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## The Central Arctic Ocean Fisheries Agreement as an element in the evolving Arctic Ocean governance complex

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#### ABSTRACT

The Central Arctic Ocean (CAO) has attracted increased attention since representatives of the five Arctic coastal states together with representatives of four other states and the European Union signed the *Agreement to Prevent Unregulated High Seas Arctic Fisheries* in October 2018. This article assesses the significance of this development as an element in the evolving governance complex for the Arctic Ocean. We begin with a discussion of the relevant legal framework, including universal treaties such as the UN Convention on the Law of the Sea (UNCLOS) and the Arctic *lex specialis* going back to the conventions of the Arctic coastal States in the 19th century and elaborated more recently under the terms of the 1996 Ottawa Declaration on the Establishment of the Arctic Council and ensuing arrangements. We then analyze the 2018 Agreement itself as an innovative arrangement including Arctic and non-Arctic states. This assessment leads to several conclusions. The agreement constitutes a progressive contribution to the evolving governance complex for the Arctic Ocean. Striking features of the agreement are (i) its reliance on a precautionary approach put in place *before* human activities get underway on a large scale and designed to ensure sustainability and (ii) the inclusion of non-Arctic states and the European Union as signatories. We consider whether the Central Arctic Ocean Fisheries Agreement will emerge as an important precedent with significant implications for the governance of the CAO as an area beyond national jurisdiction and for the Arctic Ocean governance complex more generally.

#### 1. Introduction

The signing of the Agreement to Prevent Unregulated High Seas Fisheries in the Central Arctic Ocean (hereafter the CAO Fisheries Agreement or CAOFA) on 3 October 2018 by representatives of the five Arctic coastal states together with representatives of four other states (China, Iceland, Japan, and Korea) and the European Union produced a kind of legal euphoria. For the first time, Canada, Denmark/Greenland, Norway, Russia, and the United States – the Arctic 5 – joined together with a group of non-Arctic states to forge a legally binding agreement dealing with an Arctic-specific issue. This 5+5 agreement acknowledges that no commercial fishing in the high seas portion of the Arctic Ocean is occurring at this time. But taking into account the dramatic biophysical changes now occurring in the region, the agreement prohibits the initiation of unregulated fishing in the Central Arctic Ocean (CAO), provides for a Joint Program of Scientific Research and Monitoring to

assess prospects for the development of commercially significant fish stocks in the future, and calls for regular meetings of the parties to determine whether to take steps toward the establishment of one or more fisheries management organizations in the event that commercial fishing does become an attractive prospect. A notable feature of the agreement is its reliance on the *precautionary principle*.

In this article, we analyze the development of the Central Arctic Ocean Fisheries Agreement in the broader context of the evolving governance complex for the Arctic Ocean. Section 2 discusses the contemporary legal status of the Arctic Ocean, exploring universal agreements applicable to the CAO, considering whether the provisions of UNCLOS pertaining to semi-enclosed seas apply to the CAO, and analyzing regional agreements applicable to the CAO. Section 3 deals with the negotiation of the CAOFA, while Section 4 reviews options regarding the interpretation of the agreement's most important provisions. Sections 5 concludes with a commentary on future options for

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<sup>&</sup>lt;sup>1</sup> On the concept of governance complexes, frequently called regime complexes by international relations scholars, see Ref. [17].

the CAO and Arctic Ocean governance more generally.

## 2. Overview of the legal status of the CAO and the encompassing Arctic Ocean

The establishment of 200-mile Exclusive Economic Zones (EEZs) by all five Arctic coastal states² resulted in the formation of high seas enclaves in the Arctic – areas of the water column beyond the jurisdiction of coastal States – including the *Donut Hole* in the Bering Sea surrounded by the EEZs of the United States and Russia; the *Polygon* in the Sea of Okhotsk surrounded by the EEZ of Russia, and the *Loop Hole* in the Barents Sea surrounded by the EEZs of Norway and Russia.³ The largest high seas enclave in the Arctic is the *Central Arctic Ocean* (CAO), an area of roughly 2.8 million k² that is totally enclosed by the EEZs of the five coastal states. The CAO is unique in this context not only because it is unusually large and (still) ice-covered for much of the year but also because there has been no significant commercial activity for centuries in this polar area.

According to the Law of the Sea, in both its treaty-based and customary forms, the five Arctic coastal States have sovereign rights within their EEZs for the purposes of exploring, exploiting, and conserving natural resources and engaging in a number of other activities. These coastal States also exercise sovereign rights regarding the natural resources of the Arctic shelves extending beyond the limits of their EEZs. But the superjacent waters of the CAO are unambiguously areas beyond national jurisdiction. They are high seas as the term is defined in Article 86 of the 1982 UN Convention on the Law of the Sea (UNCLOS).

The term CAO has a clearcut meaning in international law. But the size of the CAO is dependent on legal factors subject to change over time. For example, when Norway drew straight baselines around the Svalbard Archipelago in 2001<sup>4</sup> (and no Arctic State protested, so a tacit international agreement was reached and relevant *opinio juris* was formed), the 200-mile fishery protection zone around the archipelago moved northward and the boundaries of the CAO were changed legitimately [1]. Such changes may occur again in the future. The United States, for example, may follow the practice of Norway, Canada and Denmark by drawing straight baselines along the northern coast of Alaska. <sup>5</sup> But such changes in the delimitation of the CAO will not change the legal status of this marine area.

#### 2.1. Universal international agreements applicable to the CAO

The CAO is not the specific object of any universal convention.

However, a wide range of legal rules provided by universal agreements are applicable to this area. Some of these arrangements regulate relations between states regarding matters like the prevention of pollution from ships as in the case of the *International Convention for the Prevention of Pollution from Ships, 1973*, as modified by the 1978 and 1997 *Protocols* relating thereto (*MARPOL 1973/78*). Others are comprehensive, dealing with a broad range of maritime issues, notably the 1982 *UN Convention on the Law of the Sea (UNCLOS)*.

A number of multilateral international agreements cover the entire Arctic Ocean including the CAO. In addition to UNCLOS and MARPOL, these include: (i) environmental agreements, such as the 1992 UN Convention on Biological Diversity, including the 2000 Cartagena Protocol; the 1992 UN Framework Convention on Climate Change, including the 1997 Kyoto Protocol and the 2015 Paris Agreement; the 1972 Convention for the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, including the 1996 London Convention Protocol; the 1973 Convention on International Trade In Endangered Species of Wild Fauna and Flora (CITES), including the 1979 Bonn Amendment; the 1979 Convention on the Conservation of Migratory Species of Wild Animals, and the 1989 Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal, and (ii) agreements relating to safety of life at sea, such as the 1974 International Convention for Safety of Life at Sea (SOLAS), including SOLAS 1978, 1988 Protocols and SOLAS 1996 Agreement, and the 1978 International Convention on Training, Certification and Watchkeeping for Seafarers.

As Table 1 indicates, all Arctic coastal States are parties to most of these universal agreements. As a result, they can use these agreements as a basis for developing more specific regional arrangements. According to Article 197 of UNCLOS, States have a legal obligation to cooperate not only on a global basis but also "on a regional basis." According to Article 199, States in an area affected by pollution shall "in accordance with their capabilities ... co-operate in eliminating the effects of pollution and preventing or minimizing the damage." To this end, States of the affected region "shall jointly develop and promote contingency plans for responding to pollution incidents in the marine environment." Table 1 also shows a few exceptions to this general picture. For example, only Denmark and Norway are parties to the 1979 Convention on the Conservation of Migratory Species of Wild Animals and the 2000 Cartagena Protocol to the UN Convention on Biological Diversity, while Canada, Russia, and the USA are not.

More important is the fact that under UNCLOS all the Arctic coastal States have established 12-mile territorial seas in the Arctic. These States also proclaimed in the Ilulissat Declaration of 2008 that "an extensive international legal framework applies to the Arctic Ocean," so that there is "no need to develop a new comprehensive international legal regime to govern the Arctic Ocean." All five Arctic coastal States have adopted national laws relating to their continental shelves in the Arctic. In addition, they have established exclusive economic zones (EEZ) to the North of their Arctic coasts; Norway has proclaimed a 200-mile Fishery Protection Zone around the Svalbard Archipelago. It is the northern limits of these 200-mile zones that delimit the boundaries of the CAO (see Map 1).

The universal agreements noted above form the core of the CAO's legal regime. However, this governance system is applied by the Arctic States through their regional, bilateral and national legal practices, taking into account special characteristics of the Arctic region. The explanation of this phenomenon lies in part in the general principle of law *lex specialis derogat generali* (a concrete rule takes precedence over a general rule). In addition, some analysts believe the Arctic Ocean is a "semi-enclosed sea" in the meaning of Part IX of UNCLOS, which encourages coastal states to initiate governance of such a large area,

<sup>&</sup>lt;sup>2</sup> The Arctic Ocean has twelve Arctic marginal seas located along the northern coasts of Canada, Denmark, Norway, Russia and USA: the Barents Sea (shared by Russia with Norway); the White Sea, the Kara Sea, the Laptev Sea, the East Siberian Sea (with Russia as a coastal state); the Chukchi Sea and the Bering Sea (shared by USA with Russia); the Sea of Okhotsk (shared by Russia with Japan); the Norwegian and the Greenland seas (shared by Denmark with Norway and Iceland); the Beaufort Sea (shared by Canada with USA); and the Lincoln Sea (shared by Canada with Denmark).

 $<sup>^3</sup>$  The high seas "enclaves" called Banana, Decollette or Tie Holes (in the Greenland and Norwegian Seas) are located in the northern part of the Atlantic Ocean and not in the Arctic Ocean.

<sup>&</sup>lt;sup>4</sup> Norway in its national law uses the term "Svalbard Archipelago," though the 1920 *Treaty Relating to Spitsbergen*, which grants Norway sovereignty over this archipelago, uses the term the "Archipelago Spitsbergen." Norway cannot change the language of the Paris Treaty of 1920, since the French and English texts but not the Norwegian text are authentic (Article 10 of the Paris Treaty 1920). But Norway has not provoked any protests on behalf of the Parties for gradually substituting the national term "Svalbard" for the treaty term "Spitsbergen."

<sup>&</sup>lt;sup>5</sup> Today, the United States is the only Arctic coastal state that has not drawn straight baselines along its Arctic coasts [18].

<sup>&</sup>lt;sup>6</sup> The terms "object" and "purpose" are used in the meaning of the Vienna Convention on the Law of Treaties, 1969 (Articles 18 and 31, firstly).

 $<sup>^{7}</sup>$  These measures are nautical miles: 1 nautical mile = 1852 m.

**Table 1**Key universal treaties applicable to the CAO.

No T	itle	Norway	Russia	Denmark	USA	Canad
	N Convention on the	+	+	+	_ (*)	+
	aw of the Sea, 1982					(*)
	convention on the erritorial Sea and the	-	+	+	+	_ (*)
	ontiguous Zone,					
	958					
3 C	convention on the	-	+	+	+	_ (*)
	ligh Seas, 1958					
	Convention on the	+	+	+	+	+
	ontinental Shelf, 958					
	nternational	_1	+	+	+	
	onvention for the				·	
R	egulation of					
V	Vhaling, 1946					
	convention for the	+	+	+	+	+
	revention of Marine					
	ollution by Dumping					
	f Wastes and Other					
	latter, 1972 - ncluding London	+	+	+		+
	onvention Protocol,	т	т	T		-T
	996 Convention on					
	nternational Trade In					
E	ndangered Species of					
	Vild Fauna and Flora					
	CITES), 1973;					
	ncluding Bonn	+	+	+	+	+
	mendment, 1979 and aborone amendment,	+		+		+
	983	+		+		+
	nternational	+	+	+	$+^2$	+
	onvention for the	'		'	'	'
P	revention of					
P	ollution from Ships,					
	973, as modified by					
	ne 1978 and 1997					
	rotocols Relating hereto					
	nternational	+	+	+	+	+
	convention for Safety	T	-	Т	1	
	f Life at Sea (SOLAS),					
	974;					
	ncluding SOLAS 1978	+	+	+	+	
	nd 1988 Protocols					
	nd					
	OLAS 1996	+	-	+	-	-
	greement convention on the	+		_		
	onservation of	Τ		+		
	ligratory Species of					
	Vild Animals, 1979					
	asel Convention on	+	+	$+^3$	- (*)	+
	ne Control of					
	ransboundary					
	lovements of					
	lazardous Wastes and neir Disposal, 1989					
	N Convention on	+	+	+	- (*)	+
	iological Diversity,	-	т	T	- ( )	т
	992;					
	ncluding Cartagena	+	_	+	-	- (*)
	rotocol, 2000					
	N Framework	+	+	+	+	+
	onvention on Climate					
C	hange, 1992;					

 $<sup>^{\</sup>rm 1}$  Conditional adherence since 23 Sep. 1960, no ratification.

including measures to conserve the living resources of the sea (see Section 2.2 infra).

The Arctic Ocean is unique as an object of international law. It is much smaller than the other "recognized" oceans (Atlantic, Indian, and Pacific); it is not as deep as these other oceans; only five States have coasts bordering on the Arctic Ocean, and most of the Central Arctic Ocean has been covered by ice in modern times [2]. The Arctic Ocean also is dominated by cold and darkness during so called "polar nights" during much of the year. The global ocean conveyor belt - a system of surface and deep ocean currents - spans the other oceans but not the Arctic Ocean. 9

These "peculiarities of fact" account for the special role of the Arctic coastal states in establishing and developing *lex specialis* for the Arctic, starting with the 1825 *British-Russian Boundary Convention* delimiting "polar possessions" and using the first Arctic meridian – or "sector" – line<sup>10</sup>; the 1867 *US-Russia Convention Ceding Alaska* (still in force between the US and Russia), <sup>11</sup> and the 1973 Agreement on the Conservation of Polar Bears among the five Arctic coastal states. Under the terms of the 1973 Agreement, the Arctic coastal states recognize their "special responsibilities and special interests" in relation to the "protection of the fauna and flora of the Arctic Region."

The significant climate changes currently taking place in the Arctic "are resulting in a rapid development of regional cooperation" [3 at 7]. A number of articles of UNCLOS emphasize obligations and rights of states regarding regional cooperation, beginning with Part XII on the Protection and Preservation of the Marine Environment. The 1996 Declaration on the Establishment of the Arctic Council features a claim to regional competence to address issues of environmental protection and sustainable development on the part of the eight Arctic States with jurisdiction extending north of the Arctic Circle. These Arctic States have since concluded several important regional agreements (see Section 2.3 infra) dealing with important topics. There is some debate regarding the advisability of excluding non-Arctic States as parties to these regional agreements. What is without doubt is that no state under general international law can ignore the regional regime of protection and preservation of the Arctic created by the Arctic States.

#### 2.2. The applicability of Part IX of UNCLOS to the CAO

There is a debate among legal commentators about whether the Arctic Ocean "constitutes an enclosed or semi-enclosed sea" as the term is used in UNCLOS [4 at 5]. Some writers assert that Part IX of UNCLOS on "enclosed or semi-enclosed seas" is applicable to the CAO [5 at 134–135]. Other scholars are more cautious in their legal opinions: "An

 $<sup>(\</sup>ensuremath{^*})$  - signed but not ratified.

<sup>&</sup>lt;sup>2</sup> Does not participate in MARPOL 73/78 Annex IV.

<sup>&</sup>lt;sup>3</sup> Approved.

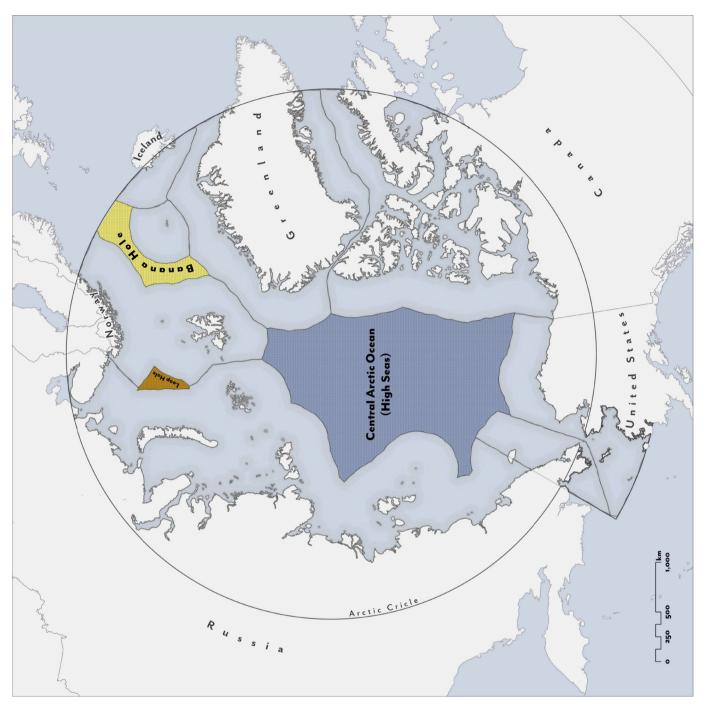
<sup>&</sup>lt;sup>8</sup> Some publications regard the southern parts of the Atlantic, Indian and Pacific Oceans as an additional "Southern Ocean" (See, for instance: *Collins World Atlas* 4th ed. 2009. British Library Catalogue in Publication Data. HarperCollins Publishers 2009, 12–13). The International Hydrographic Organization officially recognized the Southern Ocean as a separate ocean. But other official publications on the world ocean do not recognize that the southern parts of Atlantic, Indian and Pacific Oceans form a separate Southern Ocean. See for example, [19]: 449.

<sup>&</sup>lt;sup>9</sup> See Moelnaar, Elferink, and Rothwell 2013 and the website of the National Oceanic and Atmospheric Administration (available at: <oceanservice.noaa. gov/education/kits/currents/06conveyor.html>).

This convention remains in force between Canada and the United States.

<sup>&</sup>lt;sup>11</sup> Official titles of these conventions are: 1) The Boundary Treaty of 1825 between Great Britain and Russia; 2) Treaty concerning the Cession of the Russian Possessions in North America by his Majesty the Emperor of all the Russians to the United States of America; concluded March 30, 1867; ratified by the United States May 28, 1867; Proclaimed by the United States June 20, 1867. For comments see: [20].

 $<sup>^{12}</sup>$  English (authentic) texts of the main international agreements and arrangements representing the legal regime of the Arctic Ocean are systematized in Ref. [2].



Map 1. The Central Arctic Ocean.

unresolved issue is whether article 123 applies to the Arctic Ocean. Given the LOS Convention does not specify which seas the provision applies to, there is the potential for differing views between and amongst Arctic and non-Arctic states on this issue" [3, at 4s]. Even the Arctic states themselves have differing views regarding the issue.

Part IX consists of two articles: Article 122 defines the concept of enclosed or semi-enclosed seas, and Article 123 provides for specific legal regimes for such seas. An analysis of the intent underlying these provisions leads to the conclusion that it is difficult to apply them to the CAO or the Arctic Ocean as a whole. Although this ocean is "surrounded by two or more States," it is a stretch to assert that the Arctic Ocean "is connected to another sea or the ocean by a narrow outlet," given the fact that the Norwegian Sea and the Greenland Sea connecting the Arctic Ocean and the North Atlantic are not "narrow outlets." The relevance to

the Arctic Ocean of another criterion regarding enclosed or semienclosed seas is also debatable: "consisting entirely or primarily of the territorial seas or exclusive economic zones of two or more states." Although the high seas portion of the Arctic Ocean is not legally static, it will continue to encompass a sizable fraction of this ocean (about 2.8 million  $k^2$ ). So the Arctic Ocean does not seem to consist either "entirely" or "primarily" of the territorial seas or exclusive economic zones" of the five Arctic coastal states.

According to Article 123, states bordering such an enclosed or semienclosed sea "should cooperate with each other in the exercise of their rights and in the performance of their duties" under UNCLOS. In fact, the Arctic coastal states already cooperate with each other in areas including the management and conservation of marine living resources, the protection of the marine environment, and scientific research,

especially in the Barents and the Bering Sea regions. <sup>13</sup> They also cooperate "in furtherance" of these rules with "other interested States or international organizations." If the CAO or the Arctic Ocean as a whole qualifies for the status of a semi-enclosed sea, the five Arctic coastal states according to Article 123 of UNCLOS may invite "other interested States" (or international organizations) to cooperate with them or not "as appropriate." Significantly, the Commentary to UNCLOS takes the view that Part IX of the convention "does not grant additional rights" to states bordering enclosed or semi-enclosed seas [6]; 345). Under the circumstances, a clearcut resolution of the question regarding the applicability of Articles 122 and 123 to the CAO might not make much difference in practice.

#### 2.3. Regional international agreements applicable to the CAO

A more important question for purposes of this analysis is whether regional agreements concluded by the Arctic coastal states simply "mirror" UNCLOS and other universal agreements applicable to the Arctic or add substantially to the Arctic Ocean governance complex.

Although the term "regional arrangements" is used in the UN Charter (the Charter being, according to Article 103, the most important source of international Law), this term is not defined in the Charter. <sup>14</sup> It is implied that "regional" simply means "non-universal," and the prevailing view today "seems to be a pragmatic one, in the sense that some geographical element is required." Thus, the 1959 Antarctic Treaty "meets all criteria" of a regional agreement [7 at Vol. 1, 1448–1449].

Table 2 includes the key regional agreements applicable to the CAO, beginning with the 1920 *Treaty Concerning the Archipelago of Spitsbergen*, since the outer limit of the 200-mile EEZ to the North of the Svalbard Archipelago (from the baselines along the coasts of the islands as drawn by Norway in 2001) forms a part of the CAO's boundary.

Another regional arrangement, the 1973 Agreement on the Conservation of Polar Bears, constitutes the first legally binding instrument concluded by the five Arctic coastal States among themselves. Although the United States has not completed internal procedures to accept the 1973 Agreement as legally binding, it accepts the agreement as customary law. No non-Arctic State is a party to this Agreement. Nor has any non-Arctic state contested the adoption of measures to conserve polar bears not only within areas under the jurisdiction of the Arctic 5 but also beyond their jurisdiction in the high seas. According to the 1973 Agreement, the governments of the member states have recognized "the special responsibilities and special interests of the States of the Arctic Region in relation to the protection of the fauna and flora" of the whole Arctic region (including the CAO). Both the Arctic states and the non-Arctic States have an interest in protecting polar bears in the agreement area within the formal jurisdiction of the Arctic 5 and beyond encompassing the entire range of polar bears.

The eight Arctic states have concluded three legally binding regional arrangements developed under the auspices of the Arctic Council – the 2011 Agreement on Cooperation on Aeronautical and Maritime Search and Rescue in the Arctic; the 2013 Agreement on Cooperation on Marine Oil Pollution Preparedness and Response in the Arctic, and the 2017 Agreement on Enhancing International Arctic Scientific Cooperation.

The 2011 and 2013 Agreements apply to the whole Arctic Ocean. According to the 2011 agreement, the term "aeronautical and maritime search and rescue regions" includes the CAO, and each Party to the agreement is under an obligation "to promote the establishment, operation and maintenance of an adequate and effective search and rescue capability" within its relevant area (Article 3). The 2013 Agreement is applicable with respect of oil pollution incidents that occur in (or may pose a threat to) any marine area over which a Party "exercises

**Table 2**Regional treaties and other arrangements applicable to the CAO.

		Norway	Russia	Denmark	USA	Canada
1	Treaty concerning the Archipelago of Spitsbergen, signed at Paris, February 9, 1920	+	+	+	+	+
2	Agreement on the Conservation of Polar Bears, 1973	+	+	+	-	+
3	Declaration on the Establishment of the Arctic Council, 1996	+	+	+	+	+
4	Ilulissat Declaration, Arctic Ocean Conference, 2008	+	+	+	+	+
5	Agreement on Cooperation on Aeronautical and Maritime Search and Rescue in the Arctic, 2011	+	+	+	+	+
6	Agreement on Cooperation on Marine Oil Pollution, Preparedness and Response in the Arctic, 2013	+	+	+	+	+
7	Agreement on Enhancing International Arctic Scientific Cooperation, 2017	+	+	+	+	+
8	Agreement to Prevent Unregulated High Seas Fisheries in the Central Arctic Ocean, 2018	- (*)	+	- (*)	+	+

<sup>(\*) -</sup> signed but not ratified.

sovereignty, sovereign rights or jurisdiction." The Agreement specifies only the southern limits of its area of application, which differ for each Party. For example, for Norway the southern limit is the Arctic Circle; for Russia and USA the baselines lie along their arctic coasts. As for the northern limits of the scope of its application, the 2013 Agreement certainly applies to those parts of the sea-bed within the CAO which lie within the jurisdiction of the coastal states. None of the Arctic coastal states has limited its continental shelf in the Arctic Ocean to 200 miles. When all issues relating to delimitation are resolved, most of the seabed of the CAO will lie within the jurisdiction of the coastal states.

The CAO lies beyond the geographic areas identified by the Parties to the 2017 Agreement and described in Annex 1 to the agreement. In addition to the obligation of the Parties to "facilitate access" to national civilian research infrastructure and facilities and logistical services for the conduct of scientific activities in identified geographic areas, however, the science agreement includes other rights and obligations of the Parties of a general character. For example, Article 1 calls on the signatories "to enhance cooperation in scientific activities in order to increase effectiveness and efficiency in the development of scientific knowledge about the Arctic." This provision is certainly applicable to research taking place in the CAO.

The fact that only Arctic States are parties to the 2011, 2013, and 2017 regional agreements raises several questions. Is another option for Arctic governance available? Would it be reasonable to have Protocols to these Agreements (or some similar legal mechanisms) that provide an opportunity for non-arctic States to be bound by such agreements by accession? At this juncture, there is no such legal possibility within the context of these Agreements and the meaning of Article 15 of the 1969 *Vienna Convention on the Law of Treaties* pertaining to "Consent to be bound by a treaty expressed by accession."

It is undeniable that in recent years, the Arctic states have highlighted cooperation at the regional level as the most effective approach

 $<sup>^{13}\,</sup>$  [21]. See, for example, Tablesa 1.2 and 1.3.

<sup>&</sup>lt;sup>14</sup> The term "regional" was not defined in the Covenant of the League of Nations, though it was also used in it (Art. 21).

to environmental protection in the Arctic. Since the establishment of the Arctic Council in 1996, the role of regional mechanisms in solving Arctic problems has increased steadily with a number of non-Arctic states becoming active in this effort as Arctic Council Observers. <sup>15</sup> Following the adoption of the *Ilulissat Declaration* in 2008, the five Arctic coastal States also have taken the initiative on several occasions in addressing Arctic maritime issues (see Section 3 *infra*). <sup>16</sup>

Even Canada and Russia, which had resisted this understanding during the Cold War, now recognize the waters of the Central Arctic Ocean as high seas. This makes these waters an unambiguous area of common interests for both Arctic and non-Arctic States. Still, there are fundamental differences between waters to the north of the Arctic Circle that are ice-covered for much of the year and the ice-free waters of the high seas portions of other oceans. The effort of the Arctic 5 to confirm the existence of a broad legal framework for the Arctic Ocean also suggests that there is a need for a balanced approach to Arctic Ocean governance. Universal agreements are important. But a number of legal documents and research papers draw attention to the fact that strengthening the regional elements of this governance complex can provide a "safety net" and contribute to "clever governance" in the Arctic Ocean

It is notable also that the Arctic coastal States themselves do not assume that the regional framework of the Arctic Council is directly relevant to the CAO. The 1996 Declaration on the Establishment of the Arctic Council notes the general commitment of the member states to "the well-being of the inhabitants of the Arctic" and "the protection of the Arctic environment, including the health of Arctic ecosystems, maintenance of biodiversity in the Arctic region and conservation and sustainable use of natural resources." The Declaration stipulates that one of the purposes of the Arctic Council is to provide "a means for promoting cooperation, coordination and interaction among the Arctic states, with the involvement of the indigenous communities and other Arctic inhabitants on common Arctic issues, in particular issues of sustainable development and environmental protection in the Arctic." But the member states have not established the Arctic Council as a formal intergovernmental organization with the competence to handle issues relating to the CAO and first and foremost to the prevention of unregulated fishing in the area.

Both the biophysical and the legal features of the Arctic Ocean make it impossible for non-Arctic states and their nationals to engage safely in shipping, fishing, or other economic activities in the CAO absent the support of at least one of the Arctic coastal states willing to provide access to its coastal infrastructure, communication and navigational facilities, and its ability to handle extreme situations, including search and rescue and the treatment of the consequences of marine pollution. It is impossible to transit the Arctic Ocean from Asia to Europe or vice versa without crossing areas under the sovereignty and jurisdiction of at least two of the five Arctic coastal states. In these areas, including the EEZs of coastal states, vessels must comply with the applicable legal standards of a relevant Arctic coastal state. While the Polar Code adopted by the International Maritime Organization and applicable to commercial shipping (legally in force from 1 January 2017) amends MARPOL and SOLAS, the legal literature indicates that the code does not impose any restrictions on the rules of UNCLOS, including those directly relevant to Arctic waters. Under UNCLOS Article 234 entitled "Ice-covered areas," the Arctic coastal States can impose environmental standards within their EEZs that are more stringent than the standards prescribed by universal or regional instruments, so long as they are non-discriminatory in nature and based "on the best available scientific evidence."

#### 3. The development of the 2018 CAO Fisheries Agreement

UNCLOS strengthens the emphasis on conservation of living resources of the high seas. Article 116 provides that "All states have the right for their nationals to engage in fishing on the high seas subject to: (a) their treaty obligations; (b) the rights and duties as well as the interests of coastal States." Engaging in high seas fishing is legitimate only when subject to appropriate regulation [8,9]. As early as 1974, the International Court of Justice (ICJ), which the UN Charter describes as "the principal judicial organ of the United Nations," noted that "[i]t is one of the advances in maritime international law, resulting from the intensification of fishing, that the former laissez-faire treatment of the living resources of the sea in the high seas has been replaced by a recognition of a duty to have due regard to the rights of other states and the needs of conservation for the benefit of all."17 It is important to exercise caution in applying general rules on freedom of fishing to specific cases like the CAO. Still, at a time when many of the world's fish stocks are depleted, it is clear that all states have an obligation to prohibit or restrict unregulated fishing in areas of the high seas, including the CAO.

On 20 August 2009, the United States government announced a moratorium on fishing in the waters of the Beaufort Sea north of Alaska. Alaska's US Senators wrote a letter on 20 May 2011 to the Secretary of State supporting this initiative and proposing to extend it through the negotiation of an international agreement "consistent with existing international law and policy." The Senators also stated that it "is our firm belief that securing such an agreement should be a top priority for the United States as it implements its Arctic policy. The waters north of the U.S. and Russian EEZs are experiencing significant loss of multi-year sea ice. Much of this area is of fishable depth, the waters are open for several months each year now, and research is being conducted in these waters by non-coastal states already. Exploratory fishing may not be far behind. As a first step, we believe now is the time to secure an international agreement that prevents commercial fishing in these international waters." In 2012, two thousand scientists from several countries signed an "open letter" to urge governments to prevent a potential ecological catastrophe in the CAO by applying the precautionary principle and developing legal rules relating specifically to fishing in the CAO.

The precautionary principle calls on nations to take preventive measures whenever an action may cause damage to ecosystems, even when there is no conclusive evidence of a causal relationship between the action and its alleged effects. Simply put, the legal obligations embedded in the precautionary principle specify that relevant states should not use the lack of scientific certainty as a reason for postponing measures to prevent environmental degradation. The practical application of this principle to the CAO has been the focus of a number of scientific and diplomatic workshops. These meetings concluded that it is technically impossible at present to engage in the comprehensive research on the marine ecosystems of the Arctic Ocean required to collect solid data on the status of fish stocks in the remote and sometimes dangerous areas of the high seas surrounding the North Pole. But they produced consensus on the need to prevent unregulated fishing in the CAO

Soft-law sources of international environmental law, including UN General Assembly Resolutions, provide additional support for the efforts to prevent degradation of nature. As early as 1982, the UN General Assembly "expressed its awareness of the crucial importance attached by

<sup>&</sup>lt;sup>15</sup> Member states of the Arctic Council are Canada, Denmark (Greenland), Finland, Iceland, Norway, Sweden, Russia and USA.

<sup>&</sup>lt;sup>16</sup> Earlier, the five Arctic coastal States negotiated and concluded in 1973 the Agreement on the Conservation of Polar Bears, which is now applicable both to the CAO and to the EEZs of the Arctic coastal States.

 $<sup>^{17}</sup>$  Fisheries Jurisdiction (United Kingdom v. Iceland), Merits, Judgment. ICJ Reports. 1974, 31 (para. 72 of the Judgment).

<sup>&</sup>lt;sup>18</sup> The literature on the precautionary principle is bulky. But see Refs. [22,23].

<sup>&</sup>lt;sup>19</sup> For a good example see International Seminar, "Opportunities for Cooperation in Environmental Protection, Conservation and Rational Management of Biological Resources in the Arctic Ocean," Russian International Affairs Council, Working Paper №1. 2013. Moscow. Ed. I.S. Ivanov.

the international community to the promotion and development of cooperation aimed at protecting and safeguarding the balance and quality of nature" [10 at 8]. The *World Charter for Nature*, adopted by the UN General Assembly at that time in Resolution 37/7 provides, *inter alia*, that it is necessary to "fully recognize the urgency of maintaining the stability and quality of nature and of conserving natural resources" and that "lasting benefits from nature depend upon the maintenance of essential ecological processes and life support systems, and upon the diversity of life forms." The Charter declares further that "competition for scarce resources creates conflicts, whereas the conservation of nature and natural resources contributes to justice and the maintenance of peace [10 at 9]. It goes on to stipulate that the principles set forth in this Charter "shall be reflected in the law and practice of each state, as well as at the international level" [10 at 11].

Of particular importance to the treatment of the CAO is the 1995 Agreement for the implementation of the provisions of the United Nations Convention on the Law of the Sea relating to the conservation and management of straddling fish stocks and highly migratory fish stocks (the 1995 Agreement).<sup>20</sup> This agreement specifies that "states shall apply the precautionary approach widely" (Article 6) as a duty rather than as an optional measure. Article 6 further provides that "States shall be more cautious when information is uncertain, unreliable or inadequate. The absence of adequate scientific information shall not be used as a reason for postponing or failing to take conservation and management measures." Building on UNCLOS, the 1995 Agreement consolidates the general legal regime for the preservation of marine living resources occurring in the EEZs and in neighboring areas of the high seas. To this end, the 1995 Agreement provides for: (a) creation of general obligations for third states to preserve marine living resources, in particular, by making legally binding the specific conservation measures adopted by the parties to regional agreements for any state that is not a participant thereto but intends to fish for stocks regulated by such regional agreements; (b) establishment of internationally coordinated rules concerning the application of national measures relating to the preservation of natural resources; (c) determination of the concrete legal meaning of the precautionary principle as applied to specific marine areas, and (d) an emphasis on the preservation of marine ecosystems. Thus, the 1995 Agreement encourages states to develop cooperation based on regional arrangements regarding marine living resources (Articles 9-13).

Pursuant to these developments, an authorized representative of the United States and the head of the Federal Fisheries Agency of the Russian Federation signed a *Joint Statement on enhancing bilateral cooperation in fisheries* on 29 April 2013. The CAO was one object of this American-Russian Joint Statement. The main idea of this document is that unregulated fishing in the CAO should not be allowed to undermine conservation and management measures adopted by the Arctic 5 and applicable to their EEZs in the Arctic.

A cautionary precedent in this realm involves the experience of the Bering Sea high seas enclave (the *Donut Hole*). Russia and the United States took the lead in the creation of a multilateral arrangement in 1994 aimed at stopping the depletion of the biological resources in this area. In the years preceding the agreement, ~35% of the total Bering Sea catch of pollock came from the Donut Hole, an area encompassing less than 8% of the Bering Sea. Unfortunately, by the time the parties agreed to the 1994 *Convention on the Conservation and Management of the Pollock Resources in the Central Bering Sea*, the stocks were severely depleted [11 at 9–33 and 224–232].

Following the bilateral initiative of Russia and the United States regarding the CAO, the four States with the most efficient fishing

capacity in the high seas of the world ocean and an expressed interest in Arctic waters (China, Iceland, Japan, and South Korea) together with the European Union affirmed their acceptance of the precautionary principle as an approach to preserving the marine living resources of the CAO. The fact that the United States is not a party to UNCLOS did not constitute an obstacle to the creation of a legal regime for the CAO, since all the Arctic states, including the United States, accept the provisions of UNCLOS relating to sea waters and marine living resources as customary international law.

The novelty of the CAOFA is that it aims to "prevent the fire" rather than to "extinguish the fire," an innovation of great significance from the perspective of governance. In high seas enclaves, the coastal states and other interested states generally resolve conservation issues using one of several legal models: (a) a bilateral treaty between a coastal state and another interested state (e.g. the experience of New Zealand) or (b) a multilateral treaty through the efforts, first of all, of the coastal states (e. g. the experience of the USSR/Russia and the USA in the Bering Sea enclave). These experiences reveal some general elements of the legal settlement of the conflicting interests of coastal states and distant-water fishing states in these areas. It is generally accepted, expressis verbis, that the water column in these enclaves has high seas status. Fishing for resources in an enclave not subject to regulation is generally considered contrary to contemporary international law. An initial moratorium on fishing in such an area is considered a rational measure. There is a tendency in contemporary marine policy and the law of the sea to combine ecosystem-based management and the precautionary approach [12 at 83–134].

The development of the text of the CAOFA took place in distinct stages. During the first stage culminating on 16 July 2015, the five Arctic coastal States collaborated on the development of a *Declaration Concerning the Prevention of Unregulated High Seas Fishing in the Central Arctic Ocean.* <sup>21</sup> Basing their initiative on the 2008 Ilulissat Declaration, the Arctic 5 proceeded to devise "interim measures to prevent unregulated fishing in the high seas portion of the central Arctic Ocean." Notable in this context are the facts that the declaration did not take the form of a legally binding instrument and that its provisions are applicable only to the Arctic coastal States and to those operating under their jurisdiction. Nevertheless, others pushed back vigorously against this initiative on the part of the coastal States. Iceland, a member of the Arctic Council that aspires to the status of an Arctic coastal State, took the lead in voicing opposition to this five-state format of CAO governance.

The Arctic coastal States were responsive to these expressions of concern. In the 2015 Declaration itself, the Arctic 5 "acknowledge the interest of other States in preventing unregulated high seas fisheries in the central Arctic Ocean and look forward to working with them in a broader process to develop measures consistent with this Declaration that would include commitments by all interested parties." This paved the way for the start of the 5+5 negotiations, the second stage of the process leading by the end of November 2017 to consensus on the principal provisions to be included in the future CAOFA. The participants in these negotiations included both the Arctic coastal States and most others likely to have both the interest and the capacity to engage in any future fisheries in the CAO. Article 8 of the 2018 Agreement dealing with non-parties, also provides inter alia that the "Parties shall encourage non-parties to this Agreement to take measures that are consistent with the provisions of this Agreement." Efforts to refine the text continued until the formal signing of the agreement of 3 October 2018 as an international legally binding instrument.

#### 4. Interpreting the 2018 CAO Fisheries Agreement

The text of the agreement signed on 3 October 2018 includes

<sup>&</sup>lt;sup>20</sup> As provided in the Ilulissat Declaration adopted by the Arctic coastal States on 28 May 2008, "an extensive international legal framework applies to the Arctic Ocean." This framework with relevant tables of international agreements is considered in a number of publications (e.g. Refs. [9,14,24].

<sup>&</sup>lt;sup>21</sup> URL: www.regjeringen.no/globalassets/departmentene/ud/vedlegg/folke rett/declaration-on-arctic-fisheries-16-july-2015.pdf.

provisions not only intended to prohibit unregulated fishing in the CAO but also to establish a research program to evaluate the potential for commercial fisheries in the area in the future, authorize exploratory fishing on the part of the signatories to the agreement, and require a meeting of the Parties to evaluate new information regarding the potential for commercial fishing in the CAO at least every two years. The Agreement thus provides a reasonable basis for expecting the initial practice of the Arctic States to develop toward a broader marine governance system emphasizing preservation and protection of the Arctic environment and marine resources, including issues of search and rescue, emergency response, and avoidance of oil spills.

The preamble of the CAO Fisheries Agreement recognizes "the special responsibilities and special interests of the central Arctic Ocean coastal states in relation to the conservation and sustainable management of fish stocks in the central Arctic Ocean." This special status of the "central Arctic Ocean coastal states" seems more limited than their special status according to the 1973 Polar Bear Agreement which applies not only to the CAO but also to the whole "Arctic Region."

Since the 2018 Agreement refers to the 2015 Declaration, there is no doubt that the term "Arctic Ocean coastal States" means Canada, the Kingdom of Denmark (in respect of Greenland), the Kingdom of Norway, the Russian Federation, and the United States of America. While there is room for discussion whether Iceland is an Arctic coastal State or has jurisdiction extending only to the northern part of the Atlantic Ocean, there is no doubt that the Central Arctic Ocean is totally enclosed by the EEZs of the five Arctic coastal States listed in the 2008 Ilulissat Declaration and the 2015 Declaration.

According to Article 1 of the 2018 Agreement, the term "Agreement Area" means "the single high seas portion of the central Arctic Ocean that is surrounded by waters within which Canada, the Kingdom of Denmark (in respect of Greenland), the Kingdom of Norway, the Russian Federation, and the United States of America exercise fisheries jurisdiction" (see Map 1). This is the same wording used to define the Central Arctic Ocean in the 2015 Declaration. The agreement is not applicable to other high seas enclaves in the Arctic Ocean, such as the Donut Hole in the Bering Sea or the Loop Hole in the Barents Sea. The objective of the 2018 Agreement is to prevent unregulated fishing in the high seas portion of the Arctic Ocean through application of precautionary conservation measures as part of a long-term strategy to safeguard healthy marine ecosystems and to ensure the conservation and sustainable use of fish stocks in Arctic waters. The 2018 Agreement does not exclude the possibility of future arrangements among the Parties, including those providing for regulated fishing in the Agreement Area when there are sufficient data on the state of the stocks to make informed decisions. But unregulated fishing in the CAO is legally prevented by joint mechanisms administered by the Parties. As Article 1 of the CAOFA makes clear, sedentary species, being resources of the continental shelf as defined in Article 77 of UNCLOS, are not covered by the agreement.

Interim conservation and management measures are listed in Article 3 of the Agreement, beginning with the obligation of each Party to fulfill one of two alternative preconditions before authorizing vessels entitled to fly its flag to conduct commercial fishing in the Agreement Area: (a) regional or sub-regional fisheries management organizations or arrangements are established for this area and such organizations adopt relevant conservation and management measures or (b) interim conservation and management measures are established by the Parties themselves.

The 2018 Agreement creates an obligation for both "coastal state Parties" and "other Parties" to cooperate "to ensure the compatibility of conservation and management measures for fish stocks that occur in areas both within and beyond national jurisdiction in the Arctic Ocean in order to ensure conservation and management of those stocks in their entirety." Similar wording, though without reference to a specific ocean, is included in Article 7 of the 1995 UN Straddling Stocks Agreement.

Article 4 of the 2018 Agreement, providing for a Joint Program of Scientific Research and Monitoring, is to be interpreted in conjunction

not only with Part XIII of UNCLOS on Marine Scientific Research but also with the 2017 international legally binding instrument entitled *Agreement on Enhancing International Arctic Scientific Cooperation* [13]. Relying on relevant scientific information derived from the Joint Program of Scientific Research and Monitoring, from national scientific programs, and from other relevant sources and taking into account pertinent fisheries management and ecosystem considerations, the Parties shall consider whether to (a) commence negotiations to establish one or more additional regional or sub-regional fisheries management organizations or arrangements for managing fishing in the Agreement Area and (b) establish additional or different interim conservation and management measures in respect of those stocks in the Agreement Area. In addition, Article 5d of the agreement obligates the Parties to establish conservation and management measures for exploratory fishing in the Agreement Area within three years after the entry into force of the agreement.

As specified in Article 13, "the Agreement is regarded by the Parties as a long term instrument of their environmental arctic policy: it shall remain in force for an initial period of 16 years following its entry into force." Subsequently, the Agreement will remain in force for "successive five-year extension period(s)," unless any Party objects to the extension at the last meeting of the Parties or six months prior to "the expiration of the respective period."

According to Article 11, the CAOFA will enter into force 30 days after the date of receipt by the depositary "of all instruments" of ratification, acceptance, or approval of, or accession to, this Agreement from the signatories. If any one of the ten Parties fails to provide the relevant instrument to the depository, the agreement will not enter into force at all. Once the agreement is in force, Article 10 allows the Parties to "invite other States with a real interest to accede to this Agreement."

A number of the parties including Canada, the depository for the CAOFA, have ratified the agreement or expressed their consent to be bound by the agreement in other forms. At this writing (April 2020), eight of the ten signatories, including the European Union (EU), have taken the requisite steps (see Table 3). If the CAOFA enters into force, it will be binding not only for the 9 States that are signatories but also for the 27 States that are members of the EU. As noted in the EU Council Decision of 4 March 2019 "on the conclusion, on behalf of the European Union, of the Agreement to Prevent Unregulated High Seas Fisheries in the Central Arctic Ocean," the EU has authority to be a party to the 2018 Agreement by virtue of the fact that the EU "is exclusively competent, under the Common Fisheries Policy, to adopt measures for conservation of marine biological resources and to enter into agreements with third countries and international organizations in this respect." 22

Although most observers are optimistic about its prospects, we cannot predict with confidence when the CAOFA will enter into force. Even without entering into force, however, the agreement will have consequences. According to Article 18(a) of the 1969 *Vienna Convention* 

**Table 3**Agreement to Prevent Unregulated High Seas Fisheries in the Central Arctic Ocean, 2018: status of ratifications (as of 21.04.2020).

1)Arctic cod	ıstal States			
Canada	Denmark	Norway	Russian Federation	USA
+	_1	+	+	+
2) Other Ar	ctic States: Iceland			
-				
3) Non-arct	ic States			
China	Japan	Sout		
-	+	+		
EU				
+				

 $<sup>^{\</sup>rm 1}$  - positive ratification passed the 1st hearing in the Danish Parliament.

 $<sup>^{22}\,</sup>$  Official Journal of the European Union. 15.3.2019. p. L73/1.

on the Law of Treaties, "a State is obliged to refrain from acts which would defeat the object and purpose of a treaty," when it "has signed the treaty" "subject to ratification, acceptance or approval, until it shall have made its intention clear not to become a party to the treaty." No signatory to the CAOFA has expressed such an intention.

Should the Agreement fail to enter into force during the near future, what consequences can we expect? *De facto,* the consequences of such a development might turn out to be relatively limited. Many fisheries scientists believe it is unlikely that commercially significant fish stocks will appear in the CAO during the foreseeable future. Moreover, because it would be difficult for fishing vessels from non-coastal states to operate in the CAO without the support of at least one of the coastal States, the issue of governing fishing activities in the CAO in this case might fade into the background.

In the event that the development of significant stocks made further measures seem desirable, on the other hand, the coastal states might fall back on their July 2015 Declaration regarding fishing in the CAO and proceed to activate procedures for scientific research and monitoring under the terms of this arrangement. In the likely event that no non-Arctic state were to oppose this initiative, the result would be a regime put in place by the coastal States, perhaps with the informal consent of the non-Arctic signatories that did ratify the CAOFA. Such a regime would look much like the arrangement envisioned under the CAO Fisheries Agreement in substance.

In the event that the CAOFA does enter into force, there will remain the issue of stimulating the Parties to fulfill all their obligations under the 2018 agreement in good faith and monitor the actions of their nationals effectively. Each Arctic coastal State reserves the right to regulate or even prohibit fishing in the Arctic Ocean within its 200-mile EEZ as well as the right to provide other interested states access to any surplus of the allowable catch in such areas in accordance with Article 62 of UNCLOS. The Arctic coastal States have confirmed their commitment to cooperate with each other and with relevant non-Arctic States for the purpose of conserving fisheries resources of the CAO and preventing unregulated fishing in the CAO. The acceptance of several non-Arctic states and the European Union as Parties with equal status in the CAO Fisheries Agreement is already a significant political and legal innovation.

## 5. Conclusion: Future options for the CAO and the Arctic Ocean governance complex

A commitment to legal and political stability and to wise stewardship lies at the heart of the emerging international response to the environmental state-change now occurring in the Arctic Ocean [14 at xix-xxv]. The prevailing view of experts is that the Arctic Ocean can and should be insulated from recent geopolitical disagreements and conflicts occurring elsewhere [15]. Shared interests among Arctic and non-Arctic States in ensuring environmental security in the Arctic, including protection of biodiversity in the Arctic seas, should prevail. The application of the precautionary approach to governing increasing activity in the CAO reflects this thinking.

Under the circumstances, one of the options to consider now is the preparation of additional measures applicable to the CAO and potentially to other parts of the Arctic Ocean. Universal conventions, including those administered by the International Maritime Organization and the Convention on Biological Diversity (CBD) in addition to UNCLOS, provide options for more stringent ecological regulation on a regional basis by coastal and other interested states. Thus, it would be possible to consider designating areas within the CAO and beyond as Particularly Sensitive Sea Areas under IMO PSSA Guidelines, Ecologically and Biologically Significant Areas under the CBD, or protected areas under other relevant instruments of international law. In this

context, recent experience regarding efforts to create marine protected areas in portions of the high seas around Antarctica may provide insights of value to those concerned with the future of the CAO. <sup>23</sup> Eventually, the entire CAO or sizable parts of it might be included within a special regime of preservation and protection of the marine environment. The Arctic States again might take the lead in this regard.

In the event that Trans-Polar Routes become a viable option for commercial shipping, additional regulatory measures may be deemed necessary [16]. The Polar Code is already applicable to this area. But there are a variety of concerns involving issues not covered by the code in its current form, which would be particularly important in conjunction with transpolar shipping. These include the combustion and carriage of heavy fuel oils, the production of black carbon, possible ship strikes on marine mammals, the impacts of underwater noise, and the consequences of ship tracks in sea ice. Some of these concerns are already emerging as prominent issues on the agenda of the International Maritime Organization.

A longer-term option would be to fold the Arctic Ocean governance complex, including the CAOFA, into more comprehensive arrangements designed to conserve marine biological diversity and ensure sustainable use of marine resources. Such an initiative could proceed in conjunction with the ongoing effort under the auspices of the United Nations to devise a universal International Legally Binding Instrument for the Conservation and Sustainable Use of Marine Biodiversity in Areas Beyond National Jurisdiction. A useful step in this regard, would be the initiation of an appropriate intergovernmental scientific organization, an Arctic International Council for the Exploration of the Sea, with a mandate to provide knowledge needed for informed and coordinated decisionmaking regarding the full suite of human activities affecting the Arctic Ocean. In this regard the Arctic States could rely on the experience of establishing and administering the International Council for the Exploration of the Sea for the North Atlantic and it North Pacific counterpart, the Pacific International Council for the Exploration of the Sea. Participation on the part of both Arctic and interested non-Arctic states in this arrangement would be desirable.

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 $<sup>^{23}</sup>$  The Ross Sea Marine Protected Area encompasses 1.5 million  $k^2$  [25].

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