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Lefeber, R.

DOI

[10.2139/ssrn.2151241](https://doi.org/10.2139/ssrn.2151241)

Publication date

2012

Document Version

Submitted manuscript

[Link to publication](#)

Citation for published version (APA):

Lefeber, R. (2012). *Polar Warming: An Opportune Inconvenience*. (Amsterdam Law School Legal Studies Research Paper; No. 2012-86). University of Amsterdam.
<https://doi.org/10.2139/ssrn.2151241>

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POLAR WARMING: AN OPPORTUNE INCONVENIENCE

René Lefebber

Amsterdam Law School Legal Studies Research Paper No. 2012-86

Centre for Environmental Law and Sustainability Research Paper No. 2012-01

Polar Warming: An Opportune Inconvenience

René Lefebvre

1. The Changing Climate

The Polar Regions, at least the central parts of those regions, were largely unknown territories (*terra incognita*) for people until recently. The geographical North Pole was, according to contested claims, reached for the first time by Henry Peary and Matt Henson on 6 April 1909, and the geographical South Pole by Roald Amundsen on 14 December 1911. The physical features of the Polar Regions have inhibited their exploration even though indigenous peoples have dwelled in the North Pole Region for thousands of years. The Polar Regions are characterized by extreme cold conditions, with a measured record temperature of minus 89.2°C; severe aridity, with an average precipitation of less than 200 mm per year a desert; and high winds, with a measured record velocity of 327 km per hour.

Other organisms have adjusted to the extreme conditions in the Polar Regions and manage to survive there, as a species, in spite of these extreme conditions. The process of adjustment has been unique for both Polar Regions: a polar bear will never encounter a penguin in his natural habitat. This is not only due to diverging evolutionary developments, but also to differences in their natural habitats. The North Pole Region consists of warm water that is surrounded by cold land, while the South Pole Region consists of cold land that is surrounded by warm water.

The extreme conditions continue to be an obstacle for human presence in the Polar Regions. However, the Polar Regions are rapidly warming up. The average temperature in these regions rises faster than the average temperature on Earth.¹ Polar warming has resulted in faster melting glaciers; the thawing of permafrost; a decrease of the total surface covered with sea ice, land ice and snow; parts of the remaining surface becoming ice free earlier in the season and for longer stretches of time; and the remaining ice cover becoming less thick.

It is expected that some time this century the geographical North Pole will no longer be covered with ice at the end of the Arctic Summer. This may already happen for the first time at the end of this decade. The amount of sea ice at the end of the Arctic Summer of 2011 (4.6 million km²) was more than 40% less than at the end of the Arctic Summer of 1980 (7.8 million km²), which was almost 30% below the long-term average of the period 1979-2010.² Considerable parts of the land mass of Greenland, in particular the coastal areas, and Antarctica, in particular the Antarctic Peninsula, are expected to become ice free in summer time within the foreseeable future. The number of icebergs will increase even though they will melt faster as a result of global warming. Icebergs pose a threat for the sea routes in the Polar Regions which will be used more intensively, but the seriousness of this threat will depend on the melting velocity, the direction of winds and currents, and the use of detection methods that are more advanced than at the time of the sinking of the *RMS Titanic* on 15 April 1912.

Polar warming offers unprecedented opportunities for mankind. The northern sea routes will, at least for part of the year, become ice free and navigable (the North-west Passage, the North-east Passage, and the Transatlantic Passage). These routes will be shorter and safer than the

¹ Intergovernmental Panel on Climate Change (IPCC), *Fourth Assessment Report, Working Group II Report 'Impacts, Adaptation, and Vulnerability'* (2007), Chapter 15 (Polar Regions (Arctic and Antarctic)), at 653-685.

² United States National Snow and Ice Data Center, *Arctic Sea Ice News & Analysis*, www.nsidc.org.

traditional sea routes that are stricken by pirates, terrorism and war. The surface of the North Pole Region that is suitable for forestry and agriculture will increase as a result of thawing and drying up of tundra. The presence of increased amounts of melting water will make the Polar Regions, at least the North Pole Region, a suitable location for the establishment of industries that make intensive use of water or hydropower. The exploitation of mineral resources, which have so far not been exploited due to technical or economical obstacles, may become possible and profitable in the foreseeable future. The metamorphosis of the North Pole Region from an ice world into a water world will make it accessible for harvesting of fish species, such as Arctic cod and Arctic char, which live in relatively cold waters and are expected to migrate to northern waters as the water temperature rises. Together with the increase of human activities, the number of people taking up permanent or temporary residence in the Polar Regions is also likely to increase.

2. Human Presence

2.1 People and their Habitats

To satisfy their needs, people use the areas around them. These habitats provide people with goods and services. People acquire goods by harvesting or exploiting natural resources that can be found in the habitats where they dwell. Natural resources are those parts of people's habitats that they can take possession of by harvesting or exploiting such resources. Such goods may consist of organic material (plants, animals, fungi, and microbes) or inorganic material in a solid, liquid, or gaseous state (earth, water, and air). People obtain services by deriving amenities or knowledge from their habitats. Such services may consist of occupation of land, transport of goods, recreation or information. The acquisition of goods and services requires people to carry out activities in the areas around them. To that end, it may be necessary for people to partially occupy such areas, in particular for the construction of infrastructure. In addition to the direct satisfaction of needs, the acquisition of goods or services may further scientific or commercial objectives, even though it may not always be easy to determine when a scientific use becomes a commercial use.

The use of natural resources may involve its consumption. This depends on the nature of the natural resource, in particular the distinction between renewable and non-renewable resources. A resource is renewable if it can be replaced in a relatively short natural cycle. This may be a biological cycle, within which organisms are replaced by the transfer or reproduction of genetic material, or an inorganic cycle, within which elements such as earth, water and air, are replaced by substitution of identical material. A resource is not renewable, if no replacement occurs in a relatively short natural cycle, such as in the case of mineral resources and ground water resources that are not directly connected to surface water.

The use of habitats, in particular the consumption of natural resources, raises questions with respect to: (1) the access to habitats; (2) the use of habitats; and (3) the distribution of benefits that are acquired through such use. The consumption of natural resources raises questions with respect to the possibilities of others, including future generations, to satisfy their needs. This does not apply to other uses of habitats, provided that nobody is excluded from such uses and the habitat is preserved in its original state. All uses raise questions with respect to the distribution of benefits that are obtained by the use of goods and services, such as access to observations and results of scientific use, and the distribution of the revenues of commercial use. With respect to

the use of the habitats of indigenous peoples, the question arises whether such indigenous peoples have the right to restrict or prohibit the use, in particular the exploitation of non-renewable natural resources and the access to genetic resources and associated traditional knowledge.

2.2 Supply of Goods and Services

Man's presence in the Polar Regions finds its origin in the supply of goods and services by these regions. Human activities are so far mainly limited to research, fisheries, tourism, and associated logistical activities. In addition, mineral resources are exploited on a limited scale in the North Pole Region at present.

According to estimates, 13% of the unproven global oil reserves and 30% of the unproven global gas reserves are situated in the North Pole Region (more than 410 billion barrels of which approximately 84% in marine areas).³ On land, more than 400 oil and gas fields are in production accounting for 10% of the proven global reserves (approximately 240 billion barrels). There are sizeable coal reserves on Spitsbergen that have been exploited since the beginning of the 20th century (with a record level of 4 million ton in 2007); and the prospects for off-shore oil and gas exploitation are promising. At the end of the 19th century, there was a gold rush to Alaska (Klondike Gold Rush); now there is a diamond rush to the Arctic territories of Canada. The Canadian Government has decided to map the presence of other mineral resources, including rare earth materials;⁴ and mineral deposits in Greenland. These reserves cannot be exploited without associated logistical activities. Terminals and pipelines (Transalaskan Pipeline). In the South Pole Region, there is currently no search for mineral resources. Besides some proven coal and iron reserves, the presence of mineral resources in considerable quantities in the South Pole Region is a matter of speculation.

The main non-living resource of Antarctica is water in a solid state (ice). It has been estimated that the ice and snow cover of Antarctica comprises more than 90% of the world's ice and 70% of the world's fresh water reserves. The ice reserve of Antarctica is currently not used for commercial purposes in contrast to the North Pole Region where industries, such as the aluminium smelters in Iceland, make intensive use of (melting) water. The potential value of the Antarctic ice reserve has, however, been recognized in the Final Act of the 1988 Convention on the Regulation of Antarctic Mineral Resources Activities (Antarctic Mineral Resources Convention). It provides that ice and ice bergs are not mineral resources governed by the Convention, and that separate agreements must be concluded to regulate the harvesting of ice.

The biological diversity of the Polar Regions is not as big as that of warmer regions. The Polar Regions are characterized by short food chains – with plankton and other unicellular life forms as primary producers; crustaceans (notably krill), molluscs (notably squid), and small fishes as primary consumers; whales, seals, fishes, sea birds, and penguins as secondary consumers; and orcas, in the South Pole Region, and polar bears, in the North Pole Region, at the top. Short food chains and, hence, polar ecosystems are vulnerable to climate change and human activities.

The hunt for sea mammals, in particular seals and whales, has long been one of the main human activities in the Polar Regions. However, the commercial seal hunt in the South Pole

³ United States Geological Survey, *Circum-Arctic Resource Appraisal: Estimates of Undiscovered Oil and Gas North of the Arctic Circle*, USGS Fact Sheet 2008-3049.

⁴ Government of Canada, *Canada's Northern Strategy – Our North, Our Heritage, Our Future* (2009), at 15.

Region was abandoned in the 1950s, because overexploitation since the 19th century posed a serious threat to the conservation of seal species. Following the removal of dogs in the 1990s, the import of which is now banned by law, the seal hunt for dog food has also come to an end. The resumption of the hunt is currently not expected. In the North Pole Region, the commercial and indigenous seal hunt continues, including large scale hunting on the Canadian East Coast, but this exploitation does not seem to constitute a serious threat for the conservation of the species concerned. Commercial whaling ceased by and large in the 1980s following serious concerns regarding the conservation of whale species, but scientific and indigenous whaling continue.

Polar waters provide considerable quantities of fish, molluscs and crustaceans for human use, in particular food consumption. Fisheries in Antarctic waters, in particular for krill and toothfish, rapidly increased with the construction of fishing vessels that are suitable for fishing in remote waters in the 1970s. Fisheries in the North Pole Region is, for the time being, limited by the presence of ice which blocks access to the area and impedes use of traditional fishing techniques, such as trawling. There is currently no commercial fishing at the higher latitudes, but only in southern Arctic waters, such as the Barents Sea – in particular for cod, haddock and salmonids – and the Bering Sea – in particular for crab, salmonids and bottom fish.

Only the North Pole Region is inhabited on a permanent basis by approximately four million people, including various indigenous peoples which constitute approximately one-third of the population.⁵ The traditional activities of these indigenous peoples are hunting, collecting and cattle breeding (reindeer). The other inhabitants are migrants who live in the area on a permanent or temporary basis to provide services to the indigenous population, in particular education and health care, or logistical support to other human activities in the area. Besides mineral resource exploitation and fisheries, such human activities are mainly tourism and research.

Commercial tourism in the North Pole Region is mainly concentrated in the Spitsbergen Archipelago. The number of visitors for recreational and educational purposes rapidly increased from 12,400 in 1998 to 24,900 in 2006 – with an increase of the number of nights in the largest settlement from 46,201 to 83,049 and the number of passengers on cruise ships from 17,463 to 28,787.⁶ In the South Pole Region, commercial tourism likewise rapidly increased; the number of passengers on cruise ships increased from almost 7,000 in 1992-1993 to more than 45,000 in 2007-2008 – of which 6,704 went ashore in 1992-1993 and 32,198 in 2007-2008.⁷ Polar tourism is mainly ship-based. The commercial operation of tour flights on a large scale over Antarctica was discontinued after a DC-10 of Air New Zealand, with 237 passengers and 20 crew members on board, crashed on Mount Erebus. There is no permanent infrastructure in Antarctica for the hosting of tourists besides limited capacity to stay in some of the polar research stations.

Their special features attract researchers to the Polar Regions. Research is still the most important human activity in Antarctica. There are approximately 30 states that carry out substantial research, but the quantity and quality of the various national research programmes differ considerably. The construction of permanent infrastructure in the South Pole Region has so far been limited to the establishment of polar research stations (approximately 50).

Other activities in Polar Regions, directed to the collection of information, are the collection of photographic and video material – such as Alastair Fothergill's *Frozen Planet* (2011); Luc

⁵ H. Ahlenius *et al.* (Eds.), *Vital Arctic Graphics, People and Global Heritage on Our Last Wild Shores* (2005).

⁶ Governor of Svalbard, *Tourism Statistics for Svalbard* (2006), at 3-5.

⁷ International Association of Antarctica Tour Operators (IAATO), *IAATO Overview of Antarctic Tourism: 2008-2009 Antarctic Season and Preliminary Estimates for 2009-2010 Antarctic Season*, ATCM XXXII (2009) IP 86 Rev.1, at 4.

Jacquet's March of the Penguins (2005); and Werner Herzog's Encounters at the End of the World (2008) – and biological material for commercial purposes. The commercial collection of biological material is directed towards the study of genetic and biochemical characteristics of organisms for the development of products or production processes. The use of organisms for this purpose is not likely to pose a threat to the conservation of species, provided that the new product or production process will not result in the exploitation of the organism concerned in its natural habitat. The interest of biotechnologists in polar organisms stems from their special characteristics to survive in an extreme climate, in particular organisms with genetic characteristics that protect them against extreme cold and aridity (extremophiles).⁸ Polar organisms produce proteins and enzymes that have commercial value, in particular for the pharmaceutical, cosmetic and food industries. There are, for example, proteins with antifreeze characteristics that can be used to preserve food, in freezers, and tissue, for transplants.

The transiting of goods and passengers through the Polar Regions is currently not sizeable. The sea passages are not navigable due to the presence of ice in the North Pole Region and of land in the South Pole Region. However, the air space above the Polar Regions is being used for scheduled trans-Arctic and trans-Antarctic flights.

3. The Status of Natural Resources

3.1 Introduction

Man has divided his natural surroundings into demarcated areas. In this respect, the distinction between areas within the limits of the national jurisdiction of a state and areas beyond those limits is significant. The sovereignty and sovereign rights of states over natural resources found in areas within the limits of their national jurisdiction is a general principle of international law. Subject to their international obligations, states determine whether and under what conditions such natural resources may be used. Only in exceptional cases states have been willing to give up their permanent sovereignty over those resources.⁹

All states have access to areas beyond the limits of national jurisdiction of states and are entitled to carry out activities in those areas for peaceful purposes. However, states cannot lay claim to the natural resources of these areas. Pursuant to international law, these resources are *res nullius*. Accordingly, states have the freedom to use them, subject to international agreements which have changed their status or provide specific regulations for their use. The status of living resources which migrate between states or between states and areas beyond the limits of national jurisdiction of states, such as migratory fish and bird species, depends on their location. International agreements have been concluded providing specific regulations for the use of these shared natural resources.

3.2 The South Pole Region

The South Pole Region is the area south of 60° South Latitude (see map 1). This area comprises the Antarctic continent, several islands and marine areas. A small part of the Antarctic continent (approximately 15%) is an area over which no state exercises sovereignty and to which no state has yet laid a claim to sovereignty – it deserves mentioning though that Russia and the United

⁸ D. Lohan and S. Johnston, *Bioprospecting in Antarctica* (2005); D. Leary, *Bioprospecting in the Arctic* (2008).

⁹ Art. 10.2 of the 2001 International Treaty on Plant Genetic Resources for Food and Agriculture.

States each have a polar research station in this area. However, there is no universally accepted rule of international law pursuant to which no state can subject this area to its sovereignty. Several states, viz. Russia and the United States, have reserved their right to claim sovereignty over parts of the Antarctic continent or islands. In their view, this area is *terra nullius*. According to other states, this area cannot be subjected to the sovereignty of states. In their view, this area is *terra communis*.¹⁰

As for the other parts of the Antarctic continent as well as several Antarctic islands, seven states have territorial claims: Argentina, Australia, Chile, France, New-Zealand, Norway, and the United Kingdom – the claims of Argentina, Chile, and the United Kingdom are overlapping. These territorial claims are disputed by the overwhelming majority of states.¹¹ Most of these states are of the view that the Antarctic continent as a whole and all Antarctic islands are *terra communis* and, hence, cannot be subjected to state sovereignty. The 1959 Antarctic Treaty (AT) has, at least as between the parties to it, frozen the territorial claims in time (Art. IV). The status of the Antarctic continent and islands is therefore controversial and, hence, is the status of the natural resources on land and in adjacent marine areas.

The South Pole Region comprises marine areas beyond the limits of national jurisdiction, namely high seas and deep seabed, including the ocean floor and the subsoil thereof. On the basis of the 1982 Convention on the Law of the Sea (CLOS) or the 1958 Convention on the High Seas (CHS), states cannot claim sovereignty over these areas. Pursuant to the Antarctic Treaty, the freedoms of the high seas apply in this area (Art. VI). This provision has not stopped the parties to the Antarctic Treaty with decision-making powers, i.e. the Consultative Parties, to exercise collective jurisdiction over these areas – initially by means of separate international agreements but later also within the framework of the Antarctic Treaty – by prescribing rules for activities on the high seas and the deep seabed in the South Pole Region. Separate international agreements which are, or are also, applicable to marine areas have been concluded for the conservation of seals (1972 Convention for the Conservation of Antarctic Seals, Antarctic Seals Convention), the conservation of marine living resources (1980 Convention on the Conservation of Antarctic Marine Living Resources, Antarctic Marine Living Resources Convention), and the exploitation of mineral resources (Antarctic Mineral Resources Convention). Activities on the high seas and the deep seabed are also governed by a protocol to the Antarctic Treaty on environmental protection (Antarctic Protocol or AP).¹² The exercise of collective jurisdiction over activities on the high seas is not self-evident. This may be illustrated by the negotiations on the revision of measures on the conservation of Antarctic fauna and flora (Annex II AP) in 2009. Proposals implicating that these measures would become applicable to marine areas could not be agreed upon.

The area of the high seas and, hence, the geographical scope of the freedoms of the high seas in the South Pole Region cannot be determined as a result of the disputed status of the Antarctic continent and islands. Besides surmountable technical difficulties to determine baselines because of the presence of ice in the area and the absence of the required geodetic data, this is hampered by the territorial claims. Even if it would not be disputed that the Antarctic continent and islands

¹⁰ UN Docs. A/39/583 and A/41/722; see also R. Lefeber, 'The Exercise of Jurisdiction in the Antarctic Region and the Changing Structure of International Law, The International Community and Common Interests', 21 *Netherlands Yearbook of International Law* 81 (1990), at 98-116.

¹¹ *Ibid.*

¹² 1991 Protocol on Environmental Protection to the Antarctic, in particular Annex IV on prevention of marine pollution; Annex V on area protection and management; and Annex VI on liability arising from environmental emergencies.

are *terra communis* or *terra nullius*, complications present themselves in determining the area and geographical scope of the freedoms of the high seas. This originates in the controversy over the existence of marine areas adjacent to *terra communis* or *terra nullius* and the establishment of the outer limits thereof. These marine areas comprise the territorial sea (where coastal states have sovereignty subject to certain limitations), the contiguous zone, the exclusive economic zone, and the continental shelf.

The sovereignty of a coastal state does not only cover land and internal waters, but extends to the territorial sea (Art. 2 CLOS). This finds its justification in the close connection between the territorial sea and the land this marine area is adjacent to.¹³ The territorial sea exists therefore by law – this is not only true for the territorial sea of land subject to state sovereignty, but also for the territorial sea of land that is *terra communis* or *terra nullius*. The maximum outer limit of the territorial sea is twelve nautical miles (Art. 3 CLOS). With respect to *terra communis* and *terra nullius*, there is no coastal state that can establish the outer limit of the territorial sea, or the straight baselines from which this limit is measured, and exercise jurisdiction. It is not inconceivable that an international entity is designated to perform such tasks. With respect to the Antarctic continent and islands, the Consultative Parties could, with respect for the diverging views on the status of these areas in accordance with the Antarctic Treaty, create more clarity by establishing an outer limit of the territorial sea and straight baselines as well as by exercising jurisdiction.

The same approach could be followed for the contiguous zone and the exclusive economic zone. These marine areas do not exist by law, but have to be proclaimed. The exercise of jurisdiction is thus required for the proclamation of these marine areas as well as the establishment of their outer limits. The Consultative Parties could, still with respect for the diverging views on the status of these areas in accordance the Antarctic Treaty, proclaim a contiguous zone and/or an exclusive economic zone. The exercise of such geographical jurisdiction would concur with the practice of the Consultative Parties to designate protected areas, including marine areas, in the South Pole Region as an Antarctic Specially Protected Area to protect outstanding environmental, scientific, historic, aesthetic and wilderness values, or ongoing and planned research (Art. 3 Annex V AP).

The continental shelf is the natural prolongation of land and does not have to be proclaimed; the sovereign rights of coastal states over their continental shelves are inherent to their sovereignty over the land adjacent to it.¹⁴ Subject to delimitation with opposite coastal states, the minimum outer limit of the continental shelf has been established by law to be 200 nautical miles (Art. 76.1 CLOS). On the basis of this geological-geographical assumption, both *terra communis* and *terra nullius* have a continental shelf with a minimum outer limit of 200 nautical miles. On the basis of an analogous application of the Convention on the Law of the Sea, a claim can furthermore be laid to an outer continental shelf if it meets the geographic and geodetic requirements of the Convention (Art. 76.4-76.6). Such claim could be made by submitting information on the outer continental shelf to the Commission on the Limits of the Continental Shelf (CLCS) (Art. 76.8 CLOS). With respect to *terra communis* or *terra nullius*, an international entity could submit data to the CLCS. However, the admissibility of such a submission could be challenged due to the absence of a coastal state and the question whether the Convention on the Law of the Sea can be applied analogously. It appears from geodetic data of

¹³ International Court of Justice, *Fisheries Case*, Judgment of 18 December 1951, *1951 ICJ Reports* 116, at 133.

¹⁴ International Court of Justice, *North Sea Continental Shelf Cases*, Judgment of 20 February 1969, *1969 ICJ Reports* 3, at 22 (para. 19).

the Antarctic continent and islands, collected by states with territorial claims, that parts thereof meet the geographic and geodetic requirements of the Convention on the Law of the Sea for an outer continental shelf. The Consultative Parties could, again with respect for the diverging views on the status of these areas in accordance with the Antarctic Treaty, make a collective submission to the CLCS. However, besides the question of admissibility of such submission, the CLCS is not likely to consider such submission due to the existence of a dispute over the status of the Antarctic continent and islands and the legitimacy of the exercise of jurisdiction by the Consultative Parties.¹⁵

The Consultative Parties are nevertheless of the view that the Antarctic continent and islands have a continental shelf. This appears from the not-yet-in-force Antarctic Mineral Resources Convention that regulates the use of mineral resources in the South Pole Region, including the mineral resources of the continental shelf of the Antarctic continent and islands up to the deep seabed (Art. 5.2). The outer limit of the continental shelf is to be determined in accordance with international law (Art. 5.3) and would accordingly, north of the Antarctic Peninsula, extend to areas north of 60° South Latitude; according to the Consultative Parties, international law consists of the relevant provisions of the Convention on the Law of the Sea (Art. 76.1-76.7) with the exception of the provisions on the CLCS (Art. 76.8-76.10).¹⁶ The recognition of the legal existence of a continental shelf of the Antarctic continent and islands as well as the determination of the outer limit of the (extended) continental shelf affect the geographical scope of the powers of the International Seabed Authority (ISBA) in the South Pole Region pursuant to the Convention on the Law of the Sea.¹⁷ The powers of ISBA relate to the development of the mineral resources of the seabed and ocean floor and subsoil thereof beyond the limits of national jurisdiction, i.e. the area referred to in Article 1.1 CLOS or the deep seabed. Since the existence of national jurisdiction in the South Pole Region is disputed and no claim has yet been laid to part of the Antarctic continent and islands, it could be argued that the powers of ISBA extend to the coasts of the Antarctic continent and islands.

The territorial claims comprise *ipso facto* a territorial sea and a continental shelf. Most states with territorial claims have, furthermore, established outer limits of the territorial sea of twelve nautical miles¹⁸ and made a submission to the CLCS on the establishment of an outer continental shelf (Argentina, Australia and Norway) or reserved their right thereto (Chile, France, New-

¹⁵ Para. 5(a) of Annex I of the Rules of Procedure of the CLCS.

¹⁶ 1988 Final Act of the Fourth Special Antarctic Treaty Consultative Meeting on Antarctic Mineral Resources, 27 *International Legal Materials* 866 (1988).

¹⁷ Part XI CLOS (the Area); 1994 Agreement Relating to the Implementation of Part XI of the United Nations Convention on the Law of the Sea of 10 December 1982.

¹⁸ The Argentine Act No. 23.968 of 14 August 1991 applies to the Argentine Antarctic Sector (Art. 1), but the base lines of this Sector are yet to be established and/or notified; the Australian Seas and Submerged Lands Act of 1973, as Amended by the Maritime Legislation Amendment Act 1994, applies to the Australian Antarctic Territory (para. 4); the Chilean Law No. 18.565 Amending the Civil Code with regard to Maritime Space of 13 October 1986 concerns the whole territory of Chile, but the coordinates in respect of the Antarctic landmass and islands are yet to be notified; the French Law No. 71-1060 of 14 December 1971 Regarding the Delimitation of French Territorial Waters applies to the French overseas territories (Art. 5); the New-Zealand Territorial Sea and Exclusive Economic Zone Act of 1977, Act No. 28 of 26 September 1977 as Amended by Act No. 146 of 1980 applies to the Ross Dependency (para. 2.1); the Norwegian Act No. 57 of 27 June 2003 Relating to Norway's Territorial Waters and Contiguous Zone applies to Bouvet Island, Peter I Island en Queen Maud Land (para. 5), but has not yet entered into force of areas in the Antarctic Treaty area (Peter I Island en Queen Maud Land).

Zealand and the United Kingdom).¹⁹ Most of these states have established a contiguous zone with an outer limit of 24 nautical miles²⁰ and/or an exclusive economic zone with an outer limit of 200 nautical miles.²¹

The status of marine areas adjacent to the Antarctic continent and islands must be distinguished from the status of marine areas in the South Pole Region adjacent to islands which are located north of 60° South Latitude. This concerns South Georgia and the South Sandwich Islands; Heard Island and McDonald Island; and Macquarie Island. The (outer) continental shelf of these islands extends into the South Pole Region.²² These islands are not regarded as *terra communis* or *terra nullius*. The existence of sovereign rights in the marine areas adjacent to these islands extending into the South Pole Region is not controversial. The sovereignty of Australia over Heard Island, McDonald Island, and Macquarie Island is not disputed, but the sovereignty over the South Georgia and the South Sandwich Islands is disputed by Argentina and the United Kingdom.²³ Notwithstanding this dispute, the Consultative Parties, including Argentina and the United Kingdom, have jointly stated that states have sovereign rights over these marine areas.²⁴

The uncertainty over the area and scope of the freedoms of the high seas in the South Pole Region is in no one's interest. The Consultative Parties could, as if they were a coastal state, decide to exercise collective jurisdiction over the marine areas adjacent to the Antarctic continent and islands. They could establish exclusive economic zones and contiguous zones as well as the outer limits of these zones, the territorial seas and the continental shelves. To the extent that the continental shelves extend beyond 200 nautical miles, they could make a joint submission to the CLCS. The exercise of collective jurisdiction by the Consultative Parties will, however, only be effective vis-à-vis states not party to the Antarctic Treaty if the international community as a whole recognizes the legitimacy of the governance of the South Pole Region by the Consultative Parties. This is, as yet, not the case due to the conditions which states must meet to be admitted to the group of Consultative Parties.²⁵

The status of the Antarctic continent and islands as well as the adjacent marine areas is decisive for the status of the natural resources of these areas and, hence, for their governance. The natural resources of *terra nullius* and *terra communis* are *res nullius*. States, as well as their

¹⁹ Submissions of Australia of 15 November 2004; New-Zealand of 19 April 2006; United Kingdom of 9 May 2008; France of 5 February 2009; Argentina of 21 April 2009; Norway of 4 May 2009; and provisional information of Chile of 8 May 2009; see also A.G. Oude Elferink, 'The Continental Shelf in the Polar Regions: Cold War or Black-letter Law?', 40 *Netherlands Yearbook of International Law* 121 (2009), Section. 5.2.

²⁰ The Norwegian Act No. 57 of 27 June 2003 Relating to Norway's Territorial Waters and Contiguous Zone provides for a legal basis to establish a contiguous zone of 24 nautical miles (para. 4), but it has not been used with respect to Peter I Island en Queen Maud Land; the abovementioned legislation of Argentina, Australia, Chile en New-Zealand also applies to the contiguous zone.

²¹ French Decree No. 78-144 of 3 February 1978 Creating an Exclusive Economic Zone off the Coasts of the French Southern and Antarctic Territories; the abovementioned legislation of Argentina, Australia and Chile also applies to the exclusive economic zone; the legislation of New-Zealand also applies to the exclusive economic zone, but these provisions do not apply to the Ross Dependency.

²² United Kingdom, Submission in respect of the Falkland Islands, and of South Georgia and the South Sandwich Islands of 11 May 2009; and Argentina, Submission on the Outer Limit of the Continental Shelf of 21 April 2009.

²³ Diplomatic notes of the United Kingdom of 6 August 2009 in response to the submission of Argentina, referred to above; and Argentina of 20 August 2009 in response to the submission of the United Kingdom, referred to above.

²⁴ 1988 Final Act of the Fourth Special Antarctic Treaty Consultative Meeting on Antarctic Mineral Resources, 27 *International Legal Materials* 866 (1988).

²⁵ See, on legitimacy and third-party effects of the Antarctic Treaty System, R. Lefeber, 'The Exercise of Jurisdiction in the Antarctic Region and the Changing Structure of International Law, The International Community and Common Interests', 21 *Netherlands Yearbook of International Law* 81 (1990).

nationals, have the freedom to use these resources. Notwithstanding this freedom of use, states and their nationals have no rights, such as property rights, with respect to *res nullius* which are located in areas beyond the limits of national jurisdiction. However, such rights could, in accordance with domestic law, accrue to them at the time that such resources are extracted or harvested.²⁶ International agreements could limit the freedom of use. The content of such agreements could range from a general provision that the use must take into account the interests of other states to provisions on the method of use, the protection of the environment, the establishment of quota, or a temporary or permanent ban on use.

The status of natural resources in the marine areas of the South Pole Region which are part of the high seas or the deep seabed is governed by the law of the sea, in particular the Convention on the Law of the Sea. Pursuant to this Convention, the living resources of the water column outside the exclusive economic zone are *res nullius* and the mineral resources of the deep seabed *res communis humanitatis*, i.e. the common heritage of mankind (Art. 136 CLOS).²⁷ On the basis of a textual interpretation of the Convention on the Law of the Sea, the sedentary living natural resources of the deep seabed are not *res communis humanitatis*. The concept ‘resources’ comprises only mineral resources on or beneath the deep seabed, but not living resources (Art. 133(a) CLOS). Like the living resources of the water column outside the exclusive economic zone, the sedentary living natural resources of the deep seabed must therefore be regarded as *res nullius*. The question has been raised in the United Nations though whether all marine genetic resources beyond the limits of national jurisdiction should be regarded as *res communis humanitatis*.²⁸

The identification of natural resources as *res communis humanitatis* has legal implications for the right to use them. The use of *res communis humanitatis* by states or their nationals is not permitted without international consent (Art. 137.2 and Annex III CLOS). Property rights can only be acquired or exercised in accordance with such international consent (Arts. 137.3 and 1 Annex III CLOS). Consent may only be given if the interest of mankind is served thereby which presupposes the equitable sharing of benefits derived from the use (Art. 140 CLOS). The designation of mineral resources of the Antarctic continent and islands as *res communis humanitatis* is, as yet, a non-starter for (most of) the Consultative Parties. This position seems to result from the political connotations of the concept rather than its legal implications. The Antarctic Mineral Resources Convention subjects the exploitation of Antarctic mineral resources to international consent (Arts. 3 and 54) and these resources are, in fact, therefore no longer *res nullius*, but *res communis (humanitatis)*. This Convention is, however, not in force and has been replaced by a prohibition of activities related to Antarctic mineral resources (see Section 4.2.2).

3.3 The North Pole Region

²⁶ Arbitral Tribunal, *Award between the United States and the United Kingdom Relating to the Rights of Jurisdiction of the United States in the Bering's Sea and the Preservation of Fur Seals* (Bering Sea Arbitration), Award of 15 August 1893, XXVIII *United Nations Reports of International Arbitral Awards* 263, at 269.

²⁷ See also Preamble to the 1994 Agreement Relating to the Implementation of Part XI of the United Nations Convention on the Law of the Sea of 10 December 1982.

²⁸ Report of the Ad Hoc Open-ended Informal Working Group to Study Issues Relating to the Conservation and Sustainable Use of Marine Biological Diversity Beyond Areas of National Jurisdiction, UN Doc. A/61/65 (2006), in particular paragraphs 29-31 and 71-73; Letter Dated 15 May 2008 from the Co-Chairpersons of the Ad Hoc Open-ended Informal Working Group to Study Issues Relating to the Conservation and Sustainable Use of Marine Biological Diversity Beyond Areas of National Jurisdiction Addressed to the President of the General Assembly, UN Doc. A/63/79 (2008), in particular paragraphs 32-39 of the annex.

The North Pole Region cannot be unequivocally defined, but comprises at least the area north of 66.5° North Latitude (polar circle). This area comprises parts of the American, Asian and European landmasses, several islands, and marine areas (see map 2). The sovereignty over the landmasses and islands is vested in eight states: Canada, Denmark (Greenland), Finland, Iceland, Norway, Russia, Sweden, and the United States (Alaska). Their sovereignty is not disputed with the exception of a single island, namely Hans Island which is claimed by Canada and Denmark.²⁹ In addition, unresolved disputes exist with respect to the delimitation of adjacent marine areas, including the exclusive economic zones and the (extended) continental shelf in the Beaufort Sea between Canada and the United States.³⁰

In the past, some Arctic states, in particular Canada and Russia, have laid claims to territories within a spheric triangle that is formed by the geographical North Pole and longitude degrees to the east and west of these states (sector claims).³¹ These states are party to the Convention on the Law of the Sea and/or the Convention on the High Seas and, hence, have accepted that states cannot claim sovereignty over the high seas and deep seabed. A sector claim must therefore be deemed to concern the land areas within the triangle. Since the formulation of the sector claims at the beginning of the 20th century, land areas have been mapped and described more precisely notwithstanding the fact that large parts of these land areas and adjacent marine areas are covered with ice all-year round. As a result of the melting of ice in the North Pole Region, these land areas are expected to become ice free in whole or in part. It is not likely that the sovereignty of the closest Arctic state over such land areas will be disputed. Hence, the sector claims have not been without any effects.

The North Pole Region comprises marine areas which belong to the high seas and the deep seabed and which are, therefore, not susceptible to claims by states. The geographical area of the high seas and, hence, the geographical scope of the freedom of the high seas is, more or less, defined. Assuming that the land areas, beneath the ice cover, have now been fully mapped and described, the only temporary uncertainty in this connection is the establishment of the outer limits of the outer continental shelves.

There is a moot issue, however, regarding the question whether the Arctic Ocean is an enclosed or semi-enclosed sea as referred to in the Convention on the Law of the Sea (Art. 122). It would be if it qualifies as a gulf, basin or sea surrounded by two or more coastal states that is either connected to another sea or ocean by a narrow outlet, or consists entirely or primarily of the territorial seas or exclusive economic zones of the coastal states concerned. The Arctic Ocean, covering an area of 14,056 million km², is considered by the International Hydrographical Organization to be one of the five world's oceans surrounded by the Atlantic Ocean, the Pacific Ocean and the northern coasts of North-America, Asia and Europe.³² On the basis of a textual interpretation of the Convention on the Law of the Sea, the Arctic Ocean is therefore not an enclosed or semi-enclosed sea. Furthermore, a significant part of the Arctic Ocean belongs to the high seas. Hence, the Arctic Ocean does also not meet the condition that

²⁹ On the unlawfulness of the Norwegian claims to Eastern Greenland, see Permanent Court of International Justice, *Legal Status of Eastern Greenland*, Judgment of 5 April 1933, PCIJ Ser. A/B, No. 53.

³⁰ See also A.G. Oude Elferink, 'The Continental Shelf in the Polar Regions: Cold War or Black-letter Law?', 40 *Netherlands Yearbook of International Law* 121 (2009), Section. 4.2.

³¹ R. Dufresne, *Canada's Legal Claims over Arctic Territory and Waters* (2007), at 4 n. 9; J.P.A. Bernhardt, 'Spitzbergen: Jurisdictional Friction over Unexploited Oil Reserves', 4 *California Western International Law Journal* 61 (1973), at p. 109 n. 109.

³² International Hydrographical Organization, *Limits of Oceans and Seas*, 3rd ed. (1953).

the enclosed or semi-enclosed sea must consist entirely or primarily of the territorial seas or exclusive economic zones of the coastal states concerned. It does not follow that there are no enclosed or semi-enclosed seas in the North Pole Region. The following Arctic seas qualify as such: Baffin Bay, with Canada and Denmark as coastal states; Barents Sea, with Norway and Russia as coastal states; Beaufort Sea, with Canada and the United States as coastal states; Bering Sea and Chukchi Sea, with Russia and the United States as coastal states; and Greenland Sea, with Denmark and Norway as coastal states. The relevancy of the debate is limited though. The Convention on the Law of the Sea does not attribute special rights to the coastal states of enclosed or semi-enclosed seas. It merely calls upon the coastal states to cooperate with respect to, amongst others, the use of living natural resources and the protection and preservation of the marine environment of these seas (Art. 123). Even though the Arctic Ocean may not qualify as an enclosed or semi-enclosed sea, the coastal states nevertheless cooperate within the Arctic Council; they cooperate, furthermore, on a bilateral basis with respect to the enclosed or semi-enclosed seas in the North Pole Region.

In contrast, the debate over the status of the waters of the Canadian Arctic Archipelago is more relevant. These waters will become more readily accessible for vessels as a result of polar warming. It may then become possible for these vessels to navigate through various routes from the Atlantic Ocean to the Pacific Ocean (North-West Passage). In the view of Canada, these routes follow internal waters and transit through these waters is subject to its consent.³³ Other states, in particular the United States,³⁴ hold the view that these waters are straits and that no consent is required for passage in accordance with the right of transit passage in straits (Art. 38.1 CLOS). The right of transit passage only applies to straits used for international navigation (Art. 37 CLOS). Although several attempts have been made to navigate through the North-West Passage from the Atlantic Ocean to the Pacific Ocean, this has yet only been possible with the assistance of an ice breaker. It may thus be difficult to argue that the North-West Passage is a strait used for international navigation.

The status of the landmasses, islands and adjacent marine areas is, like in the South Pole Region, decisive for the status of the natural resources of the North Pole Region. Besides international obligations, the Arctic states have sovereignty and sovereign rights over the natural resources in the areas within the limits of their respective national jurisdictions. The status of the natural resources of the high seas and the deep seabed in the North Pole Region is subject to the law of the sea, in particular the Convention on the Law of the Sea, and does not differ from their status in the South Pole Region.

The status of the natural resources of one group of islands in the North Pole Region, namely the Spitsbergen Archipelago (Spitsbergen), is unique. The sovereignty of Norway is no longer in dispute since the entry into force of the 1920 Treaty Concerning the Archipelago of Spitsbergen, including Bear Island (Spitsbergen Treaty), but it is restricted by the Treaty. Pursuant to the Treaty, the nationals of all other parties have freedom of access to Spitsbergen and the right to use its natural resources on the same conditions as Norwegian nationals (Arts. 2, 3, 7 and 8). These rights also apply to the territorial sea of Spitsbergen; the outer limit of the territorial sea has been extended by Norway from four to twelve nautical miles on 1 January 2004.³⁵ It is

³³ R. Dufresne, *Canada's Legal Claims over Arctic Territory and Waters* (2007), at 15-16.

³⁴ President George W. Bush, *National Security Presidential Directive (NSPD-66) and Homeland Security Presidential Directive (HSPD-25), Arctic Region Policy*, 9 January 2009, Part III.B.5.

³⁵ Norwegian Act No. 57 of 27 June 2003 Relating to Norway's Territorial Waters and Contiguous Zone which applies to Spitsbergen since 1 January 2004 (para. 5).

disputed whether these rights apply to the other adjacent marine areas of Spitsbergen. The contemporary right of Norway to an exclusive economic zone and an (extended) continental shelf around Spitsbergen should not be controversial though. Norway has established a fisheries zone around Spitsbergen of 200 nautical miles³⁶ and the right to an outer continental shelf of Spitsbergen – in the Western Nansen Basin, Loop Hole and Banana Hole – has been recognized by the CLCS.³⁷

On the basis of a textual interpretation of the Spitsbergen Treaty, it can be argued that the rights of the other parties are restricted to the land area and the territorial sea. The relevant provisions only refer to the islands to which the Treaty applies and the territorial waters, which include internal waters as well as the territorial sea. At the time of the conclusion of the Treaty, states were not entitled to claim sovereign rights over the natural resources of the exclusive economic zone and the continental shelf. Hence, it cannot be derived from the context of the Treaty whether the parties had the intention to attribute the right to use the natural resources of adjacent marine areas beyond the limits of the territorial sea to all other parties. On the basis of an interpretation based on the recognition of the sovereignty of Norway over Spitsbergen as the object and purpose of the Treaty, it could be argued that the rights of all other parties extend to the contemporary sovereign rights of Norway to an exclusive economic zone and a continental shelf. Although the ordinary meaning of the terms of a treaty is to be determined in the light of their context and its object and purpose, there are limits to stretching those terms in order to achieve a treaty's object and purpose. The use of teleology as a method of interpretation is controversial, yet the significance of the continued existence and evolution of a treaty relation to achieve a treaty's object and purpose is acknowledged in international jurisprudence.³⁸

4. Governance

4.1 Introduction

The division of man's natural surroundings in demarcated areas is in many cases based on geodetic features, such as coast lines, watercourses and summits with ecological significance. In many cases, the division is nevertheless also the result of political decision-making heedless of ecological implications. This also applies to the identification of polar areas on the basis of latitude lines, such as the delimitation of the Antarctic Treaty area (Art. VI AT). An exception is the Antarctic Marine Living Resources Convention. This Convention is applicable to the area south of the Antarctic convergence (see map 1) and comprises, in addition to the Antarctic Treaty area, areas north of 60° South Latitude (Art. I).

The Antarctic convergence is a circumpolar line in the Southern Ocean where cold low saline water flowing to the north sinks below warmer high saline water flowing to the south. The area south of the Antarctic convergence is the polar ecosystem of the Southern Hemisphere. The polar ecosystem of the Northern Hemisphere is the area where the average temperature during the

³⁶ The fisheries zone was established on 15 June 1977 on the basis of Norwegian Act No. 91 of 17 December 1976 Relating to the Economic Zone of Norway.

³⁷ CLCS, *Summary of the Recommendations of the Commission on the Limits of the Continental Shelf in Regard to the Submission Made by Norway in Respect of Areas in the Arctic Ocean, the Barents Sea and the Norwegian Sea on 27 November 2006* of 27 March 2009; see also A.G. Oude Elferink, 'The Continental Shelf in the Polar Regions: Cold War or Black-letter Law?', 40 *Netherlands Yearbook of International Law* 121 (2009), Section 4.2.2.

³⁸ See also International Law Commission, *Report of its Sixtieth Session*, UN Doc. A/63/10 (2008), Annex A (G. Nolte, *Treaties over Time, in particular: Subsequent Agreement and Practice*).

warmest month of the year is less than 10°C. The boundary of this area runs partially north and partially south of the polar circle (66.5° North Latitude). Finland and Sweden are located entirely south of this boundary, but the Bering Sea entirely north of it. The Polar Regions can only be managed in an ecologically sound manner if these ecological boundaries are taken into account.

The ecological Polar Regions are partially internationalized (see Section 3). The internationalized areas are the areas which (a) are not subject to the jurisdiction of states, i.e. the high seas as well as the Antarctic continent and islands according to the states that consider these areas as *terra communis* or *terra nullius*, or (b) are subject to the jurisdiction of states, but where other states have rights of access and use, i.e. Spitsbergen as well as the Antarctic continent and islands according to states that consider these areas, or parts of these areas, as areas subject to their national jurisdiction. Other states and their nationals have freedom of access to these internationalized areas.³⁹

The subsequent sections focus on the use of the Polar Regions and interstate agreements which subject their use to special rules. The identification of the object and purpose of such international rules will be a central element of these sections. Such rules may be focused on: (a) the conservation of species or their habitats; (b) the attribution of user rights; (c) the sharing of the benefits arising from the use; and (d) the protection of the international public order and/or international public morals.

4.2 *The Use of Natural Resources*

4.2.1 The Harvesting of Renewable Natural Resources

The depletion of renewable natural resources may be prevented by the appropriate management of the harvesting of such resources. This requires such resources to be sustainably used in accordance with the precautionary principle and the ecosystem approach.⁴⁰ Sustainable use can be achieved by means of different conservation measures, such as the establishment of catch limits; catch method, gear and bait restrictions; catch restrictions based on species, gender, size, and age; area restrictions; seasonal restrictions; etc. The sustainable use of renewable resources would enable their use by future generations, i.e. it would provide for intergenerational equity, but it would not ensure automatically the equal and reasonable sharing of their benefits by the present generation, i.e. international equity. The achievement of international equity requires special rules that protect the interests of the international community as a whole as well as its individual members.

The harvesting of many animal and plant species of the Antarctic continent and islands is governed by the Antarctic Protocol (Annex II). The commercial exploitation of Antarctic fauna and flora is prohibited. Animal and plant specimen may only be removed from their population in accordance with a permit (Art. 3.1) that may only be issued for scientific or educational purposes (Art. 3.2); the option to issue permits for cultural purposes has recently been cancelled.⁴¹ The prohibition does not apply to all animal species, but only to native mammals, birds and plants (Art. 1(g)). Furthermore, the prohibition does not apply to all native plants, but only to the removal of such quantities of native plant specimen that their local distribution or

³⁹ Arts. I.1 AT; 87.1, 88 and 141 CLOS; 2 Fisheries Convention; 3 Spitsbergen Treaty.

⁴⁰ On the application of the precautionary principle, see A. Trouwborst, *Precautionary Rights and Duties of States* (2006).

⁴¹ Art. 3.2 of Annex II, as amended in 2009.

abundance would be significantly affected (Art. 1(g)). The prohibition has recently also become applicable to native invertebrates.⁴² The harvesting of the living natural resources of the landmasses and islands of the North Pole Region is governed by domestic law, but such law often originates in international agreements, in particular agreements related to the conservation of species and their habitats.⁴³ The harvesting of the living natural resources of Spitsbergen is also subject to domestic law. Norway is entitled to adopt conservation and, if necessary, restoration measures to protect the fauna and flora of Spitsbergen, but in the application of such measures it may not discriminate between nationals of the parties to the Spitsbergen Treaty (Art. 2).⁴⁴

Pursuant to the freedom of fisheries on the high seas, states are entitled to harvest the living natural resources of the high seas in the Polar Regions (Arts. 87.1(e) and 116 CLOS; 2 CHS; and 1.1 of the 1958 Convention on Fishing and Conservation of the Living Resources of the High Seas (Fisheries Convention)). This freedom applies to all living natural resources of the high seas and deep seabed. States are, however, required to conserve these living natural resources (Arts. 117-120 CLOS; 1.2 Fisheries Convention) and to exercise this freedom with due regard for the interests of other states (Arts. 87.2 CLOS; 2 CHS; and 1.1 Fisheries Convention). The conventions provide thus, at least *prima facie*, for better safeguards to secure intergenerational equity in the use of these resources. It appears, however, from catch data that this provision is not sufficient to ensure international equity due to the existing differences in capacities between states to harvest the living natural resources of these areas. Pursuant to the Convention on the Law of the Sea and the Fisheries Convention, the total allowable catch must result in the maintenance or restoration of populations of harvested species at levels which can produce maximum sustainable yield (Arts. 119 CLOS; 2 Fisheries Convention). In determining the total allowable catch, the best scientific evidence is to be used, and environmental factors and the effects on species associated or dependent upon harvested species must be taken into consideration. Since the adoption of these conventions, the international community has embraced the concept of sustainable fisheries and has acknowledged that this requires the application of the precautionary approach and the ecosystem approach.⁴⁵

States are required to cooperate in the conservation and management of the living natural resources of the high seas (Arts. 118 CLOS; and 1.2 CHS). Such cooperation takes place through supplementary conventions, such as the 1995 Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10 December 1982 Relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks (Straddling Stocks Convention), and regional (fisheries) management organizations. A regional convention has been concluded to conserve and manage the marine living natural resources of the South Pole Region, namely the Antarctic Marine Living Resources Convention. This Convention does not focus on the conservation of a specific species, such as the Antarctic

⁴² Art. 1(g) of Annex II, as amended in 2009.

⁴³ 1971 Convention on Wetlands of International Importance especially as Waterfowl Habitat; 1979 Convention on the Conservation of European Wildlife and Natural Habitats; 1979 Convention on the Conservation of Migratory Species of Wild Animals; especially important for the Polar Regions are the following instruments that were adopted under the latter Convention: 1998 Memorandum of Understanding on the Conservation of Siberian Cranes, as amended in 2004 en 2007, and 2001 Agreement on the Conservation of Albatrosses and Petrels, as amended in 2006.

⁴⁴ The measures have been incorporated in the Norwegian Act No. 79 of 15 June 2001 relating to the Protection of the Environment in Svalbard.

⁴⁵ 1995 Code of Conduct for Responsible Fisheries, Arts. 6.2 en 6.5.

Seals Convention or the 1946 International Convention for the regulation of whaling (Whaling Convention), but on “the importance of safeguarding the environment and protecting the integrity of the ecosystem of the seas surrounding Antarctica” (Preamble). The special features of the Antarctic ecosystem, including its short food chains, require a conservation policy that is based on “the complex of relationships of Antarctic marine living resources with each other and with their physical environment” (Arts. I.3 and II.3). This ecosystem approach is directed towards the conservation of the living natural resources (Art. II.1), but it does not exclude their rational use (Art. II.2-3). Commercial exploitation of these resources is not prohibited, but it can be restricted to safeguard their conservation. Available information must be taken into consideration, even though it is acknowledged that the knowledge base must be increased to support harvesting decisions on sound scientific information (Preamble).

A comparable regional convention does not, as yet, exist for the North Pole Region, but international cooperation has been established to manage fisheries in certain parts of this region. Cooperation in the regional fisheries management organizations for the north-eastern and north-western part of the Atlantic Ocean, i.e. the North-East Atlantic Fisheries Commission and the Northwest Atlantic Fisheries Organization respectively, extends to fisheries in the Norwegian Sea and the Barents Sea, and Baffin Bay and Davis Strait, respectively;⁴⁶ and Norway and Russia cooperate, furthermore, bilaterally in the management of the fisheries of the Barents Sea.⁴⁷ In the north-eastern part of the Pacific Ocean, cooperation in the framework of the regional fisheries management organization, i.e. North Pacific Anadromous Fish Commission, also covers fisheries in the Bering Sea.⁴⁸

In spite of the international efforts to secure sustainable fisheries, most marine fish species are overexploited and scientists have predicted that commercial marine fisheries will cease before 2050.⁴⁹ The internationally agreed conservation and management measures are not deemed sufficient to secure sustainable fisheries for future generations. The maximum sustainable yield is calculated at levels that are too high, the precautionary principle and the ecosystem approach are not applied, or the available scientific information does not enable to determine what use is sustainable or what quantities are harvested in violation of conservation and management measures (Illegal, Unreported and Unregulated Fishing). Damage to the habitats of marine animals by climate change and human activities complicates the determination of effective conservation and management measures. These considerations could still be taken into account before the northern Arctic waters become accessible for commercial marine fisheries as a result of polar warming. The United States has already taken proactive action by the establishment of a moratorium on commercial fisheries of a number of marine species, including Arctic cod and

⁴⁶ 1980 Convention on Future Multilateral Co-operation in North-East Atlantic Fisheries, as amended in 2004 en 2006; 1978 Convention on Future Multilateral Cooperation in the Northwest Atlantic Fisheries.

⁴⁷ 1975 Agreement on Cooperation in the Fishing Industry; 1976 Agreement on Mutual Fisheries Relations; 1978 Agreement on an Interim Practical Arrangement for Fishing in an Adjoining Area in the Barents Sea; since 1993 cooperation takes place in the framework of the Permanent Russian-Norwegian Committee for Management and Enforcement Cooperation within the Fisheries Sector; trilateral cooperation with Iceland in respect of the high seas of the Barents Sea (Loophole) takes place in the framework of the 1999 Agreement Concerning Certain Aspects of Co-operation in the Area of Fisheries.

⁴⁸ 1992 Convention for the Conservation of Anadromous Stocks in the North Pacific Ocean.

⁴⁹ Food and Agricultural Organization, *The State of World Fisheries and Aquaculture 2008*, at 35; B. Worm *et al.*, ‘Impacts on Biodiversity Loss in Ocean Ecosystem Services’, *Science* (2006), at 787-790.

snow crab, in parts of the Chuckchi Sea and the Beaufort Sea pending the development of a sustainable fisheries policy.⁵⁰

The Convention on the Law of the Sea specifically calls upon states to cooperate in the conservation and management of marine mammals in the high seas (Art. 120). Such cooperation takes place in the framework of the Whaling Convention with respect to most whale species. At the beginning of the 1980s, it appeared from scientific information that most, if not all, whale species were being overexploited. A temporary ban on whaling was necessary to enable the restoration of whale stocks. In 1982, the International Whaling Commission (IWC) established a world-wide commercial moratorium on whaling.⁵¹ This commercial moratorium is in force since the 1985/1986 pelagic season and the 1986 coastal season. The IWC and her predecessors have, furthermore, established whale sanctuaries in, amongst others, the South Pole Region, where commercial whaling is not allowed. In 1938, a sanctuary was established around Antarctica that comprises a part of the waters of the South Pole Region and, in 1994, the Southern Ocean Sanctuary that comprises, together with the Indian Ocean Sanctuary, all waters south of the Antarctic convergence;⁵² this moratorium, however, does not apply to Japan in respect of the killing of Antarctic minke whales.

The commercial moratorium and the establishment of the South Ocean Sanctuary have not resulted in the total absence of whaling in the Polar Regions. First, not all parties to the Whaling Convention are bound by these measures nor are states not party this Convention; the only Arctic state that is not a party to the Convention is Canada. Some IWC members allow whaling on the basis of a reservation that they have made to the commercial moratorium, namely Norway, which harvested 536 whales in 2008; Iceland, which harvested 39 whales in 2008; and Russia, which did not harvest any whales in 2008.⁵³ Several states objected to the reservation of Iceland, because it had not made this reservation at the time of adoption of the commercial moratorium (in 1982), but only at the time of its renewed accession to the Whaling Convention (in 2002). Second, the Whaling Convention allows parties to issue special permits for scientific whaling (Art. VIII). Only Japan made use of this provision in 2008 by permitting the taking of 681 whales in the South Pole Region and 211 in the North Pacific;⁵⁴ scientific whaling by Japan in the South Pole Region is being challenged by Australia before the International Court of Justice.⁵⁵ Third, the IWC has provided for an exemption to the commercial moratorium for aboriginal subsistence whaling on the condition that the meat and other products of harvested whales are used exclusively for local consumption.⁵⁶ This exemption is mainly used by indigenous peoples living in or nearby the North Pole Region in Alaska (38 in 2009), Greenland (181 in 2009), and Russia (116 in 2009). Although aboriginal whaling also takes place south of the North Pole Region, the habitat of the whale populations concerned extends to the waters of the North Pole Region.⁵⁷ The aboriginal subsistence whaling exemption is justified by human

⁵⁰ United States Code of Federal Regulations (CFR), Federal Fishing Regulations, Fisheries of the Exclusive Economic Zone off Alaska. 50 CFR 679 (Section 679.7(p)).

⁵¹ Para 10(e) of the Schedule to the Whaling Convention, as amended in 1982.

⁵² Para. 7(b) of the Schedule to the Whaling Convention, as amended in 1994.

⁵³ IWC, *Catches Taken: Under Objection*, www.iwcoffice.org.

⁵⁴ IWC, *Catches Taken: Under Scientific Permit*, www.iwcoffice.org.

⁵⁵ See Australia's Application instituting proceedings of 31 May 2010.

⁵⁶ Para. 13 of the Schedule to the Whaling Convention, as amended in 2010.

⁵⁷ IWC, *Catches Taken: Aboriginal Subsistence Whaling*, www.iwcoffice.org.

rights, in particular the rights of indigenous peoples.⁵⁸ However, it is limited by utilization rules pursuant to which the total allowable catch is determined at levels that secure the sustainable use of the whale stocks concerned.

Since the 1990s, negotiations are ongoing on the abolition of the commercial moratorium on whaling. A procedure has already been developed for the establishment of the total allowable catch in a scientifically sound manner (Revised Management Procedure).⁵⁹ The abolition of the commercial moratorium is discussed in the framework of the revision of the management system that also addresses other aspects of whaling, such as inspections, compliance, verification, research, and animal welfare. The revised management system must secure the sustainable use of whales on the basis of the precautionary principle. If the conservation of a whale species can be secured, the abolition of the commercial moratorium for the whale species concerned would be in accordance with the object and purpose of the Whaling Convention. The Convention was, after all, concluded to provide for “the proper conservation of whale stocks and thus make possible the orderly development of the whaling industry” (Preamble).

However, the legality of whaling has become less a matter of restoration, conservation and sustainable use than of public morals. This is the result of shifting opinions in several countries in the second half of the last century under the influence of campaigns of non-governmental organizations. These organizations, notably Greenpeace International and Sea Shepherd Conservation Society, make active use of their right to protest against whaling, in particular in Polar Regions. However, the Whaling Convention does not provide a legal basis for the imposition of a permanent ban on whaling on these grounds. The Convention on the Law of the Sea does not exclude a ban on such grounds by leaving it to the competent international organization to prohibit, limit or regulate exploitation of marine mammals (Arts. 65 and 120). The competent international organization for whaling is the IWC. The IWC will have to respect the object and purpose of the Whaling Convention – at least as long as one or more of its parties would like to continue whaling.

The trade between states in endangered animal and plant species is restricted by the 1973 Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). This Convention seeks to protect species of wild fauna and flora for this and the generations to come against overexploitation (Preamble). Trade is prohibited or only permitted in small quantities if a species has been listed in an annex to this Convention. Several marine mammal species have been listed in one of its annexes, including whale and seal species. With respect to whale species protected by the Whaling Convention, parties have furthermore agreed not to permit trade in whales, and products thereof, which is primarily for commercial purposes.⁶⁰

CITES is also applicable to the introduction of animal and plants from the sea, i.e. the “transportation into a State of specimens of any species which were taken in the marine environment not under the jurisdiction of any State” (Art. 1(e)). The parties to this Convention have interpreted the phrase “marine environment not under the jurisdiction of any State” as “those marine areas beyond the areas subject to the sovereignty or sovereign rights of a State consistent with international law, as reflected in the United Nations Convention on the Law of the Sea”.⁶¹ However, they have not yet agreed on the interpretation of the phrase “transportation

⁵⁸ Art. 20 of the United Nations Declaration on the Rights of Indigenous Peoples, UN Doc. A/Res/61/295 (2007), Annex.

⁵⁹ Paras. 10(a)-10(c) of the Schedule to the Whaling Convention, as amended in 1994.

⁶⁰ Resolution Conf. 11.4, as amended (2002).

⁶¹ Resolution Conf. 14.6 (2007).

into a State”, in particular it has not been clarified whether this state is the flag state and/or the port state. The specimens of species listed in the annexes and removed from the Antarctic landmass and islands are thus not protected by CITES – except for the specimens removed from those parts of the Antarctic continent and islands that are subject to territorial claims and imported into states which recognize these claims.

Domestic measures hampering trade of animal and plant species are, in principle, prohibited by the 1994 General Agreement on Tariffs and Trade (GATT). The objective of GATT is to reduce or eliminate trade barriers and thus promote the free trade in goods. A trade barrier may, amongst others, nevertheless be justified by the protection of human, animal or plant life or health (Art. XX(b)) or the conservation of exhaustible natural resources (Art. XX(g)). The Netherlands, for example, has restricted the trade in skins of baby seals in the 1980s and this restriction has recently been extended to a prohibition in products of several seal species, namely harp seals and hooded seals.⁶² Although concerns relating to population levels are mentioned in the explanatory note, the primary justification for the regulation appears to be the global public indignation over the hunting methods practiced in Canada.⁶³ The justification is thus not primarily based on any of the abovementioned exceptions, but on another exception of GATT, namely the protection of public morals (Art. XX(a)). The European Union has also adopted legislation to restrict trade in seals, and products thereof, which are taken for commercial purposes; the regulation originates in concerns of members of public and governments sensitive to animal welfare considerations.⁶⁴ These trade barriers have been challenged by Canada in the framework of the World Trade Organization.⁶⁵

Sealing north of 30° North Latitude in the Pacific Ocean is prohibited by the 1911 Convention between the United States, Great Britain, Russia and Japan for the Preservation and Protection of Fur Seals (Art. I) with the exception of aboriginal subsistence sealing (Art. IV). This Convention was concluded after an arbitral tribunal had issued an award which (a) concludes that the United States did not have any right of protection or property of fur seals migrating from and to its territory when such seals are found outside its territorial waters; and (b) establishes regulations for the protection and preservation of fur seals in the Behring Sea.⁶⁶ Although sealing in the South Pole Region has been discontinued, it is not entirely prohibited by the Antarctic Seals Convention. This Convention regulates sealing for commercial and non-commercial purposes. It seeks to prevent overexploitation on the basis of harvesting regulations that do not exceed the levels of the optimal sustainable yield (Preamble). Catch limits have been established and other conservation measures have been adopted, but these measures are not operational (see Section 2.2)

4.2.2 The Extraction of Non-renewable Natural Resources

⁶² Besluit van 4 juli 2007, houdende wijziging van het Besluit aanwijzing dier- en plantensoorten Flora- en faunawet en het Besluit vrijstelling beschermde dier- en plantensoorten in verband met het verbod op de handel in producten van zadelrobben en klapmutsen (Stb. 253) dat in werking is getreden op 23 oktober 2007 (Stb. 388).

⁶³ Ibid., explanatory note, paras. 1 en 5.

⁶⁴ Regulation No 1007/2009 (EC) of the European Parliament and the Council of 16 September 2009 on Trade in Seal Products, OJEC 2009, L 286/36.

⁶⁵ *European Communities – Certain Measures Prohibiting the Importation and Marketing of Seal Products*, WT/DS369/1 (1 October 2007) in respect of the regulations of Belgium and the Netherlands; *NRC Handelsblad* of 28 July 2009 in respect of the European regulation.

⁶⁶ Arbitral Tribunal, *Bering Sea Arbitration*, award of 15 August 1893, XVIII *United Nations Reports on International Arbitral Awards* 263, at 269 and 270-271.

The depletion of non-renewable natural resources is the inevitable result of their extraction. Intergenerational equity can only be approached by the maximization of the long-term use of these resources.⁶⁷ This cannot be easily achieved because of uncertainty as regards variables, such as the number of future generations and the extraction of such natural resources by future generations in the light of technological innovations which may make their extraction superfluous. International equity can only be achieved by means of an international arrangement that regulates the extraction of non-renewable resources of internationalized areas and provides for the sharing of the benefits of their use.

The abovementioned considerations have been the reason for the international community to restrict the freedom of use of the non-renewable resources of internationalized areas. To this end, the mineral resources of the deep seabed have been designated as *res communis humanitatis*. The exploitation of these resources by states or their nationals is subject to the consent of the ISBA in order to safeguard the equitable sharing of the benefits of their use (see Section 3.2).

Such consent is not required for the exploitation of the mineral resources of Spitsbergen. All parties to the Spitsbergen Treaty as well as their nationals are entitled to use these resources in accordance with regulations promulgated by Norway (Art. 3). Norway has the right (a) to regulate the attribution of property rights provided that such regulation does not discriminate between the nationals of the parties to the Spitsbergen Treaty (Art. 7) and (b) to promulgate mining regulations, including the imposition of an export duty based on the value of the mineral resources (Art. 8).⁶⁸ A draft of the mining regulations must be submitted to the other parties which may propose modifications; the proposed modifications are to be considered by a commission of representatives of the parties which takes decisions by majority (Art. 8).

Since 14 January 1998, the exploitation of mineral resources in the South Pole Region is prohibited. This prohibition replaced the Antarctic Mineral Resources Convention. Although this Convention is also based on a prohibition of the exploration and exploitation of mineral resources in the South Pole Region, a treaty organ may lift this prohibition through the issuance of a permit (Arts. 3-4). The exploitation of mineral resources in the framework of this Convention is strictly regulated to safeguard the preservation of the Antarctic environment and to generate benefits for the promotion of scientific research. Under pressure of non-governmental organisations, Australia and France – later followed by other Consultative Parties – decided not to ratify the Antarctic Mineral Resources Convention and instead to pursue a comprehensive ban on mineral resource exploitation in the South Pole Region. Since the ratification by Australia and France is a condition for the entry into force of the Convention (Arts. 62.1 and 29.2), it will not enter into force until these states revise their policy. When it became clear that the Convention would not enter into force, the Consultative Parties entered into negotiations on a prohibition of mineral resource exploitation in the South Pole Region. These negotiations resulted in the conclusion of the Antarctic Protocol which contains such prohibition (Arts. 7 and 25). The prohibition does not exclude scientific research with respect to mineral resources in the South Pole Region, such as seismic research.

⁶⁷ Art. 4b of the Draft Articles on the Law of Transboundary Aquifers, UN Doc. A/Res/63/124 (2008), Annex; see also commentary on Draft Article 4 in International Law Commission, *Report of its Sixtieth Session*, UN Doc. A/63/10 (2008), 13 at 40-43.

⁶⁸ The Mining Code (the Mining Regulations) for Spitsbergen (Svalbard), laid down by Royal Decree of 7 August 1925, as amended by Royal Decree of 11 June 1975.

The Antarctic Protocol envisages the potential abolition of the prohibition 50 years after its entry into force, i.e. 14 January 2048, or so much earlier as all Consultative Parties consent thereto. However, the prohibition can only be abolished if a regime for mineral resource exploitation is in force (Art. 25.5); the Antarctic Mineral Resources Convention may, as it stands or as amended, therefore still become relevant. Within 50 years of its entry into force, the prohibition may only be abolished by the amendment of the Antarctic Protocol in accordance with one of the two procedures for the amendment of the Antarctic Treaty (Art. 25.1). This requires a decision that has been adopted and ratified by all states which had consultative status at the time the amendment was opened for signature (Art. XII.1 AT). In view of this right of veto, the probability that the prohibition is abolished before 14 January 2048 is infinitesimal.

A real, but still small, probability of the prohibition's abolition exists after 14 January 2048. At a revision conference, which must be organised at the request of a Consultative Party (Art. 25.2), a proposal to amend the Antarctic Protocol, such as the abolition of the prohibition of mineral resource exploitation, may be made. A decision to that effect must be supported by a majority of the parties, including three-quarters of the states which were Consultative Parties at the time of the adoption of the Antarctic Protocol (20 states) (Art. 25.3). Such amendment will only enter into force after three-quarters of the Consultative Parties have expressed their consent to be bound, including all states which were Consultative Parties at the time of the conclusion of the Antarctic Protocol (26 states) (Art. 25.4). The Antarctic Protocol also contains a withdrawal provision that is based on a proposal of the United States (Art. 25.6). If an amendment has not entered into force three years after it was opened for signature, each party has the right to withdraw from the Antarctic Protocol. The United States insisted on this provision in order to pre-empt a blockade of a decision to abolish the prohibition on mineral resource exploitation by one or few states. The provisions on the amendment of the Antarctic Protocol do, furthermore, not prevent states from availing themselves of the possibility to withdraw from the Antarctic Treaty in order to escape from the prohibition (Art. XII.2 AT).

The Antarctic Protocol was concluded, because the negotiating states were “[c]onvinced of the need to enhance the protection of the Antarctic environment and dependent and associated ecosystems” (Preamble). Therefore, the parties “commit themselves to the comprehensive protection of the Antarctic environment and dependent and associated ecosystems and hereby designate Antarctica as a natural reserve, devoted to peace and science” (Art. 2). The decision to prohibit mineral resource exploitation in the South Pole Region has certainly been inspired by the environmental risks of mineral resource exploitation for the surrounding area (see Section 4.3). Such risks may possibly be eliminated or reduced in the future by technological innovations to a level at which mineral resource exploitation becomes acceptable. However, the exploitation of mineral resources and associated logistical activities do not befit the designation of Antarctica as a natural reserve. It would therefore appear that the prohibition has also been inspired by the objective to preserve the unspoilt scenery of the South Pole Region. To that end, the use of natural resources to satisfy human needs is sacrificed and subordinated to wilderness values. The prohibition is therefore also founded in the protection of public morals.

4.2.3 The Use of Natural Resources other than through their Harvesting or Extraction

States also make use of internationalized areas for purposes other than through the harvesting or extraction of natural resources, such as transport of goods and people by vessels, aircraft, cables and pipelines, tourism, and research, including the construction of infrastructure required for

these activities. The preservation of natural resources is not endangered by use that does not involve their harvesting or extraction, at least not if significant adverse effects for the surrounding environment are prevented or at least limited (see Section 4.3). Since all states may participate in such use and simultaneous or successive use by states is in principle possible, such use does not raise any questions with respect to the attribution of primary user rights. Such use does, however, raise questions with respect to the sharing of the benefits, in particular in cases where it results in indirect restrictions of such use.

When exercising their user rights, states must pay due regard to the interests of other states and comply with obligations connected with specific uses. For instance, in the South Pole Region, restrictions apply with respect to the construction of infrastructure. The establishment of military bases and fortifications is prohibited (Art. I.1 AT). Proposals have also been made to prohibit or at least discourage the establishment of permanent facilities on land for tourists, but the Consultative Parties have, as yet, not reached agreement on these proposals.⁶⁹ The Antarctic Treaty, furthermore, prohibits several other activities, namely military manoeuvres, the testing of any type of weapons, and nuclear explosions (Arts. I.1 and V.1). Prohibited is also the placement of weapons of mass destruction on the seabed, the ocean floor and the subsoil thereof up to the outer limits of the territorial sea.⁷⁰ The Spitsbergen Treaty requires Norway to prevent that naval bases or military fortifications are established on Spitsbergen (Art. 9). The establishment of these prohibitions of military uses has been inspired by the desire of the international community to secure that these areas will be exclusively used for peaceful purposes (see also Art. 88 CLOS).

The rights of states to make use of internationalized areas comprise their right of access to natural resources to carry out research for scientific or commercial purposes. The international community seeks to promote scientific research in these areas (Arts. III AT; 143 and 239 CLOS), and has to that end recognized the right of states and international organizations to carry out scientific research in Antarctica (Art. IV AT), the deep seabed (Arts. 87.1(F), 143, 238 and 256 CLOS), and the water column outside the exclusive economic zone (Arts. 87.1f, 238 and 257 CLOS). The corollary of this right is the obligation to exchange scientific observations and results, and make them freely available (Arts. III.1(c) AT and 244 CLOS). There are concerns that scientists do not, or not fully, cooperate in this respect because of the possible future use of scientific observations and results for commercial purposes. The use of such observations and results can, furthermore, be indirectly restricted by the acquisition of domestic rights that are internationally recognized, in particular intellectual property rights. This concerns mainly observations and results which have been acquired from the possession and analysis of organic or inorganic material, such as patents on the basis of research of genetic resources, and to a lesser extent observations and results which have been acquired without the possession of such material, such as copyrights on the basis of the collection of images.⁷¹ Access to these observations and results as well as the sharing of the benefits from their utilization for commercial purposes is a topical subject of international negotiations.

The fair and equitable sharing of benefits arising out of the utilization of genetic resources is one of the objectives of the 1992 Convention on Biological Diversity (Art. 1). The provisions of this Convention elaborating this objective (Art. 15) as well as those of the 2010 Nagoya Protocol

⁶⁹ Final Report of the Thirty-first Antarctic Treaty Consultative Meeting (2008), paras. 235-241.

⁷⁰ 1971 Treaty on the Prohibition of the Emplacement of Nuclear Weapons and Other Weapons of Mass Destruction on the Sea-Bed and the Ocean Floor and in the Subsoil thereof.

⁷¹ For the acquisition of data by remote sensing of the Earth from Outer Space, see 1986 Principles Relating to Remote Sensing of the Earth from Outer Space, UN Doc. A/Res/41/65 (1986), Annex.

on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization are only applicable to genetic resources over which states have sovereign rights.⁷² According to these provisions, states have the authority to determine whether or not prior informed consent is required for the access to genetic resources over which it has sovereign rights. It has been argued that international forums with geographical jurisdiction over these natural resources are more appropriate to develop regulations for their utilization. These forums are the Antarctic Treaty Consultative Meetings and the Commission on Antarctic Marine Living Resources in respect of the area south of the Antarctic convergence, and the United Nations General Assembly for marine areas beyond the limits of national jurisdiction. The discussions in the framework of the Antarctic Treaty have resulted in recommendations to enhance the exchange of information on the utilization of biological material and a declaration that the Antarctic Treaty System is the appropriate framework for managing the collection of biological material in the Antarctic Treaty area and the consideration of its use;⁷³ the discussions in the Commission on Antarctic Marine Living Resources since 2008⁷⁴ and the United Nations General Assembly since 2006 have not yet produced tangible results.⁷⁵

It has been suggested to place the genetic resources of the South Pole Region and the marine areas beyond the limits of national jurisdiction in a multilateral system without addressing the legal status of these resources. All states would have access to the resources in the multilateral system for research purposes. This would not only apply to the genetic resources in their natural environment (*in situ* access), but also to genetic resources which have been placed in collections (*ex situ* access). When research observations and results are no longer freely available or usable, the holder would be obliged to share benefits to promote the protection and preservation of the areas where the genetic resources have been found.⁷⁶

4.3 Adverse Effects of the Use of Natural Resources

Man produces changes in his natural environment by carrying out activities. The Polar Regions do not only change as a result of human activities in these regions, but also by human activities in other parts of the world. Some human activities have been designed to change the natural environment, such as the construction of barrages and the extraction of natural resources. In spite of such impacts, the socio-economic benefits associated with such activities may justify permitting them. Other activities create a risk of impacting on the natural environment in the event of the materialization of the risk, such as oil spills in the course of transportation of goods

⁷² Bonn Guidelines on Access to Genetic Resources and Fair and Equitable Sharing of the Benefits Arising out of their Utilization, CBD Decision VI/24 (2002); a separate convention applies to plant genetic resources, namely 2001 International Treaty on Plant Genetic Resources for Food and Agriculture.

⁷³ Biological Prospecting in Antarctica, Resolution 7 (2005) ATCM XXVIII; Collection and Use of Antarctic Biological Material, Resolution 5 (2009) ATCM XXXII.

⁷⁴ Report of the Twenty-seventh Meeting of the Commission for the Conservation of Antarctic Marine Living Resources (2008), paras. 15.10-15.13.

⁷⁵ Report of the Ad Hoc Open-ended Informal Working Group to Study Issues Relating to the Conservation and Sustainable Use of Marine Biological Diversity Beyond Areas of National Jurisdiction, UN Doc. A/61/65 (2006), in particular paras. 29-31 and 71-73; Letter Dated 15 May 2008 from the Co-Chairpersons of the Ad Hoc Open-ended Informal Working Group to Study Issues Relating to the Conservation and Sustainable Use of Marine Biological Diversity Beyond Areas of National Jurisdiction Addressed to the President of the General Assembly, UN Doc. A/63/79 (2008), in particular paras. 32-39 of the Annex.

⁷⁶ See Principles for the Access and Use of Genetic Resources under the Antarctic Treaty, Working Paper of the Netherlands to ATCM XXXIII, WP 24 (2010).

or mineral resource exploitation. Such activities may be permitted too, because the risk of an accident is negligible or considered acceptable in view of the socio-economic benefits associated with the activity concerned. The permission of such activities may be subject to measures aimed at limiting or compensating any adverse effects or minimizing any risks involved. Finally, activities may have impacts on the natural environment which were not anticipated. The state of the art at the time of the initial decision to permit the activity concerned did not enable the identification and assessment of the adverse effects or risks. Examples of such activities include various activities involving the release of hazardous substances, such as: (a) sulphur dioxide, nitrogen dioxide, ammonia and volatile organic compounds that cause acid rain; (b) chlorofluorocarbon (CFCs) and other substances that deplete the ozone layer; (c) carbon dioxide, black carbon and other greenhouse gases that cause climate change; and (d) polychlorinated biphenyls (PCBs) and other persistent organic substances that are a threat to human and animal health.

Pursuant to international law, a state may not carry out or permit the carrying out of activities within its jurisdiction or control that cause significant harm to other states or internationalized areas.⁷⁷ This is a due diligence obligation comprising various procedural and substantive elements.⁷⁸ The procedural elements require states: (a) to assess the potentially adverse effects of a planned activity; (b) to notify the potentially affected states if the transboundary adverse effects or the risks of such effects are significant; (c) to provide information on the planned activity to such potentially affected states and to exchange information with such states on the potentially adverse effects; and (d) to consult with such states over the planned activity.⁷⁹ If it is established that an activity will cause significant harm to another state, the activity may only be carried out with the consent of that state. If it is established that an activity will cause significant harm to an internationalized area, a state may not permit the activity. If it established that an activity does not cause significant harm or only creates a risk of causing such harm to other states or internationalized areas, a state may permit the activity subject to compliance with any applicable international obligations. This state bears the risk of state responsibility for an incorrect assessment of the adverse effects and the risk of such effects.⁸⁰ If a state permits an activity, it must monitor its impact to assess whether the activity produces any unforeseen adverse effects that cause significant harm to other states or internationalized areas. If the activity produces such unforeseen adverse effects, it must be adjusted or terminated in order to eliminate or at least reduce such adverse effects.⁸¹

To discharge itself of the substantive elements of its due diligence obligation to prevent significant harm to other states and internationalized areas, a state will have to prescribe rules for activities within its jurisdiction and enforce compliance with such rules. Such rules could, for example, include: (a) the requirement of an authorization; (b) the conduct of an environmental

⁷⁷ Art. 3 of the 1992 Convention on Biological Diversity; Art. 194.2 CLOS; Principle 2 of the 1992 Rio Declaration on Environment and Sustainable Development; Principle 21 of the 1972 Stockholm Declaration on the Human Environment; International Court of Justice, *Legality of the Threat or Use of Nuclear Weapons*, Advisory Opinion of 8 July 1996, *1996 ICJ Reports* 226, at 241 (para. 29).

⁷⁸ R. Lefeber, *Transboundary Environmental Interference and the Origin of State Liability* (1996), at 10-46.

⁷⁹ Draft Articles on Prevention of Transboundary Harm from Hazardous Activities, UN Doc. A/Res/62/68 (2007), Annex.

⁸⁰ Arbitral Tribunal, *Lac Lanoux*, Award of 16 November 1957, XII *United Nations Reports on International Arbitral Awards* 281, at 310.

⁸¹ Arbitral Tribunal, *Trail Smelter*, Awards of 16 April 1938 and 11 March 1941, II *United Nations Reports on International Arbitral Awards* 1905, at 1973.

impact assessment; (c) the imposition of requirements regarding the use of material, technology and personnel; (d) the limitation of admissible releases of substances and organisms, (e) the prevention of uncontrolled releases of substances and organisms; (f) the removal of waste; and (d) the development of contingency plans.

Activities in the Polar Regions are subject to various international rules to prevent or reduce their adverse effects on the environment. In the South Pole Region, the conduct of an environmental impact assessment is mandatory for all activities, scientific research included (Art. 8.2 AP). Each modification of existing activities, including the termination of an activity, requires the conduct of an environmental impact assessment as well (Art. 8.3 AP). An activity must first be evaluated at the national level. Depending of the result of the national evaluation, an international evaluation must be made. Only activities with less than a minor or transitory impact may, direct and without any conditions, be carried out (Art. 1.2 Annex I AP). Otherwise, an initial environmental evaluation is required. If it appears from an initial environmental evaluation or otherwise that an activity is likely to have no more than a minor or transitory impact, it may be carried out; if it appears that an activity is likely to have more than a minor or transitory impact, a comprehensive environmental evaluation must be made (Art. 3.1 Annex I AP). Following a comprehensive evaluation, which must be submitted to and may be discussed by the Antarctic Treaty Consultative Meeting, the party concerned decides whether or not to permit the activity. The environmental impact of an activity must continuously be monitored in accordance with a procedure that is established before the activity is commenced, unless the activity has less than a minor or transitory impact (Arts. 2.3 and 5.1 Annex I AP). Activities must be modified, suspended or cancelled if they cause damage or threaten to cause damage to the environment (Art. 3.4(b) AP). Special rules apply with respect to the introduction of non-native species, the treatment of waste and dumping at sea to reduce the risk of the unintentional introduction of non-native species (Art. 4 Annex II AP); the disposal and management of waste (Annex III AP); and discharges from ships of oil, noxious liquid substances, garbage, and sewage (Annex IV AP), and to prohibit the storage of radioactive waste (Art. V.1 AT). If, in spite of the implementation of preventive measures, an environmental emergency occurs or threatens to occur, the state which is responsible for the activity causing the contingency, must ensure prompt and effective response action on the basis of established contingency plans (Arts. 15 AP and 4-5 Annex VI AP). Other parties are expected to provide information and assistance upon request (Art. 6.1(c) AP), and may take response action subject to notification requirements (Art. 5.3 Annex VI AP). These regulations do, however, not apply to activities governed by the Antarctic Seals Convention and the Antarctic Marine Living Resources Convention.

The rules governing activities of states in marine areas in the Polar Regions are not essentially different from those governing activities elsewhere in the world to prevent or limit adverse effects for the natural environment. Pursuant to the Convention on the Law of the Sea, states must individually or jointly take measures to prevent, reduce and control pollution of the marine environment (Art. 194.1). To this end, the effects and risks of pollution must be observed, measured, evaluated and analyzed (Art. 204). In case of imminent or actual damage, potentially affected states and competent international organizations must be immediately notified and cooperate to prevent or minimize the damage (Arts. 198-199). However, these rules are not primarily directed to the assessment and regulation of activities which have or could have adverse effects on the marine environment. The Convention on the Law of the Sea only contains

specific rules on mineral resource exploitation on the deep seabed (Art. 145).⁸² In the framework of the International Maritime Organization (IMO), special regulations have been adopted to limit the unintentional introduction of non-native species, discharge of waste and dumping at sea as a result of activities in marine areas.⁸³

The Convention on the Law of the Sea specifically addresses the preservation and protection of rare or fragile ecosystems (Art. 194.5). This is relevant for the marine areas in the Polar Regions, but the provision concerned does not provide for additional measures to preserve and protect these ecosystems. The discussion in the United Nations General Assembly on the protection of marine biological diversity of the high seas and the deep seabed, in particular proposals to develop an implementing agreement, could provide for such additional measures.⁸⁴ The development of such rules has become urgent due to the proliferation of new activities, such as deep seabed bottom trawling and ocean fertilization.

The prevailing climatic conditions in the Polar Regions have been reason to develop additional measures for safety at sea. The IMO has adopted guidelines for vessels operating in Arctic ice-covered waters.⁸⁵ The objective of these guidelines is to establish appropriate standards for maritime safety and the prevention of pollution. The IMO is considering the application of these guidelines to vessels operating in Antarctic waters as well. Coastal states could transpose these voluntary guidelines in binding domestic laws and regulations. The Convention on the Law of the Sea envisages the application of such domestic laws and regulations in ice-covered areas where the presence of ice and climatic conditions for most of the year create obstructions or exceptional hazards to navigation and pollution of the marine environment could cause major harm an irreversible disturbance of the ecological balance (Art. 234).

Such regulations could limit, but never eliminate the risk of damage. It is therefore necessary to prepare for response action in the event of environmental emergencies and the compensation of the costs of such action. The remote location of Polar Regions renders it likely that third parties in the proximity of an environmental emergency will have to be relied on to assist in the implementation of response actions. Third parties will only be willing to provide such assistance if prompt and adequate compensation is available to cover their costs. In respect of the South Pole Region, a regulation has been developed that provides for the compensation of costs of such response actions (Annex VI AP). The need for such a regulation appeared at the end of the 1980s after serious oil pollution was caused when several vessels ran aground in the Polar Regions, viz. the *Exxon Valdez* in the North Pole Region and the *Bahia Paraiso* in the South Pole Region. A serious risk of damage in the North Pole Region is, furthermore, created by the nuclear waste of the Russian navy on the seabed of the Barents Sea. Other states have provided assistance to

⁸² 2000 Regulations on Prospecting and Exploration for Polymetallic Nodules in the Area (Part V); 2010 Regulations on Prospecting and Exploration for Polymetallic Sulphides in the Area (Part V); Draft Regulations on Prospecting and Exploration for Cobalt-rich Ferromanganese Crusts in the Area (Part V).

⁸³ 1972 Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter and 1996 Protocol; 1973 International Convention on the Prevention of Pollution from Ships (MARPOL), as amended; 2004 International Convention for the Control and Management of Ships' Ballast Water and Sediments.

⁸⁴ Report of the Ad Hoc Open-ended Informal Working Group to Study Issues Relating to the Conservation and Sustainable Use of Marine Biological Diversity Beyond Areas of National Jurisdiction, UN Doc. A/61/65 (2006); Letter Dated 15 May 2008 from the Co-Chairpersons of the Ad Hoc Open-ended Informal Working Group to Study Issues Relating to the Conservation and Sustainable Use of Marine Biological Diversity Beyond Areas of National Jurisdiction Addressed to the President of the General Assembly, UN Doc. A/63/79 (2008).

⁸⁵ 2002 IMO Guidelines for Ships Operating in Arctic Ice-covered Waters, MSC/Circ.1056/MEPC/Circ.399, which apply in addition to the 1977 International Convention for the Safety of Life at Sea (SOLAS), as amended.

respond to environmental emergencies created by the *Bahia Paraiso* and the nuclear waste on the seabed of the Barents Sea.⁸⁶ The response to environmental emergencies in the North Pole Region would benefit from the development of a regional seas convention for the protection of the marine environment of the Arctic Ocean that includes provisions on the response to environmental emergencies and liability for the compensation of costs of response actions.⁸⁷

Activities outside the Polar Regions, however, may be a greater threat for their preservation than activities inside these regions. This threat emanates in particular from releases of hazardous substances which are transported by airways to the Polar Regions and are deposited in these regions as a result of the cold climatic conditions. It were the forests and lakes of Scandinavia that were hit hardest by acid rain; it was the South Pole Region where a hole in the ozone layer emerged; it are the Polar Regions where the temperature rises faster than anywhere else on Earth; and it is at the top of the short food chains in the Polar Regions where high concentrations of persistent organic pollutants have accumulated. In the Preamble to the 2001 Convention on Persistent Organic Pollutants, it was acknowledged that: “the Arctic ecosystems and indigenous communities are particularly at risk because of the biomagnification of persistent organic pollutants and that contamination of their traditional foods is a public health issue”.

The anthropogenic origin of the acidification of soil and water, the depletion of the ozone layer, the accumulation of persistent organic substances in organisms, and climate change has now been recognized by the international community. Various treaties have been adopted to prohibit or at least limit the release of hazardous substances with the aim of eliminating or at least limiting the adverse effects on the environment. The international community has made progress in addressing the acidification of soil and water⁸⁸ and the depletion of the ozone layer.⁸⁹ The emissions of substances that cause acid rain or deplete the ozone layer have considerably been reduced since the 1980s (as a result of the efforts of industrialized countries), but global emissions have not yet been reduced to a level which does not cause any damage (as a result of the continuing emissions of developing countries). The accumulation of persistent organic pollutants at the top of the food chains in the Polar Regions, in particular in mammals and indigenous peoples, occurs relatively fast as a result of the short food chains in these regions. On occasion, dead terrestrial mammals and marine mammals even had to be treated as chemical waste. The international community has adopted measures to phase out or, at least, limit the use of persistent organic pollutants, but positive effects are not expected in the short term due to the slow processes in which these pollutants decompose.⁹⁰

The single biggest environmental threat for the Polar Regions, however, is global warming. Global warming is addressed by the international community through the regulation of the concentrations of greenhouse gases in the atmosphere that have an anthropogenic origin (mitigation).⁹¹ The temperature in the Polar Regions rises faster than anywhere else on Earth. The causes are not yet fully understood, but it is presumed that specific regional features, such as

⁸⁶ *Instituto Antartico Argentino*, Argentina, and Rijkswaterstaat – Tidal Waters Division, The Netherlands, *Initial Environmental Evaluation, Associated with the Salvage Operation of the Remaining Oil of the Bahia Paraiso* (1992); 2003 Framework Agreement on a Multilateral Nuclear Program in the Russian Federation and the 2003 Protocol on Claims, Legal Proceedings and Indemnification.

⁸⁷ The 2009 Arctic Offshore Oil and Gas Guidelines may provide the initial impetus.

⁸⁸ 1979 Convention on Long-Range Transboundary Air Pollution and protocols thereto.

⁸⁹ 1985 Convention for the Protection of the Ozone Layer and 1987 Protocol on Substances that Deplete the Ozone Layer.

⁹⁰ 2001 Convention on Persistent Organic Pollutants.

⁹¹ 1992 United Nations Framework Convention on Climate Change and 1997 Protocol.

the observed decrease in the power of snow and ice to reflect sunlight (albedo effect), contribute significantly to the relative fast rise of the temperature. This is caused, amongst others, by the deposit of smut in the Polar Regions which was released into the atmosphere by the emission of black carbon (or soot). Developing countries are the main source of emissions of black carbon in the 21st century. The emissions of industrialized countries have been significantly reduced in the second half of the last century. Public health considerations were the main reason for the implementation of various measures, such as the use of catalysts in cars, to achieve emission reductions of black carbon. Black carbon is a greenhouse gas under the 1992 United Nations Framework Convention on Climate Change (Climate Change Convention), but it is not subject to the emission targets of the Kyoto Protocol to that Convention (Art. 3.1 and Annex A). Furthermore, developing countries are not subject to the Kyoto Protocol emission targets even though these countries are now the main source of contemporary emissions of this greenhouse gas.

5. The Polar Regions in a Changed Climate

5.1 Adaptation to Climate Change

Adaptation to climate change presupposes that a certain degree of global warming is inevitable and that the international community must prepare itself for the resulting global changes in physical and biological systems. Adaptation is the adjustment of physical or human systems, in connection with a real or expected change of the climate and its consequences, with the aim of reducing the vulnerability of those systems to climate change. Such adjustment will often require drastic measures which in many cases cannot, or not easily, be reversed. Uncertainties with respect to the occurrence and the injurious consequences of climate change complicate the adoption of a rational decision on the implementation of such measures. Moreover, the implementation of adaptation measures requires the availability of the necessary technological, economic and administrative capacities in a country. On the one hand, adaptation measures may be implemented that in hindsight could have been avoided and, on the other hand, other adaptation measures may erroneously not be implemented.

The consequences of climate change for the Polar Regions are relatively big due to the vulnerability of the ecosystems of these regions. Furthermore, the beneficial and adverse consequences of climate change will manifest themselves sooner in the Polar Regions due to the relatively fast increase of average temperatures in these regions. This will not only create opportunities for new human activities in the Polar Regions (see Section 1), but will also impact on existing activities in these regions. The development of new activities as well as the continuation or discontinuation of existing activities requires the implementation of adaptation measures. These measures concern in particular the adjustment to changes in the polar cryosphere, in particular the loss of ice cover: glaciers will melt faster; permafrost will thaw; the total surface covered by sea ice, land ice and snow will decrease; parts of the remaining surface will become ice free earlier in the season and for longer stretches of time; and the remaining ice cover will become less thick (See Section 1). This will have a significant impact on the indigenous peoples of the North Pole Region who have not significantly contributed to climate change and lack the capacity to implement adaptation measures. The indigenous peoples will have to appeal to the authorities of the states in which they reside. International funding instruments are not available to finance the development of an adaptation policy and the

implementation of adaptation measures in the Polar Regions. This would require access of indigenous peoples to the financial resources of the Adaptation Fund of the Kyoto Protocol or the Green Climate Fund of the Climate Change Convention that currently only envisages the financing of adaptation measures in developing countries.⁹²

In the South Pole Region, adaptation measures will only be required on a small scale because the human presence in this region is still limited. For the time being, research will continue to be the primary human activity in the region. The rapid warming of the region should be reason to focus research programs more on ecosystem dynamics. Ice loss, in particular of ice shelves, could affect the research infrastructure. This may lead to the relocation of scientific stations, but is in fact no more than a small-scale logistic difficulty. In spite of the loss of ice, tourists are likely to become even more attracted to the South Pole Region by the higher temperatures. If the Consultative Parties are not able to agree on a prohibition of permanent facilities for tourists on Antarctica, the pressure to establish such facilities will further increase. The warming of the South Pole Region and the loss of ice may have significant implications for the use of natural resources. Habitats of marine living resources will be lost due to the loss of ice (mammals and birds) and the warming of water (all marine animals in cold waters). Fishing vessels will initially be moving to colder waters or target other species in warmer waters, but this is only feasible as long as populations are able to survive in new habitats and protected by conservation programs. The technical and economic feasibility of mineral resource exploitation will increase, but exploitation may not be permitted as long as the mining ban is not lifted.

In the North Pole Region, adaptation measures will be more sizeable and expensive. Investments in new activities will increase, such as the opening of shipping routes, the development of farmland and the establishment of water-intensive industry. The consequences for existing uses of natural resources in the North Pole Region, in particular fisheries and mineral resource exploitation, are comparable to those in the South Pole Region, albeit that mineral resource exploitation in the North Pole Region is not prohibited. The human presence in the region will increase as a result of new activities. Meanwhile, existing activities will suffer from higher temperatures. The existing infrastructure will be affected by the loss of sea ice and the thawing of permafrost. In particular, the traditional ways of life of indigenous peoples will come under increasing pressure.

Erosion and flooding of the coasts of low-lying areas, such as coastal areas in Alaska (United States), are the result of polar warming. Storms that hitherto raged over relatively stable frozen sea and land now result in seas battering melting coastlines. In addition, higher temperatures have brought heavy rainfall, ice jams, glacial melts, and rising sea levels. This results in flooding and erosion of the coasts of low-lying polar areas, including coastal areas of Alaska. According to the United States General Accounting Office, 184 out of 213 indigenous local communities in Alaska are increasingly threatened by these climate changes.⁹³ It appeared from a survey into nine communities that four of them are forced to make plans for relocation, including Kivalina and Shishmaref.⁹⁴

⁹² Adaptation Fund, UNFCCC Decision 1/CMP.4 (2008); Green Climate Fund, UNFCCC Decision --/COP.17 (2011).

⁹³ Testimony of the Shishmaref Erosion and Relocation Coalition before the Committee on Homeland Security and Governmental Affairs Sub-Committee on Disaster Recovery of the United States Senate of 11 October 2007 during Hearing on “*The State and Federal Response to Storm Damage and Erosion in Alaska’s Coastal Villages*”; US General Accounting Office, *Alaska Native Villages: Most Are Affected by Flooding and Erosion, but Few Qualify for Federal Assistance* (2003), GAO-04-142, at 2-3 and 13-17.

⁹⁴ *Ibid.*, at 4 and 27-35.

The Last Days of Shishmaref. Shishmaref is an indigenous local community of approximately 600 inhabitants of predominantly Iñupiat (Northern Eskimos) on the island of Sarichef. Sarichef forms part of a barrier reef that is located near the west coast of Alaska in the Chukchi Sea. The island's coasts – which are not more than a quarter of a mile broad and three miles long – erode during heavy storms. It has not been feasible to reverse this physical process and the disappearance of the island is inevitable. On 10 July 2002, the Community of Shishmaref decided that relocation of the Community would be the best option to adapt to climate change. Presently, the Community is in the process of developing plans, together with the authorities, for the relocation of the Community to mainland Alaska.⁹⁵

The costs of relocation of indigenous local communities in Alaska are high as a result of the expensive costs of equipment and transport in the remote areas where these communities reside. The costs of relocation of Shishmaref are estimated at 180 million dollars and those of Kivalina at 100 to 400 million dollars.⁹⁶ These communities do not have the necessary technological, economic and administrative capacities to develop and implement relocation plans. They are dependent on the authorities, in the case of these communities authorities of industrialized countries which possess the necessary capacities and are willing to provide the necessary assistance. The organized relocation enables these Communities to continue their traditional way of life elsewhere in their natural habitat.

5.2 *The Inevitable Injurious Consequences of Polar Warming*

It is inevitable that the Polar Regions, in spite of measures to control the concentration of greenhouse gases in the atmosphere (mitigation measures) or measures to adjust physical and human systems to reduce the vulnerability of such systems to climate change (adaptation measures), will have to face the injurious consequences of climate change.⁹⁷ The magnitude of these consequences will in part depend on the effective implementation of new mitigation and adaptation measures.

It is expected that the Polar Regions, like other parts of the Earth, will be confronted more frequently with increasingly serious natural disasters, including flooding as a result of heavier storms and sea level rise. It is possible to be better prepared for these disasters by the development and improvement of contingency plans, disaster relief plans, temporary shelter arrangements for displaced persons, and compensation mechanisms for victims. However, administrative, technical and economic capacities limit the possibilities to implement adaptation measures and to prepare for natural disasters.

It is, furthermore, expected that a warmer North Pole Region will result in a decrease in the survival capacity of indigenous peoples. The seminomadic way of life of these peoples, which is based on hunting and fishing, is not only under stress as a result of climatological factors, but also as a result of social, economic, and cultural developments.⁹⁸ The vulnerability of these

⁹⁵ Ibid., at 34. See, for an informative perspective on the social dimension of the relocation of the Community, the documentary *The Last Days of Shishmaref* (2008).

⁹⁶ Ibid., at 4 and 32.

⁹⁷ IPCC, *Fourth Assessment Report, Climate Change 2007: Synthesis Report* (2007), p. 65; R. Lefebvre, *An Inconvenient Responsibility* (2009), at 15.

⁹⁸ R.O. Rasmussen, *Globalisation, Social Issues and Arctic Livelihood*, in *Conclusions by the Chairman of the Conference Organized by the Nordic Council of Ministers (Hans Corell), Common Concern for the Arctic, 9-10 September 2008, Ilusat, Greenland*, at 5-6.

peoples is increasing due to decreased survival and adjustment capacities in spite of improved services and a warmer climate. In the framework of the Climate Change Convention, rights should therefore be attributed to indigenous peoples, including a right of access of these peoples to the Adaptation Fund and the Green Climate Fund as well as other funds for the financing of adaptation measures and the development of an adaptation policy.

On 26 February 2008, representatives of Kivalina initiated a legal action against several oil and energy companies before a court in California (United States).⁹⁹ They claim compensation for the incumbent loss of their home land as a result of global warming and the costs of their relocation (see Section 5.1). The claimants hold these companies in part liable because of: (a) long-term emissions of large quantities greenhouse gases during the burning of oil and the production of energy; and (b) conspiracy in denying the relationship between their emissions and global warming. The oil and energy companies reject the claims.¹⁰⁰ This is one of the first cases in which compensation is claimed for damage resulting from climate change and it will be a challenge for the court to address the claims. First, it will be necessary to determine whether the incumbent loss of the traditional habitat of the people of Kivalina is caused by anthropogenic warming of the Earth and that such warming is caused by the emission of greenhouse gases. Second, it will be necessary to establish to what extent the defendants have contributed to global warming. This will have to take into account that other companies too have contributed to global warming. Third, it will be necessary to determine whether all emissions of the defendants since the launch of the company should be counted and not only the emissions since the time that they should have known that the emission of greenhouse gases contributed to global warming. The case is still pending.

It is expected that polar warming will result in a decrease of biological diversity of the Polar Regions. Together with the melting of sea ice, not only the habitats of organisms living on sea ice, such as seals and polar bears, will be melting away, but also of organisms living at the underside of the sea ice. Animal and plant species will become extinct if the non-sustainable use of such species has not already produced such extinction. The fragile ecosystems of the Polar Regions will be thrown off balance and may not be preserved.

It is also expected that polar warming will result in an increase of human presence, at least in the North Pole Region. The region will be more intensely used for different human activities, such as transportation, mineral resource exploitation, forestry, and water-intensive industry (see Section 1). In view of their socio-economic benefits, it is likely that such activities will be permitted in spite of the fact that they have adverse effects for the environment or at least increase the risk of such adverse effects. Besides these adverse effects, the Polar Regions will lose their wilderness values as a result of the increase of human activities and the presence of people in these regions.

6. Conclusions

The inaccessibility of the Polar Regions explains the relative pristine state of these regions to date. The human presence in these regions is presently limited by the extreme climatological

⁹⁹ Complaint for Damages of Plaintiffs of 26 February 2008, in: *Native Village of Kivalina and City of Kivalina v. ExxonMobil Corp., et al.*

¹⁰⁰ Motions to Dismiss of Defendants of 30 June 2008, in: US District Court, Northern District of California, Oakland Division, *Native Village of Kivalina and City of Kivalina v. ExxonMobil Corp., et al.*, Case No. C 08-cv-01138 SBA; see also Plaintiff's Consolidated Opposition to Motions to Dismiss of 18 September 2008.

circumstances. This will change as a result of polar warming. The ecological boundaries of the Polar Regions will shift in the directions of the geographical poles resulting in a diminishing area of the ecological Polar Regions. Climate change and other ecological processes with an anthropogenic origin, such as the acidification of soils and waters, the depletion of the ozone layer, and the accumulation of persistent organic pollutants in people and animals constitute serious threats for the fragile ecosystems of the Polar Regions. These processes will impact on the capacity of the Polar Regions to supply goods and services of a certain quality in a certain quantity. The use of the Polar Regions will change accordingly. There will be positive changes, but there will also be negative changes. Existing activities will disappear and new activities will emerge.

The goods and services of the internationalized areas of the Polar Regions are currently free with the exception of the levies on the exploitation of mineral resources of the deep sea and Spitsbergen. The costs of human activities in the Polar Regions are thus not fully internalized. This is not only true for the costs of conservation, but also for the benefits missed by third parties (international equity) and future generations (intergenerational equity). Sustainable development requires that all external costs are internalized. This means that a price must be paid for the supply of goods and services by ecosystems (of the Polar Regions). This price should not only be paid for the consumption of natural resources, but also for the acquisition of amenities and knowledge.

The internalization of all costs of the use of internationalized areas of the Polar Regions requires an international arrangement for the use and the sharing of the benefits arising out of such use. If the use results in depletion, such as mineral resource exploitation and fishing, or limits the freedom of use by third parties, such as the construction of permanent infrastructure, this can only be achieved by means of a prohibition subject to international permission. With respect to other uses, the freedom of use could prevail, provided that an international arrangement is in force for the sharing of benefits if the use generates information that is no longer freely available or usable by third parties. Sustainable development requires therefore that the harvesting and extraction of natural resources in the (internationalized areas of the) Polar Regions is prohibited (subject to international permission) and that payments are made for all other uses. An exception to this principle could be made for activities which the international community wishes to promote, such as research, or protect, such as indigenous use.

The exceptions for research and indigenous use cannot only or wholly be justified by economic considerations, but find their justification primarily in social considerations. Social considerations could also be reason to prohibit activities wholly or partially. The promulgation of a prohibition of military use of the internationalized areas of the Polar Regions is inspired by the wish to prevent that these scenic areas become the scene of battle and originate in the wish to protect the international public order. The promulgation of the prohibition of sealing and whaling has been inspired by the wish to protect seals and whales against the use by people, at least not in manner that is animal unfriendly. This wish, however, is not shared by all states. States seem to be in agreement though that they want to preserve the pristine state of the Polar Regions.¹⁰¹ International public morals may become the legal basis for the international community to prohibit certain activities in the Polar Regions completely. The prohibition on mineral resource exploitation in the South Pole Region befits this vision and merits following.

¹⁰¹ Art. 2 AP; Preamble of the Antarctic Marine Living Resources Convention; Art. 1 of the Norwegian Act No. 79 of 15 June 2001 Relating to the Protection of the Environment in Svalbard.