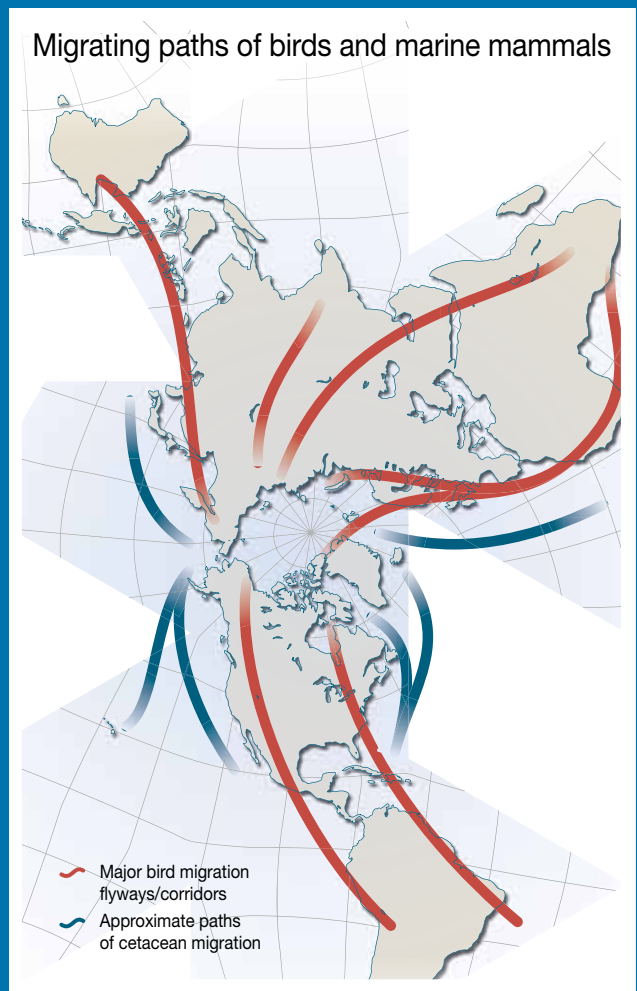
* Resilience: ability to cope with stress and recover from catastrophe.

Migratory birds in the Arctic: the importance of working with non-Arctic regions

Arctic summers, when the sun never or nearly never sets, provide a short but intense breeding season for over 270 migratory bird species[7], which seek the wetlands, tundra and coasts for their seasonal high supply of food. No other place on Earth receives so many migratory birds from all over the planet, resulting in Arctic coastal regions holding a very special global conservation value. The Arctic in the summer is the breeding home for millions of birds, which at other seasons disperse over all continents to every corner of the world. Migratory birds travel to the Arctic from as far away as South Africa, New Zealand, South America, and in the case of the Arctic Tern, all the way from Antarctica[22]. Several major migratory "flyways" are recognised[23] within which several species complete their annual migratory cycle. Many of these movements/flyways have been discovered with modern techniques such as geo-locators and small data loggers, which are used to reconstruct the migration routes and flight patterns of these species[24].

Migratory wetland and shorebirds depend on a limited number of stopover and wintering sites along their flyway, which are sparsely distributed across the landscape and span over countries and continents. Localised threats and disturbances even at one site – including collisions with man-made structures such as powerlines, illegal hunting, pollution, and habitat change – can seriously affect a species' population numbers[23]. Many migratory species that travel to the Arctic are in decline. According to BirdLife International, 11% of the world's migratory birds are Globally or Near Threatened[25]. Of the six sub-species of the red knot, a long distance migratory shorebird which breeds in the Arctic, three are in decline and two appear to be declining, whilst the trend for the 6th sub-species is not clear[7].

Reversing population declines and conserving migratory species of the Arctic requires international cooperation amongst those states located within a migratory flyway, including cooperation between Arctic and non-Arctic states. Importantly, protecting migratory birds against e.g., habitat loss or unsustainable hunting, will only be effective if these measures are similarly applied at other sites along a flyway, including staging and wintering areas. CMS, together with its daughter agreements, provides the international legal framework to facilitate this coordination. Many of its instruments such as the African-Eurasian Waterbird Agreement (AEWA) focus exclusively on flyways. Others, such as the Raptors MoU, target groups of species with a similar ecological role. This structure allows all stakeholders to work together in partnership to conserve these fascinating species for future generations[24].



markets and hence, they will be affected not only by changes in the Arctic but also by changes elsewhere[19].

The economic and cultural importance of Arctic biodiversity to Indigenous Peoples has often been in conflict with the conservation values derived and promoted from more southerly regions. Indeed, many Arctic residents have questioned conventional biodiversity (wildlife) management as practised in the past across the Arctic and have resisted systems for conservation and management of biodiversity imposed from outside the Arctic[20]. It is now acknowledged that collective action, and engagement amongst a diversity of stakeholders, is required to meet these unexpected challenges. Empowering northern residents, particularly Indigenous Peoples, through self-government and self-determination arrangements, including ownership and management of land and natural resources, is a key ingredient that can enable them to adapt to climate change and other challenges[21].

The ecosystem approach

The ecosystem approach as defined by CBD is a strategy for the integrated management of land, water, and living resources that promotes conservation and sustainable use in an equitable way, which recognizes that humans, with their cultural diversity, are an integral component of ecosystems[26,27]. It is the primary framework for action for achieving the Convention's main objectives:

1. the conservation of biological diversity;
2. the sustainable use of components of biological diversity; and,
3. the fair and equitable sharing of the benefits arising out of the utilization of genetic resources[18].

The complexity and interconnectedness of humanity and the rest of nature require knowledge produced through interdisciplinary collaboration and in close connection with other stakeholders and resource users[28]. Participatory approaches help ensure that ecosystem services and biodiversity benefit both local and Indigenous communities, as well as enabling communities to be more responsible for the sustainable management of their natural resources.

Russian experiences with Integrated Ecosystem Management

One way of implementing the ecosystem approach is through Integrated Ecosystem Management (IEM). Broadly speaking, IEM can be defined as the management of human environmental, social, and economic activities and relationships for the purpose of achieving specific conservation and development goals. IEM, therefore, represents a viable alternative for conservation compared with other disciplinary approaches.

While the number of IEM-related initiatives in Russia is limited, interest in its use is growing. Indigenous groups, in particular, have a keen interest in taking part in co-management regimes as applied in many parts of the world over recent decades. Experience with IEM is being gained through initiatives such as the ECORA – a Global Environment Facility (GEF) sponsored project between the Arctic Council working group on the Conservation of Arctic Flora and Fauna (CAFF), the Russian Federation, and UNEP/GRID-Arendal. ECORA, which ran from 2004 to 2009, took an integrated ecosystem approach to conserve biodiversity and minimize habitat fragmentation in three selected model areas of the Russian Arctic, and was one of the first and largest IEM initiatives in Russia.

With the overall goal of conservation and sustainable use of globally-significant biodiversity, the project's immediate priority was the adoption and implementation of IEM strategies and action plans in the three model areas – Kolguev Island, Kolyma River Basin, and Beringovsky district. In support of the IEM strategies and action plans, the project carried out a number of activities including biodiversity and socio-economic inventories and assessments; targeted training programs; legislative, administrative and institutional capacity building; specific conservation measures; and pilot activities to test integrated ecosystem management approaches for conserving and sustainably using natural resources. The project outcomes will help to secure the integrity of some of the world's last remaining pristine areas and support livelihoods of Indigenous and local peoples.

CHAPTER 5

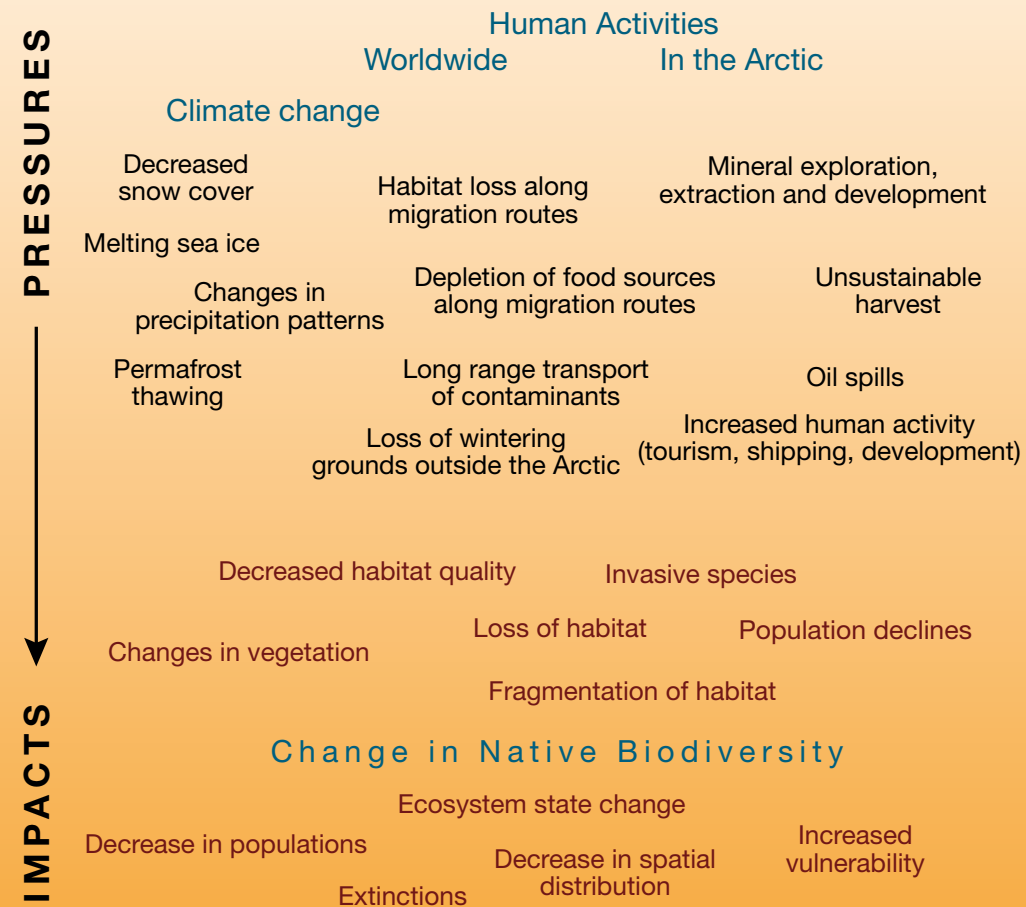
Highlighting the main issues

Increasing pressures on Arctic biodiversity

The biggest environmental challenges that affect Arctic biodiversity, ecosystem services, and economically important biological resources include climate change, industrial and associated infrastructure development both on land and at sea, resource depletion (e.g., fisheries and forestry), pollution, and increased human activity (e.g., shipping, tourism, military activities, overharvesting). Climate change is emerging as the most significant stressor on Arctic biodiversity[7]. There are many uncertainties surrounding the rate and direction of climate change and the impact this will have on Arctic biodiversity. The consequences of global warming are likely to increase the pressure on biodiversity from other sources like contamination (e.g. the secondary release of POPs from melting snow, ice and permafrost), invasive species, and the development and extraction of oil and gas and other resources (see Part II for examples). The increased stress could threaten the resilience and sustainability of the Arctic's biodiversity and the overall balance of its ecosystems, and thereby the Arctic ecosystem services and Arctic peoples' livelihoods.

During the 1970s and 1980s when many MEAs were originally negotiated, climate change was not perceived as an immediate threat to Arctic biodiversity. Over-use of resources, destruction of habitat from development activities, pollution, poor management, and other anthropogenic causes of biodiversity loss were the more typical considerations of MEAs. While many existing MEAs might be effective, if fully implemented, against conventional threats caused by local, Arctic state, or regional activities, the majority of human contributions to

Arctic biodiversity: impacts and pressures



greenhouse gas emissions and transboundary pollutants come primarily from outside the Arctic region. This also applies to the harvest of migratory Arctic species and the loss of habitat for migratory birds wintering in Africa and Asia, where wetlands are declining rapidly.

This report suggests that Arctic-specific MEAs, or MEAs that focus primarily on activities in the Arctic, may not be particularly well-placed to be effective in tackling the root causes of this global phenomenon, nor to address the negative impacts on Arctic biodiversity. To ease some of the most significant pressures on Arctic ecosystems a major effort to implement measures outside the Arctic region is imperative.

The Synthesis Report from the international scientific conference on Climate Change: Global Risks, Challenges & Decisions (Copenhagen, 10–12 March 2009)[29] noted that:
"The actual and potential impacts on biodiversity of human activities which take place in the Arctic are in many ways much easier to deal with than are the potential and actual impacts which human activities outside the Arctic may have upon the region. MEAs might score quite high on protecting Arctic biodiversity from the first category of activity, while failing dismally on the second".

Need for targeting Arctic species and for protected areas

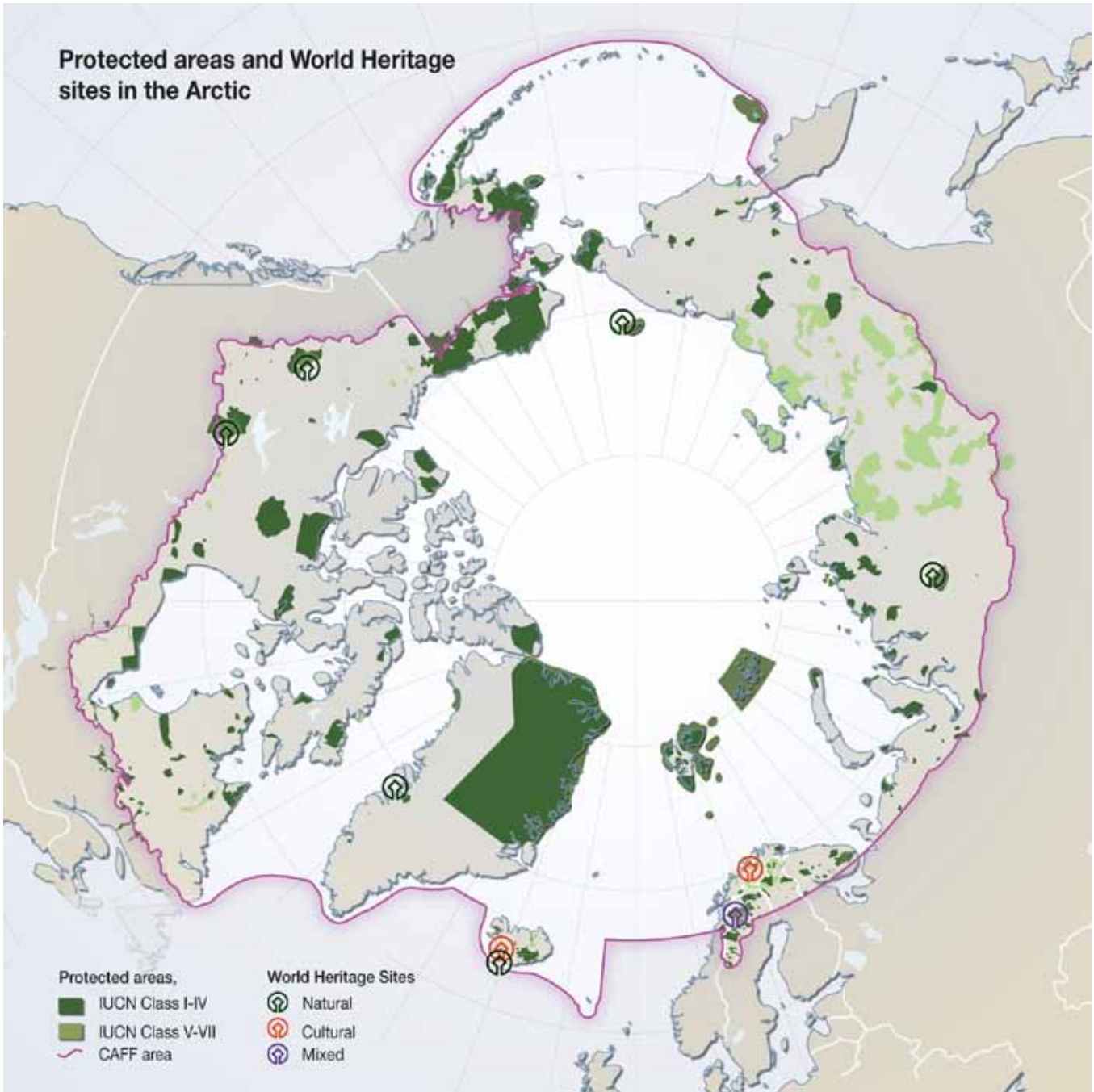
Much could be gained by specifically targeting conservation efforts at selected Arctic migratory bird species. The protection of migratory "Arctic wildlife" cannot take place without collaboration between the Arctic nations and nations hosting migratory species during their migration or wintering, such as in tropical and temperate wetlands. The Arctic Council could play a more active role in supporting the development of specific conservation efforts for migratory Arctic wildlife with regard to binding agreements with such non-Arctic states. As there are already global conventions on migratory species in place, task-specific agreements are needed to secure equal protection of the migratory species both when present in the Arctic during summer as well as when present in temperate or tropical regions. The Convention on Migratory Species, with its provisions for negotiating species-specific regional agreements, is a useful instrument in this regard. Unfortunately, USA, Canada and Russia are not party to the Convention on Migratory Species or its Agreements[30].

While increased action outside the Arctic is urgently required, Arctic nations need to substantially increase the extent of protected areas, especially in the coastal zone as well as the marine environment. Currently, only a fraction of the marine environment is protected, and an even lesser part adjacent to terrestrial protected areas, so crucial in the Arctic ecosystems. Protection of areas still remains one of the most effective tools available in management of Arctic resources, and so is the development of co-management programmes.

Lack of Arctic biodiversity data

Good governance should respond to the status and trends of Arctic biodiversity. Although a significant amount of research has been done on Arctic biodiversity (including recognition of the importance of information through traditional and local knowledge) there is still a lack of sufficient data for a comprehensive understanding of the region[7]. This also applies to information on threats and stressors, for example those of persistent organic pollutants and their interaction with climate change[31]. Consequently, efforts to protect Arctic biodiversity are being based, for the most part, on the precautionary principle.

There are however, some positive observations that can be made about the global consciousness of Arctic biodiversity over recent years. For example, the level of political and public awareness of Arctic-related environmental issues has increased dramatically, in both the Arctic states and in other parts of the world. This awareness appears to be founded on the strong cooperative scientific research efforts that have brought to light the rapidly changing state of the Arctic, including declines in Arctic sea ice, impacts on some iconic species such as polar bears (see case study on Polar bear), and the impacts on Arctic and sub-Arctic Indigenous Peoples. The retreat of Arctic sea ice in summer has also fuelled speculation about access to resources, and access generally, in the Arctic. This in turn has augmented awareness of environmental concerns.


Protected areas and World Heritage sites in the Arctic
Protected areas,
IUCN Class I-IV
IUCN Class V-VII
CAFF area
World Heritage Sites
Natural
Cultural
Mixed

Results from research conducted during the International Polar Year 2007–2008 are still emerging. The Arctic Council, through its working groups, is currently running major studies that will further alleviate some of the current knowledge gaps about populations, species, habitats, and ecosystems, as well as the trends and stressors of the Arctic biodiversity. The Arctic Biodiversity Assessment, the Circumpolar Biodiversity Monitoring Program, and the Arctic Council's Sustaining Arctic Observing Network are such examples.

Existing MEAs are not sufficiently implemented

Although existing MEAs may be effective in responding to threats caused by local, national, or regional activities, a common observation in the literature is that lack of implementation is a prevalent problem[29, p.6]. It is difficult to determine whether lack of implementation of MEAs is due to inherent problems within the substantive provisions of an agreement or whether a failure of political will, lack of resources and capacity, lack of integration into sectors impacting on the environment, or some other factor is impinging on the effectiveness of any given MEA.

The number of MEAs with some potential relevance for the Arctic, the linkages between and among them, and the complexity of issues to be addressed in order to have measureable, positive effects on biodiversity on land or at sea, make any generalized evaluation very difficult if not impossible. The process of interpretation and gap analyses of MEAs can consume scarce resources that might be better spent on implementation of existing commitments and requirements. Monitoring the implementation of environmental agreements requires effective national reporting to MEAs. n order to foster synergies between MEAs, the harmonization of national reporting has been highlighted as an effective mechanism[32], including between Arctic nations on issues of common concern.

In building knowledge about biodiversity, and in the implementation of MEAs, scientific monitoring plays an important role. However, biodiversity conservation in the Arctic goes far beyond monitoring of individual species, their migratory routes, and their habitats. Successful conservation and sustainable use of biodiversity depends to a great degree on the social, cultural, political, and economic factors at play.

Livelihoods and cultural diversity in the Arctic are increasingly recognized, and local and traditional knowledge and observations acknowledged. It is generally accepted that MEAs require the engagement of stakeholders at all levels to make them truly effective. Partnerships with Indigenous and local communities and organizations are a critical element of biodiversity-related strategies and activities in the Arctic. This is imbedded in CBD Article 8(j)[33], which recognises the knowledge, innovations and practices of Indigenous and local communities for the conservation and sustainable use of biodiversity:

"Each contracting Party shall, as far as possible and as appropriate, subject to national legislation, 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 and encourage the equitable sharing of the benefits arising from the utilization of such knowledge innovations and practices".

Need for a holistic approach

The problem with existing mechanisms for protecting Arctic biodiversity is that they do not address the root causes or drivers

of processes like global warming. As mentioned above, the fundamental threats to Arctic biodiversity associated with climate change, transboundary contaminants, habitat fragmentation, and other stress factors requires identifying international agreements that might be relevant to biodiversity in unconventional ways.

Consequently, more emphasis should be placed on broadening and mainstreaming our understanding of what constitutes an "Arctic-relevant environmental agreement" so that biodiversity MEAs do not run on a parallel track to international agreements that focus on greenhouse gas emissions, trade arrangements, investments in 'green' technologies, agricultural and forestry policies, shipping regulations, non-Arctic MEAs, and so on. If adequately implemented in their appropriate regions, these measures might alleviate some of the development pressures facing the Arctic region's resources. Although they are important management measures, parks and protected areas in the Arctic can only reduce to a certain extent the fundamental impacts on ecosystems caused by drivers as climate change.

Such a major change of focus would require more global, cross-sectoral and interdisciplinary thinking by policy-makers, scientists, and other stakeholders. It would also require additional efforts to make clearer linkages between the economy and the environment within the Arctic region as well as between the Arctic and the rest of the world. By applying an ecosystem approach to biodiversity conservation we can achieve a closer integration of conservation, sustainable use, and human development needs in the region. A holistic approach in biodiversity conservation could also ensure governance systems and management practices that are resilient and quickly adaptable.

Given the importance of engaging non-Arctic countries and organizations in the protection of Arctic biodiversity, emphasis should be put on identifying and communicating the global impacts of climate change and biodiversity loss in the Arctic, and the relevance of the Arctic to environmental and economic thinking. MEA networks could serve as arena for dialogue and initiating targeted activities. Another area could be the Arctic Council, the primary political forum for dialogue on Arctic issues. The Arctic Council has a vital role to play in broadening the understanding of the impacts of global activities on the Arctic as seen through its support to the Arctic Biodiversity Assessment, the Circumpolar Biodiversity Monitoring Programme, and Sustaining Arctic Observing Networks.

A synthesis of the main points from this chapter

Strengthening and improving on existing structures in the Arctic

- Harmonise national reporting on issues of common concern and engage all stakeholders to foster synergies between MEAs and make the international agreements more effective
- Support long-term observation and monitoring programmes of Arctic biodiversity and strengthen the interrelations between science and policy for more effective governance of this biodiversity
- Increase the extent of Arctic protected areas, especially in coastal zones as well as the marine environment.

Recognising limitations and thinking "outside the box"

- Engage policy-makers, scientists and other stakeholders in global cross-sectoral and interdisciplinary thinking to deal with increasing pressures on Arctic biodiversity.
- Recognise and address the linkages between the economy and the environment within the Arctic region, and also between the Arctic and the rest of the world.
- Further work on identifying and communicating to non-Arctic countries and organizations about the global impacts of climate change, contaminations and biodiversity loss in the Arctic, and engage non-Arctic states in implementing appropriate measures outside the Arctic region.

II

RELEVANCE OF MULTI-LATERAL ENVIRONMENTAL AGREEMENTS TO ARCTIC BIODIVERSITY

CASE STUDIES AND STAKEHOLDER PERSPECTIVES

Impressions of the Arctic

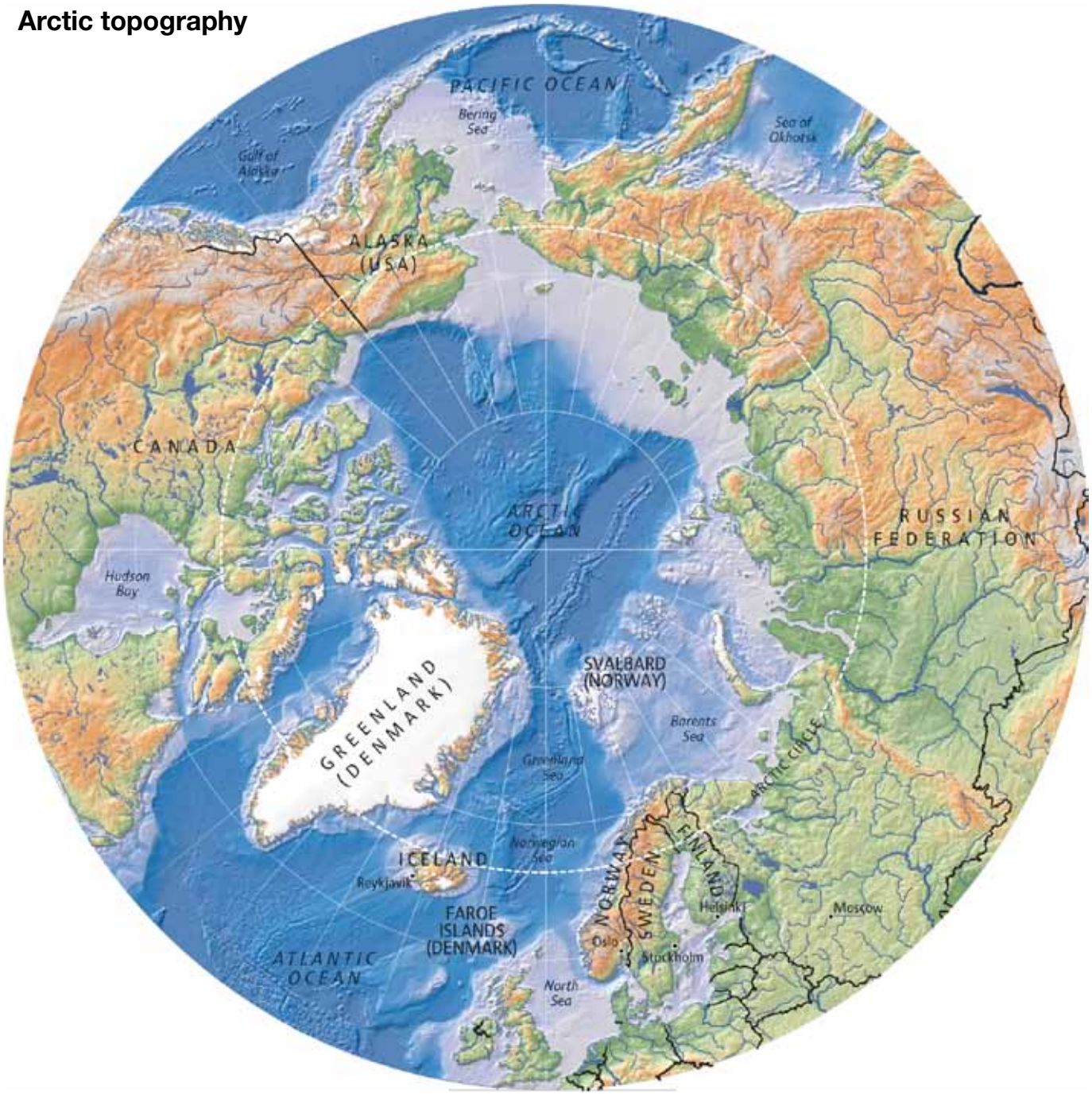
Part II gives context to the broader analytical discussion on the limitations and strengths of environmental agreements through the lens of species, and of people, inhabiting the Arctic. The six case studies (wolverines, reindeer and caribou, alcids, seals, polar bears, and red king crabs) and five stakeholder perspectives provide a snapshot of challenges, opportunities, and viewpoints on how conservation and sustainable use of biodiversity in the Arctic can be achieved.

First and foremost, these case studies demonstrate that humans and biodiversity within the Arctic are intricately linked. Arctic biodiversity has provided the foundation for the establishment of humans and their cultures in the Arctic, and has been the primary source of food, clothing, shelter, fuels, and tools[1]. Indigenous languages in the Arctic have also developed and been shaped through close contact with the environment, and these languages hold a wealth of traditional knowledge in relation to biodiversity[2]. Today, despite major local and regional differences, the harvesting and use of biodiversity continues to play a key role in traditional lifestyles and economies of the Arctic. Each case study highlights the social, economic, and cultural importance of a species, whilst also discussing some of the challenges that have arisen in reconciling the needs of stakeholders. The case studies on the wolverines and seals are of particular relevance.

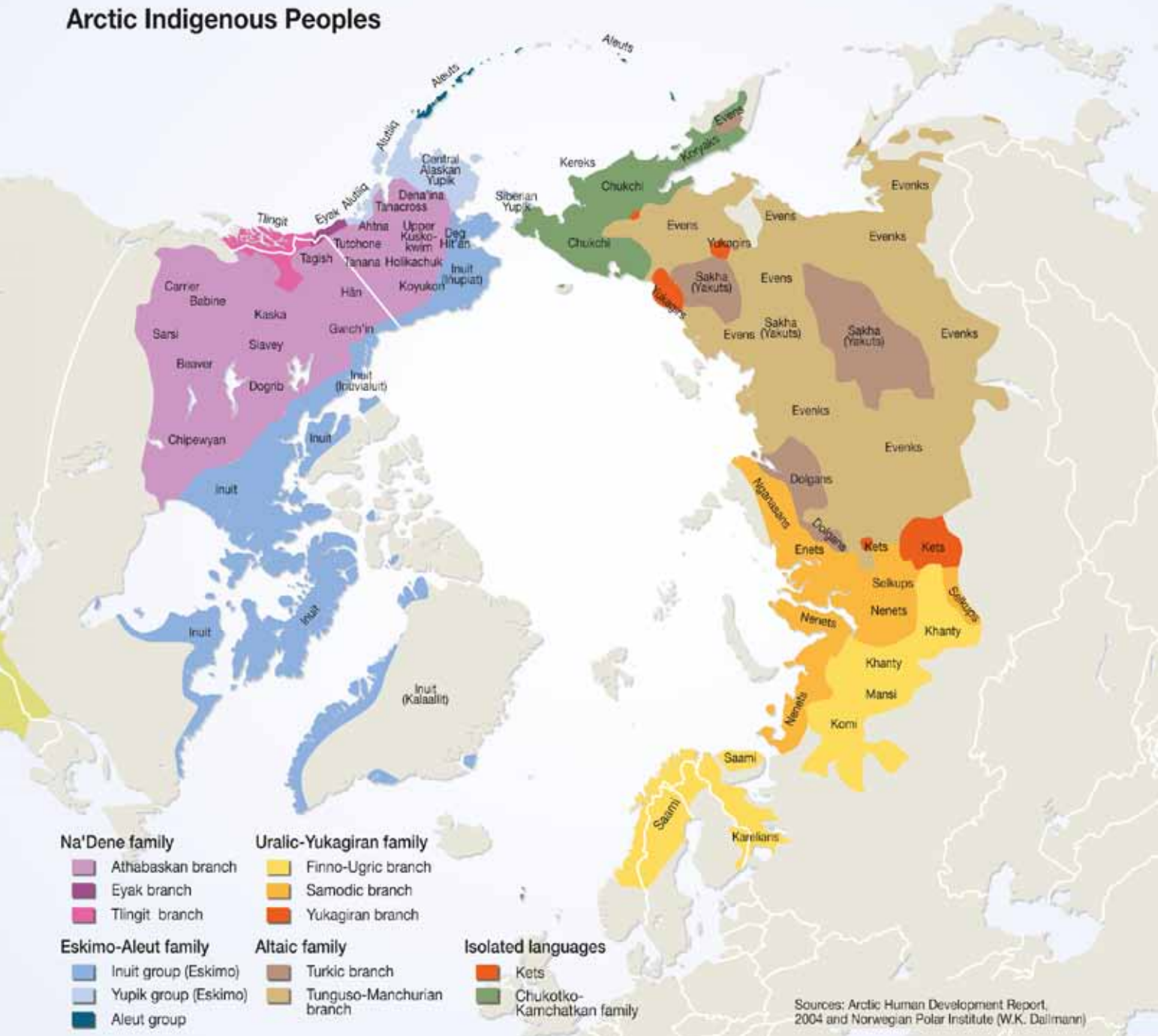
There are growing challenges and threats to Arctic biodiversity. As the Conservation of Arctic Flora and Fauna's *Arctic Biodiversity Trends 2010: Selected indicators of change* report recently concluded, climate change is emerging as the most significant stressor on Arctic biodiversity, although contaminants, habitat fragmentation, industrial development, and unsustainable harvest levels are continuing threats, and may interact and magnify impacts on biodiversity[2]. The case study on alcids, for example, demonstrates how climate change amplifies existing problems and may possibly create new ones, through changing the distribution of prey stocks, increasing the exposure to oil and gas, shipping, and tourism operations, and altering the pattern of pollutant deposition.

Many Arctic species have large ranges and are distributed across the circumpolar region, with populations extending beyond regions and national boundaries to include several Arctic states, and also beyond. Successful conservation and sustainable use of biodiversity requires effective multi-lateral/international agreements and regimes in place not only to manage species distributed across national borders, but also to limit and control transboundary threats, many of which originate outside of the Arctic. The case study on polar bears, for example, illustrates how effective protection within the Arctic has helped preserve a species, but where new threats originate mainly from outside the Arctic.

Arctic topography



Arctic Indigenous Peoples



Na'Dene family
- Athabaskan branch
- Eyak branch
- Tlingit branch

Eskimo-Aleut family
- Inuit group (Eskimo)
- Yupik group (Eskimo)
- Aleut group

Uralic-Yukagiran family
- Finno-Ugric branch
- Samodic branch
- Yukagiran branch

Altaic family
- Turkic branch
- Tunguso-Manchurian branch

Isolated languages
- Kets
- Chukotko-Kamchatkan family

Sources: Arctic Human Development Report, 2004 and Norwegian Polar Institute (W.K. Dallmann)

In addition to the case studies, various stakeholders have contributed with their perspectives on how conservation of biodiversity within the Arctic can be achieved. Although the views offered in this report cannot cover the myriad of stakeholders in the Arctic, each offers a different perspective.

With climate change recognised as one of the most significant threats to biodiversity, Ahmed Djoghlaf, Executive Secretary of the Convention on Biological Diversity (CBD), outlines the initiatives within the framework of CBD for addressing biodiversity loss in the Arctic and its associated impacts for Indigenous communities. Focussing on the need for more co-ordinated research on Arctic biodiversity, Tom Barry, Executive Secretary for the Conservation of Arctic Flora and Fauna (CAFF) working group of the Arctic Council, discusses the organization's efforts and programmes in this direction. Violet Ford, a prominent Canadian Inuit who has represented Inuit interests in international forums for many years, discusses the importance of seal hunting for Inuit, and of the impact the EU ban on seal imports has had on Inuit communities. Mikhail Pogodaev, Chair of the Association of World Reindeer Herders, talks about the wealth of traditional knowledge held by reindeer herders of the north, and how this should be rightfully acknowledged for sustainable development and the conservation of biodiversity in the Arctic. Finally, Hannes Manninen, a Finnish Member of Parliament and current Chair of the Standing Committee of Parliamentarians of the Arctic Region (SCPAR), offers a Parliamentarian's perspective on changes occurring in the Arctic, what this means for northern residents, and the steps that need to be taken to meet current and future challenges.

Climate change, biodiversity and livelihoods in the Arctic region

STAKEHOLDER'S PERSPECTIVE

Ahmed Djoghlaf
Secretariat of the Convention on Biological Diversity

Introduction

The Arctic contains unique biodiversity, which is well adapted to the dark and cold conditions which characterize the region. The wealth of life in the Arctic includes between 500 million and 1 billion birds, which migrate from the Arctic throughout the world, and more than 20 species of whales. This abundance of biodiversity supports more than 400,000 Indigenous Peoples that inhabit the Arctic Region.

As climate change emerges as one of the most significant threats to biodiversity, the Arctic region, with its dramatic visible changes, has come increasingly into focus along with the Indigenous and local communities who base their livelihoods and culture on this unique and fragile region. Climate change has already begun to affect the functioning, appearance, composition and structure of Arctic ecosystems at a rate far exceeding that which has been observed in the temperate and tropical regions. These changes to Arctic ecosystems are having significant impacts on Arctic species and the Indigenous and local communities who rely on them for their livelihoods and culture.

Although the Convention on Biological Diversity (CBD) has not adopted a specific programme of work on Arctic biodiversity, the issue is, nevertheless, reflected in many aspects of the Convention, particularly through the consideration of the importance of Arctic biodiversity to Indigenous and local communities and the associated threats from climate change. In fact, a number of activities requested by the Conference of the Parties (COP) to the CBD reflect the particular vulnerability of Arctic ecosystems to the impacts of climate change.

Arctic biodiversity in the context of the CBD

National governments who are Parties to the CBD have taken many commitments with regards to climate change adaptation and its link to indigenous and local communities. Such commitments include identifying, within their own countries, vulnerable ecosystems, including with regard to the impacts of climate change on Indigenous and local communities. Countries, through the Convention on Biological Diversity, are also encouraged to consider introducing necessary measures for ensuring the full and effective participation of indigenous and local communities in mitigating and adapting to the impacts of climate change.

An International Expert Meeting on Responses to Climate Change for Indigenous and Local Communities and their Impact on Traditional Knowledge Related to Biological Diversity in the Arctic Region was convened by the Government of Finland from 25 to 28 March 2008. At this meeting, a number of specific activities were identified that could help Parties meet their obligations concerning biodiversity, climate change, and Indigenous and local communities in the Arctic. Such activities include processes and legislation to link local knowledge and activities in the Arctic region to national level planning exercises through:

- National mitigation and adaptation strategies which fully consider all environmental, socio-economic and cultural impacts on Indigenous and local communities; and

- Recognition of the value of traditional knowledge for minimising the negative impacts of climate change response measures so as to ensure that traditional knowledge is respected, properly interpreted and used appropriately in adaptation planning and monitoring.

The meeting also recognized the need for international cooperation in linking biodiversity and climate change adaptation in the Arctic region both in terms of sharing knowledge and information and with regards to the management of transboundary species and livelihoods.

One key example of international cooperation is the Arctic Biodiversity Assessment (ABA), an initiative led by Finland, Greenland/Denmark and the United States, with members of the Steering Committee including Canada, UNEP/GRID-Arendal and UNEP-WCMC, Gwich'in Council International, and the Arctic Athabaskan Council. The ABA synthesizes and assesses the status and trends of biological diversity in the Arctic, and provides a baseline of the most current scientific research and traditional knowledge. The ABA considers and builds on the Arctic Climate Impact Assessment which includes an evaluation of impacts on natural systems.

Findings from the ABA have been considered in the preparation of the third edition of the Global Biodiversity Outlook (GBO-3), the flagship publication of the CBD. The GBO-3 is an important vehicle for informing a variety of audiences of the importance of biodiversity and the progress made in meeting the 2010 Biodiversity Target to significantly reduce the rate of biodiversity loss.

The Arctic region was also considered by the Ad hoc Technical Expert Group (AHTEG) on Biodiversity and Climate Change which recognized the vulnerability of the region. The AHTEG also discussed relevant issues such as the important role of ecosystem-based adaptation, the need for improved modelling of vulnerability and impacts and the benefits realized from the inclusion of Indigenous Peoples and local communities in climate change response planning.

Next steps: preserving life and livelihoods in the Arctic

Since the Arctic is contained within eight countries, and since the issue of climate change, biodiversity and Indigenous peoples are covered under many international agreements, including the CBD, the United Nations Framework Convention on Climate Change and the United Nations Declaration on the Rights of Indigenous Peoples, there is an urgent need for coordinated action.

The Arctic region is warming about twice as fast as the rest of the world and yet action is not yet matching this accelerated pace. There is a need for immediate capacity building and the gathering of additional knowledge on the links between biodiversity, climate change and Indigenous and local communities in the Arctic. Life and livelihoods in the Arctic need to be recognized, their value acknowledged, and their preservation made a priority.

I sincerely hope that the next Conference of the Parties to the CBD, to be held in Nagoya, Japan, in October 2010, will promote the idea of a joint work programme between the three Rio Conventions to address the specific needs of the Arctic region and its people.

Finally, the celebration, in 2010, of the International Year on Biodiversity, including a head of state Summit in New York by the 65th session of the United Nations General Assembly, offered a unique opportunity to engage heads of state from around the world on the importance of the biodiversity of the Arctic region. The slogan of the International Year on Biodiversity, *Biodiversity is Life ... Biodiversity is our Life*, applies also, and fully, to the peoples of the Arctic region.

CASE STUDY 1 Wolverines

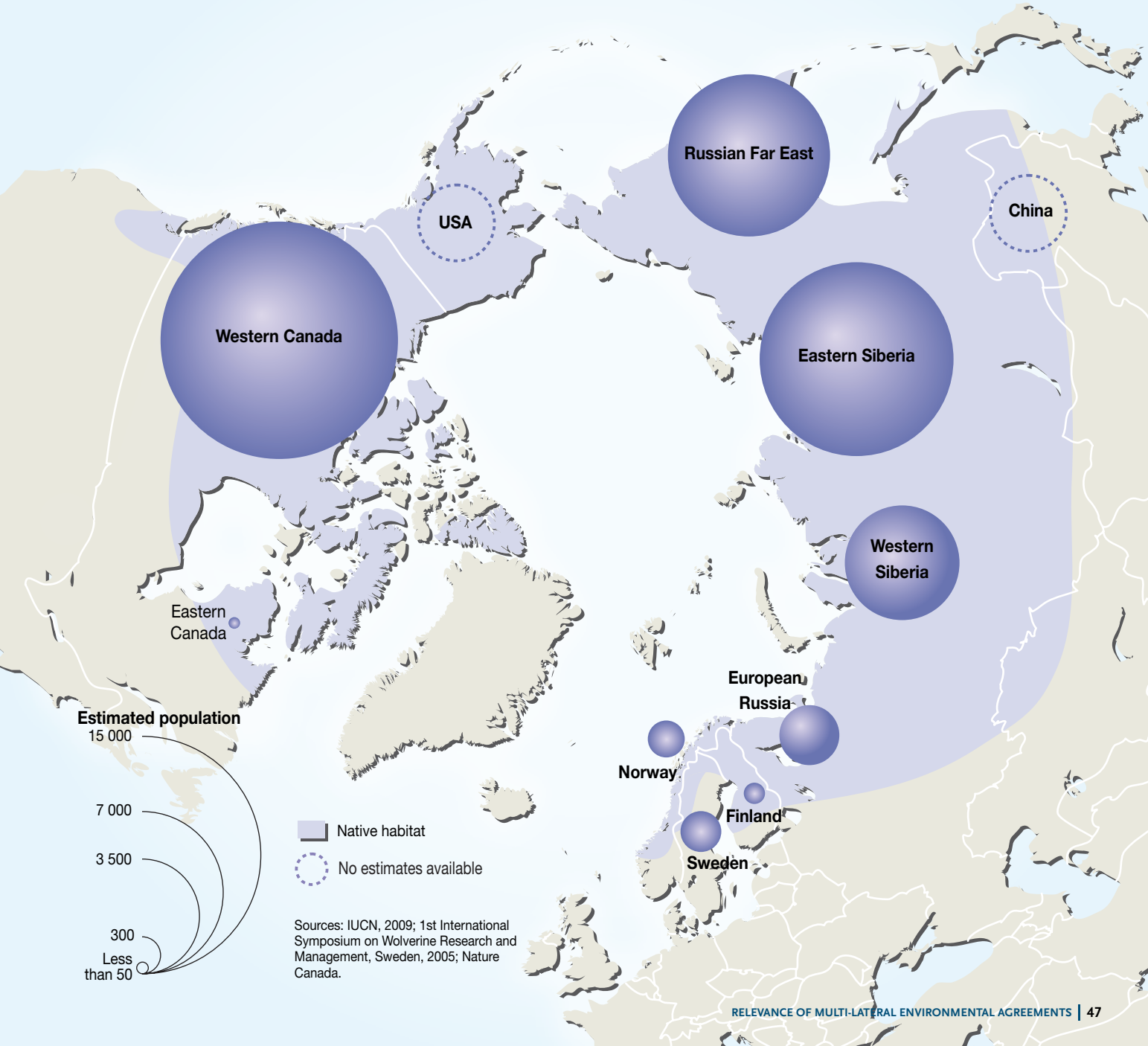
The wolverine, *Gulo gulo*, is one of the rarest, least understood large carnivores of the Arctic. The largest member of the weasel family, Mustelidae, it inhabits a variety of habitats in the alpine, tundra, taiga, and boreal zones[1].

The wolverine preys on hares and small rodents, as well as scavenges the prey of more efficient predators such as the lynx and wolf[2]. It can also hunt larger animals like moose, and wild caribou and reindeer. In areas where their ranges overlap, as is the case in Fennoscandia, wolverines prey on domestic sheep and semi-domestic reindeer[1-3].

The wolverine has significant ecological, cultural, and economic significance across its range. Their frost-resistant fur is highly valued for lining parka hoods. Given its vast home ranges and dependence on large, connected, and intact ecosystems, the wolverine is one of the most sensitive terrestrial indicators of ecological integrity[4]. The wolverine is also culturally important in many regions. Indigenous Peoples in northern Alberta, Canada believe that wolverines have great powers to be both spiritual guides or relentless enemies[5]. In northern Europe, the wolverine is often portrayed in folklore[2]. There has been a dramatic transformation of peoples' attitudes towards wolverine and large predators, especially in Europe[6]. Surveys of public attitudes in Norway and Sweden indicate that overall, the public wants wolverines and other large predators to exist, although attitudes are generally more negative in areas where conflicts occur[2,3].

Wolverines occur in various distinct populations across the circumpolar region, ranging from Fennoscandia and the Russian Federation, Mongolia and China, through to Alaska, Canada, and some of the northernmost states of the USA[1,7-9]. The European population, itself sub-divided into five distinct populations[1], is currently classed as Vulnerable by the European Mammal Assessment[10] and Endangered by the Norwegian Red List[11]. In Canada, although wolverines number in the thousands, the status designation of the western wolverine population is of Special Concern, while the eastern population is defined as Endangered[12]. Populations numbering in the thousands of individuals are thought to also exist in eastern Russia[9] and in Alaska. Despite a global, overall continued decline in the species, the wolverine is classed as a species of Least Concern on the International Union for Conservation of Nature (IUCN) Red List. However, more data on population trends, especially in North Asia, may result in this species being re-assessed as Vulnerable in the near future[1].

Wolverine population in the Arctic



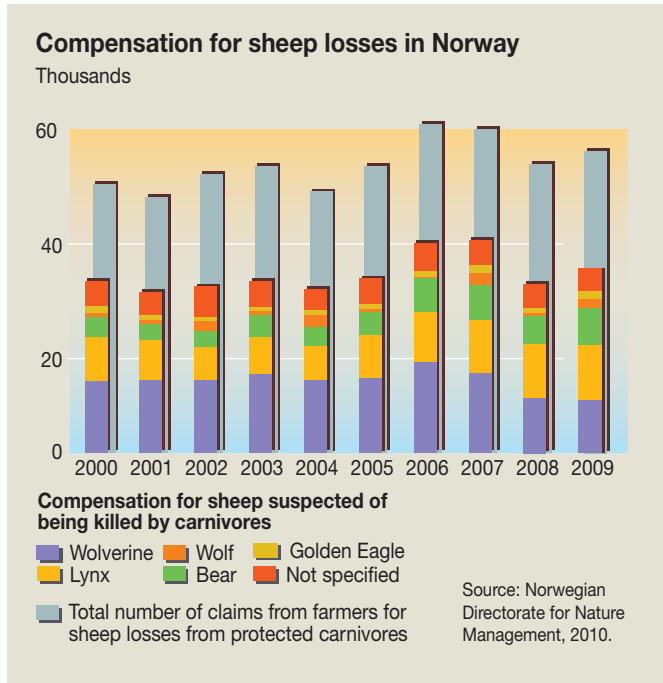
Sources: IUCN, 2009; 1st International Symposium on Wolverine Research and Management, Sweden, 2005; Nature Canada.

Threats

Habitat loss and fragmentation, small population size and low genetic diversity, harvesting, illegal poaching, and reductions in wolverines' prey base all contribute to overall global declines in wolverine populations. In Canada, for example, habitat loss to urban/suburban development, agriculture, and non-renewable natural resource developments has the potential to adversely affect wolverine populations in the future[4]. In Europe, habitat fragmentation is a serious issue, and has led to wolverine populations being confined to discrete areas insufficiently large to support viable populations[2]. Habitat fragmentation and human land use expansion into the wolverines' range have also increased the frequency of contact and conflict with humans, especially in Fennoscandia. Such conflict lowers tolerance levels and reduces local public support for the conservation of wolverines across their range[3]. While in Sweden and Finland almost no untended sheep grazing occurs in wolverine areas, the Norwegian practice is to leave sheep unattended on mountain pastures during summer[2]. Higher stock numbers and the loss of herding and livestock guarding traditions have increased the potential for conflict with wolverines[2]. Wolverines preying on semi-domesticated reindeer is well-documented in all Nordic countries[2]. Wolverine depredation on wild ungulates is another source of conflict with humans, as it can result in less game and hunting opportunities as well as reduced income for land-owners[3].

In an effort to control livestock losses, the Norwegian government sets annual harvest quotas and practices lethal control by taking young pups out of dens. However, it is questioned whether these measures are sustainable and whether these control measures reduce livestock losses to predators[1]. In North America, the wolverine's range does not greatly overlap with that of domestic sheep, and so wolverines are not directly targeted for predator control[4].

Incidents of wolverine poaching occur in Norway, Sweden, and Finland, although the actual extent of poaching is unknown[2]. In Russia, poaching of wild ungulates combined with a reduction in the domestic reindeer herding industry



in the 1990s is believed to have negatively affected Russia's European wolverine population[1].

Management challenges and opportunities

Wolverines are subject to different agreements and management regimes in the Arctic countries. In the United States, wolverines can be harvested in Alaska and Montana. On three occasions (1995, 2003, and 2008) the wolverine was petitioned for listing under the Endangered Species Act, but was unsuccessful due to lack of information on distribution, habitat requirements, and threats[1,3]. In Canada, the wolverine is harvested in all western jurisdictions, but is protected in Newfoundland and Labrador, where it is listed under the provincial Endangered Species Act[4]. Canadian management practices such as trapping closures, limited seasons, quotas, and registered trapping sessions, are considered to reduce the threat to wolverines by discouraging overharvest[4]. In Russia, where the wolverine is harvested for fur, harvesting is permitted year-round[1].

Scandinavian countries have had national legislation governing the protection of wolverines since the 1970s. The wolverine is also subject to international agreements in these countries. It is listed in Appendix II (strictly protected fauna species) of the Bern Convention, which has been ratified by Norway, Sweden, and Finland. For Appendix II-listed species, the Convention expressly forbids all forms of deliberate capture, keeping, or killing; deliberate disturbance; and possession and internal trade of this species. However, contracting parties may make exceptions in certain cases, for example, for the prevention of serious damage to livestock, as is the case in Norway, where the government exercises its right to implement measures in order to control the population size[1,3]. In Sweden and Finland, the wolverine is also listed in Appendix II (requires specially protected areas) and IV (strictly protected species) of the European Community's Habitats Directive. In Sweden, the wolverine is officially listed as Endangered and not usually subject to hunting[1]; in Finland, wolverines are fully protected[1].

Successful, on-going conservation of the wolverine across its circumpolar range will require efforts on many fronts.

Governments and researchers require more in-depth knowledge of wolverine ecology, population dynamics, and wolverine-prey relationships in order to ensure "controlled harvesting" quotas are appropriate to maintain viable populations[1]. Furthermore, better enforcement of existing regulations may be required in some areas.

Arguably, minimizing conflicts with livestock husbandry is the most important challenge for the conservation of wolverines. In Fennoscandia, few areas exist within the wolverines' range where there is no conflict potential with sheep and/or domestic reindeer[2]. The long-term success of wolverine conservation in Fennoscandia will depend on reducing conflict in multiple-use landscapes and gaining the support of local communities[2]. Any future strategies should focus on increasing local involvement in decision-making processes[3]. Farmers and local communities should be educated and encouraged to adopt husbandry practices, which minimize depredation (e.g., reviving traditional herding methods[2]). Economic incentives should be applied to encourage farmers to conserve wolverines on their lands, rather than hunting them. In Sweden reindeer herders are financially rewarded for identifying and protecting dens on their land[1].

CASE STUDY 2 Reindeer and caribou

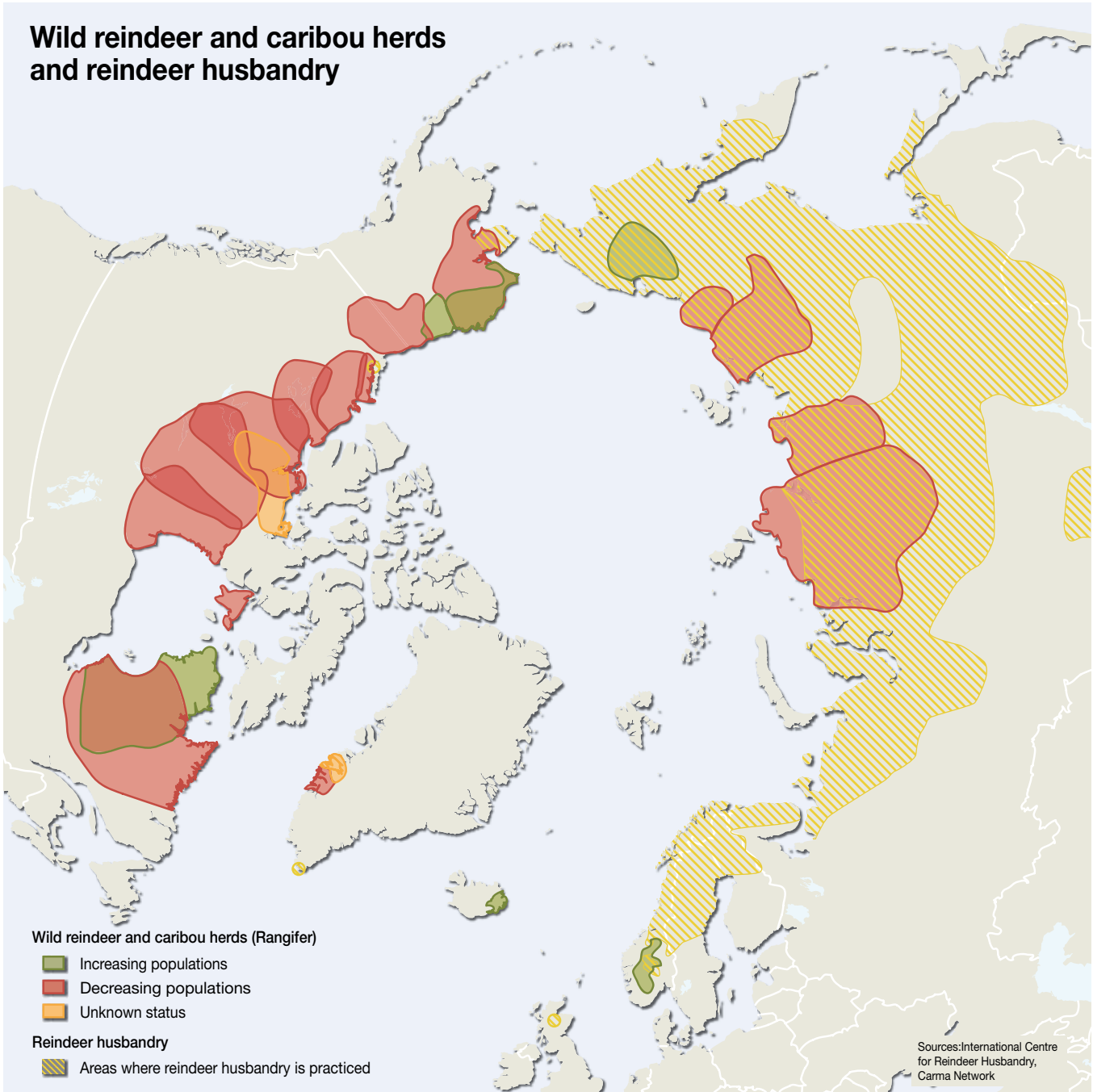
The species *Rangifer tarandus, which includes the caribou of North America, and semi-domesticated and wild reindeer of Eurasia, has a circumpolar distribution and is the most dominant large terrestrial mammal species in the Arctic[1].**

The seven sub-species of *Rangifer tarandus* occupy different Arctic habitats ranging from sub-Arctic boreal forests to the tundra of high-latitude Arctic islands, and play a key role in maintaining Arctic biodiversity. Both wild and herded animals move seasonally between summer and winter habitats[1]. Summer grazing can enrich nutrient-limited Arctic ecosystems[2], and caribou and reindeer populations support the existence of predators such as wolves and bears[3].

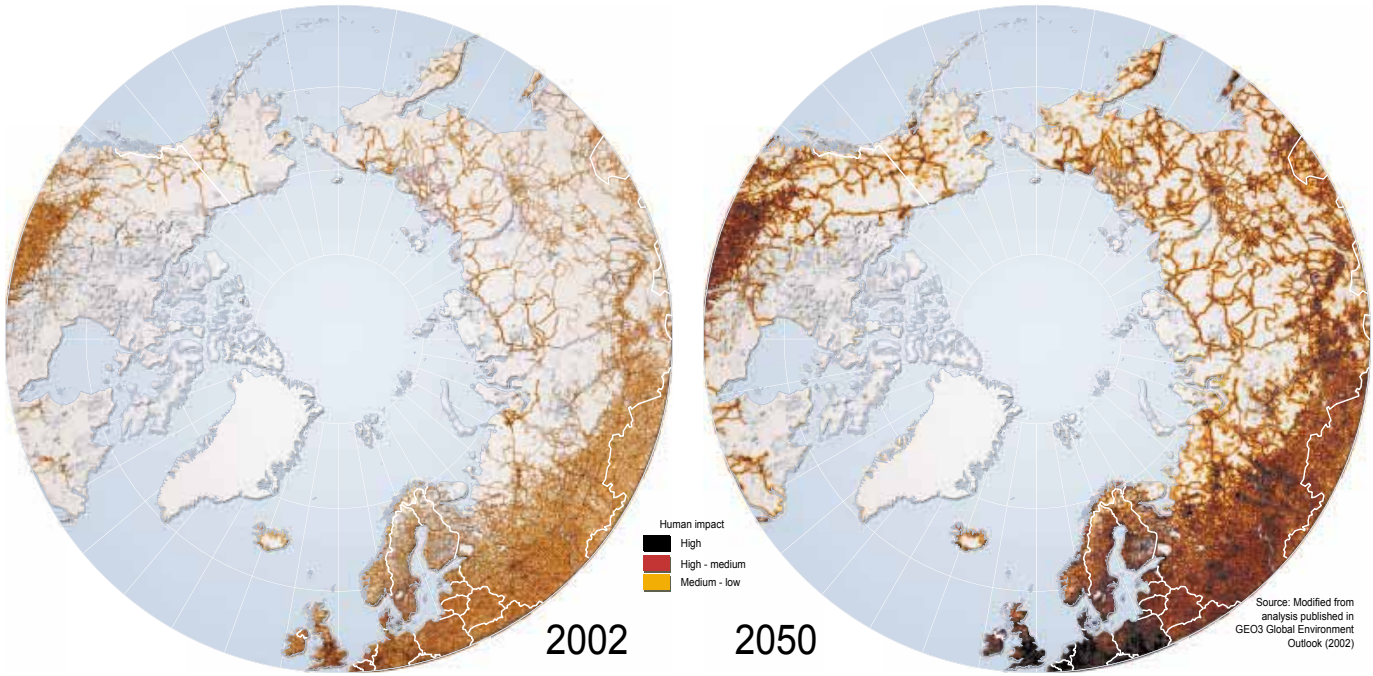
Caribou and reindeer are highly valued by both Indigenous and non-Indigenous Peoples of the Arctic. The animals are tied to the cultural identity of many northern peoples, and contribute to their social, spiritual, and economic well-being. In Eurasia, more than 20 different ethnic Indigenous Peoples are engaged in herding semi-domesticated reindeer (*Rangifer tarandus tarandus*), a traditional livelihood that has been practiced for centuries[4]. Widely hunted in Alaska, Canada, some parts of Greenland, and Russia, caribou and wild reindeer provide a consistent and predictable food supply in regions where there are few alternatives[5,6]. Reindeer husbandry and the harvesting of caribou and wild reindeer also contribute significantly to regional northern economies. An estimated 250,000–300,000 caribou and wild reindeer are harvested annually across the Arctic[7].

With 5.5 million caribou and wild Rangifer existing across the circumpolar north, it does not reach the threshold to trigger listing on the IUCN Red List of endangered species[8], but there are still good reasons to be concerned as populations appear to be in global decline. Herds are naturally characterized by periods of abundance and scarcity[9,10], but such synchronized declines at the global level are occurring alongside climate trends, increasing hunting access and efficiency and anthropogenic landscape change[11]. Continued declines will have significant negative cultural and socio-economic impacts for Indigenous Peoples[12].

* The reindeer of Eurasia and caribou of North America belong to the same species, *Rangifer tarandus*, although the herding and hunting cultures that have developed in the circumpolar region are distinct. The caribou of North America has never been domesticated, whereas both wild and semi-domesticated reindeer exist across northern Eurasia.


Wild reindeer and caribou herds and reindeer husbandry
Wild reindeer and caribou herds (Rangifer)
Increasing populations
Decreasing populations
Unknown status
Reindeer husbandry
Areas where reindeer husbandry is practiced
Sources:International Centre for Reindeer Husbandry, Carma Network

Arctic development scenario, human impact in 2050



2.5 million semi-domesticated reindeer are herded in Eurasia over 4 million square kilometres[4], with two-thirds of the population located in Russia[13]. From 1970 to 1990 the population of semi-domesticated reindeer decreased by 50% across Russia. Herd numbers in Norway, Sweden, and Finland are increasing again, following two decades of growth between 1970 and 1990 and a period of decline between 1990 and 2000[4]. The total Scandinavian population stands at approximately 700,000[4].

Threats

Caribou and reindeer require extensive grazing lands to forage. The loss of pastures and habitat fragmentation by industrial and recreational development is a serious and on-going threat, especially given the increasing interest in development within the ranges of large herds[6]. The actual physical loss of pasture land to development is not the main issue; it is abandonment by caribou and reindeer of areas surrounding developments that is of serious concern[14-17]. Developments and human activity create "avoidance" zones for the animals, reducing the amount of land available for grazing and increasing competition for forage[4].

Other activities can have additional impacts for caribou and wild/semi-domestic reindeer. Habitat fragmentation due to intensive forestry and mineral and hydrocarbon development provides easier access for hunters and predators. This contributes to declines in wild populations, as documented for wild reindeer in Finland and for the woodland caribou population in Ontario, Canada[8,18].

Climate variability and change is a growing threat to both caribou and wild and semi-domesticated reindeer. However, predicting the impacts of climate change on individual herds is complex given they have each evolved to a unique and highly varied set of environmental conditions[11]. For caribou in North America, some sub-species appear to be more susceptible to climate variability than others. North America's Peary Caribou populations in the high Arctic islands are especially vulnerable to short-term, severe weather conditions. For reindeer herders in Eurasia, the ability to find suitable grazing for herds under such conditions of climate change will depend on the extent to which reindeer can move freely across the landscape. The encroachment of infrastructure on rangeland is a key factor in herders' ability to adapt[4].

Conflict between wild and domestic herds can also be a problem, particularly in Russia. The mixing of herds can lead to transfer of disease and loss of semi-domesticated individuals by being led away by wild reindeer. New opportunities for hunting wild reindeer may undermine Indigenous livelihoods by attracting non-Indigenous Peoples to the new economic opportunity[13].

Management challenges and opportunities

The conservation and management of caribou and wild reindeer is normally the responsibility of ministries or departments of wildlife at the regional or national level[7]. Multilateral environmental agreements that exist for the conservation of wild Rangifer include: the Bern Convention on the Conservation of European Wildlife and Natural Habitats in EU/EEA countries; the EU Habitats Directive in Finland; and the Agreement between the Governments of Canada and the United States on the Conservation of the Porcupine Caribou Herd in North America.

In North America, responsibility for wild reindeer management occurs at the provincial, territorial and state levels[6]. Given that large reindeer herds can occupy many jurisdictions, co-ordination and communication in the management of shared herds can be a problem[6]. An important development over the last two decades in Canada, and to a lesser extent in Alaska, has been the establishment of co-management regimes (a form of decentralized decision-making over a resource) between Indigenous communities and state agencies, following several decades of "top-down" state management, which resulted in the erosion of trust between Indigenous Peoples and the state[6].

In Russia, responsibility for management of wild reindeer falls under the Game Resource Department of the Ministry of Agriculture, with a focus on the protection of small herds and sustainable use of larger herds. Although more local control of wild herds is slowly recognized, decision-making still lies overwhelmingly with the state[13]. The informed management of wild reindeer in Russia is hampered by the lack of effective monitoring systems, leading to large knowledge gaps in the spatial distribution and population dynamics of many wild herds[13]. Scandinavia's population of wild reindeer is listed under Annex III of the Bern Convention, which requires Norway, Sweden and Finland to regulate exploitation of the species to keep the population out of danger[19]. The Finnish forest reindeer *R.t. fennisus* is also strictly protected under Annex II of the EU's Habitats and Species Directive[20].

Re-introduction of the traditional *siida* system in Norway

The *siida* represents the basic organizational unit around which reindeer herding has traditionally been organized. However, not until the Reindeer Husbandry Act of 2007 was the *siida* legally recognized as a central entity of reindeer herding in Norway. It was introduced with a desire to monitor reindeer numbers[22].

Under the Act, the *siida* comprises one or several groups of reindeer herders within a district engaged to work together within a given area. The *siida* unit comprises an individual or family within a district, and who forms part of a *siida*. The leader of a *siida* may determine ownership within the unit. The maximum number of reindeer is determined in the light of the reindeer district's land-use plans[22].

The management of reindeer husbandry in Russia and Scandinavia is normally the responsibility of the Ministries of Agriculture at the local, regional, and national levels[7]. In Russia, no co-management boards exist and reindeer herder associations are not represented in decision-making bodies at the political level[13]. In Scandinavia, the management principles for reindeer husbandry in Norway, Sweden, and Finland vary slightly, but in all cases the Ministries of Agriculture delegate management to regional and locals levels[7]. Both Norway's and Sweden's Reindeer Herding Acts establish reindeer herding as an exclusive right of the Sámi people, whereas reindeer herding is open to all EU citizens in Finland[21]. Recently, the Norwegian Reindeer Husbandry Act (2007) has recognized the *siida*, a traditional Sámi community-based management tool for reindeer husbandry.

Reindeer herders in Scandinavia and in the wider Barents Region face a significant challenge in protecting grazing lands due to the close proximity to populated areas and conflicts with industrial and forestry developments[4,21]. Indigenous Peoples have little influence on development decisions, which are most often supported by more powerful economic interests[4]. The lack of integrated management of grazing lands also leads to piecemeal development, which gives little consideration to the need for grazing lands[4]. Interestingly, Norway's ratification of the International Labour Organization (ILO) Convention No. 169 in 1990, a legally binding international instrument that deals specifically with the rights of Indigenous Peoples – and thus enforces Norway to protect the Sámi's culture of reindeer herding – has done little to improve the Sámi's influence on developments[4].

Traditional knowledge for biodiversity and people

Across the world, traditional knowledge is being increasingly recognized and respected for its importance in biodiversity conservation, in understanding the potential impacts of development, and in contributing to sustainable development.

Reindeer husbandry represents the cultural, economic, and spiritual foundation for many Indigenous Peoples across the Arctic. Integrating the traditional knowledge of reindeer herders, which has developed from experience gained over several hundred years and which is adapted to the local environment, to more conventional western-based knowledge systems for reindeer husbandry is crucial in order to reduce the vulnerability of reindeer husbandry to impacts of climate change and industrial development. Documenting such traditional knowledge and communicating this to oil and gas developers, mainstream societies, and the national authorities is vital[4].

The Reindeer Herding Vulnerability Network Study (EALÁT), an Arctic Council-endorsed project that examines reindeer pastoralists' vulnerability, resilience, and ability to adapt to climate change, is an important initiative. It documents reindeer herders' traditional knowledge to adapt to environmental variability, and place traditional knowledge on an equal footing with scientific knowledge to reduce the vulnerability of reindeer husbandry to the effects of climate change[23].

Reindeer herders' views on MEAs and Arctic biodiversity

STAKEHOLDER'S PERSPECTIVE

Mr. **Mikhail Pogodaev**
Chair of the Association of World Reindeer Herders

The Association of World Reindeer Herders (WRH) was established in 1997 in Nadym, Russia and has a long history of unique cooperation worldwide between Indigenous reindeer herders and their institutions. The establishment of WRH provided reindeer herders with a forum for contact and cooperation, which contributed to bringing reindeer husbandry onto the international agenda. Already in 1999, the Norwegian Minister of Foreign Affairs, Mr. Knut Vollebæk, took the initiative to add reindeer husbandry on the agenda of the international Arctic cooperation, which resulted in WRH being granted Observer status to the Arctic Council.

Circumpolar reindeer husbandry has a long history in the north. More than 20 different Indigenous Peoples in the Arctic have reindeer husbandry as their livelihood. Reindeer husbandry is practiced in Norway, Sweden, Finland, Russia, Mongolia, China, Alaska, Canada, and Greenland. It involves some 100,000 herders and 2.5 million semi-domesticated reindeer which graze approximately 4 million square kilometres of pastures. Reindeer herders have managed vast areas in the Arctic over hundreds of years. Reindeer herding represents a sustainable model for management of these barren circumpolar areas, a model that has been developed through generations. These areas have only recently become significant for other interests, including the oil and gas industry.

Today reindeer herders face major challenges, such as effects of global change in their local societies, loss of grazing land, and warming of the Arctic. World reindeer herders, owing to their experience, traditional knowledge, and skills, have developed unique management strategies for protection of pastures, observation of changes, and rational use of the natural resources which should be recognized and supported. Reindeer herders should have the right themselves to determine their own future, based on their own philosophy of life and understanding of the world, and should be consulted, included, and accepted as partners when Arctic development, research, and monitoring takes place on their territories.

Metaphorically, the development of the Arctic as the new energy region of the north truly represents a "tidal wave" for the Indigenous Peoples of the north, and they must prepare to meet it – both in order to ride safely on the flood, and to settle on an even keel once the water ebbs away. The challenge is to take reindeer herders' traditional knowledge into action for sustainable development of the Arctic and, in particular, involve reindeer herders as real partners in this process as early as possible.

The connections between reindeer husbandry as a livelihood and Arctic biodiversity are complex. One of the main challenges in reindeer husbandry today is loss of pastures resulting from increasing human activity and infrastructure development, with subsequent habitat fragmentation and reduction in biodiversity. Major drivers behind this development are the world's need for energy and natural resources, also potentially linked to and facilitated by climate change. As such, globalization very much influences the lives of reindeer herders and the sustainability of their communities. As reindeer herding peoples over time have tried to preserve the grazing land on which they are dependent,

they have also contributed to preservation of biodiversity. Even though reindeer herders are not in principle against economic development, there is a growing concern regarding the needs to balance such activity with the traditional livelihoods of Arctic Indigenous Peoples and biodiversity.

The challenge of preserving Arctic biodiversity and the sustainability of the nature-based livelihoods of Arctic Indigenous Peoples is also a knowledge challenge. Science is, of course, important in this context, but not exclusively. There is also a need to include and involve the knowledge of reindeer herding peoples in the management of the Arctic. This represents another kind of knowledge, still based on observation and testing, a knowledge that is developed, organized, and transmitted differently from "western scientific knowledge". This kind of knowledge is experience-based, closely linked to the specific context it originates from. At the same time it represents knowledge probably older than western science itself, developed through generations of reindeer peoples' observations and living in the north. This knowledge needs also to be respected, used, and implemented in managing the Arctic and Arctic biodiversity. This could happen through integration of traditional knowledge into science in a real partnership of co-production of knowledge, and through implementing co-management regimes for the Arctic areas.

CASE STUDY 3 Alcids

The alcids, a family of birds (Alcidae), which include the razorbills, puffins, murres, and auklets, spend the majority of their lifetime in the open ocean feeding on plankton or fish, with only short periods of time spent on land to breed.

They occur exclusively in the Northern Hemisphere within Arctic, sub-Arctic, and boreal latitudes, and are some of the most widespread and numerous seabirds[1]. Their main centre of distribution, the Bering Sea, is one of the most important seabird areas in the world[2]. The Atlantic puffin (*Fratercula arctica*), thick-billed murre[2] (*Uria lomvia*), and common murre (*Uria aalge*) have ranges exceeding 1,000,000 km² and number in the millions or tens of millions of breeding pairs[3,4].

The harvesting of alcids and other seabirds has a long tradition among coastal communities in the Arctic[5,6]. It forms an important component of subsistence lifestyles in Indigenous communities in Greenland, Canada, Alaska, and Russia[6]. Alcids provide culturally important food for communities in northern Norway, Iceland, the Faroe Islands, and Newfoundland and Labrador.

Global populations of thick-billed murre and common murres are declining, although increases have occurred in some regions[5]. Populations of Atlantic puffin also may be declining, especially in Iceland where a large portion of the world population breeds[4,7]. However, these declines do not approach thresholds for the species' to be classed of global conservation concern by the IUCN.

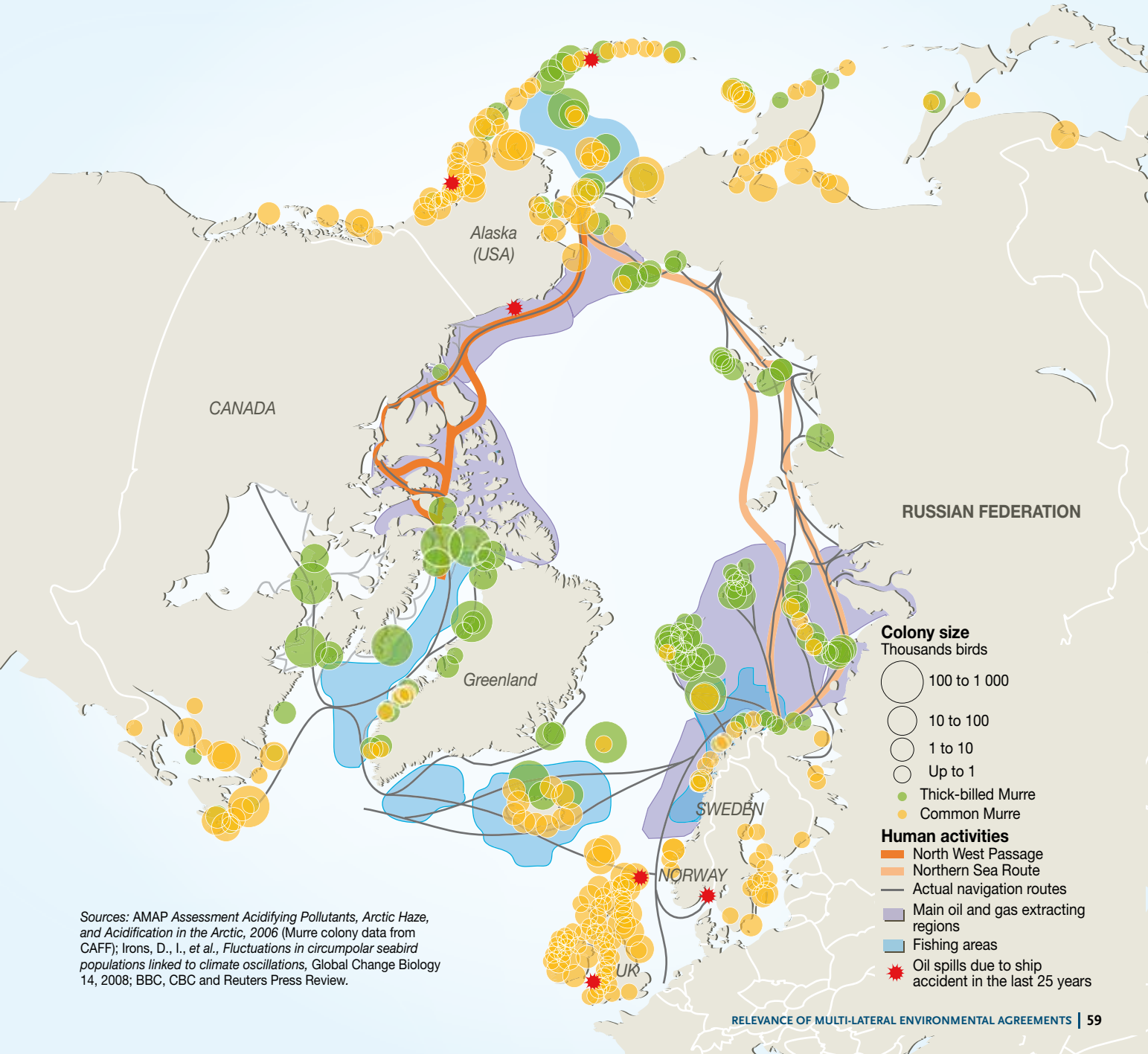
Threats

Alcids[3] face a number of direct and indirect marine and terrestrial threats, which influence their survival and reproductive success. These include transboundary pollutants[8,9], by-catch mortality from fisheries[10,11], competition with fisheries for fish stocks[12,13], disturbance of breeding sites/habitat[14], and unsustainable harvesting[6].

Climate change is an overarching threat. It amplifies existing problems and may possibly create new ones (such as disease and parasites) through changing the distribution of prey stocks and fisheries; extending oil and gas exploration, and shipping and tourism operations; and by altering the pattern of pollutant

2. In Europe, murres are known as guillemots.
3. For the purposes of simplicity and clarity this chapter examines only a few, relatively well-known and studied of the twenty-two alcid species: the little auk, puffins, and murres. A review for the entire family of alcids is beyond the scope of this chapter.

Murre colonies and human activities



Sources: AMAP *Assessment Acidifying Pollutants, Arctic Haze, and Acidification in the Arctic, 2006* (Murre colony data from CAFF); Irons, D., I., *et al., Fluctuations in circumpolar seabird populations linked to climate oscillations,* Global Change Biology 14, 2008; BBC, CBC and Reuters Press Review.

deposition. Declines in ice may affect the ability of birds to find energy-rich food at dependable locations by shifting the spatial distribution of underlying food webs[15]. Climate change may also affect the temporal distribution of prey species, and cause a mismatch at the time of breeding between food availability and nutritional requirements[16,17].

Alcids, like many Arctic wildlife species, are exposed to persistent organic pollutants (POPs)[8,9]. Because they are located near the top of the food chain, their contaminant levels are high relative to fish and plankton, although mostly below known effect levels[8].

With Arctic nations having some of the most active fisheries in the world, fishing operations also pose a threat to alcids through by-catch mortality[10] and unsustainable fishing practices, which reduce the food for seabirds[12,13]. Historically, hundreds of thousands of murres have been taken in net fisheries from Greenland, Norway, and Russia. Today, seabird by-catch is thought to be declining to negligible levels although this is not monitored routinely on shipping vessels in Arctic nations other than some US fisheries[10]. Overexploitation of fish stocks has also had a dramatic impact on some alcid populations, including on common murres feeding on Barents Sea capelin[12], and Atlantic puffins feeding on Barents Sea herring[13].

Human disturbance of alcids and other seabirds at breeding colonies is thought to pose a threat, and can have negative effects on the nesting success of common murres[18]. The unsustainable harvesting of all seabirds, including alcids, is of concern in some Arctic countries (e.g., Greenland[19]). Finally, introduced predators such as dogs, cats, mink, and rats, which have devastated seabird populations in the past in more southerly regions, poses a threat to burrow-nesting alcids, such as the tufted puffin, *Fratercula cirrhata*[15,20]. Predator eradications in Canada, Alaska and elsewhere have substantially increased safe nesting habitat for seabirds[5], although introduction of predators may increase as growing human developments expand north[15].

Marine pollution, especially oil, is a significant threat. Alcids are particularly sensitive to even small oil spills because of their concentrated aggregations[5,21]. There is also concern over the impacts of cruise ship tourism on Arctic seabird colonies, given its rapid growth[14]. Greater ship traffic increases the risk of groundings and other accidents, which may result in oil spills and other consequences[14].

Management challenges and opportunities

Alcids are subject to highly varied national and local management regimes across the Arctic, and a number of international legal agreements, conventions, and instruments are in place for the management of some species.

A variety of management regimes exist to control the harvesting of seabirds. In the USA and Canada, for example, protection for migratory birds exists under national legislation that implements the North American Migratory Bird Convention of 1916 in each country. The only seabirds that can be harvested legally in either country are the common and thick-billed murres in a hunt open only to residents of Newfoundland and Labrador. Russia, despite having signed a number of international and bilateral agreements, has no adequate legal framework in place for the management and protection of marine ecosystems and its associated species within the Arctic regions[6]. Across Arctic countries it is recognized that more information on seabird population trends and harvests is needed as a basis for sustainable harvest management[6].

National legislation to address the threats to alcids and other wildlife through the emission of transboundary pollutants has existed in some Arctic countries since the 1970s[8]. These have been complemented more recently by regional protocols and multilateral environmental agreements, which have banned or restricted the use of POPS. However, despite evidence that the "legacy" POPs* are decreasing or have reached stable levels, exposure of Arctic biodiversity to new contaminants is increasing[9,22]. Regional agreements and instruments to prevent or eliminate pollution in the marine environment also exist. The International Convention for the Prevention of Pollution from Ships (MARPOL, 1973), which aims to eliminate pollution by oil and other harmful substances from ships, is an important agreement for seabirds. In Canada implementation of this agreement has led to increased prosecution of vessels dumping oil in Canadian waters. The Arctic Council's Emergency Prevention, Preparedness and Response working group (EPPR) co-ordinates and promotes international cooperation on preventing and dealing with environmental emergencies in the Arctic, such as the release of hazardous materials from ships into the environment.

Under the UN Law of the Sea (UNCLOS), regional fisheries management organizations such as the North Atlantic Fisheries Agreement have a duty to minimize by-catch of non-target species, including seabirds, in their fisheries. A number of voluntary instruments also exist to limit the threat of by-catch from fisheries, including the Code of Conduct for Responsible Fisheries[24] and the International Plan of Action for Reducing Incidental Catch of Seabirds in Longline Fisheries[25].

The breeding sites of alcids and other seabirds are represented in many coastal protected areas in the Arctic[26]. All of the major Alaskan seabird colonies are protected under the Alaska Maritime Refuge[27]. In Canada, many important seabird colonies are protected as Migratory Bird Sanctuaries or as Provincial or Territorial sanctuaries[28]. The Nordic countries (Norway, Finland, Sweden, & Denmark – with the exception of Greenland) are also party to the African-Eurasian Waterbird Agreement[29], which calls on parties to engage in a wide range of conservation actions to protect migratory bird species, which are dependent on wetlands for at least part of their annual cycle. The Agreement covers several alcids, including the little auk, common and thick-billed murre[30].

A major constraint for the effective management and conservation of alcids and other seabirds is the lack of information regarding species' distribution at sea, population status, and the relative impacts of the threats they face. International advisory bodies such as CAFF work to address these constraints. The Circumpolar Seabird Group, an expert group under CAFF, works to identify gaps, advance knowledge, and develop co-operative research and species actions plans amongst Arctic countries. This group developed the International Murre Conservation Strategy and Action Plan, which addresses the management of common and thick-billed murres across Arctic countries and is considered a success story for cooperative action on Arctic seabird conservation[31].

Regulating POPs and marine pollution

Agreements which have banned or restricted the use of POPs include:

- Regional protocol on POPs under the Convention on Long-Range Transboundary Air Pollution (1998)
- Stockholm Convention on Persistent Organic Pollutants (2002) – signed and ratified by all Arctic nations apart from the USA, Russia, and Greenland and the Faroe Islands (as autonomous countries under the Kingdom of Denmark)[23]

Agreements and instruments to prevent or eliminate pollution in the marine environment exist and include:

- Convention for the Protection of Marine Environments of the North-East Atlantic (OSPAR, 1998)
- The International Convention for the Prevention of Pollution from Ships (MARPOL, 1973)

* "Legacy" POPs refer to persistent organic pollutants covered by agreements such the global Stockholm Convention on Persistent Organic Chemicals. New emissions from these POPs are either banned or restricted, and any release into the environment is largely a result, or "legacy", of past practices.

Conservation of Arctic Flora and Fauna

STAKEHOLDER'S PERSPECTIVE

Tom Barry
Executive Secretary, Conservation of Arctic Flora and Fauna (CAFF) Program

Introduction

The Conservation of Arctic Flora and Fauna (CAFF) Program was established to foster a more coordinated, regional approach with regards to the conservation of Arctic biodiversity. CAFF is one of the six working groups of the inter-governmental Arctic Council, and has a focus on biodiversity conservation. Board members come from the eight Arctic countries and six Indigenous organizations. Observers are from international organizations and non-Arctic states. The CAFF mandate is, *inter alia*:

- to address the conservation of Arctic biodiversity, and to communicate the findings to the governments and residents of the Arctic, helping to promote practices which ensure the sustainability of the Arctic's living resources, and
- to monitor, assess, report on, and protect biodiversity in the circumpolar Arctic.

CAFF produces conservation strategies, guidelines and assessments of Arctic biodiversity, and facilitates monitoring and research. These, via submission to the Arctic Council, help inform policy development and identify gaps in our knowledge. The integration of scientific and traditional ecological knowledge helps regional management and policy issues.

Supporting management of the Arctic's biodiversity through integrated monitoring

There are a number of urgent needs for the conservation of Arctic biodiversity including an evaluation of status and trends; the establishment of baseline data; and improved, enhanced capacity to monitor and understand changes. Much monitoring already takes place on Arctic biota, but we need a more integrated approach to biodiversity monitoring on a circumpolar rather than national scale. Such an approach allows for more coordinated gap analyses and answers to regional and global, rather than local, pressures. This approach also allows for greater awareness of Arctic responsibilities to global challenges.

CAFF uses several approaches to respond to these needs, of which there are two main programmes: the Circumpolar Biodiversity Monitoring Programme (CBMP), with long-term perspectives in mind, and the Arctic Biodiversity Assessment (ABA), which is a short-term status assessment. Two expert groups – one on seabirds, the other on flora – work with both scientific and management issues. CAFF also implements individual projects on the ground, such as the GEF-sponsored project ECORA (An Integrated Ecosystem Approach to Conserve Biodiversity and Minimize Habitat Fragmentation in the Russian Arctic), which worked in three model areas in the Russian Arctic. Furthermore CAFF endorses Arctic projects that are considered important to Arctic biodiversity conservation but are supervised by other stakeholders and actors.

Such activities are essential in order to allow us to determine how to effectively manage and cope with the challenges and changes facing Arctic environments. Numerous natural and human stressors are operating in the Arctic and more recently climate change has heightened the need for strong and coordinated action, to allow us to identify and

fill the knowledge gaps on various aspects of biodiversity conservation. Coordinated action is essential to facilitate agreement on joint action plans and strategies with which to meet these challenges.

Addressing missing aspects on governance and management of biodiversity in the Arctic

The most urgent issues that need to be more comprehensively addressed in current discussions are concerned with what we can do in these times of rapid changes. Some of the questions that need to be examined include:

- Do we need a conservation approach that is better suited to the environmental and ecological changes that are approaching?
- How can environmental conservation, including that of protected areas, be managed in the most beneficial way as biodiversity changes in response to climate change?
- How can we mitigate and adapt to these new circumstances and ensure the sustainability of the Arctic's living resources?

Traditionally, Arctic research has tended to focus on the physical environment, which is generally more easily quantifiable. Research on a circumpolar scale into Arctic biodiversity has proved challenging to address. Changes in biodiversity are often taken for granted by virtue of research into the physical sciences. Still, how biodiversity and its associated ecosystem services reacts remains little known. This is all the more pressing an issue given the current effects of climate change on Arctic biodiversity.

In order to address these issues effectively, we need better information and understanding of the Arctic environment and of what is happening to Arctic biodiversity. The task to find ways in which to respond to the challenges we face will require not only increased monitoring and related research but also better and improved cooperation between all involved parties, to allow us to consider the most effective way forward. An example of such cooperation is the Memorandum of Cooperation recently signed between CAFF and the Convention on Biological Diversity (CBD). Both the CBD and CAFF activities complement one another in that CAFF, as a working group of the Arctic Council, provides a vehicle for knowledge and action in the Arctic region, while the CBD provides an important global framework for biodiversity efforts. The CBD can help place Arctic biodiversity within a global framework while CAFF can help inform the CBD on the status and trends of biodiversity in this globally significant region.

CASE STUDY 4 Seals

Several species of seal live in the Arctic. Although their life cycles vary, many of them depend on ice as a pupping, moulting, and resting platform. Like other Arctic marine mammals, seals are adapted to a harsh environment (e.g., periods of low food availability and cold temperatures)[1].

The ringed seal, *Pusa hispida*, is by far the most abundant endemic seal species in the Arctic[2]. It is unique in its ability to maintain breathing holes in thick sea ice, and hence it occupies areas unreachable by other seals[2]. Other ice-dwelling seal species include the bearded seal (*Erignathus barbatus*), the harp seal (*Pagophilus groenlandicus*) and hooded seal (*Cystophora cristata*) in the North Atlantic; and the spotted seal (*Phoca largha*) and ribbon seal (*Histriophoca fasciata*) in the Pacific.

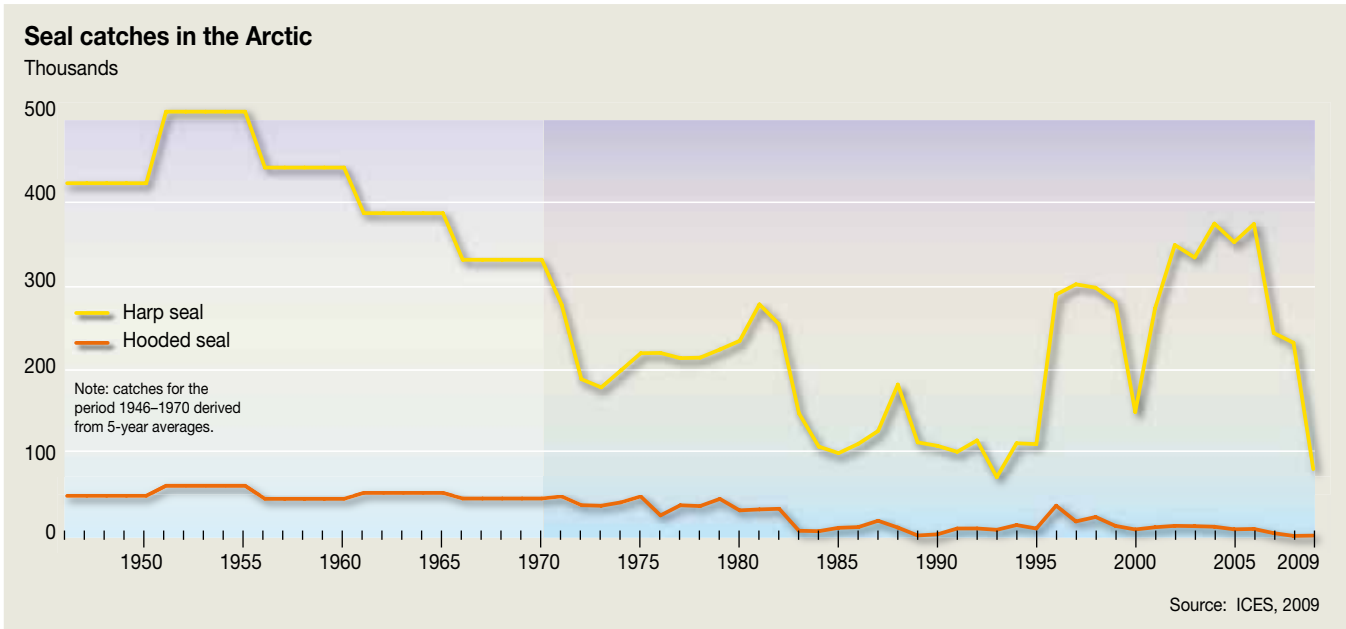
Seals have been important to humans since people settled in the Arctic. They have provided meat and oil for food, fuel for cooking and heating, and skins for clothing and boat covers. They continue to be an important subsistence animal for coastal-dwelling northern peoples, especially Russians, Native Alaskans, Arctic Canadians, and Greenlanders[3].

Seal hunting and processing are still culturally significant activities. The sharing of meat, oil, and skins of seals within a community provides social status to the hunters and needed nutrition and materials to recipients. Hunters from Arctic cultures have similar ways of showing respect to seals by honouring their spirit so that seals will continue to be plentiful and provide food for their communities. Seals harvested may also be sold in local markets, providing an economic value in remote areas where store-bought food is unaffordable on a daily basis. Handicrafts from seal parts may be sold for money to buy items needed for hunting.

According to the IUCN Red List of Threatened Species, most Arctic seal species are currently evaluated as having a low risk of extinction, with the exception of the hooded seal[4]. Although the population in the northwest Atlantic is stable, the northern-most breeding population in the northeast Atlantic (West Ice) declined by 85–90% over the last 40–60 years. Even

Marine mammals in the Arctic

Source: Arctic Council-PAME, *Arctic Marine Shipping Assessment Report*, 2009.



with protective measures taken in the last few years, recent data shows that the decline is continuing through unknown causes[5]. As a result, the hooded seal had been classified as vulnerable on both Norway's Red List since 2006[6] and on the IUCN Red List since 2008[5]. The ribbon seal, spotted seal, and the Okhotsk Sea ringed seal sub-species (*P. h. ochotensis*) have not been categorized by IUCN due to insufficient data[3].

Threats

Climate change predictions for the coming decades may change the prognosis for some seal species significantly[1]. In a warmer Arctic, endemic seals will face extreme levels of habitat change, the most dramatic being the reduction in sea ice[1]. Less ice, together with increased water and air temperatures, will impact seals' mobility and the density and distribution of their prey. It will increase competition from invasive temperate species and increase predation from species formally unable to reach them. Finally, it will increase the risk of disease, and possibly increase the risks from contaminants[1]. Seals will also be affected by an increase in human activities like shipping and exploitation of natural resources in areas previously inaccessible due to ice[1].

There is a significant difference of opinion regarding seal species that is most vulnerable to climate change. Most likely all ice-associated species will face great challenges[1,7]. Of the Arctic seals, the hooded seal appears to be the most sensitive. Hooded seals have very specific feeding requirements and use sea ice for whelping and moulting. The ringed seal and bearded seal seem to be less vulnerable because they occur across the Arctic, have large population sizes, can live in a variety of habitats, and can feed on many species.

Studies conducted in the Arctic show that all seal species contain POPs and heavy metal contaminants even when levels in air, soil, and water are low[8]. This is because seals and other top predators in the Arctic absorb and accumulate contaminants that have become concentrated in the fatty tissues of their prey[9].

The EU seal ban

In Europe, the main focus of the discussion related to seal management has been on animal welfare aspects of seal hunting practices. In 1983, the European Union (EU) placed a ban on sealskins from certain species of seal pups, and in July 2009 EU nations gave their final approval to a ban on all imports of seal products with the exception of products resulting from hunts traditionally conducted by Inuit peoples living in Alaska, Canada, Greenland, and Russia – and which may only be marketed on a not-for-profit basis.

However, Greenland's Premier Kuupik Kleist and other Inuit leaders criticized the ban for being incompatible with international agreements and human rights[17]. The North Atlantic Marine Mammal Commission (NAMMCO) stated that the EU import ban on seal products "raises serious concerns for the future of international cooperation on responsible management and the sustainable use of renewable natural resources in general"[18]. NAMMCO further argued that all peoples have the right to use their resources responsibly and sustainably for their economic development, including the right to benefit from international trade. Both Norway and Canada requested WTO dispute settlement consultations following the EU's decision to ban trade in seal products.

The seal product sales ban was due to come into force on 20 August 2010, but was temporarily suspended by a preliminary ruling the European Court of Justice at the request of Inuit organisations and companies selling seal products[19].

The ban has put the EU application to gain permanent observer status with the Arctic Council at stake. The day before the Council's Ministerial meeting in April 2009, the Canadian Foreign Affairs Minister Lawrence Cannon told CBC News: "Canada doesn't feel that the European Union, at this stage, has the required sensitivity to be able to acknowledge the Arctic Council, as well as its membership, and so therefore I'm opposed to it"[20]. The Council concluded that it would defer a decision on new applicants until its next gathering in 2011.

Inside and outside Europe, the ban was backed by the public through a consultation, in which massive dissatisfaction with current seal hunting practices was revealed. The consultation also discovered a knowledge gap of hunting methods employed, and that respondents were mainly opposed to seal hunting for ethical reasons[15].

Contaminants can have a negative impact on seals' immune status and their reproduction[8]. Another consequence of the bio-accumulation is that people who eat large quantities of seals and marine mammals have higher levels of POPs and mercury levels than people who do not consume these animals[10].

Large-scale commercial harvests are restricted to harp and hooded seals, except for the hooded seal population in the Jan Mayen area of the Greenland Sea[11,12]. Both species faced intense commercial hunting in the 19th and 20th centuries, first for oil, and later mainly for the highly prized pelts of pups[5,13]. Seal products nowadays also include a significant aphrodisiac trade (particularly for harp seal sex organs), and

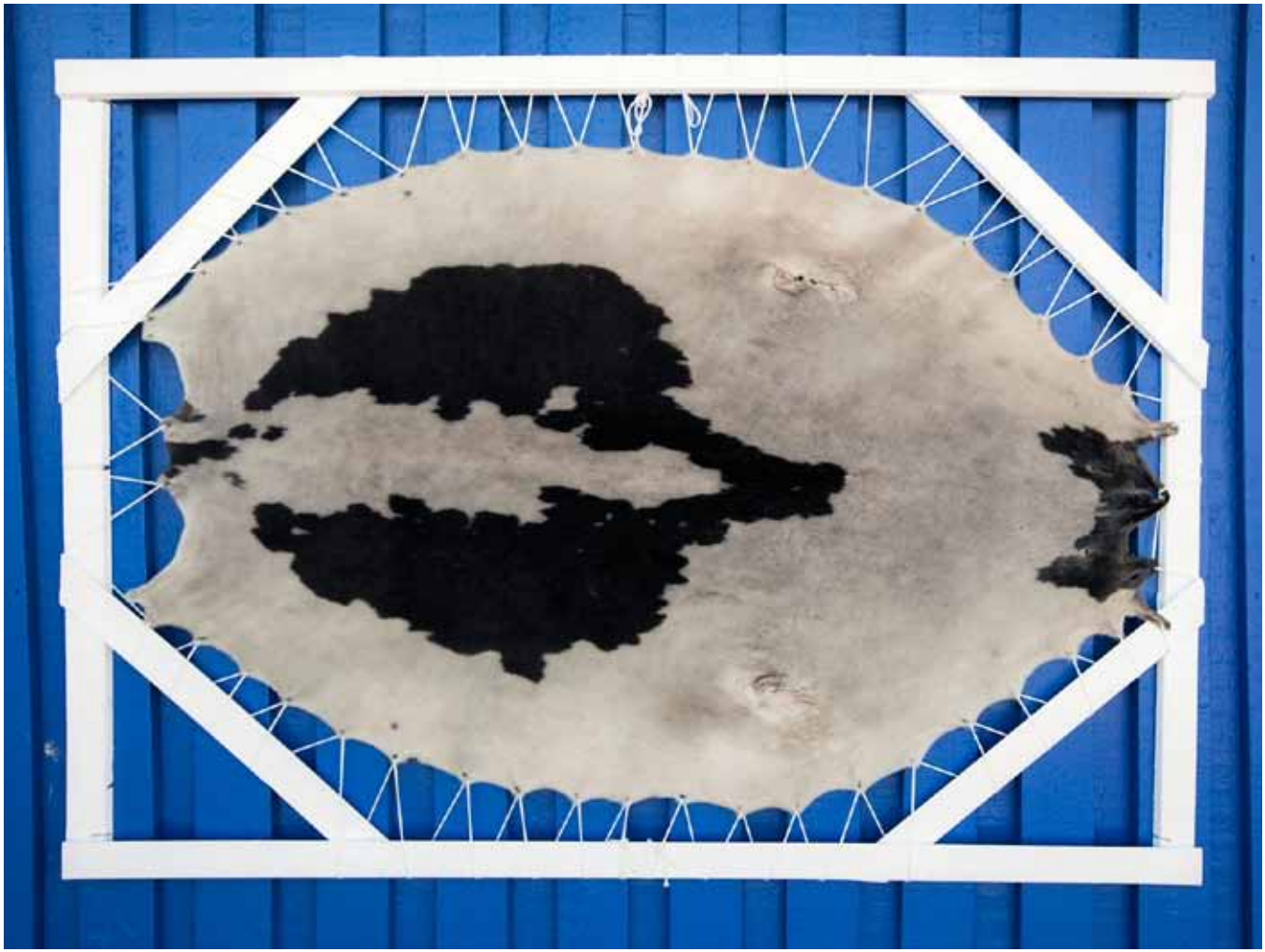
seal oil has become a popular health product because of its omega-3 content. Canada, Greenland, Norway, and Russia have been and are still involved in regulated commercial harvest of these species.

Management challenges and opportunities

An exploration of existing conservation and environmental agreements for all Arctic seal species is beyond the scope of this chapter. Whilst a number of agreements and protection measures cover several seal species, prominence in this section is given to the hooded seal, as this species is arguably in most need of attention given its vulnerable status.

Documented population declines of hooded seals resulted in the introduction of quotas in the early 1970s in order to achieve sustainable harvests[4]. Due to concerns over low pup production estimates, the International Council for the Exploration of the Sea (ICES)/North Atlantic Fisheries Organization (NAFO) Working Group on Harp and Hooded Seals (WGHARP) is an important source of scientific advice on the management and harvest of harp and hooded seals. WGHARP annually provides quota advice to ICES/NAFO member states for their harvests of these seal species. Since 2007, WGHARP has recommended that no harvest of Greenland Sea hooded seals should be permitted, with the exception of catches for scientific purposes[11]. As for setting quotas for the northwest Atlantic hooded seal, a precautionary approach has been adopted since 2007[11]. In Canada, the killing of both harp seal white-coat pups or hooded seal blue-backs (pups) for commercial purpose is prohibited[12], and in Svalbard both harp and hooded seals are protected.

Appendix 3 of the Conservation of European Wildlife and Natural Habitats (Bern Convention) lists protected fauna species, including six seal species with habitats in the Arctic (hooded seal, bearded seal, harp seal, harbour seal, ringed seal, and grey seal). Through the framework of the EU Habitats Directive, signatory states of the Bern Convention have agreed to take appropriate and necessary legislative and administrative measures to ensure the protection of the wild fauna species



listed in its appendices, and any exploitation of wild fauna specified shall be regulated in order to keep the populations out of danger[14]. However, the Bern Convention's applicability to seals in the Arctic is limited. Of the European seal hunting nations, only Norway has ratified the Convention. Russia has not signed the Bern Convention. Greenland, although a part of Denmark, is not part of the European Commission and is not committed by the legislation[15]. With a focus on animal welfare, in 2010 the EU is putting a ban on all imports of seal products with the exception of products "derived from hunts traditionally conducted by Inuit and other Indigenous communities and which contribute to their subsistence"[16].

In the USA the Marine Mammal Protection Act (MMPA) limits hunting of marine mammals to Alaska Natives who may take seals for subsistence use and for the production of authentic native handicrafts, which may then be sold. MMPA prohibits all other consumptive use of marine mammals.

The CBD and its significance for seal management in the Arctic

STAKEHOLDER'S PERSPECTIVE
Violet Ford
Former Vice-President, International Affairs, Inuit Circumpolar Council Canada

Inuit practice sustainable development through a combination of age-old practices and modern institutional frameworks. Inuit pursue their economic goals and economic self-reliance while at the same time practicing sustainable use.

Traditional practices of the Inuit relevant to marine resources have been carried out in a manner that contributes to and enhances their sustainable use. Inuit are for the most part a marine-based Indigenous People who rely heavily on marine biodiversity as a food source and for economic self-reliance, and this includes the hunting and harvesting of seals. This resource has always been hunted and harvested in a sustainable and humane manner.

In 1983, the EU passed a limited import ban on some seal products, with an exemption for Inuit. The result was a global collapse in prices for seal products and an attendant 220% increase in the suicide rate of adult male hunters, who are one of the key holders of traditional knowledge.

Today, another seal import ban by the EU has been introduced. Is this history repeating itself? The difference today is that Inuit are producing seal products for economic self-reliance and when these bans are in place, this will impact severely on the economy, livelihoods, and traditional knowledge and culture of the Inuit, and on the sustainable use of this biodiversity.

Another difference with the 1983 ban is the existence, since 1992, of the Convention on Biological Diversity and its objectives which include the conservation and sustainable use of biological diversity, and the fair and equitable sharing of benefits arising from its utilization. This treaty provides for involvement of Indigenous communities in the sustainable use of biological resources coinciding with its objectives. CBD is particularly significant because it recognizes, in its preamble, the close and traditional dependence on biological resources of many Indigenous and local communities that embody traditional lifestyles, and the desirability of equitable sharing of benefits arising from the use of traditional knowledge, innovations, and practices relevant to the conservation of biological diversity and the sustainable use of its components.

This preamble, combined with Article 8(j), is seen as one of the key articles for Indigenous communities. This article provides that each contracting party shall as far as possible and as appropriate:
"Subject to its national legislation 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 and encourage the equitable sharing of the benefits arising from the utilization of such knowledge, innovations and practices."

Indigenous Peoples have been very influential with state governments to ensure that decisions of the Conference of the Parties (COP) provide for the full and effective participation of Indigenous Peoples, and are an indication of the commitment that state governments are making to implement Article 8(j). One such decision adopted by the COP is Decision VII/12

relating to the Addis Ababa Principles and Guidelines for Sustainable Use. These principles and guidelines provide a framework for assisting governments, Indigenous and local communities, resource managers, the private sector, and other stakeholders to use biodiversity in a sustainable manner.

The Addis Ababa Principles and Guidelines could be applied in the case of seal management and overall marine governance by Inuit. Principles and guidelines relevant to the seal ban include Principles 1 and 9:

Principle 1 states that when an international agreement adopts a policy regarding the use of biodiversity, national laws must be compatible if sustainability is to be enhanced. The associated operational guidelines involve a consideration of local customs and traditions and identify any overlaps, omissions and contradictions in existing laws and policies.

Principle 9 provides that sustainability of use depends on biological parameters of the resource being utilized and recognizes that social, cultural, political, and economic factors are equally important; it is therefore necessary to take such factors into account and involve Indigenous and local communities, and the people experienced in these different fields, at all levels of the decision making process. The guidelines state that such factors that could influence the sustainability of management should be taken account of. This principle has not been applied in the introduction of the seal import ban.

Thus, the seal import ban imposed by the EU can be seen as inconsistent with the CBD objectives and contravenes COP Decisions, such as the above stated Principles and Guidelines which have not been applied in light of the biodiversity being used, the conditions under which they are used, and the cultural context in which use is taking place

CASE STUDY 5 Polar bears

More than any other animal, the polar bear, *Ursus maritimus*, is recognized as the symbol of the Arctic. With white fur and a sub-skin blubber providing insulation, the polar bear has adapted to live in severe cold conditions. The polar bear finds the majority of its prey on the sea ice – mostly seals[1].

Polar bears are important in traditional cultures. Inuit and other peoples hunt them for their meat, which is used for human consumption or dog food, and the skins are used for clothing or other purposes. The financial return from the sale of polar bear hides is important income. In Canada, sport hunting of polar bears occurs and this forms a part of the quota assigned to some communities[2].

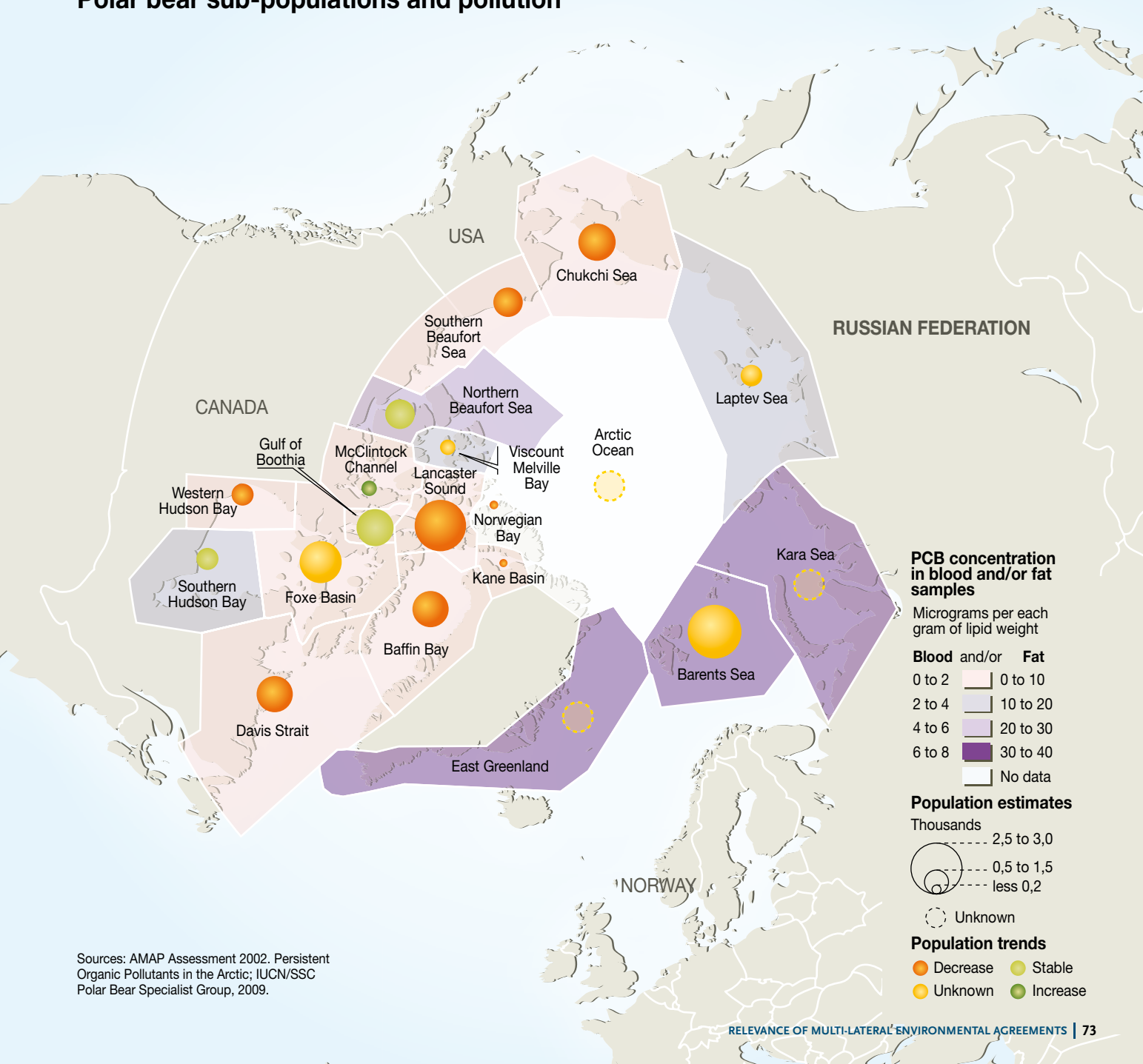
Polar bears were also hunted by wintering trappers in the Norwegian Arctic, and after the 1950s by trophy hunters in Alaska and Svalbard. Polar bear hunting is still permitted under the Agreement on the Conservation of Polar Bears (see below) in the Canadian Arctic, Greenland, Alaska (USA), and in parts of eastern Russia (Chukotka area). In the Norwegian Arctic and western Russian areas, polar bears are protected from all forms of harvest except problem or defensive kills[2].

Today, the annual harvest is between 500 and 700 bears (2–3% of the world population) and is thought to be sustainable[2]. However, over-harvest is an ongoing concern for many polar bear populations, particularly in areas where there is no information on population size[2].

During the mid 1960s, reliable data on numbers of polar bears was lacking. According to the literature at the time, world numbers were thought to range between 5,000 and 19,000 polar bears[3], although numbers as high as 25,000 were mentioned[4], which above all confirmed that such figures could only be considered as "guesstimates."

International cooperation and research on polar bears started in earnest with the establishment of the Polar Bear Specialist Group under the IUCN in 1968. An important issue discussed was whether polar bears belonged to one common population, which was constantly migrating around the Arctic Basin, or existed within several discrete populations, some of which could be shared between two or three nations. One common world population would require cooperation and agreements

Polar bear sub-populations and pollution



Sources: AMAP Assessment 2002. Persistent Organic Pollutants in the Arctic; IUCN/SSC Polar Bear Specialist Group, 2009.

between Arctic nations about management and harvests. But management and hunting quotas would only be a national or possibly bilateral issue for discrete populations.

Studies of polar bear population discreteness were prioritized in the years that followed. There are now thought to be between 20,000 and 25,000 bears in the world, which occur in 19 relatively discrete sub-populations[5,6].

Threats

The polar bear is identified as Vulnerable by the IUCN Red List based on a suspected population reduction due to loss of sea ice habitat caused by climate warming[7]. Other population stress factors include over-harvest, toxic contaminants, shipping, recreational viewing, oil and gas exploration, and development[7].

Retreating and thinning sea ice may affect polar bears in many ways[8]. Less sea ice makes it difficult for the bears to hunt seals, or may even reduce seal numbers. When waters around traditional polar bear denning areas are ice-free, pregnant females may have difficulties in getting ashore to dig maternity dens. Pregnant females that are stranded on shore, may have less access to food when the sea ice disappears in spring and summer so that their overall condition is reduced when they give birth in late autumn[9,10]. Lack of fat reserves may limit their ability to nurse cubs for three to four months and cub mortality may increase. There are several factors that have consequences for population growth and sustainability[11]. Some populations are already showing signs of stress and IUCN's International Polar Bear Specialists Group fears that poor ice conditions will have significant negative impacts on polar bear populations in the near future. The world's polar bear population could be reduced by two-thirds by the year 2050 if climatologists are correct about the extent that sea ice will change in the coming decades[1]. Also, less sea ice is increasing human-polar bear interactions (by forcing polar bears to stay on land for longer periods) which may have negative impacts on both polar bears and people in these regions in coming years[12].

Many parts of the Arctic are affected by air and seaborne transboundary pollutants that may have far-reaching negative effects upon Arctic ecosystems. Topping the food chain in the Arctic, the polar bear is exposed to high levels of pollutants that are magnified with each step higher in the food web (a process known as biomagnification). Recent studies have suggested that the immune system may be weaker in polar bears with higher levels of toxic contaminants (e.g., Polychlorinated Biphenyls or PCBs)[2]. There is also evidence that the hormone system of polar bears is affected by pollution, something that may interfere with reproduction and growth[2]. Climate change could also indirectly affect Arctic animals topping the food chain, such as the polar bear, through the secondary release of toxic contaminants have long been trapped in snow, ice and permafrost that is now melting[13,14].

Regulating POPs and marine pollution

The Nunavut government decided, in the beginning of March 2010, to reduce the hunting quotas of the Baffin Bay polar bear population from 105 to 65 animals by 2013. This is a region where polar bear numbers have been disputed by scientists and Inuit. Inuit in Baffin Bay have demanded compensation for hunters who have long relied on polar bears as part of their livelihoods. The bears create an important income source through the sales of hides and sport-hunting packages.

At the time, the Nunavut government also hoped that slashing the hunting quota in Baffin Bay would help Canada sway international opinion away from a U.S. proposal to ban the commercial trade of polar bear products, by reclassifying the polar bear as a species at risk of extinction under the Convention on the International Trade in Endangered Species (CITES)[20]. The U.S. proposal to CITES was subsequently rejected by a majority of governments in late March 2010[16].

Management challenges and opportunities

The 1975 Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) aims to "ensure that international trade in specimens of wild animals and plants does not threaten their survival". Polar bears are currently listed under Appendix II of CITES, which "lists species that are not necessarily now threatened with extinction but that may become so unless trade is closely controlled"[15]. Hence, all international trade in polar bear parts is governed by CITES. In March 2010 a proposal to CITES to reclassify the polar bear as a species threatened with extinction, effectively banning the commercial trade of polar bear hides, teeth, and claws, was rejected by a majority of governments, led by Canada. They recognized insufficient scientific evidence to support an Appendix I listing and the role of polar bears in the culture and economy of Indigenous Peoples[16].

However, it is argued[17] that neither CITES nor other conventions have the legal instruments required for the Arctic nations to address and protect polar bear habitats. They refer instead to the Agreement on the Conservation of Polar Bears, signed in 1976 by all Arctic countries with polar bear populations (i.e., Canada, the US, Norway, Russia, and Denmark/Greenland) and reaffirmed for an indefinite period in 1981. The Agreement's Article II says that "each Contracting Party shall take appropriate action to protect the ecosystems of which polar bears are a part". Although the word "shall" may be considered binding for the parties to the Agreement, the enabling legislation for Article II is, however, domestic because Article VI states that "each contracting Party shall enact and enforce such legislation and other measures as may be necessary for the purpose of giving effect to this Agreement". This may pose particular challenges when impacts from climate change, trans-boundary pollution, and habitat fragmentation may have far-reaching consequences for Arctic terrestrial and marine ecosystems. Due to increased concerns about the negative effect of global warming on polar bears, the parties to the Agreement at their meeting in March 2009 decided to refer the climate change problem related to polar bears to international climate negotiations.

In addition to the Agreement on the Conservation of Polar Bears, there are two bilateral agreements on management of polar bears, one between USA and Russia on the conservation and management of the Alaska-Chukotka polar bear subpopulation; and the other between USA and Canada (Inuvialuit-Inupiat) on polar bear management in the Southern Beaufort Sea[7,18]. In late 2009, a Memorandum of Understanding was also signed by Greenland, Nunavut and Canada for the management of the shared Baffin Bay and Kane Basin polar bear subpopulation[12].

Although Indigenous/local stakeholders were not involved in the negotiations over the Agreement on the Conservation of Polar Bears, there was always a clear understanding that local and Indigenous Peoples should be allowed to continue their traditional hunting. Article III of the Agreement on the Conservation of Polar Bears addresses local and Indigenous People's polar bear hunting by saying "by local people using traditional methods in the exercise of their traditional rights and in accordance with the laws of that Party". This Article was particularly important for USA and Canada with their large Inuit population, and for Greenland's Indigenous People, whose traditional hunting and fishing is important for their livelihood and whose rights were already recognized in national legislation.

The intent of the Agreement is for all jurisdictions to consult with each other and to continue to collaborate on issues related to the long-term conservation of polar bears[10]. Recent development of co-management agreements and greater involvement of local people and hunters are improving the management of polar bears, with traditional ecological knowledge being incorporated into polar bear conservation plans and initiatives. Compared to the situation in the 1960s and 1970s, polar bear harvest management is vastly improved[2]. The "Inuvialuit-Inupiat Polar Bear Management Agreement in the Southern Beaufort Sea" is an example of good cooperation on management of a shared population. Indigenous user groups from Canada and Alaska meet annually to consult on research and management in order to ensure sustainable management of the shared Southern Beaufort Sea population[19].

CASE STUDY 6 Red king crabs

The red king crab, *Paralithodes camtschaticus*, one of the world's largest arthropods, is a generalist predator that preys on a large range of organisms living on the surface of and burrowing in the sea bed[1-5].

The red king crab is native to the Okhotsk and Japan Seas, the Bering Sea, and the northern Pacific Ocean[3], where it is an important economic resource. In Alaskan waters, red king crabs have historically been the second most valuable species to fishermen after salmon, although since the 1980s overharvesting has led to the closure of some areas to fishing[6,7]. The king crab also has an invasive distribution in the Barents Sea. Since its introduction in the 1960s, the population has increased steadily and expanded its range, which now spans from Sørøya, Norway in the west[8] and Kolguev Island, Russia in the east, and to about 72° north[9].

The species is thought to have reached the limit of its eastern distribution[3,10] but continues its westward expansion along the Norwegian coast[3].

The number of commercially-sized crabs in Russian waters of the Barents Sea is estimated at approximately 5.85 million individuals[11], and evidence of declining fertility might indicate that the species has or is reaching the limits of population growth[10]. In Norway, the species had an estimated population of four million in 2004[2,12] and further population growth and westward expansion can be expected[10].

Introduction and successful establishment of the red king crab into the Barents Sea region has had strong (and mixed) social, cultural, and economic impacts, especially for small-scale fishermen[10,13]. Traditional fisheries have been impacted through by-catch problems in both coastal spring and summer fisheries[10,14]. However, the red king crab also represents an important and growing income to fishermen[15], and in coastal northern Norway this has permitted small fishing communities to grow[16,17]. By 2005, the total landed value in Norway reached 80 million NOK[18]. The red king crab thus represents an important new sea product, which is opening up international markets as well as attracting tourists. In northern Norway, king crab safaris are available for tourists, and an annual king crab festival is organized in cooperation with culture and tourism businesses to increase consumer awareness of the red king crab and other small-scale food products from the region.

Red king crab native and invasive distribution

Threats

The extent to which the red king crab poses a threat to the Barents Sea ecosystem and its commercial fisheries' is debated amongst fishermen and scientists[16,19] and the low research priority assigned to the species during its early years of invasion has not facilitated the task of clarifying this issue[10]. Current research reflects concerns on impacts of crabs on benthic communities and commercially important fish.

In high abundance, the red king crab appears to affect benthic communities in its native habitat[20], and in its invasive range, benthic organisms appear to be the most important food prey item[1,20]. However, there is no conclusive evidence that the red king crab has affected total biomass or species richness of benthic communities[21]. The commercial scallop, *Chlamys islandica*, a slow-growing epibenthic species, is believed to be particularly exposed to red king crab predation[2]. Few studies exist on the indirect impact of red king crabs as food competitors of fish. Concern also exists that king crab facilitates the spread of blood parasites in fish[22]. Given the current state of knowledge on the impacts of red king crab on native benthic communities and fishes, it is difficult to draw any precise conclusions on the threat caused to the Barents

Sea ecosystem and impact on native benthic communities[2]. Research to quantify the impact of king crab thus remains a high priority.

Management challenges and opportunities

Between the opening of commercial harvesting in 2002 and until 2007, the population of red king crabs in the Barents Sea was jointly managed between Norway and Russia, with the objective of harvesting the red king crabs as an economically sustainable population[2]. During this period the Joint Norwegian-Russian Fisheries Commission set quotas for each country, based on scientific advice from Norwegian and Russian scientists. Since 2007, Norway and Russia have agreed to manage the red king crab separately within their respective economic zones[23] and have set their own national quotas. Since 2004, Norway has taken measures to limit the spread west along Norway's coast by implementing two management regimes. East of 26° East (Northern Cape), within a limited area, the red king crab is managed as a sustainable resource, and quotas are set accordingly. West of this point an open and non-legislated fishery has been set up in order to limit the spread of the crab until more information on the impact of the species is obtained[14].

The Government of Norway considers the measures implemented so far in its waters are in line with the country's international commitments[13]. It sees no legal obligation to exterminate the red king crab in its waters – a decision subject to scientific research, monitoring, and assessment[13]. Indeed, within the framework of bilateral cooperation between Norway and Russia, the two countries have undertaken joint research on the red king crab since 1992, including the effects on native marine ecosystems and commercially-important fishes. A three-year joint research programme completed in 2008 has contributed much to improve the current understanding of red king crab ecology. A new joint 3-year research programme was agreed upon in March 2010[27].

The Global International Waters Assessment (GIWA) in the Barents Sea Region identifies the modification of marine ecosystems by invasive species, in particular the red king crab and snow crab, as one of the most important and growing issues facing its waters[10]. The red king crab has also served as an indicator for the Barents Sea region, in demonstrating that its waters are receptive to alien species. Unfortunately, there is clear evidence that international agreements and instruments have been ineffective in dealing with the problem, despite efforts of various international and national organizations[10], and further westward expansion of the red king crab can be expected[10].

Invasive species and MEAs

Invasive alien species have been identified as one of the most important issues threatening aquatic habitats and biodiversity in general[24,25]. Many multilateral environmental agreements require party states to take action to prevent, reduce, monitor, and control the introduction and transfer of invasive alien organisms. These include:

- United Nations Convention on the Law of the Sea (UNCLOS, 1982)
- Rio Declaration of the United Nations Conference on Environment and Development (UNCED, 1992)
- Convention on Biological Diversity (CBD, 1992) and its Jakarta Mandate (1995)
- Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR, 1992)[25]

The CBD is the major international agreement relating to invasive species, to which both Norway and Russia are party. Article 8 of the CBD calls on parties to "prevent the introduction of, control or eradicate those alien species which threaten ecosystems, habitats or species" and to "develop or maintain necessary legislation and/or other regulatory provisions for the protection of threatened species and populations"[24]. Guiding Principles for the implementation of the above article have also been adopted by the Conference of Parties to the CBD[26].

Arctic biodiversity – for the good of the people

STAKEHOLDER'S PERSPECTIVE

Hannes Manninen
Member of Parliament (Finland), and Chair of the Standing Committee of Parliamentarians of the Arctic Region (SCPAR)

The Arctic ice is melting and it is having a profound impact on the Arctic. The melting sea ice makes the Arctic Ocean more accessible for ships and other human activities, but the thawing of the tundra makes it more difficult to travel on land. As a parliamentarian living in the Arctic, I am concerned about the consequences of this. What will a higher temperature entail for the forestry sector in our countries and for the Arctic fauna? How will warmer water and a greater human presence influence the fisheries and the living resources in the Arctic Ocean?

The people living in the Arctic have always been the main focus of Arctic parliamentary cooperation. How the people are affected and how we can help them to adapt to a warmer climate have both been high on our agenda. We do, however, also recognize that what happens to our natural environment is closely linked to how the people are affected by climate change.

Climate change has been a pivotal issue for Arctic parliamentary cooperation. We know that the Arctic climate is changing, and that nature and living conditions for the Arctic peoples are changing as a result of this. The Arctic Parliamentary Conference held in Brussels in September 2010 decided to support the drafting of a Second Arctic Human Development Report that covers Arctic societies and their welfare in a global context.

To many Northerners, fishing and hunting are important elements of their identity and way of life. To a large extent, job

opportunities in the North are based on natural resources, and the use of these vast resources will be important in the future economy of the North. The Indigenous Peoples living in the Arctic are closely linked to their natural environment through their traditional lifestyles, as subsistence hunters or reindeer herders.

What happens to the flora and fauna in a changing climate and what does that mean for the people living in the Arctic? What happens when habitats change and – perhaps even more important – how does increased human activity influence the ecosystems in the Arctic?

At present, we don't have sufficient knowledge about these processes. The Arctic parliamentarians support the work of

the Arctic Council to assess the current biodiversity situation in the Arctic and to establish a circumpolar monitoring program to detect and report changes in nature. This work will give us an overview of the most up-to-date research and provide an important instrument for monitoring Arctic biodiversity.

As parliamentarians, we must ask ourselves if we have the right international regulatory framework to meet the rapid changes happening in the Arctic. The basis for the governance of the Arctic Ocean is the United Nations Convention on the Law of the Sea. It is, however, clear to me that in light of the changing climate and the increased human activity, we need to conduct an audit of the more specific multilateral environmental agreements relevant to the Arctic.

We must seek to find ways to regulate human activity in the Arctic and aim to keep ahead of development. One example is the ongoing process in the International Maritime Organization (IMO), which is looking at how regulation for shipping in ice-covered waters can be improved.

Sustainable communities in the Arctic will continue to rely on the rich natural resources in the Arctic. At the recently held Arctic parliamentary conference we also discussed the management of living resources in the region. In the conference statement we ask the Arctic countries to establish an Arctic cooperation on the management of living resources in the Arctic. We also underline the need for better Arctic cooperation on emerging fisheries and on transborder fish stocks in the Arctic, to secure future generations the possibility to harvest from these renewable resources.

Glossary of commonly cited definitions, agreements, conventions, and organizations

A

Agreement between the Governments of Canada and the United States on the Conservation of the Porcupine Caribou Herd

Signed in 1987. The signatories of the agreement were the Government of Canada, the Government of Yukon, the Government of Northwest Territories, the Council of Yukon Indians, the Inuvialuit Game Council, and the Dene Nation and the Métis Association of the Northwest Territories.

Agreement on the Conservation of African-Eurasian Migratory Waterbirds (AEWA)

Entered into force in 1999 and ratified since then by 62 countries and the European Union. Among the Arctic countries Finland, Sweden and Norway have become a Contracting Party. Denmark joined with exception of Greenland.

Agreement on the Conservation of Polar Bears

Signed in 1976 by Arctic Countries with polar bear populations (Canada, the US, Norway, Russia, and Denmark/Greenland) and re-affirmed for a definite period in 1981.

Arctic Biodiversity Assessment (ABA)

Endorsed by the Arctic Council of Ministers in Salekhard 2006. Its purpose is to synthesize and assess the status and trends of biodiversity in the Arctic. The ABA is coordinated by the Arctic Council's Conservation of Flora and Fauna (CAFF) Working Group, and is divided into two phases – the Arctic Biodiversity Trends 2010 report (recently completed), and a full scientific Arctic Biodiversity Assessment scheduled for completion in 2013.

Arctic Climate Impact Assessment (ACIA)

An international project of the Arctic Council and International Arctic Science Committee (IASC) to evaluate and synthesize knowledge on climate variability, climate change, and increased ultraviolet radiation and their consequence. Results were released in November 2004.

Arctic Council

A high-level intergovernmental forum to provide a means for promoting cooperation, coordination and interaction among the Arctic States, with the involvement of the Arctic Indigenous communities and other Arctic inhabitants on common Arctic issues – focussing particularly on issues of sustainable development and environmental protection in the Arctic. Member states of the Council are Canada, Denmark (incl. Greenland and Faroe Islands), Finland, Iceland, Norway, Russian Federation, Sweden, and the United States of America. The Council also consists of six permanent participants, consisting of Arctic organizations of Indigenous Peoples.

Arctic Monitoring and Assessment Programme (AMAP)

An international organization established in 1991 to implement components of the Arctic Environmental Protection Strategy (AEPS). It is now a working group of the Arctic Council, whose current objective is "providing reliable and sufficient information on the status of, and threats to, the Arctic environment, and providing scientific advice on actions to be taken in order to support Arctic governments in their efforts to take remedial and preventive actions relating to contaminants".

B

Bern Convention

Shorthand for the Convention on the Conservation of European Wildlife and Natural Habitats. Adopted in 1979, entered into force in 1982. The Convention aims to "conserve wild flora and fauna and their natural habitats, especially those species and habitats whose conservation requires the co-operation of several States, and to promote such co-operation. Particular emphasis is given to endangered and vulnerable species, including endangered and vulnerable migratory species". The Convention's four Appendices list protected species: I – strictly protected flora species; II – strictly protected fauna species; III – protected fauna species; and IV – prohibited means and methods of killing, capture and other forms of capture.

Biodiversity

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; this includes diversity within species, between species and of ecosystems.

C

Carta di Siracusa

The "Siracuse Charter", adopted by the Ministers of Environment of the G8 and other countries in 2009, and elevated biodiversity as a permanent theme of environmental dialogue of the G8 .

Circumpolar Biodiversity Monitoring Programme (CBMP)

An international network of scientists, government agencies,

Indigenous organizations and conservation groups working together to harmonise and integrate efforts to monitor the Arctic's living resources. The CMBP is a cornerstone programme of the Arctic Council's Conservation of Arctic Flora and Fauna (CAFF) Working Group.

Conservation of Arctic Flora and Fauna (CAFF)
A working group of the Arctic Council, CAFF's mandate is "to address the conservation of Arctic biodiversity, and communicate the findings to the governments and residents of the Arctic, helping to promote practices which ensure sustainability of the Arctic's living resources".

Convention on Biological Diversity (CBD)
Adopted in 1992, entered into force in 1993. The objectives of the Convention 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, including by appropriate access to genetic resources and by appropriate transfer of relevant technologies, taking into account all rights over those resources and to technologies, and by appropriate funding".

Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)
Adopted in 1973, entered into force in 1975. It aims "to ensure that international trade in specimens of wild animals and plants does not threaten their survival". The species covered by CITES are listed in Appendices, according to the degree of protection they need.

Convention on Migratory Species (CMS)
Also called the "Bonn Convention". Adopted in 1979, entered into force in 1983. The Convention aims to conserve terrestrial, marine and avian migratory species throughout their range. Appendix I lists migratory species threatened with extinction; Appendix II lists migratory species that need or significantly benefit from international co-operation.

Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR)
The 1998 OSPAR Convention is the current legal instrument guiding international cooperation on the protection of the marine environment of the northeast Atlantic. The objective is to "conserve marine ecosystems and safeguard human health in the northeast Atlantic by preventing and eliminating pollution; by protecting the marine environment from the adverse effects of human activities; and by contributing to the sustainable use of the sea". The OSPAR commission has developed a strategy for its biological diversity and ecosystems-related work, including a list of species and habitats that are threatened or in decline.

E
Ecosystem
A dynamic complex of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit.

Emergency Prevention, Preparedness and Response (EPPR)
Established in 1991 to implement components of the Arctic Environmental Protection Strategy (AEPS) and currently a working group of the Arctic. Its goal is to provide "a framework for future cooperation in responding to the threat of environmental emergencies".

F
Fennoscandia
A geographic and (geological) terms used to describe the Scandinavian Peninsula, the Kola Peninsula, Karelia and Finland.

G
G8
Group of Eight (G8) member countries are Canada, France, Germany, Italy, Japan, Russia, the United Kingdom and the United States. The eight members meet once a year at Heads of State and Government levels.

Global Environment Facility (GEF)
An independent financial organization established in 1991 that provides grants to developing countries and countries with economies in transition for projects related to biodiversity, climate change, international waters, land degradation, the ozone layer, and persistent organic pollutants.

H
Habitats Directive
Shorthand for the European Council Directive 92/43/EEC of 21 May 1992 on the Conservation of natural habitats and of wild fauna and flora. The main aim of the EC Habitats Directive is to promote the maintenance of biodiversity by requiring Member States to take measures to maintain or restore natural habitats and wild species

at a favourable conservation status, introducing robust protection for those habitats and species of European importance. The habitats listed in Annex I, and species listed in Annex II of the Directive, are protected by means of a network of sites – "Natura 2000".

I

ILO Convention # 169

Shorthand for the Convention concerning Indigenous and Tribal Peoples in Independent Countries. Adopted in 1989, entered into force 1991. The broad objectives of the Convention include giving recognition to, consulting with and empowering the rights of Indigenous Peoples.

International Convention for the Prevention of Pollution from Ships (MARPOL)

As modified by the Protocol of 1978 relating thereto. Adopted in 1973, entered into force in 1983. Its stated objective is to preserve the marine environment through a complete elimination of pollution by oil and other harmful substances and the minimization of accidental discharge of such substances. The Convention contains 6 annexes which cover the prevention of different forms of marine pollution from ships.

International Council for the Exploration of the Sea (ICES)

ICES coordinates and promotes marine research on oceanography, the marine environment and on living marine resources in the north Atlantic. Members include all coastal states bordering the north Atlantic and the Baltic Sea, with affiliate members in the Mediterranean Sea and southern hemisphere. ICES is an important source of scientific advice on the marine ecosystem to governments and international regulatory bodies that manage the north Atlantic Ocean and adjacent seas.

International Maritime Organization (IMO)

Established in 1948, and is a specialized agency of the United Nations responsible for improving maritime safety and preventing pollution from ships. IMO is the source of about 60 legal instruments that guide the regulatory development of its member states to improve safety at sea, facilitate trade amongst seafaring states, and protect the marine environment.

International Polar Year (IPY) 2007-2008

A large scientific programme focused on the Arctic and Antarctic from March 2007 to March 2009. IPY 2007-2008 was organized by the International Council for Science (ICSU) and the World Meteorological Organization (WMO).

International Union for the Conservation of Nature (IUCN)

Founded in 1948, it is the world's largest global environmental network. IUCN provides a neutral forum for governments, NGOs, scientists, business and local communities to find pragmatic solutions to conservation and development challenges. IUCN established the Species Survival Commission, which provides information on biodiversity to conservation organizations, government agencies and other IUCN members.

IUCN Red List

Shorthand for the IUCN Red List of Threatened Species, it provides an objective global approach for evaluating the conservation status of plant and animal species. Its goals are to "identify and document those species most in need of conservation attention if global extinction rates are to be reduced; and to provide a global index of the state of change in biodiversity".

J

Jakarta Mandate

Shorthand for Jakarta Mandate on Marine and Coastal Biological Diversity. Global consensus on the importance of marine and coastal biological diversity, adopted in 1995 by the second Conference of the Parties to the Convention on Biological Diversity (CBD). Includes the program of work on marine and coastal biodiversity under CBD.

Joint Norwegian-Russian Fisheries Commission

Established in 1976 to manage cod, haddock and capelin in the Barents Sea, and is also involved in other aspects of fisheries regulation.

M

Multilateral Environmental Agreement (MEA)

MEAs are internationally agreed-upon measures to protect the environment and/or to promote sustainable development.

N

North Atlantic Fisheries Organization (NAFO)

An intergovernmental fisheries science and management body, founded in 1979 as a successor to the International Commission of the Northwest Atlantic Fisheries (ICNAF). NAFO's overall objective is to contribute through consultation and cooperation to the optimum utilisation, rational management and conservation of the fishery resources of the Convention area.

North Atlantic Marine Mammal Commission (NAMCCO)

An international body for cooperation on the conservation, management and study of marine mammals in the North Atlantic. NAMCCO provides a mechanism for co-operation on conservation and management for all species of cetaceans (whales and dolphins) and pinnipeds (seals and walruses) in the region.

Nordic Council of Ministers (NCM)
The forum for Nordic governmental co-operation. Denmark, Finland, Iceland, Norway, and Sweden have been members since 1971. The autonomous territories of Greenland, the Faroe Islands and Åland have the same representation as the member states.

O
OSPAR
See Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR)

P
Persistent Organic Pollutant (POP)
A chemical substance that persists in the environment, bioaccumulates through the food web, and poses a risk of causing adverse effects to human health and the environment. Characteristic of POPs is their long-range transport through the atmosphere and water bodies into regions where they have never been produced.

Protection of the Arctic Marine Environment (PAME)
A working group of the Arctic Council, that serves as the focal point of the Council's activities related to the protection and sustainable use of the Arctic marine environment.

R
Ramsar Convention on Wetlands
Adopted in 1971 and came into force in 1975. An intergovernmental treaty that provides the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources.

S
Standing Committee of Parliamentarians of the Arctic Region (SCPAR)
Responsible for work between Conferences of Parliamentarians of the Arctic Region (CPAR). SCPAR started its activities in 1994. The Conference and Standing Committee take initiatives to further Arctic cooperation, and act, in particular, as a parliamentary forum for issues relevant to the work of the Arctic Council.

Stockholm Convention on Persistent Organic Chemicals
Adopted in 2001, entered into force in 2004. Also referred to as the "POPs Convention." The stated objective of the convention is to "protect human health and the environment from persistent organic pollutants by reducing or eliminating releases to the environment".

Sustaining Arctic Observing Networks (SAON)
A process that responds to the need for a well-coordinated and sustained Arctic Observing Network that meets scientific and societal needs. The SAON Initiating Group was formed in 2007 to develop recommendations on how to achieve long-term Arctic-wide observing activities.

U
UNCED – United Nations Conference on Environment and Development (UNCED)
Held in Rio de Janeiro in 1992. Outcomes of the Conference included: Agenda 21; the establishment of the Commission on Sustainable Development (CSD); the Rio Declaration on Environment and Development, the Non-Legally Binding Authoritative Statement of Principles for a Global Consensus on the Management, conservation and sustainable development of all Types of Forests (also known as "the Forest Principles"). UNCED also led to the negotiation and adoption of the UN Convention to Combat Desertification (UNCCD). Both the UN Framework Convention on Climate Change (UNFCCC) and the Convention on Biological Diversity were opened for signature at the Conference.

United Nations Convention on the Law of the Sea (UNCLOS)
Adopted in 1982, entered into force in 1994. The major features of the Convention include navigational rights, territorial sea limits, economic jurisdiction, legal status of resources on the seabed beyond the limits of national jurisdiction, passage of ships through narrow straits, conservation and management of living marine resources, protection of the marine environment, a marine research regime and a binding procedure for settlement of disputes between States.

United Nations Environment Programme (UNEP)
Established in 1972, it is the designated authority of the United Nations system on environmental issues at the regional and global level. Its mandate is "to coordinate the development of environmental policy consensus by keeping the global environment under review and bringing emerging issues to the attention of governments and the international community for action".

W
Working Group on Harp and Hooded Seals (WGHARP)
An expert working group under ICES/NAFO. WGHARP meets annually to consider recent research on the two species and to provide quota advice to ICES/NAFO member states for their harvests of harp and hooded seals. WGHARP is closely aligned with other harp and hooded seal research and management programs conducted by the governments of Canada, Greenland, Norway, Russia, and the United States (e.g., the National Oceanic and Atmospheric Administration's Fisheries Service (NOAA Fisheries Service), the North Atlantic Marine Mammal Commission (NAMMCO), and the Joint Norwegian-Russian Fisheries Committee).

Acronyms and abbreviations

ABA	Arctic Biodiversity Assessment
ACIA	Arctic Climate Impact Assessment
AEWA	Agreement on the Conservation of African-Eurasian Migratory Waterbirds
AMAP	Arctic Monitoring and Assessment Programme
CAFF	Conservation of Arctic Flora and Fauna Programme
CBD	Convention on Biological Diversity
CBMP	Circumpolar Biodiversity Monitoring Programme
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CMS	Convention on Migratory Species
COP	Conference of Parties
EALÁT	Reindeer Herding Vulnerability Network Study
EC	European Commission
EPPR	Emergency Prevention, Preparedness and Response
EU	European Union
GEF	Global Environment Facility
GIWA	Global International Waters Assessment
GPA	Global Programme of Action for the Protection of the Marine Environment from Land-based Activities
ILO	International Labour Organization
IPY	International Polar Year
IUCN	International Union for the Conservation of Nature
MARPOL	International Convention for the Prevention of Pollution from Ships
MEA	Multilateral Environmental Agreement
NAFO	North Atlantic Fisheries Organization
NAMMCO	North Atlantic Marine Mammal Commission
OSPAR	Convention for the Protection of the Marine Environment of the North-East Atlantic
PAME	Protection of the Arctic Marine Environment
POP	Persistent Organic Pollutant
SAON	Sustaining Arctic Observing Networks
SCPAR	Standing Committee of Parliamentarians of the Arctic Region
UNCED	United Nations Conference on Environment and Development
UNCLOS	United Nations Convention on the Law of the Sea
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
WGHARP	ICES/NAFO Working Group on Harp and Hooded Seals
WHC	UNESCO Convention concerning the Protection of the World Cultural and Natural Heritage
WTO	World Trade Organization

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We are very grateful to Bernard Funston (Northern Consulting) for authoring the majority of Part I of this report. Thanks to Tony Gaston (Environment Canada) for contributions to the alcids case study, and to Thor S. Larsen for co-authoring the polar bear case and the chapter on the ecosystem approach. We are also thankful to Violet Ford (Inuit Circumpolar Council), Ahmed Djoghlaf (Secretariat of the Convention on Biological Diversity), Mikhail Pogodaev (Association of World Reindeer Herders) and Tom Barry (CAFF Secretariat) for providing stakeholder contributions.

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