

Faculty of Law

Managing And Conserving Living Resources In Warming Waters: How To Adapt Fisheries Management To Impacts Of Climate Change

The adaptability of the fisheries management regime of the Arctic and sub-Arctic regions to the key legal challenges triggered by climate change

Eduard González Gonzalvo

Master's thesis in Joint Nordic Master's Programme in Environmental Law. JUR-3920-1 23V Master's thesis.
May 2023



Abstract

Climate change effects in the oceans are changing the marine environment and its ecosystems. These changes are impacting, and will continue to do so, the fish populations in unpredictable ways. One of the regions that is and will be more affected by the impacts on climate change on fish populations, and therefore fisheries, is the Arctic region. Fisheries is one of the key components of local and regional communities, and even states, in the Arctic region. The objective of this study is to see if the fisheries regime of the Arctic marine area is sufficiently adaptive to tackle these impacts on the marine living resources of the area. To accomplish this objective, the first thing to do will be a systematic description of the fisheries regime of the Arctic marine area, composed primarily by UNCLOS, the UNFSA and the CAOFA Agreement. Then, the key legal challenges to the Arctic and sub-Arctic regions fisheries management regime triggered by climate change are going to be identified, mainly the changes in fish production, growth, distribution and migration patterns and the “gap” of the regime in the high seas of the Central Arctic Ocean. Lastly, the adaptation mechanisms of this regime will be studied to see if these are enough to tackle this problem. Particular attention is paid to UNCLOS’ rules of references, the UNFSA’s concept of “real interest”, and CAOFA Agreements’ introduction as a central piece of the precautionary principle.

Table of contents

1. Introduction	5
1.1. Background.....	5
1.2. Purpose and Research Question	6
1.3. Methodology.....	6
1.4. Scope and Limitations	8
1.5. Structure.....	9
2. The fisheries management regime of the Arctic and sub-Arctic regions	11
2.1. Introduction	11
2.2. UNCLOS	13
2.3. UNFSA	19
2.4. Relevant RFMOs and agreements	23
2.5. Other relevant instruments.....	29
3. The key legal challenges triggered by climate change	31
3.1. Introduction	31
3.2. The effects of climate change in the oceans	31
3.3. The key legal challenges triggered by the effects of climate change in the oceans	37
4. The adaptability of the Arctic fisheries regime to the key legal challenges triggered by climate change	42
4.1. Introduction	42
4.2. Adaptability of UNCLOS and UNFSA	43
4.3. The role of RFMOs and the CAOFA Agreement.....	51
5. Conclusion	55
6. References	56
6.1. Literature	56

6.2. Legislation, treaties, and conventions.....	58
6.3. Case law.....	60

1. Introduction

1.1. Background

Climate change will alter the supply quantity, quality, and distribution of fish stocks.¹ This is just one of the challenges that the international fisheries management will face due to the impacts of climate change in our oceans. In the Arctic region, which plays a key role in the Earth's climate and environment system, temperatures are raising almost twice as fast, and the sea ice is melting much faster than expected.² This will lead to expanding fisheries in the Arctic, such as local species going further north and foreign species moving to northern areas.³

This expansion of fish stock to the north, as it has been studied, will leave “winners” and “losers”⁴ when it comes to the availability of marine living resources between different communities. If we add this to the increasing global population, this migration of food supplies to the north could be accompanied by communities and populations migrations to the north as well to exploit the new resources available in the Arctic region and could lead to the over-exploitation and deterioration of the Arctic marine environment.⁵

The effect of moving stocks challenges one of the foundations of the international law of the sea regime for managing living resources established in the United Nations Convention of the Law of the Sea⁶ (UNCLOS), which takes both a species-based approach and a zonal based approach consisting in maritime zones under the jurisdiction of the coastal state and areas beyond national jurisdiction (ABJN).⁷

The change in quantity, quality and distribution of fish stock will be greater for the Arctic and sub-Arctic fisheries regime, gaining fishing activity due to the new opportunities created under these new circumstances. Furthermore, the Central Arctic Ocean area is governed by the Agreement to Prevent Unregulated High Seas Fisheries in

¹ (Sumalia, 2016).

² (Tedsen, Cavalieri, & Kraemer, 2014).

³ (Molenaar, Climate Change and Arctic Fisheries, 2009).

⁴ (Molenaar, Integrating Climate Change in International Fisheries Law, 2020)

⁵ (Mendenhall & et al, 2020)

⁶ United Nations Convention on the Law of The Sea (adopted in December 1982, in force 16 November 1994).

⁷ (Molenaar, Climate Change and Arctic Fisheries, 2009).

the Central Arctic Ocean ⁸ (2008) (CAOF Agreement) only allows to authorize vessels to realize commercial fishing activities to pursue specific conservation and management measures for the sustainable management of fish stocks adopted by RFMOs or for research and scientific purposes.⁹

1.2. Purpose and Research Question

The purpose of this master's thesis is to reflect upon the capacity of the regime of the Arctic and sub-Arctic regions to adapt to the key legal challenges caused by climate change. The overarching research question is *“Is the fisheries management regime of the Arctic and sub-Arctic regions sufficiently adaptive to key legal challenges triggered by climate change?”*

The following sub-questions need to be answered to achieve a satisfying answer to the overarching research question. The first sub-question will be *“what is the fisheries management regime of the Arctic and sub-Arctic regions?”*. The second sub-question asked will be *What challenges for this regime are triggered by climate change, and how do these pose legal challenges?”*. After that, there will be a need to ask, *“what does adaptation to these challenges mean and to what extent is this regime adaptive?”*. The last question, to summarize and draw some conclusion, will be *“has the regime proven to be adaptive enough to the key legal challenges identified?”*.

1.3. Methodology

Due to the nature of our topic and how the research question is formulated, the objective is to describe the existing international law for the fisheries management regime in the Arctic and sub-Arctic regions in a systematized way to find potential gaps in the context of changing circumstances that is climate change. This exercise is within the realm of the doctrinal legal research, described by Jan M. Smits as follows:¹⁰

“(…) research that aims to give a systematic exposition of the principles, rules and concepts governing a particular legal field or institution and analyses the relationship between these principles, rules and concepts with a view to solving unclarities and gaps in the existing law.”

⁸ Agreement to Prevent Unregulated High Seas Fisheries in the Central Arctic Ocean (adopted in October 2018, in force June 2021).

⁹ (Molenaar, Climate Change and Arctic Fisheries, 2009).

¹⁰ (Smits, 2015).

To simplify this definition we can say that is a systematic way to describe the various elements of certain legal field and the relationship and interactions between them.

To identify the different components of the fisheries regime of the Arctic and sub-Arctic region it will be necessary to consult the sources of international law, that are mentioned in article 38 of the Statute of the International Court of Justice¹¹ (ICJ). It is mentioned in this provision that the three main sources of international law are international conventions, international custom, and the general principles of law, with two subsidiary sources being jurisprudence and academic work. In this exercise to identify the fisheries regime of the Arctic and sub-Arctic regions it is important to not disregard the importance of soft law, because knowing that it does not venerate states and parties and creates enforceable rights and obligations, it can reflect principles of international law or custom, or even it can crystallize new customs or general principles of international law. Soft law is a relevant instrument in the development of international law and must be considered when systematically describing it.¹²

Another important factor to consider when doing the exercise of systematically describing the Arctic and sub-Arctic fisheries regime is the rules on interpretation of international law. This is important because the very purpose of treaty interpretation is to establish the meaning of the text that the parties intended the text to have in the circumstances when the question has arisen.¹³ These rules for treaty interpretation are reflected in the 1969 Vienna Convention on the Law of the Treaties¹⁴ (VCLT), in its article 31.

The objective is to know how adaptive the Arctic and sub-Arctic regions fisheries management regime to the key legal impacts due to climate change is. To see this, we must know and understand the mentioned regime, a task that fits well with the objectives of doctrinal legal research.

Entering more into detail we see that the first sub-question will define the regime of the Arctic and sub-Arctic fisheries in a systematized manner. To describe the regime, it is important to go through the sources of international law of the sea in this case one by one. After this, to know how the impacts created by climate change can pose legal challenges

¹¹ Statute of the International Court of Justice (adopted in June 1945, in force August 1965).

¹² (Roberts & Sivakumaran, 2018).

¹³ (Fitzmaurice, 2018).

¹⁴ Vienna Convention on the Law of Treaties (adopted in May 1969, in force January 1980).

to the defined regime, an auxiliary approach will be momentarily used to understand the impacts of climate change in the Arctic and sub-Arctic regions. Having defined the regime object of our study and the impacts of climate change it would be key establishing the relation between the impacts of climate change and how those impacts can pose legal challenges to the fisheries management regime of the Arctic and sub-Arctic region. For Chapter 4, regarding adaptation mechanisms the sources of international law become less relevant as the regime has been systematically described already and it will be more focused on how to understand the provisions or mechanisms that are used or can potentially or not be used for the adaptation of the regime to the legal challenges triggered by climate change.

The conclusion will serve to link the most important ideas found while working on the thesis. This exercise could help to, after all the systematic description and interpretation of the provisions, to observe if the regime is adaptive enough to face the challenge that society and its management regimes is facing regarding the marine living resources and how it's been affected by climate change.

1.4. Scope and Limitations

The geographical scope of this thesis is the Arctic and sub-Arctic regions. A definition of what it is understood as Arctic and sub-Arctic regions will be made in Chapter 2. It is general practice among academics studying fisheries in the Arctic and its legal regime to use the definition made and used in general practice by the Arctic Council, that will be the one used as reference for this master thesis as well. The choice of this area is because fishing activities could potentially increase to a large degree in this region because of new fishing stocks moving from southern regions, while local fish stock moves north as the sea ice melts.¹⁵

Regarding the spatial scope of the international fisheries management regime, and as it has been mentioned in this chapter as well, only the key legal challenges of the Arctic and sub-Arctic regions will be studied, seeing that a vast number of legal impacts that can be identified. The RFMOs studied, due to the limited space for this research, will be only the North-East Atlantic RFMOs.

Regarding the species approach of UNCLOS and the entire fisheries management regime, the focus of this master thesis will be transboundary fish stocks, straddling fish

¹⁵ (Molenaar, *Climate Change and Arctic Fisheries*, 2009).

stocks, highly migratory species. Marine mammals, sedentary species, anadromous species, and catadromous species will be mentioned during the thesis, but their special regime will be not specifically studied regarding its adaptation to the key legal challenges triggered by climate change. Each of these types of special species has its own special regime and study the adaptation capabilities of each regime seems a task rather too long for the spatial limitations that a master thesis has.

In relation to the impacts of climate change on the oceans, the impacts that these effects have on fish populations, therefore on fisheries and the key legal challenges that all this trigger to the fisheries regime, some clarifications must be made. While the effects of climate change on the oceans and its effects on fish populations will be named for its relations to fisheries, the study will not go into detail about them or their regulation. An example of this is ocean acidification. While an interesting subject for international law of the sea as it is, this thesis does not seem to be the place for a deep discussion. The same goes for the other phenomena caused by climate change affecting the oceans., such as the shifting boundaries caused by sea level rise.

Moreover, regarding the key legal challenges caused by the impacts of climate change in the Arctic marine area fisheries regime, a filter must be made. There are numerous key legal challenges due to climate change and in this study a selection by relevance has been made.

A similar exercise has been done when it comes to the adaptation mechanisms of the fisheries regime of the Arctic marine area. There are also numerous mechanisms for the adaptation of this regime and an in-deep analysis of each of them could take an amount of space that it is just not available in this master thesis. Therefore, a selection of the most relevant has been made for its study.

1.5. Structure

The structure of the thesis follows the research sub-questions of the thesis. This looks as it follows.

The first chapter systematically describes the Arctic and sub-arctic regions regime regarding international fisheries management. The second chapter identifies the key legal challenges due to the impacts of climate change. The third chapter will discuss the adaptability and the adaptability mechanisms that can be found in international law of the sea in general, to then study into detail the adaptability and the mechanisms of each level

of the fisheries regime, UNCLOS, UNFSA, RFMOs, ... The last chapter, the conclusion of the thesis, will serve to connect all the ideas and to share our view on the topic at hand.

2. The fisheries management regime of the Arctic and sub-Arctic regions

2.1. Introduction

To determine if the fisheries management regime of the Arctic and sub-Arctic region is sufficiently adaptive to the key legal challenges triggered by climate change it is important to determine first the international regime for fisheries in our ocean, determine what comprises the Arctic and sub-Arctic regions, and the make a systematic description of the fisheries management regime of the Arctic and sub-Arctic regions and its components.

The introduction of this chapter is going to mention the international treaties and bodies relevant for fisheries management and conservation. After this will follow an explanation of what it is understood to be the Arctic and sub-Arctic regions to be able to select the relevant international treaties and bodies for this research.

The international regime for fisheries management in our oceans is found in UNCLOS. The legal framework established for the management and conservation of living resources is further developed in the 1995 United Nations Fish Stocks Agreement¹⁶ (UNFSA) for straddling and highly migratory fish stocks. Regional Fisheries Management Organizations (RFMOs) are referred to, both in UNCLOS and the UNFSA, as a desired way to fulfill the duty to cooperate between parties in the conservation and management of shared fish stocks.¹⁷

Other relevant treaties and soft law instruments for the management and conservation of marine living resources are the FAO Code of Conduct for Responsible Fisheries (1995)¹⁸ and the OSPAR Convention¹⁹ creating the OSPAR Commission, which regulates the protection and the measures taken to preserve the marine environment of the North-East Atlantic.²⁰

¹⁶ The United Nations 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 (adopted in August 1995, in force December 2001).

¹⁷ (Harrison, 2017).

¹⁸ The FAO Code of Conduct for Responsible Fisheries (adopted in October 1995).

¹⁹ Convention for the Protection of the Marine Environment of the North-East Atlantic (adopted in September 1992, in force March 1998).

²⁰ (Molenaar, Climate Change and Arctic Fisheries, 2009).

As currently there is not general definition of what it is the Arctic marine area or what has been called during the thesis as “Arctic and sub-Arctic regions, the definition done by the Arctic Monitoring and Assessment Programme (AMAP) of the Arctic Council of the “AMAP area” will be used. This area is comprised of the marine areas north of the Arctic Circle (66°32'N), and north of 62°N in Asia and 60°N in North America, as it can be seen in the map below.²¹



Map 1. Arctic characterization: High, Low and Sub Arctic and ocean currents.
Source: Arctic Portal: Based on Arctic Human Development Report; AMAP Assessment: Arctic Ocean Acidification, 2013.

Now that it has been stated that the legal framework for international fisheries is established in UNCLOS and the area subject of this study has been defined, it is the moment to define what UNCLOS and the international treaties and agreements operating

²¹ (Molenaar, Climate Change and Arctic Fisheries, 2009).

under UNCLOS or developing its regime determine regarding the conservation and management of living resources.

2.2. UNCLOS

2.2.1. *Functions and objectives of UNCLOS*

To understand the international legal framework determined in UNCLOS for international fisheries management it is key to understand the objectives and functions of the international law of the sea and UNCLOS first.

One of the current functions of international law of the sea are to create a spatial division the seas and oceans into jurisdiction areas for the states, and then determine the different rights, duties, and obligations that each state has in each of the different jurisdiction's areas. The other function of the international law of the sea is to establish the need for international cooperation between states to manage the oceans. The ocean is not physically divided into jurisdiction areas and the ecosystems and the living organisms living in them do not understand of legal borders. It is important to understand that these functions, spatial distribution of jurisdiction of states and international cooperation, must complement each other and create synergies between them for an efficient management of the oceans and seas.²²

UNCLOS was created with the objective to establish a constitution of the oceans and seas to avoid conflict between states and contribute to stability and peace in the international community.²³

This objective to be a constitution of the oceans can be seen reflected in different characteristics of UNCLOS. First, one of the objectives of this so-called "constitution of the oceans" was to cover as much marine issues as possible and cover them comprehensively. Another characteristic of UNCLOS and could make it seem like a constitution of the oceans is that it is seen as a package deal, as one of its provisions, article 310 prohibits reservations by establishing the following: "No reservations or exceptions may be made to this Convention unless expressly permitted by other articles of this Convention."²⁴

²² (Tanaka, *The Law of the Sea in Perspective*, 2019).

²³ (Molenaar, *Climate Change and Arctic Fisheries*, 2009).

²⁴ (Tanaka, *The Law of the Sea in Perspective*, 2019).

2.2.2. *Spatial distribution of UNCLOS*

The current spatial division of jurisdiction areas are the following: internal waters, territorial sea, the contiguous zone, the exclusive economic zone (EEZ), archipelagic waters, the continental shelf, the high seas and The Area (the seabed, the ocean floor and subsoil beyond the limits of national jurisdiction).

Regarding internal waters and territorial sea, article 2 and 3 of UNCLOS determine, first, that internal waters are not regulated by international law as it forms part of each state's national territory, therefore each coastal states has full sovereignty of its internal waters. It also establishes that this full sovereignty of the internal waters is extended to territorial waters, that must not exceed 12 nautical miles. The difference between internal waters radiates between who establishes full sovereignty in each part. States enjoy the full sovereignty in internal waters because it's part of their territory, but in the case of the territorial sea, the states enjoy full sovereignty because it is established by international law, UNCLOS, so this full sovereignty must comply with the rest of the provisions and rules established in UNCLOS.

The Contiguous zone, that it is now usually within the limits of each state's EEZ, can extend to 24 nautical miles from the baselines, as established in article 33 of UNCLOS, and it serves to prevent and punish infringements of fiscal, immigration and sanitary national laws and regulations within each state's national territory.²⁵

The EEZ is a new concept in international law of the created by UNCLOS. It is established in articles 55, 56 and 57, mentioning that it is an area beyond and adjacent to the territorial sea which rights and duties are governed by Part V of UNCLOS (article 55), and must not extend beyond 200 nautical miles (article 57). The rights and duties of coastal states are established in article 56, grating coastal states sovereign rights of exploration and exploitation, conservation and management of natural resources of the waters superjacent to the seabed, the seabed and the subsoil. It also grants right for exploration and exploitation of other economic activities such as the production of energy from water, winds and currents. Other states must be able to enjoy their rights of navigation and overflight, laying of submarine cables and pipelines and other

²⁵ (Dolliver, 2010).

international lawful uses of the sea related to these freedoms, as determined in article 58 of UNCLOS.²⁶

The continental shelf is defined in article 76, and it says that it is the natural prolongation of its territory beyond its territorial sea to the outer edge of the continental margin, or to 200 nautical miles from the baselines. It comprises the seabed and the subsoil of the submarine areas, also established in article 76. The continental shelf must not extend, in any case, beyond 350 nautical miles from the baselines which the breadth of the territorial sea is measured or 100 nautical miles from the 2,500 metre isobath, as determined by article 76, in its paragraphs 2, 4, 5, 6 and 7. As determined in article 77, the rights of the coastal state are the exploration and exploitation of its natural resources, consisting of its mineral and other non-living resources, and also living organisms considered as sedentary species. Other states' rights to lay down submarine cables and pipelines are subject to the coordination with the coastal state for the delineation of the course of the cables and pipelines, as established in article 79 of UNCLOS.²⁷

The high seas are the areas that are not included in the EEZ, territorial or archipelagic waters or internal waters of any state, determined in article 86 of UNCLOS. In these waters, states enjoy the freedom of the high seas, consisting of the following: navigation, overflight, lay down submarine cables and pipelines, construct artificial islands or other island permitted under international law, fishing, and scientific research. Each state has the right to sail ships under its flag and those ships are under its exclusive jurisdiction, as determined under article 92 of UNCLOS.²⁸

This spatial distribution of the oceans and states' jurisdiction is important because it is at the core of the functioning of the legal framework created by UNCLOS regarding the management and conservation of living resources. It is important to understand it clearly and to see the different positions that states can be in regarding their rights, obligations and duties, and how this change depending on the geographical area that the states are fishing, or the fish stocks are situated.

2.2.3. Management and conservation of living resources

The legal framework for management and conservation of marine living resources established in UNCLOS is based upon two main pillars, the spatial distribution of

²⁶ (Dolliver, 2010).

²⁷ (Dolliver, 2010).

²⁸ (Dolliver, 2010).

jurisdiction of states and a species-based approach. Regarding species-based approach, UNCLOS separates between the following type of marine living resources: transboundary fish stocks, straddling fish stocks, highly migratory species, marine mammals, sedentary species, anadromous species, and catadromous species.²⁹

It seems necessary to make a couple of clarifications regarding the mentioned types of species or living resources just mentioned. First, it is important to explain what are transboundary, straddling and highly migratory fish stocks. The first one refers to resources that are situated in the EEZs of neighboring states. Straddling stocks can be situated in one of more EEZs but also live in the high seas, and highly migratory species are tuna and tuna-like species defined in Annex I that occur in both the EEZ(s) and the high seas.³⁰

Second, this division is also made because certain specific characteristics and needs of specific type of species demand different methods for their management, conservation, and exploitation. This is the case for the abovementioned anadromous species, catadromous species, and marine mammals. This specific regime will be explained later.³¹ Because of this, from now every time that wording “fish stock” is mentioned it will not be referring to these types of species.

The first that must be made is that states enjoy the full sovereignty when managing the marine living resources found in their internal waters. The same must be said when talking about the marine living resources in territorial waters, as established in articles 2 and 3 of UNCLOS, giving full sovereignty to coastal states. The same regime also applies to sedentary species found in the continental shelf, as stipulated in article 77 of UNCLOS giving states sovereign rights for the exploration and exploitation of natural resources, and more specifically in its paragraph 4, mentioning the following: “together with living organisms belonging to sedentary species, that is to say, organisms which, at the harvestable stage, either are immobile on or under the seabed or are unable to move except in constant physical contact with the seabed or the subsoil.”³²

For the EEZ, UNCLOS, in its article 56, establishes that coastal states enjoy full sovereign rights regarding the exploration and exploitation, management and

²⁹ (Hoel, 2020).

³⁰ (Hoel, 2020).

³¹ (Harrison, 2017).

³² (Harrison, 2017).

conservation of the marine living resources. These sovereign rights are not given without any conditions or obligations for the coastal states, though.³³ For example, article 56 paragraph 1.(c).(iii) establishes the duty for the coastal state to protect and preserve the marine environment, which is enriched by article 192 that applies to all maritime zones.³⁴

Furthermore, article 61 of UNCLOS regarding the conservation of living resources establishes the obligation of coastal states to determine the total allowable catch (TAC) of the marine living resources of its EEZ.³⁵ But in determining the TAC, states must take into account that article 61 also creates the obligation to take into account the best scientific evidence when setting the TAC and to ensure the proper management and conservation measures for the maintenance of the living resources, while also taking the appropriate measures to maintain or restore the population of the harvested species at a level which can produce the maximum sustainable yield, taking into account economic and environmental factors.³⁶ It is important to mention that article 61 paragraph 2 explicitly mentions the duty to avoid that the fish stocks are endangered by over-exploitation.³⁷ It is also mentioned in paragraph 3 of said article 61 to take into account when setting the TAC dependent species (predator-prey related species), by-catch or associated species and general minimum standards.³⁸

In the provision established in Part V regarding the EEZ, there's a duty for cooperation in the exploitation, management, and conservation of the fish stocks. This duty for cooperation is seen across all the provisions in this Part V. It is first mentioned in article 61 paragraph 2, when mentioning what a state must consider when setting the TAC, saying that when appropriate, the coastal state and international organization shall cooperate to this end. Furthermore, articles 63 and 64 specifically refer to this duty of cooperation. Article 63, divided into two paragraphs regulates transboundary fish stocks in its first paragraph and straddling fish stocks in its second paragraph. It establishes the duty of cooperation to the coastal states, and to the states fishing in the high seas in the case of the straddling stocks, through regional or subregional organizations or agreements and to coordinate the measures to ensure the conservation and development of the fish stocks. Article 64 refers to highly migratory fish stocks, establishing, as well, the duty for

³³ (Harrison, 2017).

³⁴ (Harrison, 2017)

³⁵ (Harrison, 2017).

³⁶ (Molenaar, Climate Change and Arctic Fisheries, 2009).

³⁷ (Harrison, 2017).

³⁸ (Molenaar, Climate Change and Arctic Fisheries, 2009).

direct cooperation between the coastal states and the states fishing the stocks in the high seas, through the appropriate regional or subregional organization or by creating the appropriate regional or subregional organization.³⁹

Alf Håkon Hoel makes a good summary of these provisions, putting it in this way:

“UNCLOS stipulates that coastal states are obliged to conserve resources, basing decisions on the best available scientific evidence and aiming for a sustainable yield, to ensure optimum utilization of resources, and to cooperate with other states in the management of transboundary resources.”⁴⁰

It is also important to clarify that article 62 of UNCLOS, while encouraging coastal states to follow the criteria determined in article 61 for the management of living resources, it establishes the obligation to promote the optimum utilization of the mentioned resources. That is, almost an obligation to exploit the resources, in a responsible and sustainable way, but an obligation for its exploitation, nonetheless. Therefore, states have the obligation to share its stocks when they don't have the capacity to exploit the set TAC. The states who acquire those quotas must comply with the management and conservation measures of the coastal state, as established in paragraph 4 of article 62. This duty to give access to surplus to other states is one of the key components of the concept of “optimum utilization”.⁴¹

Regarding the legal framework for the management and conservation of living resources in the high seas, UNCLOS refers to it in its Part VII. Article 116 establishes the right for every state to fish on the high seas, but that right is subject to the provisions of section 2 of Part V of UNCLOS, their treaty obligations, and the rights, duties, and interests of coastal states in regards of the straddling and highly migratory fish stocks established in articles 63.2, 64 and 67 of UNCLOS. Furthermore, article 119 creates the same duties of conservation, avoiding over-exploitation and considerations when setting the TAC while managing the marine living resources as the duties set for coastal states in article 61 of UNCLOS.⁴²

Article 117 creates a duty of cooperation and coordination between states when setting and applying management and conservation measures through the appropriate

³⁹ (Harrison, 2017).

⁴⁰ (Hoel, 2020).

⁴¹ (Harrison, 2017).

⁴² (Harrison, 2017).

regional or subregional organization or agreements. Article 118 then establishes how this cooperation must be done as being through the creation and establishment of the appropriate regional or subregional organizations or regional agreements.⁴³

As established in article 92 of UNCLOS flag states have all the jurisdiction when it comes to enforcement measures of the management and conservation measures taken by the states.⁴⁴

Regarding the special provisions about anadromous and catadromous species, UNCLOS considered their special circumstances. Anadromous species are those which spend most of their lives in the sea and migrate to fresh water to breed. Catadromous species are those which spend most of their life in fresh water but migrate to sea to breed. The special regime for the first one of these species is set in article 66, while the special regime for the second one is set in article 67. In both special regimes the coastal state in which the species spend a part of their life cycle and have a crucial role in their management and conservation has a primary interest and responsibility for their management through their entire life cycle, meaning that, as a rule, fishing for these stocks shall not take place in the high seas. In the case of catadromous species, there is no exception to this rule.⁴⁵

Lastly, regarding marine mammals, their special legal framework is found in article 65 and article 120, the first one for their management and conservation in the EEZ and the second one for their management and conservation in the high seas. The main distinction between marine mammals and other species is that states have no duty regarding their optimum utilization, as the one in article 62 for example, meaning that states can be as preservative as they are willing with them.⁴⁶

2.3. UNFSA

2.3.1. UNFSA's objectives and scope of application

While UNCLOS was a step in the right direction to reach a consensus in the international community regarding international fisheries management, there were topics that needed further development. One of them being the legal regime for the management of highly migratory and straddling fish stocks, as in UNCLOS it is only found a general

⁴³ (Rayfuse, 2015).

⁴⁴ (Harrison, 2017).

⁴⁵ (Harrison, 2017).

⁴⁶ (Harrison, 2017).

obligation between the coastal state(s) and the interested states in fishing those stocks in the high seas. Negotiations started at the 1992 Rio Conference on Environment and Development and an agreement was reached in 1995, when the UNFSA was adopted.⁴⁷

First, it is important to clarify that, while UNFSA is an instrument on its own, it is stated in article 2 of the agreement that its objective is to:⁴⁸

“The objective of this Agreement is to ensure the long-term conservation and sustainable use of straddling fish stocks and highly migratory fish stocks through effective implementation of the relevant provisions of the Convention.”

Furthermore, article 4 of UNFSA stipulates that the provisions in the agreement shall deteriorate rights, duties and jurisdictions established in UNCLOS and that the agreement must be interpreted in a manner consistent and aligned with UNCLOS. These two provisions combined establish an interrelation between UNCLOS and UNFSA as the latter being used as an implementation and development tool for the former, and as a guide to interpret UNCLOS.⁴⁹

It also seems important to point out that, in article 3 of UNFSA, regarding its scope of application, it is stated that while the provisions in UNFSA apply to highly migratory and straddling fish stocks in the high seas, the measures and obligations created by article 6 and 7 of UNFSA (articles 6 dealing with the precautionary approach and article 7 dealing with the compatibility of the conservation measures) also apply within areas of national jurisdiction regarding the abovementioned stocks.⁵⁰

2.3.2. UNFSA's principles

One of the key aspects of the agreement is the compatibility of the conservation measures. Article 7 establishes a duty to cooperate directly or through the appropriate cooperation mechanisms referred to in Part III of UNFSA, regarding RFMOs, when managing straddling and highly migratory fish stocks. Furthermore, article 7 also establishes the principles that must guide this cooperation, integrating into the management and conservation of highly migratory and straddling fish stocks, what were

⁴⁷ (Harrison, 2017).

⁴⁸ (Hassan, 2009).

⁴⁹ (Harrison, 2017).

⁵⁰ (Molenaar, Climate Change and Arctic Fisheries, 2009).

at that point in time, recent developments of international environmental law, like the precautionary approach or the ecosystem-based approach.⁵¹

Another one of the key aspects of UNFSA, as it has just been mentioned, is the introduction of the developments of environmental law, like the precautionary principle and the ecosystems-based approach into the regime of international fisheries management in general, and specifically to the regime of straddling and highly migratory fish stocks. This can be seen from the start, more specifically in article 2, as it mentions that the objective of UNFSA is to ensure the “long-term conservation and sustainable use of straddling fish stocks and highly migratory fish stocks”.⁵²

Moreover, article 5 of UNFSA lists certain number of principles that states must give effect to when managing and conserving straddling and highly migratory fish stocks. In that list provided by article 5 are mentioned the following principles: precautionary principle in paragraph (c), being this one further developed in article 6 of UNFSA; the protection of biodiversity in the marine environment in paragraph (g); and the ecosystem-based approach in paragraph (e), even though it is not specifically named, a brief description is made.⁵³

Attention must be put into the precautionary approach because as the same UNFSA consider that it deserves an article just for it, and the way which it must be implemented is detailed in the Annexes. The first paragraph mentions that states must be applied when managing and conserving marine living resources to protect the marine living resources and protect the environment. As it has been mentioned in other parts of UNFSA, there's specific angle to protect and marine environment introduced in UNFSA and the main objective of the application of the precautionary approach is to better conserve the marine living resources and protect the environment. Furthermore, the precautionary approach, in paragraph 2 of article 6, is formulated as a positive obligation to be cautious when the information is not certain. In the following paragraphs there's guidelines on how to apply the precautionary principle.⁵⁴

⁵¹ (Harrison, 2017).

⁵² (Harrison, 2017).

⁵³ (Molenaar, Climate Change and Arctic Fisheries, 2009).

⁵⁴ (Harrison, 2017).

2.3.3. RFMOs in UNFSA

The UNFSA gives a central role to RFMOs in the management and conservation of straddling and highly migratory fish stocks. It puts RFMOs at the center when it comes to the management of the mentioned living resources. This can be seen first in the structure of UNFSA, as it dedicates an entire part of the agreement, Part III, to mechanisms for international cooperation concerning straddling and highly migratory fish stocks. First off, article 8 creates the obligation for the parties of UNFSA to take part in the RFMOs or appropriate regional agreements. Additionally, special attention must be put into paragraphs 3 and 5 of said article 8.⁵⁵ Article 8 paragraph 3 says the following:

“Where a subregional or regional fisheries management organization or arrangement has the competence to establish conservation and management measures for particular straddling fish stocks or highly migratory fish stocks, States fishing for the stocks on the high seas and relevant coastal States shall give effect to their duty to cooperate by becoming members of such organization or participants in such arrangement, or by agreeing to apply the conservation and management measures established by such organization or arrangement.”

This provision is extremely important because of its implications. First off, for the parties that are members of the UNFSA, the UNFSA gives exclusive authority to the RFMOs or regional agreements to establish the appropriate management and conservation measures regarding the straddling and highly migratory fish stocks while complying with the transparency and participation conditions.⁵⁶ In addition, the same paragraph, while giving duties to the interested parties to participate in the relevant RFMOs or agreements to their interest, it also gives them the right to participate in the mentioned relevant RFMOs or agreements.⁵⁷

Another provision of extreme importance is paragraph 4 of article 8, which stipulates the following:⁵⁸

“ Only those States which are members of such an organization or participants in such an arrangement, or which agree to apply the conservation and management measures established by such organization or arrangement, shall have access to the fishery resources to which those measures apply.”

⁵⁵ (Molenaar, Climate Change and Arctic Fisheries, 2009).

⁵⁶ (Harrison, 2017).

⁵⁷ (Molenaar, Climate Change and Arctic Fisheries, 2009).

⁵⁸ (Molenaar, Climate Change and Arctic Fisheries, 2009).

This provision limits the access to the straddling and highly migratory fish stocks to states that cooperate. In this case cooperation does not obligate the state interested in accessing those resources to be a member of the relevant RFMOs or agreement, but it does establish that the state must cooperate in good faith and apply the conservation and management measures put into practice by the mentioned relevant RFMOs or agreement. This is important because these conservation and management measures usually include quotas, and quotas are not given to non-member states regularly. In case that there is no relevant RFMO or agreement, paragraph 5 of article 8 establishes the obligation to create it.⁵⁹

Article 9 of UNFSA lists the minimum requirements that states must agree upon when establishing RFMOs or regional agreements. Those are the stocks which the conservation and management measures apply; the spatial scope of application; the role, work, objectives and operation of the RFMO and mechanisms for obtaining scientific data.⁶⁰

Article 10 of UNFSA lists the functions that a RFMO must have. Between those functions it mentions that RFMOs must: agree on and comply with the appropriate conservation and management measures; adopt and apply generally recommended minimum standards; agree on standards for the operation of scientific data; promote scientific assessment of the relevant fish stocks for the RFMO; establish the appropriate mechanisms for control, monitoring, compliance and surveillance and enforcement; ensure cooperation with national agencies and industries; publicity of the management and conservation measures adopted and put into pace by the RFMO or regional agreement.⁶¹

2.4. Relevant RFMOs and agreements

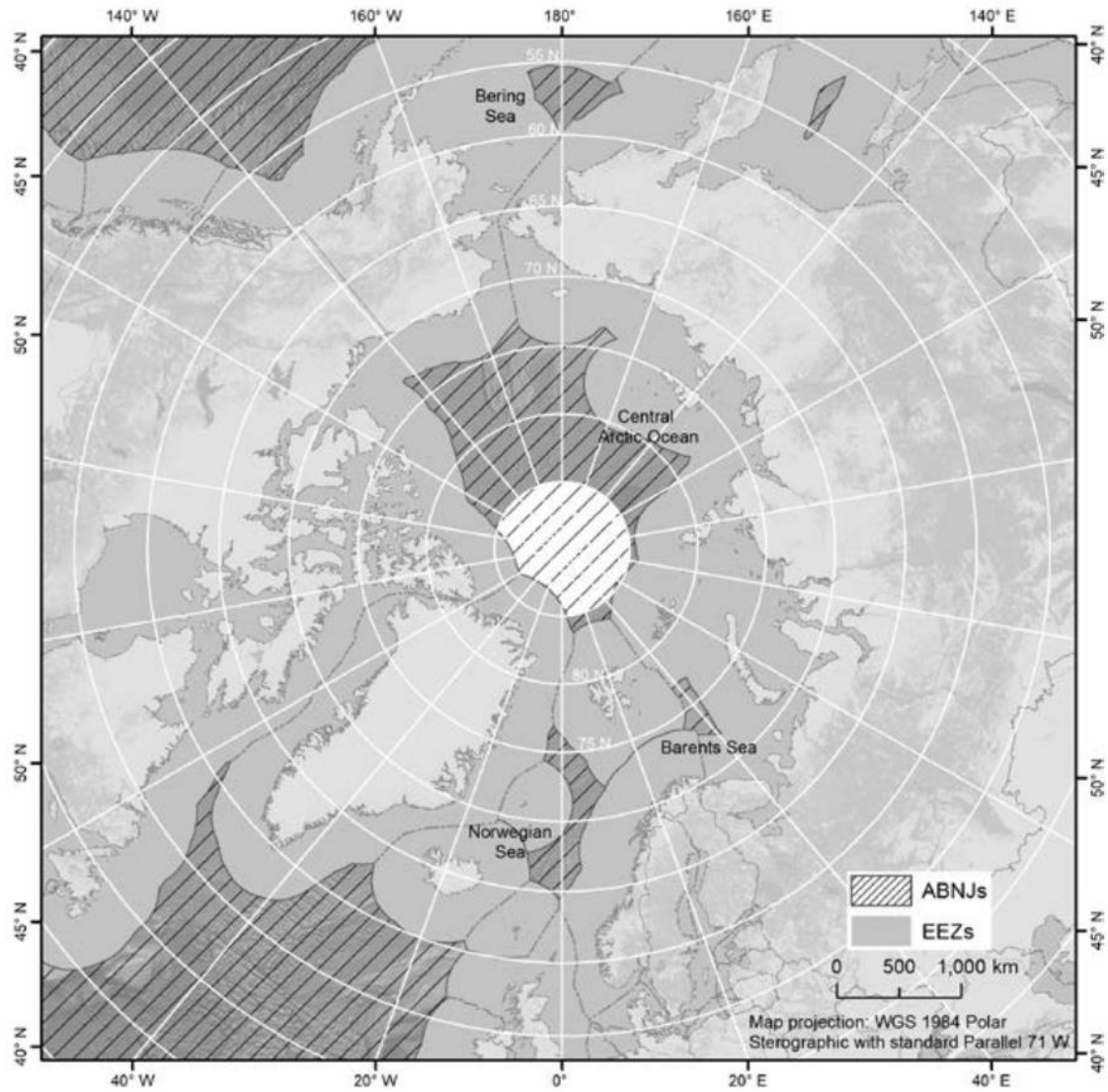
2.4.1. The Arctic marine area seen from UNCLOS's spatial distribution.

To determine which RFMOs and regional agreements are relevant to the fisheries management regime in the Arctic marine area it is first important to have clear the map of the area with the high seas' areas and the EEZs, this can be seen in the map below.

⁵⁹ (Molenaar, Climate Change and Arctic Fisheries, 2009).

⁶⁰ (Hassan, 2009).

⁶¹ (Hassan, 2009).



Map 2. Areas beyond national jurisdiction in sub-Arctic seas. Source: Created by Associate Professor Keshav Prasad Paudel, College of Fisheries Science, UiT – The Arctic University of Norway.

From the map it is possible to observe that, first, in the center of the Arctic Ocean there's an area of high seas. After that it is noticeable that there's a lot of the Arctic marine area that falls within the jurisdiction of the five coastal Arctic States: Russia, Norway, Canada, the United States and Denmark/Greenland. Between the EEZs areas under the jurisdiction of the five coastal states there are four areas of high seas in the Arctic marine area: the Donut Hole in the Bering Sea, the Loophole in the Barents Sea, the Banana Hole in the Norwegian Sea, and the high seas area between eastern Canada and Greenland.⁶²

⁶² (Hoel, 2020).

A clarification must be made because there is uncertainty regarding the marine area around Svalbard. The Treaty of Spitsbergen⁶³ grants Norway the sovereignty over the territory of Svalbard, but this Treaty was adopted and entered into force before UNCLOS, therefore the EEZ did not exist at that moment in the international community. Because of this, the Treaty of Spitsbergen did not establish anything regarding whether Norway possesses or has the right to establish an EEZ over around the baseline of the Svalbard territory and therefore has or not the sovereign rights over the marine living resources of a potential EEZ around Svalbard, including in this conundrum also the potential sovereign rights over the marine living resources on the outer continental shelf. There is no agreement or consensus so far about this question in the international community.⁶⁴

2.4.2. *The CAOFA Agreement*

The CAOFA Agreement regulates fishing in the central part of the Arctic marine area that are high seas. The CAOFA Agreement is a treaty, and unlike the rest of RFMOs or regional agreements as it does not implement a regime for fisheries in the area, but temporarily bans unregulated commercial fishing until the effects of climate change in the area are better understood, being seen in the international community as an example of a science-based manifestation of the precautionary principle in international fisheries. It is also worth mentioning that the CAOFA agreement recalls that the provisions and principles that govern the international regime for fisheries established in UNCLOS, the UNFSA and the FAO Code of Conduct for Responsible Fisheries.⁶⁵

The CAOFA Agreement's definition of fish, found in article 1 paragraph (b) says the following: ““fish” means species of fish, molluscs and crustaceans except those belonging to sedentary species as defined in Article 77 of the Convention”. From here, the CAOFA Agreement excludes of its provisions sedentary species regulated under article 77 of UNCLOS and marine mammals.⁶⁶

Regarding the temporal scope of the CAOFA Agreement, article 13 paragraph establishes that the initial duration will be for a period of 16 years following its entry into force. Moreover, paragraph 2 of the same article 13 creates an automatic five-year

⁶³ Treaty on the Status of Spitsbergen (adopted in February 1920, in force August 1925).

⁶⁴ (Molenaar, *Climate Change and Arctic Fisheries*, 2009).

⁶⁵ (Schatz, Proelss, & Liu, 2019).

⁶⁶ (Schatz, Proelss, & Liu, 2019).

extension a party to the agreement presents an objection to the extension of the agreement.⁶⁷

Article 14 of the CAOFA Agreement deal with its relationship with other agreements. First off, article 14 paragraph one establishes, aligned with what it has been seen in the “recalling” part before the first article, that the parties to the CAOFA Agreement would still be bound, making a specific mention to the duty to cooperate, by UNCLOS, the UNFSA and other relevant instruments of international law. In addition, article 14 paragraph 2 stipulates that the parties’ rights and obligations under UNCLOS, the UNFSA and other relevant instruments will not be affected negatively by the CAOFA Agreement.⁶⁸

It is also important to clarify the following said in article 14 paragraph:

“This Agreement shall not alter the rights and obligations of any Party that arise from other agreements compatible with this Agreement and that do not affect the enjoyment by other Parties of their rights or the performance of their obligations under this Agreement. This Agreement shall neither undermine nor conflict with the role and mandate of any existing international mechanism relating to fisheries management.”

This paragraph of the provision determines that the CAOFA Agreement respects the role of RFMOs and regional agreements in the international legal regime for fisheries management and establishes that it will not deteriorate with the role of those instruments.⁶⁹

2.4.3. Other relevant RFMOs and regional agreements

Regarding the four pockets of high seas in the sub-Arctic regions, the Bering Sea Loophole is regulated by the Convention on Conservation and Management of Pollock⁷⁰, while in the North Atlantic there are the Northwest Atlantic Fisheries Organization (NAFO)⁷¹ and the North East Atlantic Fisheries Commission (NEAFC)⁷². The latter is of

⁶⁷ (Schatz, Proelss, & Liu, 2019).

⁶⁸ (Schatz, Proelss, & Liu, 2019).

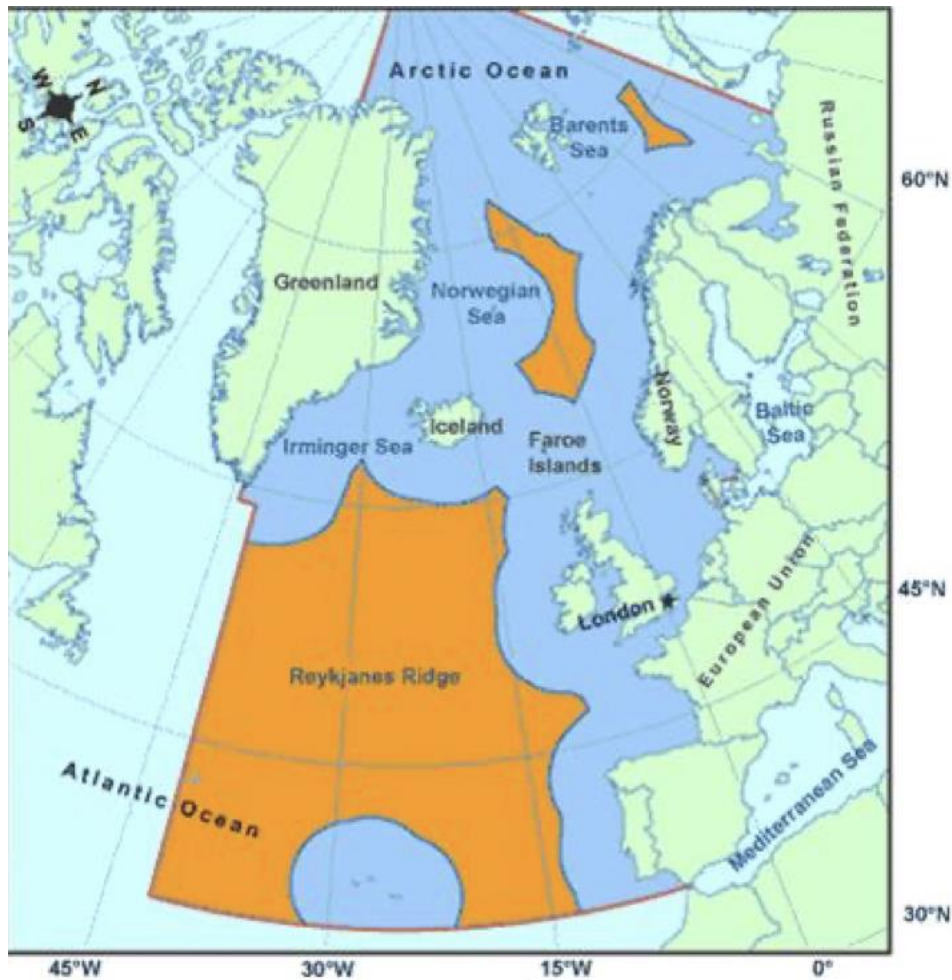
⁶⁹ (Schatz, Proelss, & Liu, 2019).

⁷⁰ Convention on the Conservation and Management of Pollock Resources in the Central Bering Sea (adopted in June 1994, in force December 1995).

⁷¹ Convention on Future Multilateral Cooperation in the Northwest Atlantic Fisheries (adopted in October 1978, in force January 1979).

⁷² Convention on Future Multilateral Co-operation in North East Atlantic Fisheries (adopted in November 1980, entered in force November 1980).

great relevance as it covers the Banana Hole in the Norwegian Sea and the Loophole in the Barents Sea, as we can see in the map below.⁷³



Map 3. NEAFC Convention Area. Source: (Molenaar & Corell, Arctic Fisheries, 2009).

Moreover, there is another relevant regional fisheries management agreement, the Joint Norwegian-Russian Fisheries Commission (Joint Commission) established by the bilateral Framework Agreement.⁷⁴ This agreement's objective was to resolve the dispute over the two state's maritime zone's delimitations over the Barents Sea and was

⁷³ (Hoel, 2020).

⁷⁴ Agreement between the Government of the Kingdom of Norway and the Government of the Union of Soviet Socialist Republics on Co-operation in the Fishing Industry, Moscow, 11 April 1975 (adopted in April 1975, entered in force April 1975).

complement by the Mutual Access Agreement⁷⁵ and the Grey Zone Agreement.⁷⁶ The later was not renewed, and in 2010 the Murmansk Treaty⁷⁷ to complement the Joint Commission. There are a few special characteristics about this Joint Commission that deserve some consideration. The first is that the Joint Commission promotes that third states do not pursue fishing activities in the Loophole in exchange of the right of access to Norwegian and Russian EEZs and other benefits such as access and use of their ports. The other special characteristic about the Joint Commission is regarding its spatial scope, as it is not explicitly identified as such, and it declares its competence over fisheries whose distributional range extend into the Loophole, the Norwegian Sea, The Greenland Sea, or the Arctic Ocean. Down below a map of the Barents Sea is shown.⁷⁸



⁷⁵ Agreement between the Government of the Union of Soviet Socialist Republics and the Government of the Kingdom of Norway Concerning Mutual Relations in the Field of Fisheries, Moscow, 15 October 1976 (adopted in October 1976, entered in force April 1977).

⁷⁶ Agreement between Norway and the Soviet Union on provisional practical arrangements on fishing in an adjacent area of the Barents Sea of 11 January 1978 (adopted in January 1978, entered in force January 1978).

⁷⁷ Treaty between the Kingdom of Norway and the Russian Federation concerning Maritime Delimitation and Cooperation in the Barents Sea and the Arctic Ocean, Murmansk, 15 September 2010 (adopted in September 2010, entered in force July 2011).

⁷⁸ (Molenaar, International regulation of Central Arctic Ocean Fisheries, 2016)

Map 4. Map of the Barents Sea region, including the Exclusive Economic Zones (EEZ) and shelf areas (to 200 m depth) of the Russian Federation and neighboring Norway. Source: (Popov & Zeller, 2018).

There is a different situation for two more RFMOs that cover part of the Arctic marine area: the International Commission for the Conservation of Atlantic Tuna (ICCAT)⁷⁹ and the North Atlantic Salmon Conservation Organization (NASCO)⁸⁰. Even though both cover part of the Arctic marine area, it seems highly unlikely that these two RFMOs are involved or are going to be involved relevant. First, it seems not probable that tuna and tuna-like species migrate that far north. Regarding NASCO, the international legal regime for anadromous species, including NASCO itself, prohibits fishing of the mentioned type of species in the high seas.⁸¹

2.5. Other relevant instruments

To finish to determine the regime for international fisheries in the Arctic marine area, it would worth mentioning two international instruments that even though they do not directly form the regime, they influence it.

The first one would be the FAO Code of Conduct for Responsible Fisheries. The objective of this instrument is to, as Daud Hassan perfectly summarizes: “to undertake strategies and policies for fisheries resources management and urge states to utilize fishing techniques and practices that could reduce the impact on the ecosystem.”⁸²

The FAO Code of Conduct for Responsible Fisheries, as established in its article 1.1, it's not a binding instrument, meaning that it is voluntary for states to adopt and comply with. It does, however, apply to all kind of fish stocks, within or outside areas of national jurisdiction.⁸³

Moreover, it was adopted in 1995, and like the UNFSA, adopted the same year, it does reflect the advancements in the international community regarding sustainability aspects and the evolution of international environmental law and its concepts. Furthermore, it also incorporates the same type of rule of reference establishing the

⁷⁹ International Convention for the Conservation of Atlantic Tunas (adopted in May 1966, entered in force March 1969).

⁸⁰ Convention for the Conservation of Salmon in the North Atlantic Ocean (adopted in January 1982, entered in force October 1983).

⁸¹ (Schatz, Proelss, & Liu, 2019)

⁸² (Hassan, 2009)

⁸³ (Harrison, 2017)

requirement to check the international minimum standards. Additionally, in articles 8 through 14, it also emphasizes cooperation through RFMOs or relevant regional agreements and mentions that these instruments should be the ones putting in practice the provisions in the FAO Code of Conduct for Responsible Fisheries.⁸⁴

The second instrument worth mentioning would be OSPAR Commission. Even though the works of the OSPAR Commission deal with the protection of the marine environment,⁸⁵ the works under Annex IV on the assessment of the quality of the marine environment and under Annex V on the Protection and Conservation of the Ecosystems and Biological Diversity of the Maritime Area are interrelated with the management and conservation of marine living resources as they form part of the environment, and through the UNFSA and the rule of reference more international environmental law developments must be incorporated to the international fisheries regime.⁸⁶ Moreover, Part XII, regarding the protection of the marine environment, of UNCLOS must be considered when interpreting the provisions of the management and conservation of living resources.⁸⁷

⁸⁴ (Harrison, 2017)

⁸⁵ (Hoel, 2020)

⁸⁶ (Molenaar, Climate Change and Arctic Fisheries, 2009).

⁸⁷ (Tanaka, Reflections on the Implications of Environmental Norms for Fishing: The Link between the Regulation of Fishing and the Protection of Marine Biological Diversity, 2020).

3. The key legal challenges triggered by climate change

3.1. Introduction

After studying the regime for marine living resources management in the Arctic marine area and systematically described it, and before studying its adaptation mechanism, it is important to see to what changes in the current circumstances it has to adapt to.

For this, in this chapter the general effects that climate change causes to our oceans will be explained. It will be followed by the specific than the Arctic and sub-Arctic regions are experimenting. It is important to understand the effects of climate change in the oceans and in the Arctic and sub-Arctic regions to understand then the impacts that those can have on the ecosystems, the Arctic marine environment and therefore the impacts and changes that fish populations can experiment because of climate change.

Following this a description of the impacts that Arctic fisheries will be done, linking the impacts of climate change to fish populations to the consequences that this has on this activity. The potential changes in fish populations will profoundly affect fisheries in the area. Therefore, to understand the key legal challenges to the fisheries regime in the Arctic it is important to understand, first, the changes that climate change has and will have on the activity that the regime object of this study regulates.

After this it will be the time, then, to link these impacts on fisheries to the Arctic and sub-Arctic fisheries management regime by seeing the key legal challenges that these impacts on Arctic fisheries trigger in the regime object of this study. It is important to identify them well and to see in which parts of the regime that it has been describe chapter one and challenged. To sum up, the objective of this chapter is identifying the key legal challenges triggered by climate change in the Arctic and sub-Arctic fisheries regime and to locate which parts of the Arctic and sub-Arctic fisheries regime are being challenged.

3.2. The effects of climate change in the oceans

3.2.1. The effects of climate change from a global perspective

Climate change is affecting the oceans across the globe, it is not localized in a specific region. The consequences in each region can be different because of the specific context and different Geographic, social, or economic conditions. But it is possible to identify

three main phenomena affecting the oceans: warming waters, ocean acidification and sea level rise. The consequences of these phenomena, as it has been mentioned just now, can be different depending on the conditions of the region and can also be of a direct or indirect nature. For example, migrations from one region which is experimenting a reduction in its natural resources to another region that because of the effects of climate change is experimenting an increase of natural resources. As it can be seen in this example and in many more effects that climate change has in the oceans and the consequences this brings, it is often said that the impacts of climate change on fisheries will have both “winners” and losers” among ocean users, regions, and communities.⁸⁸

Regarding ocean warming, its impacts produce changes in fish stocks distributions, productivity, growth. This induced distribution shifts in fish populations can make the fish stocks unavailable in its original region accessible in new locations and to new fisheries in the new locations. All of this causes changes in the ecosystems and the rearrangement of these ecosystems' food-webs. Moreover, warming waters damage coral reef ecosystems, which are a key component of the ecosystems because of their role as a support and host to fish populations. Warming waters also suffer from a slower reproduction time and recruitment of coral, which impedes reef accretion and rebound from acute events.⁸⁹

Ocean acidification first's impact its on calcareous organisms (from phytoplankton to coral reefs of shellfish) by decreasing the capacity of these organisms to create hard shells, and if the pH gets to low it can even start dissolving them. This drives ecosystems to change towards more fleshy algae type of ecosystems. Moreover, a decreased capacity of coral reefs to build their skeletons reduce the ecosystem's resilience to processes like bleaching, overfishing of herbivores and nutrient overloading. Furthermore, loss of coral reef severely impacts the reproduction capacity of reef fish populations.⁹⁰

Sea level rise only affects to the coastal zones, unlike the other two phenomena. It can potentially damage coastal ecosystems by negatively affecting the juvenile fish's habitats like salt marshes and mangroves. Furthermore, sea level rise can affect negatively

⁸⁸ (Mendenhall & et al, 2020)

⁸⁹ (Mendenhall & et al, 2020)

⁹⁰ (Mendenhall & et al, 2020)

to coastal infrastructure and industries reducing the fishing capacity of local communities, industries, and regions.⁹¹

An easy way to clarify, sum up, and see how all these effects can cause conflicts in fisheries of all that has been said up until now is by showing the following mind map found in (Mendenhall & et al, 2020):



Map 5. Potential pathways between climate change and fisheries conflict. Source: (Mendenhall & et al, 2020)

3.2.2. The effects of climate change in the Arctic and sub-Arctic region

The Arctic region’s climate is raising almost twice as fast as in other regions in the world, because of this, one of the three main phenomena that has been identified in section 3.2.1, warming waters, is happening much faster in this region than in the rest of the world. Furthermore, the raising climate is causing the reduction of the ice-cap in the Central Arctic Area, both in relation to the coverage and thickness of the Arctic sea ice. This creates a greater influx of fresh water to go onto the Arctic Ocean, reducing the salinity of the mentioned water mass.⁹²

The reduced Arctic sea ice will most likely improve the levels of primary and secondary production, extending the habitat areas for Subarctic species, for example cod and herring.⁹³ Moreover, the reduction of sea ice will increase the connectivity between the North Atlantic and North Pacific Oceans. Additionally, increasing activities such as shipping in the central Arctic Ocean due to the regression of the sea ice will add to this

⁹¹ (Mendenhall & et al, 2020)

⁹² (Molenaar, Climate Change and Arctic Fisheries, 2009)

⁹³ (Molenaar, Climate Change and Arctic Fisheries, 2009)

connectivity between the two oceans and increase even more the change in species' distribution and the thread of invasion from non-native species.⁹⁴

As it has been mentioned in section 3.2.1, climate change will also cause an ecosystems' shift that will change the species composition. The scientific community has observed a "borealization" of Arctic marine ecosystems with Atlantic waters pushing northwards, as it has been observed in the Barents Sea.⁹⁵ Because of potential migration to the north, some species will disappear, other will be added, while also changing the relative importance between them.⁹⁶

One general conclusion is that, potentially, warming waters in the Arctic marine area will improve the conditions for some of the most exploited marine living resources of the area.⁹⁷

On the other hand, the above mentioned increased freshwater inflow, pollution and the effects of ocean acidification presents thread to the Arctic marine ocean, that is a fragile ecosystem, and therefore to the health of the ecosystems of the are and the reproduction rate of the species that inhabit it.⁹⁸

Moreover, the mentioned change in distribution and the potential migration towards the north could lead to an invasion of non-natives species that could be a risk of disease for native species. Furthermore, this could also increase competition to native species that could become threatened. Additionally, Warmer water temperatures could potentially lead to changes in the reproduction rate of benthic local species that changes the entire biomass of the ecosystems, affecting the entire nutrient supply chain through the vertical mixing and could affect the productivity of the ecosystems and fish populations. All these potential negative factors must be also considered and could counterbalance the favorable conditions due to the moderate water warming, while reflecting the vulnerability of the Arctic marine environment and marine living resources.⁹⁹

3.2.3. *The impact on Arctic fisheries*

Fisheries is one of the most important sectors in the Arctic region. The economies of entire communities and countries are relying upon this sector. As an example, fisheries

⁹⁴ (Molenaar, International regulation of Central Arctic Ocean Fisheries, 2016)

⁹⁵ (Hoel, 2020)

⁹⁶ (Molenaar, Climate Change and Arctic Fisheries, 2009)

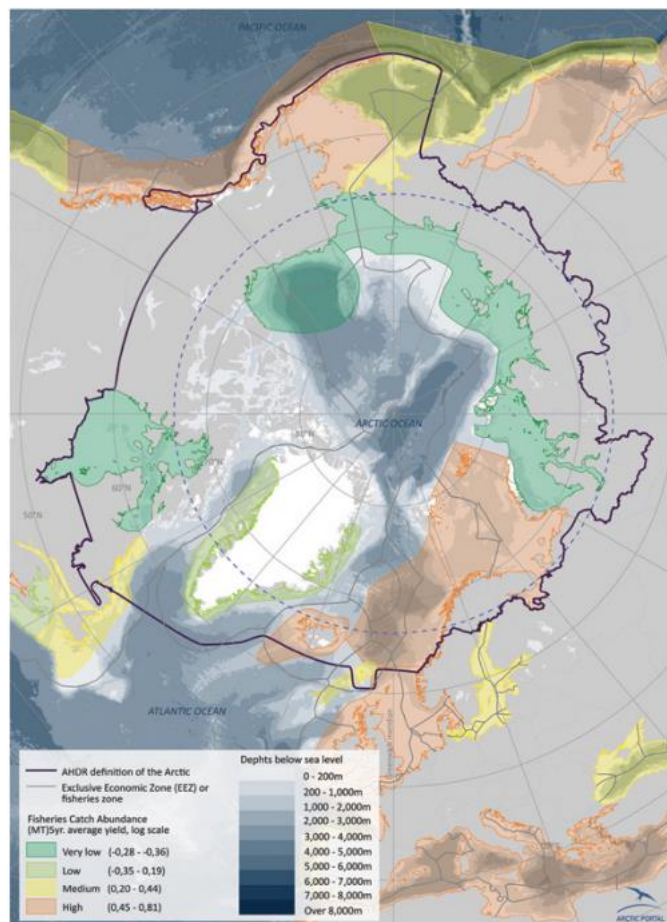
⁹⁷ (Molenaar, Climate Change and Arctic Fisheries, 2009)

⁹⁸ (Molenaar, International regulation of Central Arctic Ocean Fisheries, 2016)

⁹⁹ (Hassan, 2009)

and the related economic sector account for the 25% of the GPD in 2020. In Norway it accounts for the 0.7%, being the second most important industry just behind the oil and gas industry. In Norway, though, the impact of fisheries is more regional as most of the sector is in the northern part of the country. Fisheries also generates usually more than 90% of export value of the Faroe Islands and Greenland, and about 40% in Iceland. Furthermore, the fisheries sector is a vital source for food and employment in certain local and rural communities in Russia, Canada, and Russia.¹⁰⁰

Arctic fisheries are situated, in its majority, in the low sub-Arctic, in the marine ecosystems and shelf areas off the coasts of Labrador, Greenland and Iceland, the Bering and Barents Seas below the central Arctic Ocean. These ecosystems are rich ones regarding biological production.¹⁰¹ Studies so far show that the potential new fishing opportunities in the near future will still occur in the EEZ(s) of coastal states rather than in the high seas. This spatial distribution of Arctic fisheries is shown in map 6 below.¹⁰²



¹⁰⁰ (Arnarsson & Justus, 2015)

¹⁰¹ (Arnarsson & Justus, 2015)

¹⁰² (Molenaar, Status and Reform of International Arctic Fisheries Law, 2014)

Map 6. Large Marine Ecosystems – catch abundance. Source: Arctic Portal, 2014, based on National Oceanic and Atmospheric Administration (NOAA), 2013

These fisheries in the sub-Arctic marine area contribute significantly to the global fish supply, getting up between seven and eight million tones.¹⁰³

On the other hand, the central Arctic Ocean is low in biological production,¹⁰⁴ and currently there are no significant commercial fishing activities, while some small-scale subsistence fisheries occur in the Arctic Ocean in general.¹⁰⁵

As it has been explained during this sub-section, sub-Arctic ecosystems are rich in biological production and are an important resource for fishing activities and the fishing industry in general. There are a great number of significant commercial fish stocks in the Arctic marine area. The range and distribution of these stocks varies, while some of them are in the northern parts of the Atlantic and Pacific Ocean, others have a circumpolar distribution.¹⁰⁶

Important North Atlantic fish stock usually include the North-East Arctic cod, haddock, Norwegian spring-spawning, scandian, herring, Atlantic salmon, and red king crab. In the North Pacific the more important are the Alaska pollock, Pacific cod, snow crab, and various Pacific salmon species. The important circumpolar species for commercial fisheries include capelin, Greenland halibut, and northern shrimp.¹⁰⁷

As it has been explained in section 3.2.1. of this chapter climate change could affect and change the reproduction rates, growth, mortality, and spatial distribution of these fish stocks because of the warming temperatures of the waters in the ocean, freshwater influx, changes in salinity, and competition for food from non-native species due to the changes in spatial distribution caused by the warming waters. But these potential changes could be beneficial for some of the more important commercial fishing stocks. As an example, warming waters could potentially improve reproduction and growth rates of species such as cod, herring and pollock stocks. On the other hand, these same warming waters could negatively impact species that prefer and need colder waters, such as the king crab stocks

¹⁰³ (Hoel, 2020)

¹⁰⁴ (Arnarsson & Justus, 2015)

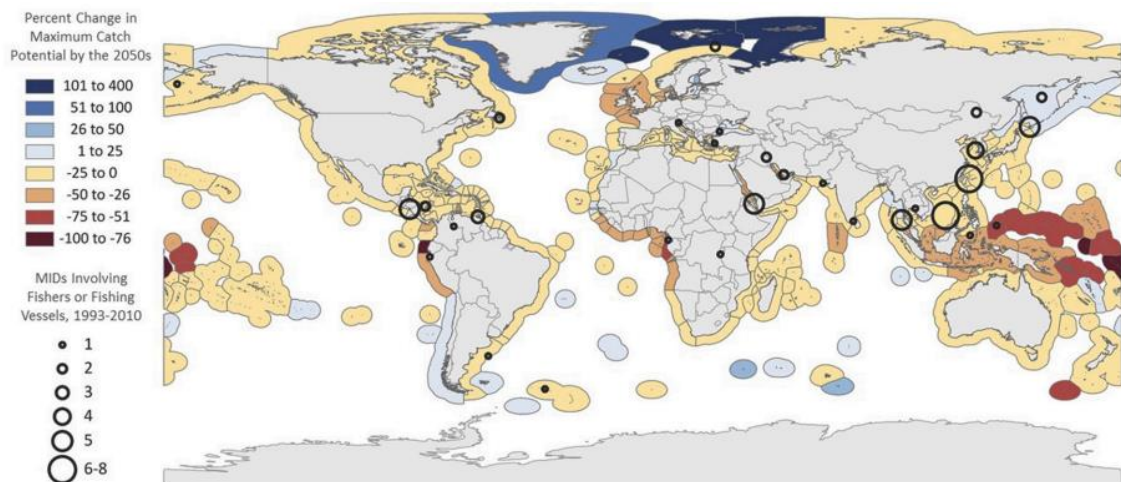
¹⁰⁵ (Molenaar, Status and Reform of International Arctic Fisheries Law, 2014)

¹⁰⁶ (Molenaar, Status and Reform of International Arctic Fisheries Law, 2014)

¹⁰⁷ (Molenaar, Status and Reform of International Arctic Fisheries Law, 2014)

in the eastern Bering Sea. Other potentially threatened species could include cold water stocks such as the northern shrimp.¹⁰⁸

To sum up the impacts of climate change in Arctic Fisheries, it can be said that the mentioned impacts will result in, even though there's no complete consensus in the scientific community, an increase in fish stocks abundance and reproductive and growth rates due to the warming waters and the melting of the ice caps, and northerly poleward migration of fish stocks. This potential trend can be seen in map 7 below.¹⁰⁹



Map 7. Historical militarized inter-state disputes involving fisheries, overlaid on projected change in maximum catch potential. Source: (Mendenhall & et al, 2020)

3.3. The key legal challenges triggered by the effects of climate change in the oceans

As the legal regime of the Arctic marine area has been systematically described and the impacts of climate change in the oceans and more specifically in the Arctic region have been identified, it is possible now to observe the challenges that the later can trigger to the regime object of our study.

Two mayor challenges have been identified in the regime that have been triggered by climate change. The first one is the adjustment that the regime must make to the changes in the productivity, growth, and distribution of fish stocks. The second one if the so-called “gap” in the Central Arctic Ocean. In this section a more in-depth look will be made in these two challenges.

¹⁰⁸ (Hassan, 2009)

¹⁰⁹ (Mendenhall & et al, 2020)

Nonetheless, this does not mean in any case that there's only these to challenges to tackle when talking about the fisheries management regime of the Arctic marine area. For example, another key challenge for the regime relates to science and data in the Arctic marine area. It's quite difficult to apply the now "trending" in the international environmental law community ecosystems-based approach when you lack substantial data about the ecosystems. And in the Arctic region, in general, between the uniqueness and complexity of the Arctic regions, the difficult working conditions in the area and technical, infrastructure and scientific limitations.¹¹⁰

3.3.1. Adjustment to the changes in productivity, growth, and distribution of fish stocks

A mayor challenge for the Arctic and sub-Arctic fisheries management regime is the adjustment to the changes in productivity, growth, and distribution of fish stock. And between those, the challenge to adjust to the migration patterns of fish stock seem to be the one which can cause more conflict and suppose more of a thread to the regime.¹¹¹

As it has been explained in Chapter 2 of this study, one of the foundations of UNCLOS when it regards to the legal framework regarding fisheries management is its spatial distribution approach to determine which states have access to which resources. The potential migration of fish stock between EEZ(s) of different states and between the spatial scope of different RFMOs or regional fisheries management agreements, and the changes in the migration patterns could be conflictive and lead to dispute between states.¹¹²

This could be because the legal framework established by UNCLOS right now, while it established a duty to cooperate, the nature of this duty is one of conduct, not one of results.¹¹³

Furthermore, UNCLOS regime for fishing in the high seas and the does not force states to join the relevant RFMOs or regional fisheries management agreements when fishing in the high seas. And while the UNFSA does so, not every member of UNCLOS is part of the UNFSA and that duty to cooperate with the relevant RFMO or regional fisheries management agreement does not apply to those that are not part of UNFSA. Furthermore, the UNFSA species-based approach only makes it competent or applicable

¹¹⁰ (Molenaar, Climate Change and Arctic Fisheries, 2009)

¹¹¹ (Arnarsson & Justus, 2015)

¹¹² (Mendenhall & et al, 2020)

¹¹³ (Harrison, 2017)

to straddling or highly migratory fish stocks. Additionally, the potential measures taken by those RFMOs regarding the adaptation to the impacts of climate change to fish populations would face the same general challenges that any measures taken by RFMOs face, like for example enforcement measures.¹¹⁴

An example of the type of conflict that the change in migration patterns of a commercially relevant species can cause can be seen in the mackerel dispute between the EU and Norway on one side and Iceland, Faroe Islands, and Greenland. The mackerel stocks migration and feeding patterns have changes in recent years, moving towards the northwest, entering Icelandic, Greenlandic, and Faroese waters. This cause that Iceland and Greenland start exploiting this resource while the Faroese increased its catch. The EU and Norway were not totally pleased about this, and a conflict arose between the two sides, that now must negotiate the total available quotas and its distribution.¹¹⁵

Another example can be found in the case of the Norwegian spring-spawning herring fisheries in the 1950s and the 1960s. This stock was one of the largest fish stocks in the world and was an important piece in the economy and society of regions and local communities of Norway, Russia, Iceland, and the Faroe Islands. A combination of overfishing, unsustainable fishing practices and a change in the climatic conditions caused the collapse of the stock by the late 1960s. The regime for this stock was not equipped to adapt itself to climatic changing conditions or promoted sustainable fishing conservation and management measures, and this led to the mentioned collapse of the fish stock. After more appropriate conservation and management measure were put in place, the fish stock recovered but the changes in its distribution and migration patterns due to climatic conditions remained in the population.¹¹⁶

3.3.2. *The “gap” in the Central Arctic Ocean*

As it has been explained in this chapter, climate change is causing for the Arctic sea ice to retrieve and to reduce both in extension and thickness. Just in summer of 2022, 40% of the Central Arctic Ocean melted.¹¹⁷

Because of this, and even though the current Arctic coastal states believe that right now of on the near future there's no commercially viable fisheries in the Central Arctic

¹¹⁴ (Mendenhall & et al, 2020)

¹¹⁵ (Arnarsson & Justus, 2015)

¹¹⁶ (Jeffers, 2010)

¹¹⁷ (Arnarsson & Justus, 2015)

Ocean, the mentioned Arctic coastal states believed that it was necessary to reach an agreement in the form of the CAOFA Agreement to put a moratorium of 16 years on commercial fishing activities in the mentioned area. The Joint Program of Scientific Research and Monitoring (JPSRM) established by the CAOFA Agreement was intended to increase our scientific knowledge and data from the region,¹¹⁸ and one of the motives for this is to be able to assess in the future the potential viability of commercial fishing activities in the area.¹¹⁹

The Arctic coastal states themselves recognize that in case of the development of commercial fishing activities in the Central Arctic Area, the creation or development of a RFMO or a regional fisheries management agreement would be needed for the conservation and management of the marine living resources of the Central Arctic Ocean when, in article 1.(c).(i) says the following:¹²⁰

“whether to commence negotiations to establish one or more additional regional or subregional fisheries management organizations or arrangements for managing fishing in the Agreement Area, and”

Regarding the NEAFC, while it is true that it covers part of the Central Arctic Ocean, it barely covers an 8% of the high seas area of it.¹²¹

There's a debate regarding whether the Joint Commission is considered a regional fisheries management organization by the CAOFA Agreement because it is not mentioned specifically in the “UNDERLINING”, unlike the NEAFC. But the Joint Commission is in the FAO's list of Regional Fisheries Bodies so it is understood that it would have to be considered as one.¹²²

Nonetheless, and even though the spatial scope it is not defined and is extended by the parties to the entire Central Arctic Ocean, the participants of the Joint Commission only have shown the will to apply the management and conservation measures of the mentioned agreement in the Loophole area. It does make common sense because it would be impossible for them to apply the management and conservation measures of marine

¹¹⁸ (Schatz, Proelss, & Liu, 2019)

¹¹⁹ (Arnarsson & Justus, 2015)

¹²⁰ (Molenaar, International regulation of Central Arctic Ocean Fisheries, 2016)

¹²¹ (Jeffers, 2010)

¹²² (Molenaar, International regulation of Central Arctic Ocean Fisheries, 2016)

living resources in the Central Arctic Ocean without the approval and cooperation of the other three Arctic Ocean coastal states.¹²³

Therefore, it can be said that there's a gap in the fisheries management regime of the Central Arctic Ocean, and even more so if you consider or consider the low participation of the CAOF Agreement.¹²⁴

¹²³ (Molenaar, International regulation of Central Arctic Ocean Fisheries, 2016)

¹²⁴ (Molenaar, International regulation of Central Arctic Ocean Fisheries, 2016)

4. The adaptability of the Arctic fisheries regime to the key legal challenges triggered by climate change

4.1. Introduction

After making a systematic description of the Arctic marine area first, and then identifying the key legal challenges triggered by climate change to the mentioned regime, it is time to see how this regime can adapt to those. Furthermore, it is time to study as well if the mechanisms and characteristic that the regime has are sufficiently adaptive to deal with the problem at hand and if the current regime can adapt itself and, at the same time, manage fisheries in a sustainable way, while avoiding exploitation, and fish stock collapse.

To be able to do this exercise, it is important to understand what adaptation means in the context of international law and then, more specifically, what does it mean in the context of the regime object of this study. Alan Boyle asks himself a similar question in (Boyle, 2008) when he asks the following:¹²⁵

“How do treaties evolve? How in particular do we ensure the “durability over time” of a global convention, intended to elaborate “a new and comprehensive regime for the law of the sea”? Earlier attempts to do so all failed. Why should the most recent attempt be any more successful?”

But first, it is important to understand what adaptation means, as a general concept. Webster dictionary defines it as it follows:¹²⁶

“Adjustment to environmental conditions: such as

a: adjustment of a sense organ to the intensity or quality of stimulation

b: modification of an organism or its parts that makes it more fit for existence under the conditions of its environment: a heritable physical or behavioral trait that serves a specific function and improves an organism's fitness or survival”

From this definition it is possible to extract the idea that, in this case, for a regime to be adaptable it must have natural conditions, characteristics or mechanisms to adjust itself to the new external conditions and changes in its environment. The changes can be of

¹²⁵ (Boyle, 2008)

¹²⁶

different natures, such as social, economic, geographical, ... In this case, the organism or object that must adapt it's the fisheries management regime of the Arctic marine area and the changes to its environment or external conditions are introduced by climate change, and those changes are those that the ecosystems, the marine environment, and the marine living resources are experimenting due to climate change. It is logical that to study if "something" is adaptable you must have the object defined and to what it must adapt to.

It is important to remember, the nature of the legal doctrinal method and one of its essential characteristics. A doctrinal approach places itself inside the legal system, therefore, the regime is not only the subject of the study but also provides the framework for the study. This exercise of the adaptive capabilities of the fisheries management regime of the Arctic marine area to the key legal challenges triggered by climate change must be done from an internal perspective, at it has been stated in Chapter 1 of this study.¹²⁷

Having clarified all this, it is time now to see if the fisheries regime of the Arctic marine is sufficiently adaptive to the key legal challenges triggered by climate change. The first step to do that will be to study the adaptations mechanism that UNCLOS and the UNFSA have, take a deeper look at the specific mechanisms for the fisheries regime, and see if those are efficient to adapt to the challenges identified. After that, the role that RFMOs, regional fisheries management agreements, and the CAOFA Agreement must play in the adaptation of the regime to the key legal challenges due to climate change will be studied.

4.2. Adaptability of UNCLOS and UNFSA

4.2.1. UNCLOS adaptive nature and adaptation mechanisms

As it has been explained in Chapter 2 of this master thesis, UNCLOS was adopted with the intention to be the "constitution of the oceans", and like any constitution, UNCLOS its harder to amend than other treaties, it also has provisions stating UNCLOS primacy over other treaties and regulations regarding any of UNCLOS topics or competences, it is subject to interpretation and application by international courts and has enjoys a certain amount of satisfaction and agreement over its provisions. Furthermore, it was conceived has a package deal and required consensus for its adoption, while trying to cover all subjects related to the oceans as a whole and in a comprehensive way.

¹²⁷ (Smits, 2015)

Nonetheless, like any other constitution, it must be able to evolve, adapt, and change alongside its external circumstances and the society or it will not last.¹²⁸

It must be clear that adaptation and evolution is not the same process when it come to international law and the changing of a treaty. Nonetheless, these concepts can create synergies between them and characteristic for one can help to for the other. Because of this, it is important to study the evolutionary capabilities of UNCLOS before getting to the adaptability and adaptation mechanisms.¹²⁹

One of the first mechanisms that UNCLOS, and in general it is found in international law is the re-interpretation of the provisions, principles, ideas, or concepts of the treaty. Dynamic interpretation is a key component of the evolutionary change of treaties and international law. Evolutive interpretation is a way to save treaties and regulation of premature obsolesce or a constant need of modifications due to the unforgiving past of tie and the changes in the circumstances that this provokes. These changes can be observed in the jurisprudence regarding the treaty object of our study. The rules for treaty interpretation in international law are found in article 31 of the VCLT, and what it is important to remember is that evolutive interpretation must be done within the legal framework established by the treaty and in which the treaty is and according to the will of the parties at the time of its adoption.¹³⁰

Still talking about evolutive interpretation, it must be noted that normally evolutive interpretation involves concepts, phrases, ideas, or even words of the treaty or convention and it is not a general change in the treaty itself. Furthermore, evolutive interpretation is that exactly, interpretation, and not rewriting, and therefore, its role usually is not a “game-changer”.¹³¹

Another instrument used for the evolutionary change of treaties and UNCLOS as well is the use of soft law. By soft law it is referred to non-binding instruments of all kinds, like declarations, recommendations... that are made to guide the actions and activities under certain treaties, conventions, or international organizations. Some of these end up having an almost normative nature.¹³²

¹²⁸ (Boyle, 2008)

¹²⁹ (Boyle, 2008)

¹³⁰ (Boyle, 2008)

¹³¹ (Boyle, 2008)

¹³² (Boyle, 2008)

Soft law instruments are used oftentimes to guide the interpretations and implementation of treaties and conventions in situations that some of the parties do not agree on the bindingness of the provisions that have been agreed upon. Soft law can also be used when the subject aimed is not part of the international community and because of this is not possible to include a certain type of provisions in international agreements.¹³³

Soft law is also used to guide the incorporate new developments in form of new principles in certain fields of international law into consolidated treaties and help guiding the implementation of those new principles into the provisions of the existing treaty. Article 31 of the VCLT certainly includes general principles of law to help and inform the interpretation of treaties. An example of this is the implementations of the precautionary principle into UNCLOS as it has been seen in the *Southern Bluefin Tuna*¹³⁴ case.¹³⁵

Furthermore, UNCLOS relies as well in its further development through the implementing agreements such as the UNFSA and its duties regarding the duty of cooperation and the arrangement of RFMOs and regional fisheries management. While its objective is to create a comprehensive and global framework for the oceans, at the same time this allows UNCLOS to consider the uniqueness of each ecosystem and the special circumstances of each of the different areas of the oceans, and the social, economic, and political circumstances of each state, region, and even local communities.¹³⁶

Moreover, UNCLOS has the capacity to suffer evolutionary changes through the interaction with other treaties, such as the 1992 Convention on Biological Diversity¹³⁷ (CBD) thanks to article 311 paragraph 2 of UNCLOS establishing that UNCLOS will not affect the rights and obligations of its parties when it regards to other treaties and conventions when the rights and obligations regarding UNCLOS are not deteriorated and parties can still enjoy and fulfill them. Additionally, when it comes to the protection of the marine environment and the CBD, article 237 of UNCLOS establishes that special obligations and principles reached by states that are consistent with the principles and

¹³³ (Boyle, 2008)

¹³⁴ *Southern Bluefin Tuna Cases (Provisional Measures)* (1999) ITLOS Nos 3 and 4, paras 77-9, and Judges Laing at paras 16-19; Treves at para 9, and Shearer.

¹³⁵ (Boyle, 2008)

¹³⁶ (Boyle, 2008)

¹³⁷ Convention on Biological Diversity (adopted in June 1992, entered in force December 1993)

provisions of UNCLOS are to be included in the regime established in Part XII of UNCLOS regarding the protection of the marine environment.¹³⁸

This study of the different ways that UNCLOS can experiment evolutionary changes was necessary because of different reasons, but mainly two. The first one is that a treaty that is in constant evolution with its surroundings will have lesser difficulty to adapt to changes. In theory, its evolving with society, its dynamic and in constant movement, then certainly it will have less difficulty to adapt to new changes and circumstances when its already keeping up and evolving with its context and the changes that society constantly experiments. Secondly, synergies and connections may happen between the characteristic that it has to be able to evolve and its adaptability and adaptation mechanisms. When the parties embedded UNCLOS to be able to evolve, the same parties sure wanted it to be able to adaptive as well. These two characteristics work well together.¹³⁹

Now talking specifically about adaptation, UNCLOS has usually adapted to changes through two plus on mechanisms. The first two are its nature and mechanisms as a framework including the rules of reference, and the second one is through its interpretative processes. The third one is indirectly and directly at the same time, through its development agreements and the RFMOs and regional fisheries management agreement that develop its framework regarding fisheries in each region and sub-region.¹⁴⁰

Regarding the first one, the rules of reference play an important role in UNCLOS's adaptability. The term "rules or reference" itself is not used in UNCLOS, but it basically refers to provisions that incorporate other rules and standards into the treaty.¹⁴¹

Even though there is not a standardized way that the rule of reference is found in UNCLOS, usually there the same elements to it: the obligation to the state parties and the rule that is being referenced.¹⁴²

The rules of reference are found in different intensities through UNCLOS but the main ones can be found in the provisions regarding shipping, navigation and Part XII dealing with the protection of the marine environment. There's also rules of reference in

¹³⁸ (Boyle, 2008)

¹³⁹ (Barnes & Barret, 2016)

¹⁴⁰ (Barnes & Barret, 2016)

¹⁴¹ (Nguyen, 2022)

¹⁴² (Nguyen, 2022)

articles 60, 207, 212, 262, but these ones take a weaker form being formulated as “take into account”.¹⁴³

There's a key importance on how the rule of reference is formulated as it will lead to more or less amount of discretion left for the state parties to comply with the referred rules and standards or not.¹⁴⁴

Specifically talking about the rules of reference regarding the conservation and management of marine living resources, there's only two provisions that could be considered or resemble like a rule of reference in UNCLOS and are in articles 61 paragraph 3 and 119. Article 61 paragraph 3 says as it follows:¹⁴⁵

“Such measures shall also be designed to maintain or restore populations of harvested species at levels which can produce the maximum sustainable yield, as qualified by relevant environmental and economic factors, including the economic needs of coastal fishing communities and the special requirements of developing States, and taking into account fishing patterns, the interdependence of stocks and any generally recommended international minimum standards, whether subregional, regional or global.”

Article 119 formulates it almost the same way. The formula used to include the potential rules of reference “any generally recommended international minimum standards” changes “accepted”, used in other provisions for “recommended” leaving leeway and discretion to the states. It has been accepted that these provisions should include the FAO Code of Conduct and the CBD into the fisheries regime of UNCLOS. UNCLOS and the parties intended for these standards to be included, even though with lots of discretion for the state parties, into the fisheries management and conservation regime.¹⁴⁶

Furthermore, UNCLOS nature as it has been studied through this master thesis is more of a framework for the regime and leaving other instruments to develop it and set the details in the mentioned fisheries regime. The application of the rules of reference here would allow UNCLOS to be relevant in this regime, beyond the principles and main duties, rights and obligations set out by it, by incorporating the norms and standards set out in these other relevant instruments like the FAO Code of Conduct, the CBD, and more

¹⁴³ (Nguyen, 2022)

¹⁴⁴ (Nguyen, 2022)

¹⁴⁵ (Nguyen, 2022)

¹⁴⁶ (Nguyen, 2022)

specific to the case of this study and that could be really interesting and helpful for the Arctic marine area fisheries regime, the OSPAR Commission and the Arctic Council.¹⁴⁷

Moreover, aligned with UNCLOS intention to consider the oceans' problems as a whole and taking a holistic approach to them, the rules of reference would facilitate to do that and allow a more holistic way to protect the marine environment. The management and conservation of fisheries resources are separated of Part XII of UNCLOS regarding marine pollution and the protection of the marine environment. Moreover, the marine living resources both are part and are the marine environment and the ecosystems themselves, while in UNCLOS they are separated. Recently, the *Southern Bluefin Tuna* case have stated that the management and conservation of the marine living resources are part of the protection of the marine environment, this could be a way to extend the Part XII rule of reference regarding the protection of the marine environment and marine pollution to the fisheries management regime, taking a more holistic approach to both topics, as desired by UNCLOS.¹⁴⁸

Against these arguments exposed just now in favor of the rule of reference for the adaptability of the fisheries management regime in general and in the Arctic Ocean, it can be said and considered the following things. First, the addition of the rules of reference could break the consent rule of international law. Secondly, the rules of reference could disturb the current balance between the rights and duties of coastal and flag states in the EEZs. Third, there are other techniques available to incorporate the developments of international law into UNCLOS.¹⁴⁹

Evolutionary interpretation can also be used as an adaptation mechanism, but for it be used as such it must fulfil three main criteria. First, the concept must be a generic term that could be filled with meaning. Second, there must be a consensus between the parties, explicit or implicit, that the concept could evolve. Third, the concept must be establishing long-term legal framework. UNCLOS, in the intention of the parties to be a constitution of the oceans that resists the test of time and deals with all ocean-related problems in a comprehensive and holistic way fulfill all these conditions. It does use tons of generic

¹⁴⁷ (Nguyen, 2022)

¹⁴⁸ (Nguyen, 2022)

¹⁴⁹ (Nguyen, 2022)

terms left there for its development and UNCLOS itself is a long-term framework for the oceans.¹⁵⁰

Another mechanism for adaption is the due diligence obligations, because of their nature, not being a well-defined concept that at the same time is quite flexible, it can be adapted to different situations. ITLOS said about it in the *Area Advisory Opinion*¹⁵¹ the following:¹⁵²

“The content of “due diligence” obligations may not easily be described in precise terms. Among the factors that make such a description difficult is the fact that “due diligence” is a variable concept. It may change over time as measures considered sufficiently diligent at a certain moment may become not diligent enough in light, for instance, of new scientific or technological knowledge. It may also change in relation to the risks involved in the activity. ... The standard of due diligence has to be more severe for the riskier activities.”

The third that has been mentioned, the development of UNCLOS through its implementation agreements and RFMOs and regional fisheries management will be studied in the next sub-sections of this Chapter. But it has been seen that UNCLOS could potentially introduce to its fisheries management regime the recommendations and standards of relevant international and regional organizations and institutions such as the OSPAR Commission and the Arctic Council through the rules of reference. That could be a first step for the adaptation of the Arctic fisheries management regime to the key legal challenges triggered by climate change.

4.2.2. *The role of the UNFSA*

As it has been pointed out during this master thesis, the UNFSA is an implementing agreement of UNCLOS regarding fisheries management of straddling and highly migratory fish stocks. It puts emphasis in the duty of cooperation between coastal and flag states and almost restricts the access to these fish stocks to the parties that are a member of the relevant RFMOs or regional fisheries management agreement or that agree to comply with the measures taken by the mentioned regional organizations or agreements. It does not have any relevant new adaptation mechanisms that have not been seen before in UNCLOS. But it does introduce a concept that could change the way the

¹⁵⁰ (Barnes & Barret, 2016)

¹⁵¹ Area Advisory Opinion (n 21), para 117.

¹⁵² (Barnes & Barret, 2016)

regime sees the participation rights in RFMOs and regional fisheries management agreements. Article 8 paragraph 3 says the following:¹⁵³

“Where a subregional or regional fisheries management organization or arrangement has the competence to establish conservation and management measures for particular straddling fish stocks or highly migratory fish stocks, States fishing for the stocks on the high seas and relevant coastal States shall give effect to their duty to cooperate by becoming members of such organization or participants in such arrangement, or by agreeing to apply the conservation and management measures established by such organization or arrangement. States having a real interest in the fisheries concerned may become members of such organization or participants in such arrangement. The terms of participation in such organization or arrangement shall not preclude such States from membership or participation; nor shall they be applied in a manner which discriminates against any State or group of States having a real interest in the fisheries concerned.”

The concept of “real interest” was therefore introduced. It was introduced as a tool to balance the conflicting interests when managing straddling or highly migratory fish stocks. Initially it was thought as balancing the interests of flag states against the interests of coastal states, but then it was thought as a bar of participation to have rights to participate in certain RFMOs or regional fisheries management agreements, but this perception of the concept of “real interest” was rejected too.¹⁵⁴

Currently there's no clear definition of what the concept of “real interest” could mean and there's a lot of uncertainty around it. But it does seem to fit into the definition made by the concepts that could experiment an evolutionary interpretation. This could allow for this concept to introduce consideration regarding the marine environment, climate change, and the effects of climate change in the oceans and its effects on its ecosystems and fish populations. As an example, in the case of a future development of an RFMO that covers the Central Arctic Ocean, the non-coastal Arctic States could use this concept of real interest to enter the RFMOs as parties to collaborate into the conservation and

¹⁵³ (Molenaar, The Concept of "Real Interest" and Other Aspects of Co-operation through Regional Fisheries Management Mechanisms, 2000)

¹⁵⁴ (Molenaar, The Concept of "Real Interest" and Other Aspects of Co-operation through Regional Fisheries Management Mechanisms, 2000)

management of fisheries resources in the Arctic and defending a more sustainable and ecosystem-based approach management.¹⁵⁵

4.3. The role of RFMOs and the CAOFA Agreement

As it has been seen throughout this master thesis, RFMOs and regional fisheries management agreement play a key role in the management and conservation of fishing resources. Both are put in the center of fisheries management by UNLCOS and the UNFSA as the mechanisms to put into place the duties of cooperation and coordination when taking measures for the mentioned management of fisheries. Therefore, is it difficult to assume that they will also play a key role in the adaptation of the fisheries regime of the Arctic marine area.¹⁵⁶

4.3.1. The role of the CAOFA Agreement

Even though it has been mentioned in this thesis that what the CAOFA Agreement does is basically establishing a temporally ban on unregulated fisheries in the high seas areas of the Central Arctic Ocean, it is also at the same time a step in the right direction in two different ways when facing the key legal challenges by climate change to the Arctic marine area fisheries regime.¹⁵⁷

The first instrument that it does integrate for the adaptation of the fisheries regime of the Arctic marine area is the integration of the precautionary approach into the mentioned regime. It is true that the precautionary approach was already introduced in the fisheries regime by the UNFSA, but there two weak points about this latter introduction that the CAOFA Agreement addresses and are better suited for facing the uncertainties and potential changes in the changes in reproduction, growth, and changes in the distribution and migration patterns of fish stocks.¹⁵⁸

The first one is the species-scope of the UNFSA. The UNFSA only applies to straddling and highly migratory fish stocks, while, at it has been explained in Chapter 2 of this thesis, the CAOFA Agreement applies to what the mentioned agreement defines as “fish”, being this concept wider that just straddling and highly migratory fish stocks.¹⁵⁹

¹⁵⁵ (Molenaar, The Concept of "Real Interest" and Other Aspects of Co-operation through Regional Fisheries Management Mechanisms, 2000)

¹⁵⁶ (Molenaar, Integrating Climate Change in International Fisheries Law, 2020)

¹⁵⁷ (Schatz, Proelss, & Liu, 2019)

¹⁵⁸ (Schatz, Proelss, & Liu, 2019)

¹⁵⁹ (Schatz, Proelss, & Liu, 2019)

Secondly, while it is true that the precautionary approach has been established as a general principle in fisheries management internationally, it is just one more guiding principle that must be considered on each individual case.¹⁶⁰

On the other hand, The CAOFA Agreement, as it has been explained in Chapter 2 of this thesis and in this section before, establishes a temporary moratorium on commercial fishing. But this temporary ban could be conserved as a form of allocation of fishing quotas, the case is just that the allocation is zero. And these zero allocations of fishing quotas are done because of the lack of knowledge and understanding of the fishing opportunities and the state and effects of the arctic ecosystems and arctic marine environment. All this could be understood to be the application of the precautionary approach to its fullest extent.¹⁶¹

It must be clear though, at the same time, that the CAOFA Agreement's intentions or objectives are not temporary ban commercial fishing activities, its objective is to ban unregulated commercial fishing activities. Therefore, if a RFMO were to be created to regulate commercial fishing activities in the high seas of the Central Arctic Ocean, the CAOFA Agreement would have no effect with respect of those measures. Furthermore, the same CAOFA Agreement contemplates the potential creation or adoption of a RFMO for the high seas of the Central Arctic Ocean. It does do in article 5, paragraph 1(c)(i) and (ii), that goes as it follows:¹⁶²

“(i) whether to commence negotiations to establish one or more additional regional or subregional fisheries management organizations or arrangements for managing fishing in the Agreement Area, and

(ii) whether, once negotiations have commenced pursuant to subparagraph (i) above and once the Parties have agreed on mechanisms to ensure the sustainability of fish stocks, to establish additional or different interim conservation and management measures in respect of those stocks in the Agreement Area;”

These two provisions read in conjunction seem to be a careful and considered process for the future establishment of a RFMO in the high seas areas of the Central Arctic Ocean. But at the same time, as it has been established throughout this agreement and it has been explained during this thesis in Chapter 2 and this thesis, the potential future RFMO would

¹⁶⁰ (Schatz, Proelss, & Liu, 2019)

¹⁶¹ (Schatz, Proelss, & Liu, 2019)

¹⁶² (Schatz, Proelss, & Liu, 2019)

have to follow the international framework for fisheries established by UNCLOS, the UNFSA, and by rule of reference made in the same CAOFA Agreement and UNCLOS and the UNFSA, to the generally accepted international rules and standards, and more importantly the sustainability principle and the precautionary approach.¹⁶³

Additionally, the CAOFA Agreement also tackles one of the legal challenges identified for the fisheries management regime of the Arctic marine area, that is the recollection and gathering of scientific knowledge and data of the Arctic marine environment and ecosystems. It does so in article 4, creating the “Joint Program of Scientific Research and Monitoring (JPSRM). The JPSRM must be put into place within two years of the entry into force of the CAOFA Agreement and creates an “data sharing protocol” between the parties to the agreement. It is established that the parties of the CAOFA Agreement will guide the development, coordination, and implementation of the JPSRM and while doing so the must consider the “the work of relevant scientific and technical organizations, bodies and programs”. The Agreement does not name expressly any organization or body, but the international community recognizes the work done by the International Council for the Exploration of the Sea (ICES) and the North Pacific Marine Science Organization (PICES), and more specifically for the Arctic marine area the work of the Arctic Council would have to be considered as well.¹⁶⁴

It is also worth also mentioning the concept of “real interest” introduced in article 8 of the UNFSA and its relationship with the CAOFA Agreement. As it has been explained in this Chapter, the concept of “real interest” historically involved coastal states and flag states historically fishing for fish stocks. In this scenario, this concept cannot be applied, because there have not been significant commercial fisheries going on in the Central Arctic Ocean. An evolutionary interpretation of the concept in this case could introduce concept such as scientific interest, the protection of the Arctic environment, or the conservation of marine living resources as “real interests” to have the right to participate in the CAOFA Agreement.¹⁶⁵

4.3.2. The role of other relevant RFMOs

RFMOs, for the very reason of its existence and tis own nature, vary and range widely in its institutional form, provisions like management and conservation of living resources,

¹⁶³ (Schatz, Proelss, & Liu, 2019)

¹⁶⁴ (Schatz, Proelss, & Liu, 2019)

¹⁶⁵ (Schatz, Proelss, & Liu, 2019)

enforcement and compliance mechanisms, and amendments and modification processes. This variation between them makes them resilience to the pass of time and adaptable to the key legal challenges triggered by climate change.¹⁶⁶

At it has been mentioned during this study, there are few relevant RFMOs or regional fisheries management agreements in the Arctic marine area, being the most important ones the NEAF and the Joint Commission.¹⁶⁷

For the mentioned RFMOs and regional fisheries management organizations to be sufficiently adaptable to the key legal challenges triggered by climate change, and for the potential RFMO established in the high seas of the Central Arctic Ocean, they would have to incorporate the precautionary approach and the ecosystem-based approach to its decision-making procedures. At the same time, they should reinforce their cooperation and coordination mechanisms, both regarding the sharing and transferring of scientific knowledge and data and the allocation and transfer of quotas of fish stock.¹⁶⁸

¹⁶⁶ (Mendenhall & et al, 2020)

¹⁶⁷ (Molenaar, International regulation of Central Arctic Ocean Fisheries, 2016)

¹⁶⁸ (Mendenhall & et al, 2020)

5. Conclusion

The overarching research question is “Is the fisheries management regime of the Arctic and sub-Arctic regions sufficiently adaptive to key legal challenges triggered by climate change?”

To answer this question a systematic description of the Arctic marine area regime for fisheries and the management and conservation of marine living resources has been made. It has been identified that UNCLOS, the UNFSA, the CAOFA Agreement, the NEAFC and the Joint Commission, complemented by other instruments are the key pieces of this regime.

Following this exercise, the key legal to the Arctic marine area fisheries regime challenges triggered by climate change impacts have been identified, those mainly being the “gap” in the Central Arctic Ocean, the changes in production, growth, distribution and migration patterns, and the difficulties getting scientific knowledge and data for the region.

Lastly, the adaption mechanisms of this regime have been studied to see if the regime in its entirety is sufficiently adaptive to face the identified legal challenges. It has been seen that through combination of the rule of reference, evolutive interpretation, general concepts keen to evolution and adaptive interpretation, and UNCLOS nature of an evolving treaty that can develop through implementing agreements and the functions of RFMOs, and regional fisheries management agreements could be adaptive enough to face the mentioned key challenges.

6. References

6.1. Literature

- Arnarsson, S., & Justus, D. (2015). Changing Nature of Arctic Fisheries. In A. Stepien, T. Koivurova, & P. Kankaanpää, *The Changing Arctic and the European Union* (p. 115-136). Brill | Nijhoff.
- Barnes, R. A., & Barret, J. (2016). The Continuing Vitality of UNCLOS. In R. A. Barnes, & J. Barret, *The United Nations Convention on the Law of the Sea: A living Instrument* (p. 459-489). BIICL.
- Boyle, A. (2008). Further Development Of The Law Of The Sea Convention: Mechanisms For Change. *International & Comparative Law Quarterly* (Vol. 54/3), 563-584.
- Dolliver, N. (2010). Maritime Jurisdiction. *Max Planck Encyclopaedia of International Law*.
- Fitzmaurice, M. (2018). The Practical Working of the Law of Treaties. In M. Evans, *International Law* (p. 138-180). Oxford Law Trove.
- Harrison, J. (2017). Fishing and the Conservation of Marine Living Resources. In J. Harrison, *Saving the Oceans Through Law: The International Legal Framework for the Protection of the Marine Environment* (págs. 165-208). OUP Oxford.
- Hassan, D. (2009). Climate Change and the Current Regimes of Arctic Fisheries Resources Management: An Evaluation. *Journal of Maritime Law & Commerce* (Vol. 40/4), 511-536.
- Hillebrand, H., & et al. (2018). Climate Change: Warming Impacts on Marine Biodiversity. In M. Salomon, T. Markus, & (eds.), *Handbook on Marine Environmental Protection* (p. 353-373). Springer International Publishing AG.
- Hoel, A. H. (2020). The evolving management of fisheries in the Arctic. In K. N. Scott, & D. L. VanderZwaag, *Research Handbook on Polar Law* (p. 200-218). Edward Elgar Publishing Limited.

- Jeffers, J. (2010). Climate Change and the Arctic: Adapting to Changes in Fisheries Stocks and Governance Regimes. *Vol. (37/3) Ecology law quarterly*, 917-977.
- Johansen, E. (2018). Climate Change and the Arctic: Legal Regulations in Changing Times. In M. H. Nordquist, J. N. Moore, & R. Long, *The Marine Environment and United Nations Sustainable Development Goal 14* (p. 368-390). Brill | Nijhoff.
- Mendenhall, E., & et al. (2020). Climate change increases the risk of fisheries conflict. *Vol. (117) Marine Policy*.
- Molenaar, E. J. (2000). The Concept of "Real Interest" and Other Aspects of Co-operation through Regional Fisheries Management Mechanisms. *Vol. (15/4) The International Journal of Marine and Coastal Law*, 475-531.
- Molenaar, E. J. (2009). Climate Change and Arctic Fisheries. In T. Koivurova, & et al., *Climate Governance in the Arctic* (p. 145-166). Springer.
- Molenaar, E. J. (2014). Status and Reform of International Arctic Fisheries Law. In E. Tedsen, & a. et, *Arctic Marine Governance* (p. 103-125). Springer-Verlag.
- Molenaar, E. J. (2016). International regulation of Central Arctic Ocean Fisheries. In M. H. Nordquist, & a. et, *Challenges of the Changing Arctic: Continental Shelf, Navigation, and Fisheries* (p. 429-463). Brill.
- Molenaar, E. J. (2020). Integrating Climate Change in International Fisheries Law. In E. Johansen, & et al., *The Law of the Sea and Climate Change* (p. 263-288). Cambridge University Press.
- Molenaar, E. J., & Corell, R. (2009). *Arctic Fisheries*. Arctic TRANSFORM.
- Nguyen, L. N. (2022). Expanding the Environmental Regulatory Scope of UNCLOS Through the Rule of Reference: Potentials and Limits. *Vol. (52/4) Ocean Development & International Law*, 419-444.
- Popov, S., & Zeller, D. (2018). Reconstructed Russian Fisheries Catches in the Barents Sea: 1950-2014. *Vol.(5/266) Frontiers in Marine Science*.
- Rayfuse, R. (2015). Regional Fisheries Management Organizations. In D. R. Rothwell, A. G. Oude Elferink, K. N. Scott, & T. Stephens, *The Oxford Handbook of the Law of the Sea* (p. 438-458). OUP Oxford.

- Roberts, A., & Sivakumaran, S. (2018). The Theory and Reality of the Sources of International Law. In M. Evans, *International Law* (p. 89-124). Oxford Law Trove.
- Schatz, V. J., Proelss, A., & Liu, N. (2019). The 2018 Agreement to Prevent Unregulated High Seas Fisheries in the Central Arctic Ocean: A Critical Analysis. *Vol. (34/2) The international journal of marine and coastal law*, 195-244.
- Smits, J. M. (2015). What is Legal Doctrine? On the Aims and Methods of Legal Research. *Maastrich European Private Law Institute Working Paper (6)*, 17.
- Sumalia, U. (2016). Climate, Oceans, and the Law of Special and General Adaptation. In K. R. Gray, & et al., *The Oxford Handbook of International Climate Change Law*.
- Taekema, S. (2011). Relative Autonomy, A Characterisation of the Discipline of Law. In B. van Klink, & S. Taekema, *Law and method: interdisciplinary research into law* (p. 33-52). Tübingen: Mohr Siebeck.
- Tanaka, Y. (2019). The Law of the Sea in Perspective. En Y. Tanaka, *The International Law of the Sea* (p. 3-47). Cambridge: Cambridge University Press.
- Tanaka, Y. (2020). Reflections on the Implications of Environmental Norms for Fishing: The Link between the Regulation of Fishing and the Protection of Marine Biological Diversity. *Vol. (22/3-4) International Community Law Review*, 389-409.
- Tedsen, E., Cavalieri, S., & Kraemer, R. A. (2014). *Arctic Marine Governance. Opportunities for Transatlantic Cooperation*. Springer.

6.2. Legislation, treaties, and conventions

United Nations Convention on the Law of The Sea (adopted in December 1982, in force 16 November 1994).

Agreement to Prevent Unregulated High Seas Fisheries in the Central Arctic Ocean (adopted in October 2018, in force June 2021).

Statute of the International Court of Justice (adopted in June 1945, in force August 1965).

Vienna Convention on the Law of Treaties (adopted in May 1969, in force January 1980).

The United Nations 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 (adopted in August 1995, in force December 2001).

The FAO Code of Conduct for Responsible Fisheries (adopted in October 1995).

Convention for the Protection of the Marine Environment of the North-East Atlantic (adopted in September 1992, in force March 1998).

Treaty on the Status of Spitsbergen (adopted in February 1920, in force August 1925).

Convention on the Conservation and Management of Pollock Resources in the Central Bering Sea (adopted in June 1994, in force December 1995).

Convention on Future Multilateral Cooperation in the Northwest Atlantic Fisheries (adopted in October 1978, in force January 1979).

Convention on Future Multilateral Co-operation in North East Atlantic Fisheries (adopted in November 1980, entered in force November 1980).

Agreement between the Government of the Kingdom of Norway and the Government of the Union of Soviet Socialist Republics on Co-operation in the Fishing Industry, Moscow, 11 April 1975 (adopted in April 1975, entered in force April 1975).

Agreement between the Government of the Union of Soviet Socialist Republics and the Government of the Kingdom of Norway Concerning Mutual Relations in the Field of Fisheries, Moscow, 15 October 1976 (adopted in October 1976, entered in force April 1977).

Agreement between Norway and the Soviet Union on provisional practical arrangements on fishing in an adjacent area of the Barents Sea of 11 January 1978 (adopted in January 1978, entered in force January 1978).

Treaty between the Kingdom of Norway and the Russian Federation concerning Maritime Delimitation and Cooperation in the Barents Sea and the Arctic Ocean, Murmansk, 15 September 2010 (adopted in September 2010, entered in force July 2011).

International Convention for the Conservation of Atlantic Tunas (adopted in May 1966, entered in force March 1969).

Convention for the Conservation of Salmon in the North Atlantic Ocean (adopted in January 1982, entered in force October 1983).

Convention on Biological Diversity (adopted in June 1992, entered in force December 1993)

6.3. Case law

Southern Bluefin Tuna Cases (Provisonal Measures) (1999) ITLOS Nos 3 and 4, paras 77-9, and Judges Laing at paras 16-19; Treves at para 9, and Shearer.

Area Advisory Opinion (n 21), para 117.