

**THE ICE-FREE ARCTIC IS COMING: WHY A
CIRCUMPOLAR NETWORK OF MARINE PROTECTED
AREAS IS NEEDED TO PROTECT ARCTIC FISHERIES
FROM CLIMATE CHANGE**

*Angie Lyne Fredrickson**

ABSTRACT

Changes in the Arctic's climate and corresponding shifts in marine ecosystems are occurring much more quickly than climate models and scientists predicted. At the same time, interest in the Central Arctic Ocean for fishing, transportation, tourism, and oil and gas exploration is increasing. An increase in these activities will diminish the capacity of Arctic living marine resources, including fish, to respond to the environmental changes caused by climate change. Because the resiliency of Arctic fisheries will be diminished, and because these fisheries have economic, cultural, and ecological significance for Arctic nations, there is a need for an Arctic fisheries management framework that is adaptable enough to accommodate the considerable degree of uncertainty intrinsic to the rapidly changing Arctic. This Note considers whether existing international law can provide a framework that is sufficiently flexible to respond to rapid, non-linear changes, and sufficiently comprehensive to adequately protect fisheries that are made vulnerable by the direct and indirect effects of climate change. This Note introduces the unique climate change issues facing the Arctic, as well as the existing international legal framework for Arctic fisheries. This Note concludes by suggesting that a fisheries management regime that embraces a precautionary, ecosystem-based approach through the establishment of a circumpolar network of Marine Protected Areas is needed to en-

* J.D. Candidate, 2016, Drexel University Thomas R. Kline School of Law; M.M.A., School of Marine Affairs, University of Washington; B.A., Barnard College, Columbia University. I would like to thank Professor Alex C. Geisinger, for his extraordinary insights, guidance, and encouragement during the drafting process; the *Drexel Law Review* members, for their careful and diligent editing of this Note; and Professor Craig H. Allen, for teaching me about the Law of the Sea. I extend a special thanks to Professor David L. Fluharty, both for his invaluable work on this subject and for his continual support – thank you for always being there. Finally, a thousand thanks to my family and to my friends, especially Allison, Emma, Jacqueline, and my mother – your unfaltering love and care made this law school adventure possible. I dedicate this Note to my first mentor, Marc. J. Hershman, and to all of the mentors who followed – thank you for believing in me.

sure the protection of the Arctic's present and future fisheries in light of the uncertainties that currently plague the region.

TABLE OF CONTENTS

INTRODUCTION	186
I. THE ARCTIC AND ITS CHANGING CLIMATE	192
A. <i>Arctic Ecosystems</i>	198
B. <i>Effects of Climate Change on Arctic Fisheries</i>	199
1. <i>Scientific uncertainty surrounding how climate change affects Arctic fisheries</i>	199
II. ARCTIC OCEAN GOVERNANCE REGIME.....	202
A. <i>The Arctic Council</i>	203
B. <i>The 1982 United Nations Convention on the Law of the Sea</i>	206
1. <i>Exclusive economic zone</i>	207
2. <i>High seas</i>	209
3. <i>Shared fish stocks, straddling fish stocks, and high seas fish stocks</i>	210
4. <i>The U.N. Fish Stocks Agreement and FAO Flag State Agreement</i>	212
III. LIMITATIONS OF REGIONAL FISHERIES MANAGEMENT ORGANIZATIONS	217
A. <i>Recommendations for Improving the Effectiveness of RFMOs</i>	220
B. <i>The International Community's Continued Commitment to RFMOs</i>	221
IV. PROTECTING ARCTIC FISHERIES THROUGH A CIRCUMPOLAR NETWORK OF MARINE PROTECTED AREAS	224
A. <i>Ecosystem-Based Management and Marine Protected Areas</i>	224
B. <i>Addressing the Enforcement Challenge</i>	228
C. <i>Legal Mechanisms for Establishing a Central Arctic Ocean Marine Protected Area</i>	229
CONCLUSION	231

INTRODUCTION

For centuries, the Arctic has been a remote and isolated place, and its natural resources have been relatively unexploited. While it is

true that indigenous peoples of the Arctic have hunted and fished for subsistence for several millennia,¹ the cold and harsh weather conditions, the vast extent of snow and ice, the lack of infrastructure, and the vast distances separating life north of the Arctic Circle from the most concentrated parts of human civilization have deterred extensive natural resource extraction in the Arctic. But today, the Arctic is changing.² Polar ice is melting rapidly due to rising atmospheric temperatures, warming seas, and changing oceanic currents.³ These physical changes are driving social and economic change.⁴ Warmer temperatures are creating an Arctic that is more hospitable for commerce and industry; activities like tourism, shipping, and oil, gas, and mineral extraction are on the rise in Arctic re-

1. HJÁLMAR VILHJÁLMSOON ET AL., ARCTIC CLIMATE IMPACT ASSESSMENT 696–97 (Cambridge Univ. Press ed. 2005) [hereinafter ACIA] (citing TRYGVE SOLHAUG, DE NORSKE FISKERIERS HISTORIE 1815–80 (Universitetsforlaget ed., 2d ed. 1983), available at <http://www.amap.no/documents/doc/arctic-arctic-climate-impact-assessment/796> (“For the past thousand years, fishing for cod and herring has been important for coastal communities in Norway and northern Russia . . . Throughout the centuries, fishing was purely coastal and seasonal and based on the large amounts of adult cod and herring migrating into near-shore waters for spawning.”); see also Jennifer Jeffers, Note, *Climate Change and the Arctic: Adapting to Changes in Fisheries Stocks and Governance Regimes*, 37 *ECOLOGY L.Q.* 917, 922 (2010) (“The Arctic seas contain some of the world’s oldest and richest commercial fishing grounds.”).

2. ACIA, *supra* note 1, at 155.

3. *Id.* at 991 (“Many types of observations indicate that the climate of the Arctic is changing. For example, air temperatures are generally warmer, the extent and duration of snow and sea ice are diminishing, and permafrost is thawing . . . It is very likely that human-induced factors, for example the rise in GHG concentrations and consequent enhancement of the global greenhouse effect, will lead to very large changes in climate, indeed, changes that will be much greater in the Arctic than at middle and lower latitudes.”); *id.* at 991–92 (observing temperature changes in the Arctic from 1954 to 2003 show “[m]ean annual atmospheric surface temperature changes range from a 2 to 3 °C warming in Alaska and Siberia to a cooling of up to 1 °C in southern Greenland. Winter temperatures are up to 4 °C warmer in Siberia and in the western Canadian Arctic.”); *id.* at 992 (“Rapid changes in regional climates (so-called regime shifts) are also evident in the climatic record. For example, in 1976 in the Bering Sea region there was a relatively sudden shift in prevailing climatic patterns, which included rapid warming and reduction in sea-ice extent. Such shifts have led to numerous, nearly instantaneous impacts on biota and ecosystems, as well as impacts on human communities and their interactions with the environment. Although such fluctuations are not fully understood and are therefore difficult to predict, regime shifts can be expected to continue to occur in the future, even as the baseline climate is also changing as a result of global warming.”); *id.* at 993 (“New species, never before recorded in the Arctic, have also been observed. The distribution ranges of some species of birds, fish, and mammals now extend further to the north than in the past.”).

4. *Id.* at 990 (“The Arctic is . . . important to the global economy. There are large oil and gas and mineral reserves in many parts of the Arctic, and [A]rctic fisheries are among the most productive in the world, providing food for millions . . . Climate change is likely to benefit north-south connections, including shipping, the global economy, and migratory birds, fish, and mammals that are important conservation species in the south.”).

gions.⁵ While this increase in commercial and industrial activity benefits Arctic communities through financial investment in the region, it also has the potential to harm these communities by damaging the fragile Arctic ecosystem.

Recent science shows that changes in the Arctic's climate and corresponding shifts in marine ecosystems are occurring much more quickly than climate models and scientists predicted.⁶ Warmer temperatures are producing an increasingly ice-free Arctic Ocean in the summer months.⁷ As the ice melts, new swaths of open water emerge in the Arctic Ocean, and Arctic fisheries that were previously protected by remoteness and ice are now more accessible.⁸ As waters warm, sub-Arctic fish stocks endemic to lower latitudes will likely migrate north in search of colder waters, and fishing fleets will likely follow.⁹ An increase in commercial fishing from both Arctic states and non-Arctic states with distant-water fishing fleets will threaten Arctic fisheries both directly and indirectly.¹⁰ Therefore, in coming decades, Arctic fish stocks will have to adapt to multiple new stressors, including direct climate effects,¹¹ increased competition for habitat from sub-Arctic species, and increased fishing pressure.¹² While many formerly robust fisheries in lower latitudes have been severely depleted by decades of overexploitation, Arctic and sub-Arctic species remain healthy, and sub-Arctic waters contain some of the richest fishing grounds on earth, abundant in commercially important stocks like cod and herring.¹³ As the Arctic warms and these commercially important fish migrate north, a combination

5. *Id.* at 1002.

6. David Fluharty, *Arctic Marine Living Resources*, in 2012 NORTH PACIFIC ARCTIC CONFERENCE PROCEEDINGS, THE ARCTIC IN WORLD AFFAIRS: A NORTH PACIFIC DIALOGUE ON ARCTIC MARINE ISSUES, 151, 152 (Oran R. Young, Jong Deog Kim & Yoon Hyung Kim eds., 2012).

7. *Id.*

8. *See id.*

9. *See id.*

10. Bonnie A. Malloy, *On Thin Ice: How a Binding Treaty Regime Can Save the Arctic*, 16 HASTINGS W.-NW. J. ENVTL. L. & POL'Y 471, 472-73 (2010) (describing possible direct effects as including commercial fishing of Arctic fish stocks not previously commercially fished and incidental takes of non-targeted species, while also describing possible indirect effects as including the environmental impacts of fishing vessels). Distant water fishing nations are nations with fleets of fishing vessels operating outside of their own coastal waters. RAMÓN BONFIL ET AL., THE FOOTPRINT OF DISTANT WATER FLEETS ON WORLD FISHERIES 3 (1998), available at http://awsassets.panda.org/downloads/distant_water1.pdf. For a discussion of how the activities of distant water fishing fleets have affected global fisheries, see *id.*

11. *See* ACIA, *supra* note 1, at 636.

12. *See* Fluharty, *supra* note 6, at 151.

13. Malloy, *supra* note 10, at 473.

of factors converge to position the Arctic as a “prime target” for fisheries exploitation.¹⁴

Looking forward, constant change and uncertainty will become the new normal for the Arctic.¹⁵ Because there is so much uncertainty surrounding the nature and extent of these forthcoming changes, and because the natural environment is changing much more rapidly in the Arctic than in other places on Earth,¹⁶ it is critical that the Arctic’s natural resource management governance structures be both sufficiently comprehensive and sufficiently flexible to ensure adequate protection of existing marine species in this new era of change and uncertainty.

This Note considers the effect of climate-induced changes on Arctic fish stocks and whether the fisheries management regimes provided for under existing international law are comprehensive and flexible enough to ensure the preservation of present and future Arctic fish stocks. In 2008, the five coastal Arctic states—Canada, Denmark, Norway, Russia, and the United States (the Arctic Five)—announced in The Ilulissat Declaration that there was no need to develop a new legal framework to govern the Arctic.¹⁷ Quite the opposite, these states asserted that existing international law, in particular the 1982 United Nations Law of the Sea Convention (LOSC),

14. *Id.* (citing UNITED NATIONS ENVIRONMENT PROGRAMME, IN DEAD WATER 38 (Christian Nellemann, Stefan Hain & Jackie Alder eds., 2008), available at http://www.unep.org/pdf/InDeadWater_LR.pdf (“With 52 percent of the world’s fisheries already overexploited, oceans are under stress and depletion of the remaining fish stocks is accelerating due to synergies between overfishing, pollution, ocean warming, and infestations of invasive species. The decline in fish has led to an increase in international, regional, and domestic regulations, which has caused a search for less regulated fishing areas and fish stocks—like the Arctic.”). Scientists are already observing fish migrating north in search of colder waters. See Carl Zimmer, *Ocean Life Faces Mass Extinction, Broad Study Says*, N.Y. TIMES (Jan. 15, 2015) <http://www.nytimes.com/2015/01/16/science/earth/study-raises-alarm-for-health-of-ocean-life.html> (“Some fish are migrating to cooler waters already. Black sea bass, once most common off the coast of Virginia, have moved up to New Jersey. Less fortunate species may not be able to find new ranges.”).

15. See generally Fluharty, *supra* note 6.

16. *Id.*; Michael J. Geiselhart, Note, *The Course Forward for Arctic Governance*, 13 WASH. U. GLOBAL STUD. L. REV. 155, 158–59 (2014) (“The Arctic region is feeling the effects of global climate change more severely and more quickly than almost anywhere else on [E]arth—the ‘Arctic Amplification’ . . . is attributable to atmospheric mixing, whereby warm air from the equator moves to the poles . . . [T]he movement of moisture and warm water currents from the equator amplifies this trend. Reductions in sea ice and snow cover are another important factor in Arctic Amplification. As the region becomes less white, it absorbs more heat instead of reflecting it.”).

17. See The Ilulissat Declaration, Arctic Ocean Conference, May 28, 2008, available at http://www.oceanlaw.org/downloads/arctic/Ilulissat_Declaration.pdf.

provided all of the legal tools required for the Arctic to successfully weather whatever future storms a changing climate might conjure.¹⁸

In the eight years between the signing of The Ilulissat Declaration and the publication of this Note, it has become clear that the Arctic's climate is changing more quickly than climate models predicted, that marine ecosystems are responding more rapidly to these changes than scientists predicted, and that there is greater uncertainty surrounding the nature of these changes due the potential for abrupt—rather than incremental—climate change.¹⁹ Given the rapid pace of change and the great degree of uncertainty surrounding projected changes, this Note suggests that the creation of a circumpolar network of no-take Marine Protected Areas will be necessary to ensure the protection of the Arctic's present and future fisheries.

The establishment of a circumpolar network of no-take Marine Protected Areas (MPAs) will provide the best protection for present and future Arctic fisheries.²⁰ Fisheries managers presently face three serious problems in the Arctic. First, while there is no longer any dispute that the Arctic is changing, there is a great deal of uncertainty surrounding the rate and nature of present and future changes.²¹ A lack of both historic and present-day data poses a huge challenge. This lack of scientific understanding suggests that managers should apply the "precautionary principle."²² Second, as the cryosphere melts, multi-year sea ice becomes open water, and a new high seas emerges in the Central Arctic Ocean (CAO).²³ Because the

18. The Arctic Five recently affirmed its commitment to the LOSC in the Declaration Concerning the Prevention of Unregulated High Seas Fishing in the Central Arctic Ocean. Declaration Concerning the Prevention of Unregulated High Seas Fishing in the Central Arctic Ocean, July 16, 2015, available at <https://www.regjeringen.no/globalassets/departementene/ud/vedlegg/folkerett/declaration-on-arctic-fisheries-16-july-2015.pdf>. The Declaration states:

We recall that an extensive international legal framework applies to the Arctic Ocean. These interim measures will neither undermine nor conflict with the role and mandate of any existing international mechanism relating to fisheries. . . . Nor will these interim measures prejudice the rights, jurisdiction[,] and duties of States under relevant provisions of international law as reflected in the 1982 United Nations Convention on the Law of the Sea, or the 1995 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, or alter the rights and obligations of States that arise from relevant international agreements.

Id.

19. See Fluharty, *supra* note 6, at 152.

20. See *infra* Part IV.

21. See *infra* Part I.B.1.

22. See *infra* text accompanying note 110.

23. See *infra* Part I.

LOSC codifies the historically established right to freedom of the seas on the high seas, unless states formally bind themselves to an agreement to abstain from fishing, the high seas of the CAO are fair game for anyone who wishes to fish them.²⁴ Decades of international efforts to address overfishing on the high seas have resulted in several international agreements,²⁵ but the international community has been unable to find a silver bullet to address the monitoring, enforcement, and reporting challenges associated with illegal, unregulated, and unreported fishing on the high seas.²⁶ Third, in recent decades, scientists have acknowledged the failures of the single species approach to fisheries management in general.²⁷ In response, managers have started to embrace ecosystem-based management, including Marine Protected Areas, as a more holistic, more sustainable, and more effective approach to managing fisheries.²⁸

This Note is comprised of four parts. Part I provides necessary background information, describing the Arctic Ocean ecosystem, identifying the Arctic states, and providing a brief overview of some of the Arctic's present challenges.²⁹ It also discusses the observed and projected changes to the Arctic's climate and to Arctic fisheries.³⁰ In Part II, this Note discusses the current governance structure of the Arctic Ocean.³¹ This includes a discussion of the primary international treaty that governs Arctic fisheries, the LOSC, as well as the existing non-binding institutions and agreements influencing Arctic Ocean governance.³² This Part also includes a description of the existing legal regime for fisheries management set forth in the LOSC.³³ Further, it provides an overview of the two binding international agreements aimed at addressing straddling and high seas fish stocks: the 1995 United Nations Fish Stocks Agreement (Fish Stocks Agreement) and the 1993 FAO Flag State Agreement (Flag State Agreement).³⁴ Particular attention will be given to the Fish Stocks Agreement's focus on Regional Fisheries Management Organiza-

24. See *infra* Part II.B.2.

25. See *infra* Part II.B.

26. See *infra* Part III.

27. See *infra* Part IV.

28. *Id.*

29. See *infra* Part I.

30. See *id.*

31. See *infra* Part II.

32. *Id.*

33. *Id.*

34. *Id.*

tions (RFMOs) and whether RFMOs constitute the most effective way to manage straddling and high seas fish stocks in the CAO.³⁵

In Part III, this Note considers whether the creation of an RFMO for Arctic fisheries will result in a management regime that is comprehensive and flexible enough to accommodate the considerable degree of uncertainty intrinsic to the rapidly changing Arctic.³⁶ This Part explores the strengths and weaknesses of RFMOs in the context of Arctic fisheries management.³⁷ It concludes that an RFMO will not provide adequate protection to Arctic fisheries due to the inherent weaknesses of the RFMO framework, the Arctic's unique political environment, and the rapid rate of change in the Arctic.³⁸ In Part IV, this Note proposes an alternative approach to ensuring the preservation of present and future Arctic fisheries: the designation of a network of no-take Marine Protected Areas throughout the Arctic, including in the high seas of the CAO.³⁹ It asserts that the establishment of a circumpolar network of no-take MPAs, in conjunction with other ongoing fisheries management efforts, provides the best protection for Arctic fisheries.⁴⁰

I. THE ARCTIC AND ITS CHANGING CLIMATE

The Arctic is an enormous area, covering over one-sixth of the earth's surface.⁴¹ At the center of Arctic is the Arctic Ocean,⁴² which is surrounded by the landmasses of Canada, Greenland, Norway, Finland, Iceland, Sweden, Russia, and the United States.⁴³ While the

35. *Id.*

36. *See infra* Part III.

37. *Id.*

38. *See id.*

39. *See infra* Part IV.

40. *See id.*

41. Tom Barry, *The Conservation of Arctic Flora and Fauna (CAFF): Working with the CBD to Support Arctic Biodiversity*, NAT. RESOURCES POL'Y & PRAC. (Nov. 16, 2011), <http://nr.iisd.org/guest-articles/the-conservation-of-arctic-flora-and-fauna-caff-working-with-the-cbd-to-support-arctic-biodiversity>.

42. Jeffers, *supra* note 1, at 922 ("Critical to understanding Arctic governance is recognizing that the Arctic is not a landmass, but an ice-covered ocean surrounded by land.").

43. *Id.* at 923. Definitions of the Arctic vary. The Merriam-Webster dictionary defines the Arctic as "the Arctic Ocean and the lands in it and adjacent to it." *Arctic Definition*, MERRIAM-WEBSTER.COM, <http://www.merriam-webster.com/dictionary/arctic> (last visited Dec. 16, 2015). This Note considers the Arctic to be the region north of the Arctic Circle, which is at 66°34'N latitude. This is consistent with the term Arctic as defined in 15 U.S.C. § 4111, which defines the Arctic as "all United States and foreign territory north of the Arctic Circle and all United States territory north and west of the boundary formed by the Porcupine, Yukon, and

Arctic's coastal seas⁴⁴ have been historically free of ice for all or portions of each year, until very recently, a thick cover of ice that remained intact year-round permanently covered much of the Arctic Ocean.⁴⁵ But today, the Arctic Ocean's ice is melting.⁴⁶ Much of what was once multi-year ice is now first-year ice,⁴⁷ and large portions of the Arctic Ocean are now ice-free during the summer months.⁴⁸ While earlier climate models predicted that the Arctic Ocean would be completely free of ice during the summer as early as the end of this century,⁴⁹ satellite observations of sea ice extent in the Arctic Ocean reveal a much more accelerated trend,⁵⁰ showing a "marked

Kuskokwim Rivers; all contiguous seas, including the Arctic Ocean and the Beaufort, Bering, and Chukchi Seas; and the Aleutian chain." 15 U.S.C. § 4111 (1984).

44. The Arctic coastal seas include the Barents Sea, the Bering Sea, the Beaufort Sea, the Chukchi Sea, the East Siberian Sea, the Greenland Sea, the Kara Sea, the Laptev Sea, Baffin Bay, Hudson Bay, Hudson Strait, and other water bodies. *Arctic Ocean*, CIA WORLD FACTBOOK (Aug. 1, 2003), available at <http://www.factbook.org/factbook/xq.shtml>; Jeffers, *supra* note 1, at 928.

45. See Geiselhart, *supra* note 16, at 157 n.14 (noting that the ACIA defines the Arctic as "a single, highly integrated system comprised of a deep, ice covered, and nearly isolated ocean surrounded by the land masses of Eurasia and North America, except for breaches at the Bering Strait and in the North Atlantic.").

46. ACIA, *supra* note 1, at 997 tbl.18.3 ("Summer sea-ice extent decreased by about 7% per decade between 1972 and 2002, and by 9% per decade between 1979 and 2002, reaching record low levels in 2002. The extent of multi-year sea ice has also decreased, and ice thickness in the Arctic Basin has decreased by up to 40% since the 1950s and 1960s due to climate-related and other factors."). "Sea-ice extent is very likely to continue to decrease, particularly in summer. Model projections of summer sea-ice extent range from a loss of several percent to complete loss." *Id.*

47. U.S. COAST GUARD, ARCTIC STRATEGY 11 (2013), available at https://www.uscg.mil/seniorleadership/DOCS/CG_Arctic_Strategy.pdf (defining multi-year ice as sea ice that survives through the summer months and first-year ice as ice that forms and melts seasonally); J.C. Stroeve et al., *Changes in Arctic Melt Season and Implications for Sea Ice Loss*, 41 GEOPHYSICAL RES. LETTER 1216, 1216 (2014).

48. See Stroeve et al., *supra* note 47, at 1222. The extent of sea ice in the Arctic has been at a record low every year since 2007. See *id.* at 1216. Between 1979 and 2001, sea ice extent in September (when Arctic ice is at its lowest) decreased at a rate of 7% per decade. *Id.* In contrast, if one considers the rate of decrease between 1979 and 2013, the rate doubles to a 14% decrease of sea ice extent per decade. *Id.*

49. In 2007, one study by the Intergovernmental Panel on Climate Change projected an ice-free Arctic Ocean by the end of this century. WORKING GROUP II CONTRIBUTION TO THE FOURTH ASSESSMENT REPORT OF THE INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, CLIMATE CHANGE 2007: IMPACTS, ADAPTATION AND VULNERABILITY 756 (2007) [hereinafter IPCC ADAPTATION REPORT], available at https://ipcc.ch/pdf/assessment-report/ar4/wg2/ar4_wg2_full_report.pdf; ACIA, *supra* note 1, at 999 ("Some of the models project an entirely ice-free Arctic Ocean in summer by the end of the 21st century.").

50. Jan-Gunnar Winther, Dir., Norwegian Polar Inst., and Chair, Fram Ctr., Presentation at the Center for Strategic and International Studies (July 16, 2014), http://csis.org/files/attachments/140616_warmingarctic_slides.pdf (citing 2011 data from the National Snow and Ice Data Center and NASA). Satellite observations between 1950 and 2011 show that sea

decrease in the volume of multi-year ice.”⁵¹ U.S. Navy scientists predict that the Arctic could lose its summer sea ice as early as 2016.⁵² Limited scientific understanding of the processes affecting Arctic sea ice, large annual variability due to weather events, and the difficulty of downscaling global climate models to regional scales make it quite difficult for climate scientists to forecast the future rate of sea ice loss with certainty.⁵³ However, based on observed changes and current climate models, the majority of climate scientists conclude that a completely ice-free Arctic Ocean during the summer months is likely in the next thirty to forty years, if not much sooner.⁵⁴

While society to the south continues to squabble over whether global climate change is a myth, changes in the Arctic’s climate have already become a reality.⁵⁵ Scientists observe that the entire Arctic marine ecosystem is changing.⁵⁶ These ecosystem changes impact both fisheries and the “patterns of human activities dependent on them,” such as fishing.⁵⁷ In addition to observed increases in temperature,⁵⁸ the Arctic is also experiencing changes to the

ice extent, measured in 10⁶ km², decreased to 4.61 M km². *Id.* This is significant because climate models did not predict this extent of sea ice loss until 2050. *See id.*

51. U.S. COAST GUARD, *supra* note 47, at 11.

52. Nafeez Ahmed, *US Navy Predicts Summer Ice Free Arctic by 2016*, THE GUARDIAN (Dec. 9, 2013), <http://www.theguardian.com/environment/earth-insight/2013/dec/09/us-navy-arctic-sea-ice-2016-melt>; Wieslaw Maslowski et al., *The Future of Arctic Sea Ice*, 40 ANN. REV. OF EARTH AND PLANETARY SCI., 625, 639 (2012).

53. Maslowski et al., *supra* note 52, at 646–47.

54. *Id.* at 635.

55. WORKING GROUP II OF THE INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, CLIMATE CHANGE 2001: IMPACTS, ADAPTATION, AND VULNERABILITY 16 tbl.SPM-2 (2001), *available at* http://www.grida.no/climate/ipcc_tar/wg2/pdf/wg2TARspm.pdf (“Changes in climate that have already taken place are manifested in the decrease in extent and thickness of Arctic sea ice, permafrost thawing, coastal erosion, changes in ice sheets and ice shelves, and altered distribution and abundance of species in polar regions . . .”).

56. *See* Fluharty, *supra* note 6, at 151 (“[C]hanges in the physical and chemical processes . . . drive atmospheric and ocean circulation, the loss of sea ice, [and] changes in precipitation and runoff . . . affect nutrient distribution and availability[,] . . . [which] result[s] in alterations in ocean microbiology and primary and secondary production . . .”).

57. *Id.*

58. *See* U.S. COAST GUARD, *supra* note 47, at 18 (“Alaska has warmed more than twice as rapidly as the rest of the United States . . .”);

CONTRIBUTION OF WORKING GROUPS I, II AND III TO THE FIFTH ASSESSMENT REPORT OF THE INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, CLIMATE CHANGE 2014: SYNTHESIS REPORT 40 (2014), *available at* http://www.ipcc.ch/pdf/assessment-report/ar5/syr/SYR_AR5_FINAL_full.pdf (“Each of the last three decades has been successively warmer at the Earth’s surface than any preceding decade since 1850.”).

cryosphere,⁵⁹ including a reduced extent of snow, ice, and permafrost,⁶⁰ and corresponding changes to the terrestrial, freshwater, and marine ecosystems.⁶¹ All of these changes are caused in large part by a steady increase in the emissions of greenhouse gases into the atmosphere since the Industrial Revolution.⁶² Scientists observe that changes to snow and ice in the Arctic are particularly important because they “play a crucial role in shaping the [A]rctic environment,” meaning that changes in the snow and ice will be “very likely to have profound effects on the environment, biota, ecosystems, and humans.”⁶³

Arctic communities are experiencing the dramatic and devastating impacts of a changing climate first-hand, and the indigenous and coastal populations of the Arctic have been adversely impacted.⁶⁴ In the village of Kivalina in Northwest Alaska, the retreat of “fast ice” (sea ice that forms and remains along the coast)⁶⁵ in recent years has exposed the village to storm surges and coastal erosion.⁶⁶ And in coastal communities like Shishmaref, Alaska, which has been inhabited for 4,000 years,⁶⁷ climate effects such as thawing permafrost, retreating sea ice, rising sea levels, and new and extreme weather patterns are “undermining the integrity of the community’s basic public infrastructure”⁶⁸ The impacts “are so severe that the community faces certain relocation to the Alaskan mainland.”⁶⁹ Some structures are already being moved inland. For instance, resident Leona Goodhope returned from school one day to

59. The cryosphere is “the frozen water part of the Earth system.” Nat’l Oceanic and Atmospheric Admin., *What is the Cryosphere?*, NAT’L OCEAN SERVICE (May 19, 2014), <http://oceanservice.noaa.gov/facts/cryosphere.html>.

60. ACIA, *supra* note 1, at 996.

61. *Id.* at 997–99.

62. *Id.* at 990.

63. *Id.* at 997.

64. Government of Canada, *Sea Ice Types and Forms*, ENV’T AND CLIMATE CHANGE CAN. (last modified July 23, 2013), <http://www.ec.gc.ca/glaces-ice/default.asp?lang=En&nav=F2358C10-1>.

65. Chris Mooney, *The Remote Alaskan Village that Needs to Be Relocated Due to Climate Change*, WASH. POST (Feb. 24, 2015), <http://washingtonpost.com/news/energy-environment/wp/2015/02/24/the-remote-alaskan-village-that-needs-to-be-relocated-due-to-climate-change/>.

66. ACIA, *supra* note 1, at 997.

67. Malloy, *supra* note 10, at 473–74.

68. WORLD WILDLIFE FUND, ARCTIC CLIMATE IMPACT SCIENCE: AN UPDATE SINCE ACIA 97 (2008), *available at* <http://www.climateneeds.umd.edu/reports/WWF-Climate%20Change-Arctic.pdf>.

69. *Id.*

discover her house had been relocated to prevent it from falling into the ocean.⁷⁰

Climate change is indisputably affecting the people of the Arctic. And it is certainly adversely impacting Arctic species as well. The loss of ice in the Arctic has dire consequences for species that rely on ice for critical habitat. Scientists have concluded that ice-dependent species are particularly “sensitive to climate change because small changes in temperature can affect the thickness and extent of sea ice.”⁷¹ Polar bears will lose a large range of their natural habitat as the ice thins and disappears,⁷² and species that rely on ice to rest, mate, and rear their young will also be highly vulnerable.⁷³

The shifting climate is also prompting socio-economic change in the Arctic. Developed and developing nations continue to look for new sources of fossil fuels to meet their perceived energy needs, and seismic surveys indicate that vast reserves of oil and gas are present in the Arctic.⁷⁴ The U.S. Geological Survey estimates that 13% of the world’s undiscovered oil reserves (90 billion barrels) and 30% of the undiscovered gas reserves (1,699 trillion cubic feet of natural gas, and 44 billion barrels of natural gas liquids) are in the Arctic.⁷⁵ As the Arctic warms and summer sea ice disappears, an increased number of companies are considering the feasibility of oil, gas, and mineral development in the Arctic Ocean.⁷⁶

70. Malloy, *supra* note 10, at 474.

71. See WORLD WILDLIFE FUND, *supra* note 68, at 60 (citations omitted).

72. *Id.* at 13 (“Work since the ACIA confirms the risks to polar bears from decline and earlier break-up of [A]rctic sea ice, with a conservative model projecting a two-third loss of the current population by mid-century. Studies show impact on body condition, size, and on [behavior] in several regions. Changes at population level are often complicated by influence of harvest, but declines in two of 19 populations have been attributed to climate change. Population surveys have been undertaken in some regions to establish or improve baseline data.”).

73. *Id.* (“IPCC AR4 identifies sea ice biome as the marine ecosystem most likely to be especially affected by climate change Confirmation by evidence of declining trends for a range of marine species of the sea ice biome, including some in the upper trophic levels (e.g., ringed seals, some populations of ivory gulls, grey whales).”).

74. U.S. GEOLOGICAL SURVEY, CIRCUM-ARCTIC RESOURCE APPRAISAL: ESTIMATES OF UNDISCOVERED OIL AND GAS NORTH OF THE ARCTIC CIRCLE (2008), available at <http://pubs.usgs.gov/fs/2008/3049/fs2008-3049.pdf> (“The extensive Arctic continental shelves may constitute the geographically largest unexplored prospective area for petroleum remaining on Earth.”).

75. *Id.*; see also U.S. COAST GUARD, *supra* note 47, at 5.

76. Fluharty, *supra* note 6, at 151; U.S. COAST GUARD, *supra* note 47, at 13 (“Hard mineral extraction is a mature industry in the Russian Arctic and is growing in the U.S. Arctic. Indeed, the U.S. Arctic is home to one of the largest zinc and lead mines in the world The Government of Norway attributes the following percentages of worldwide mineral production to the Arctic: nickel (11 percent), cobalt (11 percent), tungsten (9 percent), zinc (8 percent), palla-

In addition, open waters in summer months will lead to an increase in maritime activity.⁷⁷ The transportation industry is eager to take advantage of an ice-free Arctic Ocean to move goods quickly from manufacturing hubs in Asia to markets in Northern Europe, and Arctic tourism is a growing industry.⁷⁸ A changing climate may also lead to an increase in Arctic fishing. While it is true that coastal communities have fished in Arctic and sub-Arctic waters for hundreds of years,⁷⁹ when Arctic waters become accessible as sea ice recedes, the fishing fleets of many nations may choose to begin fishing in the Arctic.

Anthropogenic activities are already negatively impacting the Arctic's pristine ecosystems,⁸⁰ and a changing climate will exacerbate the harm caused by activities such as oil, gas, and mineral extraction, shipping, and fishing. Scholars have observed that:

[c]limate change and anthropogenic stresses on our environment, such as pollution and overfishing, are not mutually exclusive. Their synergistic effects transcend state boundaries creating universal problems that only a combined international effort can address Unfortunately, the severest impacts are occurring in remote locations placing international responses on the periphery of most nations' agendas. The Arctic is one [of] these remote regions, whose

dium (40 percent), platinum (15 percent), gem-grade diamonds (26 percent), industrial-grade diamonds (24 percent), and apatite (11 percent).").

77. U.S. COAST GUARD, *supra* note 47, at 11.

78. *Id.* at 13. The U.S. Coast Guard describes commercial ship traffic in the Arctic using three categories: destination shipping (shipping in and out of the Arctic, in support of Arctic commercial activity such as seasonal offshore oil drilling); trans-Arctic shipping (using the Arctic as a shipping route between destinations outside of the Arctic, namely eastern Asia and Europe); and adventure tourism (e.g., tours through the Northwest passage). *Id.* There are two possible trans-Arctic shipping routes connecting Europe with Asia: the Northwest Passage, which hugs the landmass of North America, and the Northern Sea Route, which follows the northern coastline of Eurasia. *Id.* According to the U.S. Coast Guard, "[d]ue to adverse weather conditions, unpredictable ice conditions, and limited navigation infrastructure, neither route is expected to become extensively trafficked during the next 10 years. However, the Russian Federation continues to develop and promote the Northern Sea Route as a viable option for commercial trans-shipment which could increase maritime activity over time." *Id.*

79. ACIA, *supra* note 1, at 696-97 ("For the past thousand years, fishing for cod and herring has been important for coastal communities in Norway and northern Russia. Throughout the centuries, fishing was purely coastal and seasonal and based on the large amounts of adult cod and herring migrating into near-shore waters for spawning"); see also Jeffers, *supra* note 1, at 921 ("The Arctic seas contain some of the world's oldest and richest commercial fishing grounds.").

80. See Fluharty, *supra* note 6, at 151 (describing how the transport of toxic materials into the Arctic ecosystem affects living marine resources).

uniquely intense impacts have culminated in its recognition as a barometer for climate change and the earth's health.⁸¹

Anthropogenic activities such as oil, gas, and mineral extraction, shipping, and fishing will place stress on marine species by introducing pollution, including noise pollution, into the Arctic environment.⁸² In addition, oil, gas, and mineral extraction alter the natural environment. Fishing directly depletes the resource.⁸³ And with all of these activities comes the risk of a catastrophic environmental disaster, such as an oil spill arising from a collision between vessels, or from the failure of a well.⁸⁴ In light of the uncertainty surrounding projected climatic changes, scholars urge society to take all practicable measure to reduce non-climate change stresses, so that ecosystems are as resilient as possible.⁸⁵ Unfortunately, in the Arctic changes in climate are facilitating an increase, rather than a decrease, in non-climatic stressors.

A. Arctic Ecosystems

Despite the Arctic's harsh climate, its waters teem with life. Polar bears are at the top of the Arctic's marine food web.⁸⁶ These apex predators are supported by a complex ecosystem of fish, birds, seals, walrus, and whales.⁸⁷ Arctic marine species have evolved to thrive in frosty conditions.⁸⁸ Male polar bears make temporary snow dens to survive winter storms, while female polar bears use snow to create the maternity dens where they give birth and raise cubs during

81. Malloy, *supra* note 10, at 472 n.1 (citing *Inuit in Global Issues: Speaking to the World About Climate Change*, 17 ICC JOURNAL SILARJUALRIRINIQ (2003), available at http://plato.acadiau.ca/courses/pols/inspired/content/html/ICC_Journal_Climate_Change.htm) ("In 2003, the United Nations Environment Programme's Governing Council passed a resolution for increased monitoring in the Arctic due to the intense effects climate change has on the region. The Arctic is now seem as warning of the future to come and as providing information to aid the world in changing or adapting to that fate.").

82. See Fluharty, *supra* note 6, at 235.

83. See generally Malloy, *supra* note 10, at 473.

84. See *id.* (discussing the devastation that could result from exploitation of the Arctic region).

85. Robin Kundis Craig, "Stationarity Is Dead" – Long Live Transformation: Five Principles for Climate Change Adaptation Law, 34 HARV. ENVTL. L. REV. 9, 43 (2010) (advocating for the elimination or reduction of non-climate change stresses so as to increase resiliency because "vulnerability to climate change can be exacerbated by other stresses.") (quoting IPCC ADAPTATION REPORT, *supra* note 49).

86. WORLD WILDLIFE FUND, *supra* note 68, at 80–85.

87. *Id.*

88. See *id.* at 60–62.

the winter.⁸⁹ Arctic whales migrate under sea ice by breathing through cracks and other small openings in the ice.⁹⁰ Ringed and bearded seals and walrus rely on sea ice to mate, give birth, avoid predators, and rest between foraging activities. The Arctic cod, also called polar cod, is a key species in the Arctic food web.⁹¹ Other important Arctic fish include turbot, various whitefishes, and Arctic char. Salmon also sustain traditional coastal communities in the region. In the Bering Sea, just south of the Arctic Circle, sub-Arctic species of salmon and pollock are abundant and form the basis for large commercial fisheries.⁹² Most Arctic fish species thrive only in waters within a very specific temperature range.⁹³

B. Effects of Climate Change on Arctic Fisheries

In 2004, a comprehensive effort was undertaken to assess how changes in climate would impact the Arctic.⁹⁴ The result was the Arctic Climate Impacts Assessment (Assessment), which acknowledges that the Arctic is experiencing unprecedented and disruptive environmental, economic, and social change.⁹⁵ Although over a decade old at the time of this Note, the Assessment continues to provide the most comprehensive evaluation of how climate change will likely affect Arctic fisheries.

1. Scientific uncertainty surrounding how climate change effects Arctic fisheries

Scientists acknowledge that it is not easy to project changes in climate, even when models are built on robust data sets.⁹⁶ Because Arctic fisheries have traditionally been fished at relatively low levels of intensity, and because conducting stock surveys in the Arctic has proven challenging due to the extent of ice cover, data on the Arctic fisheries is quite limited. Imperfect data on Arctic fisheries means

89. *See generally id.*

90. *Id.* at 211.

91. *Id.*

92. WWF, FACTSHEET: EFFECTS OF CLIMATE CHANGE ON ARCTIC FISH 1 (2008), available at http://www.climatechange.ie/pdf/WWF/arctic_fish_factsheet.pdf.

93. *Id.*

94. ACIA, *supra* note 1.

95. *Id.* at 54, 94-95, 946, 951, 1019-20.

96. *Id.* at 770.

that the models predicting how climate change will affect fisheries in the Arctic are less reliable. Further, because the climate models used in the Assessment did not include scenarios for “ocean temperatures, watermass mixing, upwelling, and other relevant ocean variables,” the authors of the Assessment acknowledged that it was “not possible to predict the effects of climate change on marine fish stocks with any degree of certainty.”⁹⁷

The Assessment is now ten years old, and in the subsequent decade, the extent of uncertainty embedded in the Assessment’s findings has been made manifest as further studies have altered or contradicted the Assessment’s projections. Because it remains the most comprehensive evaluation of how climate will impact Arctic fisheries, the key findings of the Assessment are listed below. Where available, more recent scientific findings have been incorporated.

The Assessment predicts that reductions in sea ice will affect marine ecosystems, likely prompting changes in the distribution and migration patterns of fish stocks.⁹⁸ Specifically, it predicts that climate change will likely “induce an ecosystem regime shift in some areas, resulting in a very different species composition . . . [including changes in] relative population size, fish growth rates, and spatial distributions of fish stocks.”⁹⁹ More recent studies have shown that as Arctic waters continue to warm, important sub-Arctic commercial fish stocks—including capelin, Atlantic cod, herring, mackerel, and Bluefin tuna—are migrating northward.¹⁰⁰

While the Assessment projected some negative impacts on fisheries,¹⁰¹ it also concluded that a reduction in sea ice coupled with moderate warming may benefit some commercially significant sub-Arctic species, such as cod and herring, due to an increase in “pri-

97. *Id.*

98. *See id.* at 694.

99. *Id.* at 692.

100. *See* U.S. COAST GUARD, *supra* note 47, at 28 (“The Bering Sea remains home to one of the world’s richest biomasses and is currently the only sustainable fishery in U.S. Arctic waters. As ice recedes and water temperatures change, fish stocks are observed to be migrating northwest. This observation is informal and anecdotal. The North Pacific Fishery Management Council is conducting a study to gather more reliable data on migration of fish stocks. Preliminary information indicates there may be a ‘cool pool’ of water below the surface that is discouraging a further shift northward. However, if fish stocks begin to migrate north, commercial fishing interests will surely follow, which could lead to increased foreign incursions into the U.S. EEZ in the Arctic Ocean.”).

101. *See* ACIA, *supra* note 1, at 770, 999 (stating that, for example, “[s]ustained, increased UV radiation exposure could have negative impacts on fisheries . . . [and u]ltraviolet radiation can act in combination with other stressors, including pollutants, habitat destruction, and changing predator populations, to adversely affect . . . aquatic species.”).

mary productivity, increases in feeding areas, and higher growth rates."¹⁰² The most recent assessment of the United Nations' Intergovernmental Panel on Climate Change, however, concluded that while sub-Arctic commercial fisheries may benefit from climate change, traditional Arctic fish species, such as the polar cod, will be threatened.¹⁰³

Even if Arctic and sub-Arctic fish stocks increase in abundance as waters warm, an increase in fish abundance could lead to an increase in fishing activity, which would place increased pressure on the fragile Arctic ecosystem. Research indicates that Arctic fish may be significantly less resilient to projected climate changes because cold-water species mature and reproduce less quickly, and therefore have less adaptive capacity than species in warmer climates.¹⁰⁴ When the adaptive capacity of an ecosystem is unknown, or when an ecosystem is known to have a diminished adaptive capacity, most scientists recommend that steps be taken to reduce non-climatic stressors.¹⁰⁵ And when a great degree of scientific uncertainty is present, most scientists advocate for the application of the precautionary principle.¹⁰⁶

The future of Arctic fisheries is further complicated by recent observations that show that fish stocks have already begun migrating north,¹⁰⁷ a fact that suggests that warming water temperatures, along with other climatic changes, are prompting ecosystem shifts. These shifts are occurring much more rapidly than scientists predicted.¹⁰⁸ If this trend continues, non-endemic species may crowd the habitat of Arctic fish stocks. Further, as the ice melts, Arctic fisheries are made increasingly accessible to commercial fishermen. Where a frozen Arctic Ocean made large-scale commercial fishing of

102. *Id.* at 770, 754.

103. IPCC ADAPTATION REPORT, *supra* note 49, at 668.

104. *See, e.g.,* Felicia C. Coleman & Laura E. Petes, *Getting into Hot Water: Ecological Effects of Climate Change in Marine Environments*, 17 SOUTHEASTERN ENVTL. L.J. 337, 338 (2009).

105. *See, e.g.,* Craig, *supra* note 85 at 43–52.

106. The "precautionary principle" is a risk-management tool that directs natural resource managers to err on the side of caution when dealing with scientific uncertainty. The June 1992 Declaration of the Rio Conference on Environment and Development defines the precautionary principle in Principle 15, which states: "In order to protect the environment, the precautionary approach shall be widely applied by States according to their capabilities. Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation." The June 1992 Declaration of the Rio Conference on Environment and Development, *available at* <http://www.un.org/documents/ga/conf151/aconf15126-1annex1.htm>.

107. *See* Zimmer, *supra* note 14.

108. *See* Geiselhart, *supra* note 16, at 161.

stocks below the ice economically and technically infeasible, as the Arctic becomes increasingly ice-free, and as global demand for fish increases, the potential for Arctic fish stocks to be targeted for large-scale extraction by the commercial fishing industry will rise. In addition to the changes prompted by warmer temperatures and reduced sea ice, there is growing concern about how ocean acidification may damage Arctic marine ecosystems.¹⁰⁹ Unfortunately, science suggests that the Arctic's marine ecosystem may be particularly vulnerable to the deleterious effects of ocean acidification.¹¹⁰

To date, most of the discussions about climate change in the Arctic have assumed a rapid but incremental change in Arctic marine ecosystems.¹¹¹ However, increasing evidence points toward the possibility of abrupt, rather than incremental, changes in climate.¹¹² The occurrence of abrupt climate changes would alter the scientific community's existing scenarios in ways that are hard to predict.¹¹³ Consequently, in the decade that has passed between the completion of the Assessment and the writing of this Note, the uncertainty surrounding how and to what extent the Arctic climate will change in future decades has only increased. Further uncertainty exists regarding how changes in climate will affect Arctic marine ecosystems, including fish stocks. Even greater uncertainty surrounds the social and economic changes that will transpire in response to changes in the Arctic's natural environment, and how these social and economic changes will in turn affect the natural environment. Given the enormous uncertainty that surrounds the future of the Arctic, this region's fisheries management and living marine resource governance regimes must be flexible enough to respond quickly to unanticipated or sudden changes, and comprehensive enough to take effective action.

II. ARCTIC OCEAN GOVERNANCE REGIME

What follows is an overview of the current Arctic governance regime for fisheries management, including a description of the insti-

109. See, e.g., IPCC ADAPTION REPORT, *supra* note 49, at 677; Heidi R. Lamirade, Note, *From Sea to Carbon Cesspool: Preventing the World's Marine Ecosystems from Falling Victim to Ocean Acidification*, 34 SUFFOLK TRANSNAT'L L. REV. 183 (2011).

110. See, e.g., Sarah M. Kutil, Comment, *Scientific Certainty Thresholds in Fisheries Management: A Response to a Changing Climate*, 41 ENVTL. L. 233, 266 (2011).

111. See Fluharty, *supra* note 6, at 152.

112. See *id.*

113. *Id.*

tutions, legally binding and non-legally binding agreements, and relevant international law that governs fisheries management in the Arctic. Modern treaty law is based on state consent. Sometimes, however, non-legally binding documents may become the basis for a new legally binding norm (i.e., customary international law) if a sufficient number of states adopt the practices identified therein.¹¹⁴ Non-legally binding documents, often termed “soft law,” are important because they are normally easier to adopt than binding treaties.¹¹⁵ Over time, soft law can influence the creation of new legally binding norms, either by setting the stage for future treaty negotiations, by influencing national legislation and policy, or by developing into rules of customary international law themselves “if the conviction of legal obligations (*opinio juris*) can be demonstrated for those states implementing the rules in question.”¹¹⁶

A. The Arctic Council

The Arctic Council is the principal forum for discussing issues affecting the Arctic at the regional scale. Inter-governmental cooperation on Arctic issues is a fairly recent phenomenon, first proposed by the Secretary-General of the U.S.S.R., Mikhail Gorbachev, in 1987.¹¹⁷ The following year, the eight Arctic states created the Arctic Environmental Protection Strategy (AEPS) through a multilateral, nonbinding agreement.¹¹⁸ The AEPS represented the first step in addressing societal and environmental issues from a regional perspective.¹¹⁹ In 1996, the same countries reaffirmed their commitment to addressing Arctic issues at a regional scale through the establishment of the Arctic Council as a high-level inter-governmental forum.¹²⁰

114. LOUIS B. SOHN ET AL., *LAW OF THE SEA IN A NUTSHELL* 157 (2d ed. 2010).

115. *Id.*

116. *Id.*

117. Timo Koivurova et al., *Canada, the EU, and Arctic Ocean Governance: A Tangled and Shifting Seascape and Future Directions*, 18 J. TRANSNAT'L L. & POL'Y 247, 259 (“During the Cold War, Arctic-wide cooperation was not possible, except in very limited policy areas, such as the conclusion of the 1973 Polar Bear Treaty between the five Arctic range states. This was due to the fact that the superpowers and their allies confronted each other in the Arctic . . . one of the major military strategic hot spots during the Cold War.”).

118. *Canada-Denmark-Finland-Iceland-Norway-Sweden-Union of Soviet Socialist Republics-United States: Arctic Environmental Protection Strategy*, 30 INT'L LEGAL MATERIALS 1624 (1991) [hereinafter *Arctic Environmental Protection Strategy*].

119. Koivurova et al., *supra* note 117, at 260.

120. *Id.* at 262.

The Arctic Council is a soft law organization; it is not an inter-governmental body vested with binding decision-making power, and it has no independent legal power as a legislative or regulatory body.¹²¹ Instead, it functions as a forum for discussion. The Council's mission is to: "provide a means for promoting cooperation, coordination[,] and interactions among the Arctic states, with the involvement of the Arctic Indigenous communities and other Arctic inhabitants on common Arctic issues, in particular issues of sustainable development and environmental protection in the Arctic."¹²² The Council is currently comprised of the eight Arctic states and six permanent participants representing Arctic Indigenous communities. Four European states are official observers, and several non-governmental institutions are permanent observers.¹²³

As global recognition of Arctic issues has grown, the Council's strength as a forum for cooperation has increased, and the scope of its work has become more ambitious.¹²⁴ The Arctic Council has clear strengths as a high-level, non-binding international body, and it has made significant contributions to our understanding of the Arctic marine environment.¹²⁵ Through its Protection of the Marine Environment (PAME) working group, the Arctic Council has prepared valuable products for marine policymakers, including comprehensive assessments, guidelines, and practical manuals relating to environmental protection of the Arctic Ocean.¹²⁶ The policy recommendations embedded in these assessments, guideline, and manuals have helped to set the priorities of the Arctic Council, and have influenced the actions of the Council's member states.¹²⁷ For example, the Arctic Marine Strategic Plan (AMSP), adopted by the Council in 2004, includes several recommended actions, including "identifying potential areas where new guidelines and codes of practice for the marine environment are needed; promoting application of the ecosystem approach; promoting the establishment of marine protected areas, including a representative network; [and] calling for periodic

121. *Id.* at 261.

122. *Arctic Environmental Protection Strategy*, *supra* note 118, at 1631.

123. *See* Jeffers, *supra* note 1, at 923. The European states that are official observers are Germany, the Netherlands, Poland, and the United Kingdom. *Id.*

124. Koivurova et al., *supra* note 117, at 261.

125. For example, the Arctic Council produced the Arctic Climate Impacts Assessment, discussed in Part I.B of this Note.

126. Koivurova et al., *supra* note 117, at 264.

127. *Id.* (noting that the Council's scientific assessments have influence on both regional and global environmental negotiation processes).

reviews of both international and regional agreements and standards”¹²⁸

Understanding that the Arctic Council was necessarily limited in its ability to establish a legal regime that would effectively ensure the protection of the Arctic marine environment, much ink has been spilled and many debates have ensued about the best way to approach Arctic governance.¹²⁹ In response to this ongoing debate, the five Arctic coastal states took declarative action in 2008, outlining their approach to Arctic Ocean governance in The Ilulissat Declaration.¹³⁰ In this Declaration, the states affirmed that they saw “no need to develop a new comprehensive international legal regime to govern the Arctic Ocean”¹³¹ Rather, the states declared their belief that existing international treaties, particularly the LOSC, provide a sufficient legal framework to effectively manage the Arctic marine environment.¹³² Scholars have observed that “[i]n the wake of [T]he Ilulissat Declaration, it seems likely that . . . the . . . Arctic Ocean coastal states will, at least in the near term, avoid a comprehensive regional sea agreement in favor of sectoral cooperative initiatives.”¹³³ Actions taken by the United States in recent years affirm its willingness to work within the confines of existing international law; for example, the U.S. has expressed interest in establishing agreements with Canada and Russia for the management of transboundary fish stocks.¹³⁴

128. *Id.*

129. *See id.* at 265–69 (describing how prior to The Ilulissat Declaration in 2008, several NGOs, including the IUCN, WWF Arctic, and UNEP, convened numerous discussions to determine how to ensure environmental protection in the Arctic, assessed the effectiveness of existing regimes, and studied the possibility of an Arctic treaty, perhaps modeled after the Antarctic Treaty System).

130. *Id.* at 268–69.

131. *Id.* at 269.

132. *Id.*

133. *Id.* at 274–75.

134. *Id.* at 267–68 (“As some of the fish stocks in the EEZ [Exclusive Economic Zone] off Alaska are likely to be transboundary, reference should be made to United States Senate joint resolution (S.J. Res.) No. 17 of 2008, directing the United States to ‘. . . initiate international discussions and take necessary steps with other Arctic nations to negotiate an agreement or agreements for managing migratory, transboundary, and straddling fish stocks in the Arctic Ocean’ The House of Representatives voted in favor of S.J. Res. No. 17 in May 2007, and the President signed it on June 4, 2008. The current United States Administration has so far informed Canada and the Russian Federation of S.J. [sic] Res. No. 17 of 2008, and has expressed its willingness to engage in exploratory talks on the issue. The United States also brought S.J. [sic] Res. No. 17 of 2008 to the attention of SAOs during their meeting in November 2007. During the discussion that followed ‘[t]here was strong support for building on and considering

Scholars have opined that the willingness of these states to address fisheries management through bilateral or multi-lateral agreements indicates that “a considerable majority of the Arctic states does not want the Arctic Council to become directly involved in fishery management and conservation.”¹³⁵ Recent events have confirmed this belief—in July 2015, the Arctic Five met in Oslo to sign the Declaration Concerning the Prevention of Unregulated High Seas Fishing in the Central Arctic Ocean.¹³⁶ The fact that Canada, Norway, Denmark, Russia, and the United States chose not to use the Arctic Council as a forum to decide how to approach managing fishing in the High Seas CAO affirms the notion that most Arctic states do not see the Arctic Council as the proper venue for fisheries management decisions.

Given the real possibility that the Arctic coastal states may continue to make fisheries management decisions without the direct input of the Arctic Council, using mechanisms provided in the LOSC, and given that The Ilulissat Declaration and the Declaration Concerning the Prevention of Unregulated High Seas Fishing in the Central Arctic Ocean identify the LOSC as the primary source of applicable international law for Arctic Ocean governance, the next section of this Note includes an overview of those sections of the LOSC that are applicable to fisheries management, and considers whether they can provide sufficient protection for Arctic fish stocks.

B. The 1982 United Nations Convention on the Law of the Sea

The 1982 United Nations Convention on the Law of the Sea (LOSC) embodies most binding international law governing the oceans and living marine resources therein.¹³⁷ Known as the “constitution for the oceans,”¹³⁸ the LOSC establishes a “comprehensive in-

this issue within the context of existing mechanisms.”) (quoting S.J. Res. 17-2, 110th Cong. (2007) (enacted)).

135. *Id.* at 268.

136. See Declaration Concerning the Prevention of Unregulated High Seas Fishing in the Central Arctic Ocean, *supra* note 18.

137. U.N. Convention on the Law of the Sea, *opened for signature* Dec. 10, 1982, 1883 U.N.T.S. 397 (entered into force Nov. 16, 1994) [hereinafter LOSC or the Convention]. As of January 2014, 157 states are parties to the LOSC. The United States is the only Arctic state that is not a party to the Convention. See the chronological list of ratifications at http://www.un.org/Depts/los/reference_files/chronological_lists_of_ratifications.htm#.

138. William C.G. Burns, *Potential Causes of Action for Climate Change Impacts Under the United Nations Fish Stocks Agreement*, 7 SUSTAINABLE DEV. L. & POL'Y 34, 35 (2007) (quoting Tommy T.B. Koh, President, Third United Nations Conference on the Law of the Sea, A Constitution for the Oceans: Remarks at the Third United Nations Conference on the Law of the

ternational approach to ocean management.”¹³⁹ After nine years of negotiation at the United Nations’ International Maritime Organization (IMO),¹⁴⁰ the LOSC entered into force in 1993, one year after sixty states ratified the Convention. Today, most states are a party to the Convention, but even those who are not a party, including the United States, acknowledge most aspects of the LOSC as customary international law.¹⁴¹ The LOSC “regulates a wide range of ocean management issues including maritime boundaries, coastal-state management responsibilities, deep seabed mining, navigation, pollution, and marine living resource management, including fisheries.”¹⁴² The LOSC delineates jurisdictional zones within the marine environment, and imbues coastal states and flag states¹⁴³ with specific rights and responsibilities in these respective zones.¹⁴⁴ While the LOSC applies to the Arctic Ocean, it does not provide place-based provisions specifically tailored to the Arctic’s unique environment. For the purposes of this Note’s discussion of Arctic fisheries, the most relevant jurisdictional zones codified by the LOSC are the Exclusive Economic Zone (EEZ) and the high seas.

1. Exclusive economic zone

A coastal state’s EEZ extends 200 nautical miles (nm) seaward from the state’s coastline.¹⁴⁵ Within its EEZ, a coastal state has both

Sea (Dec. 6 and 11, 1982), available at http://www.un.org/Depts/los/convention_agreements/texts/koh_english.pdf.

139. Randall S. Abate, *Marine Protected Areas as a Mechanism to Promote Marine Mammal Conservation: International and Comparative Law Lessons from the United States*, 88 OR. L. REV. 255, 288 (2009).

140. The IMO is the United Nations organization tasked with ensuring the safety of international shipping and protection of the marine environment. The IMO is the international forum for all LOSC-related matters, including all amendments to the Convention and its Annexes. *Brief History of IMO*, INT’L MARITIME ORG. (2015), <http://www.imo.org/en/About/HistoryOfIMO/Pages/Default.aspx>.

141. The Presidential Letter of Transmittal of the Law of the Sea Convention, Oct. 6, 1994, S. TREATY DOC. NO. 103-39, at iii (1994) states that it is the policy of the United States “to act in manner consistent with” the Convention’s “provisions relating to traditional uses of the oceans and to encourage other countries to do likewise.”

142. Abate, *supra* note 139, at 288.

143. The LOSC defines a flag state as the state in which a vessel is registered. *See* LOSC, *supra* note 137, art. 217. On the high seas, flag states hold sole jurisdiction over oceangoing vessels. *Id.*

144. *See, e.g., id.* arts. 3, 24, 25, 33, 55–58, 60, 61, 76, 77, 87, 94.

145. *Id.* art. 57 (The Convention uses the word “baseline” in lieu of “coastline.” The process for determining a coastal state’s baseline is rather complex, can be highly contentious, and is beyond the scope of this Note.)

the right and duty to manage and conserve its living marine resources, including its fisheries.¹⁴⁶ Article 56 of the LOSC provides that coastal states have the responsibility to protect and preserve the marine environment.¹⁴⁷ Article 61 contains provisions for the conservation of a coastal state's living marine resources, including fish, within its EEZ.¹⁴⁸ Specifically, it provides that a state shall "determine the allowable catch of the living resources" within its EEZ,¹⁴⁹ and shall use the "best scientific evidence available," to ensure that living resources therein are "not endangered by over-exploitation" through the application of "proper conservation and management measures."¹⁵⁰ Article 62 provides guidance on the types of measures that a state may consider.¹⁵¹ In developing their resource management measures, the LOSC requires states to consider ecological interactions, providing that states shall "take into consideration the effects on species associated with or dependent upon harvested species with a view to maintaining or restoring populations of such associated or dependent species above levels at which their reproduction may become seriously threatened."¹⁵²

146. *Id.* art. 56.

147. *Id.*

148. *Id.* art. 61,

149. *Id.* art. 61(1).

150. *Id.* art. 61(2).

151. Article 62(4) of the Convention provides that the laws and regulations established by a coastal state to manage its fisheries within its EEZ may include:

(a) licensing of fishermen, fishing vessels and equipment, including payment of fees and other forms of remuneration, which, in the case of developing coastal States, may consist of adequate compensation in the field of financing, equipment and technology relating to the fishing industry; (b) determining the species which may be caught, and fixing quotas of catch, whether in relation to particular stocks or groups of stocks or catch per vessel over a period of time or to the catch by nationals of any State during a specified period; (c) regulating seasons and areas of fishing, the types, sizes and amount of gear, and the types, sizes and number of fishing vessels that may be used; (d) fixing the age and size of fish and other species that may be caught; (e) specifying information required of fishing vessels, including catch and effort statistics and vessel position reports; (f) requiring, under the authorization and control of the coastal State, the conduct of specified fisheries research programmes and regulating the conduct of such research, including the sampling of catches, disposition of samples and reporting of associated scientific data; (g) the placing of observers or trainees on board such vessels by the coastal State; (h) the landing of all or any part of the catch by such vessels in the ports of the coastal State; (i) terms and conditions relating to joint ventures or other cooperative arrangements; (j) requirements for the training of personnel and the transfer of fisheries technology, including enhancement of the coastal State's capability of undertaking fisheries research; (k) enforcement procedures.

Id. art. 62(4).

152. *Id.* art. 61(4).

The LOSC vests a coastal state with the authority to exercise its sovereign rights within its EEZ by taking enforcement measures, including boarding and inspecting vessels, and, where necessary, arresting vessels and crew members, initiating judicial proceedings, and levying penalties for violations of a coastal state's fisheries laws and regulations.¹⁵³ Finally, the LOSC also encourages cooperation among states to ensure effective conservation through sharing scientific data, such as statistical information on catch and fishing efforts.¹⁵⁴

2. High seas

The freedom of the high seas has been a basic law-of-the-sea principle since the seventeenth century, when Dutch scholar Hugo Grotius advanced the concept of "the freedom of the seas" in his work, *Mare Liberum*.¹⁵⁵ While the basic freedoms of the high seas were defined in earlier conventions,¹⁵⁶ Part VII of the LOSC codified these freedoms by expressly providing that all states, both coastal and land-locked, have a right to exercise the freedom of the high seas, including the freedom of fishing.¹⁵⁷ Therefore, all states have the right to fish on the high seas.¹⁵⁸ This means that unlike other maritime zones, the high seas is a commons, and the resources found therein are considered public goods, owned by none and available

153. Article 73(2) of the Convention provides that "arrested vessels and their crews shall be promptly released upon the posting of reasonable bond or other security." *Id.* art. 73(2). Article 73(4) of the Convention provides that in "cases of arrest or detention of foreign vessels the coastal State shall promptly notify the flag State . . . of the action taken and of any penalties subsequently imposed." *Id.* art. 73(4).

154. *Id.* art. 61(5).

155. HUGO GROTIUS, *THE FREEDOM OF THE SEAS* 30 (Ralph Van Deman Magoffin trans., Oxford Univ. Press 1916) (1633).

156. Article I of the 1958 Convention on the High Seas defined "high seas" as "all parts of the sea that are not included in the territorial sea or in the internal waters of the state." Convention on the High Seas art. I, Apr. 29, 1958, 450 U.N.T.S. 11 (entered into force Sept. 30, 1962). While the LOSC's creation of EEZs necessarily changed that definition, the LOSC did not specifically define the term "high seas." See LOSC, *supra* note 137, art. 1.

157. The freedoms of the high seas include the freedom of navigation, the freedom of overflight, the freedom of fishing, the freedom to lay submarine cables and pipelines, the freedom to construct artificial islands, installations and structures, and the freedom of scientific research. Article 2 of the 1958 High Seas Convention expressly mentions the first four freedoms. LOSC, *supra* note 137, art. 2. Article 87(1) of the LOSC lists the last two freedoms. *Id.* art. 87(1). Article 86(1) of the LOSC provides that all high seas freedoms apply in waters that are not the internal waters, territorial sea, or EEZ of a state. *Id.* art. 86(1).

158. LOSC, *supra* note 137, art. 116.

to all.¹⁵⁹ When the concept of the freedom of the seas was first conceived by Grotius, he believed that fisheries were an inexhaustible resource, and that “[i]f a man were to enjoin other people from fishing, he would not escape the reproach of monstrous greed.”¹⁶⁰ The near extinction of many fisheries following the full-scale deployment of industrialized commercial fishing in the mid-twentieth century revealed that Grotius’ belief that there would always be plenty of fish in the sea was incorrect.

Today, modern international law recognizes that the risk of a “tragedy of the commons” exists when resources are publicly owned and available to all.¹⁶¹ In the Fisheries Jurisdiction case, the International Court of Justice noted that “the former *laissez-fair* treatment of the living resources of the sea in the high seas has been replaced by a recognition of a duty to have due regard to the rights of other states and the needs of conservation for the benefit of all.”¹⁶² The recognition that unregulated fishing on the high seas had led to the depletion of numerous fish stocks was a driving force behind the development of the EEZ regime during the LOSC negotiations.¹⁶³ With the adoption of EEZs, much of the former high seas fell under the sovereign control of coastal states, which now had a duty to responsibly manage the living marine resources within their jurisdiction.¹⁶⁴ In addition to the safeguards created through the EEZ regime, the LOSC also recognizes “the obligation of all states, especially those whose nationals fish on the high seas, to take measures for the conservation and management of the living resources of the high seas, and to ensure that their nationals comply with these measures.”¹⁶⁵

3. *Shared fish stocks, straddling fish stocks, and high seas fish stocks*

Because fish do not recognize the artificial jurisdictional boundaries stipulated in the LOSC, the Convention also includes specific

159. GROTIUS, *supra* note 155, at 20, 25.

160. *Id.* at 38.

161. See, e.g., Shi-Ling Hsu, *What is a Tragedy of the Commons? Overfishing and the Campaign Spending Problem*, 69 ALB. L. REV. 75 (2005).

162. Fisheries Jurisdiction (Ger. v. Ice.) 1974 I.C.J. 175, 200 (July 25), available at <http://www.icj-cij.org/docket/files/56/6001.pdf>.

163. See Hsu, *supra* note 161, at 103–04.

164. See LOSC, *supra* note 137, art. 56.

165. *Id.* art. 87(1)(e).

provisions for the management of shared stocks and straddling stocks. Article 63 concerns fish stocks occurring “within the exclusive economic zones of two or more coastal states,” known as “shared stocks,” and fish stocks occurring “both within the exclusive economic zone and in an area beyond and adjacent to it [i.e., the high seas],” known as “straddling stocks.”¹⁶⁶ The LOSC directs coastal states to cooperatively agree upon management measures to effectively manage both shared and straddling stocks, through the auspices of sub-regional or regional organizations.¹⁶⁷ As sea ice in the Arctic Ocean melts, revealing more open water in the CAO, some fish stocks may begin to straddle areas that are located within the high seas (i.e., 200 nautical miles or more seaward of any coast-line) and areas within the EEZs of various Arctic coastal states. Given this fact, the LOSC’s framework for managing straddling stocks is likely to be a particularly significant tool for managing Arctic fish stocks in coming decades.

Enforcement is one of the most challenging aspects of ocean fisheries management. It is not difficult to imagine why. Oceans are vast bodies of water by definition, and the areas encompassed within a coastal state’s EEZ are very large indeed. Patrolling so large an area is a daunting task for even the most well-equipped coastal state. And yet, while coastal states face significant enforcement challenges with respect to ensuring that foreign-flagged vessels do not illegally fish in the waters of their EEZs, ensuring effective management of high seas fisheries (i.e., ensuring that all states who are party to the LOSC adhere to the conservation measures in Part VII of the Convention) has proven much more challenging. Following the completion of the LOSC, many coastal states established EEZs and claimed sovereign rights over the management and exploitation of the living marine resources therein.¹⁶⁸ Consequently, most of the world’s commercial fisheries were no longer within the high seas, and the freedom to fish, long recognized on the high seas, was no longer available to foreign-flagged vessels within the EEZs of coastal states.¹⁶⁹ As a result of this jurisdictional change, distant water fishing fleets, which were effectively excluded from fishing within the

166. *Id.* art. 63.

167. *See id.*

168. *See id.* art. 56.

169. *See* GLOBAL OCEAN COMM’N, POLICY OPTIONS PAPER #9: IMPROVING ACCOUNTABILITY AND PERFORMANCE IN INTERNATIONAL FISHERIES MANAGEMENT 7 (2013), available at http://www.globaloceancommission.org/wp-content/uploads/POP-9_Reform-of-Fisheries-Management_FINAL-1.pdf.

coastal states' EEZs, increased their efforts to fish for straddling stocks beyond the 200-nm EEZ limit—i.e., on the high seas.¹⁷⁰ These states also increased their fishing efforts on discrete high seas stocks (i.e., fish found exclusively within the high seas).¹⁷¹ While it is difficult to estimate the number of vessels fishing on the high seas, scholars estimate that a minimum of roughly 4,000 vessels are authorized to do so.¹⁷²

This increase in fishing effort on the high seas had a negative effect on targeted fisheries. In 2006, the FAO concluded that “almost two-thirds of the stocks for which the state of exploitation can be determined [are] classified as either overexploited or depleted.”¹⁷³ More recent studies have concluded that the FAO likely underestimated the scale of the problem, because the FAO estimate failed to account for the effect of overfishing on the structure and function of marine ecosystems.¹⁷⁴ Scholars posit that overfishing has weakened the resiliency of marine ecosystems, thereby hindering the ability of ecosystems to withstand the effects of climate-related stressors like ocean acidification and warmer water temperatures.¹⁷⁵

4. *The U.N. Fish Stocks Agreement and FAO Flag State Agreement*

High seas fisheries are overexploited because the LOSC expressly provides that all states have the freedom to fish on the high seas.¹⁷⁶ By the early 1990s,¹⁷⁷ the international community recognized that the situation concerning overexploited high seas fish stocks had become dire, and acknowledged the need for measures more specific than those provided in the LOSC to address the problem of over-

170. See FAO FISHERIES & AQUACULTURE DEPARTMENT, FOOD & AGRIC. ORG. OF THE U.N., THE STATE OF WORLD FISHERIES AND AQUACULTURE 121-22 (2006) [hereinafter FAO STATE OF WORLD FISHERIES], available at <http://www.fao.org/docrep/009/A0699e/A0699e00.htm>.

171. See SOHN ET AL., *supra* note 114, at 432 tbl. 2.

172. See GLOBAL OCEAN COMM'N, *supra* note 169, at 3 (explaining the use of the High Seas Vessels Authorization Record to provide a minimum number of vessels authorized to fish on the high seas, because the Record has not been regularly maintained and does not include records from several known high seas fishing nations, including China, Russia, and Chinese Taipei).

173. FAO STATE OF WORLD FISHERIES, *supra* note 170, at 33.

174. See GLOBAL OCEAN COMM'N, *supra* note 169, at 2.

175. See *id.*

176. LOSC, *supra* note 137, art. 116.

177. Recall that the LOSC did not enter into force until 1994. LOSC, *supra* note 137.

fishing straddling and high seas stocks on the high seas.¹⁷⁸ In 1992, the United Nations formally acknowledged that the LOSC provisions concerning the management of straddling stocks did not adequately address overfishing on the high seas.¹⁷⁹ Accordingly, the United Nations set out to create two new legally binding international agreements, each taking a different approach to the management of high seas fisheries.¹⁸⁰

First, the United Nations initiated negotiations to create an implementing agreement of the LOSC¹⁸¹ that would “establish, reinforce, and implement effective means and mechanisms to ensure responsible fishing on the high seas, in accordance with relevant provisions of [the LOSC].”¹⁸² These negotiations, which took place from 1992 to 1995 at the Conference on Straddling Fish Stocks and Highly Migratory Fish Stocks, resulted in the Fish Stocks Agreement.¹⁸³ The Fish Stocks Agreement entered into force in 2001.¹⁸⁴ As of 2011, 141 parties had signed on, including all of the Arctic states.¹⁸⁵ While recognizing that all states enjoy the freedom to fish on the high seas,¹⁸⁶ the Fish Stocks Agreement nevertheless seeks to establish a regime for managing those straddling fish stocks which “sojourn” the high seas, including highly migratory species, like tuna.¹⁸⁷ The Fish Stocks Agreement seeks to manage these fisheries through the estab-

178. See GLOBAL OCEAN COMM’N, *supra* note 169, at 7, 8.

179. See SOHN ET AL., *supra* note 114, 435–36.

180. See GLOBAL OCEAN COMM’N, *supra* note 169, at 8 (discussing the development of the 1993 FAO Flag State Agreement); FAO STATE OF WORLD FISHERIES, *supra* note 170, at 123 (discussing the development of the 1995 UN Fish Stocks Agreement).

181. Notwithstanding this agreement’s “implementing” nature, states can be party to the 1995 Convention without being party to the LOSC.

182. Declaration of Cancun: Declaration of the International Conference on Responsible Fishing, cl. 11, May 6–8, 1992, *available at* <http://www.uilapesca.eu/public/eventi/20121201/imm/pdf/05%20FAO%201992%20Cancun%20Declaration%20on%20Responsible%20Fishing.pdf>.

183. See 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, U.N. GAOR, 6th Sess., U.N. Doc. A/CONF:164/37 (Sept. 8, 1995) [hereinafter Fish Stocks Agreement], *available at* http://www.un.org/depts/los/convention_agreements/convention_20years/1995FishStockAgreement_ATahindro.pdf.

184. SOHN ET AL., *supra* note 114, at 438.

185. PHILIPPE SANDS ET AL., PRINCIPLES OF INTERNATIONAL ENVIRONMENTAL LAW 408 n.513 (3d ed. 2012).

186. *Id.* at 405. (“Article 87 [of the LOSC] maintains the freedom of all states to fish in the high seas . . .”).

187. *Id.* at 409.

lishment of Regional Fishery Management Organizations.¹⁸⁸ The U.S. Coast Guard defines a Regional Fishery Management Organization (RFMO) as:

an international organization dedicated to the sustainable management of fishery resources in a particular region of international waters and/or of highly migratory species. An RFMO may focus on conservation of certain species of fish (e.g., tuna in the Atlantic) or on all fish stocks in a region (e.g., the Commission for the Conservation of Antarctic Living Marine Resources).¹⁸⁹

RFMOs play a central role in managing high seas fisheries in the Fish Stocks Agreement.¹⁹⁰ As envisioned by the United Nations, RFMOs provide a forum for states to cooperatively develop and enforce specific fisheries conservation objectives.¹⁹¹ RFMOs are responsible for “assessing the status of fish stocks of commercial value within their area of jurisdiction; setting limits on catch quantities and the number of vessels allowed to fish; [and] conducting inspections and/or regulating the types of gear that can be used.”¹⁹² As of 2013, there were eighteen RFMOs, and their jurisdictions cover “nearly the entire ocean.”¹⁹³

The Fish Stocks Agreement creates management obligations for both coastal and flag states.¹⁹⁴ It stipulates that RFMOs should be comprised of representatives from both coastal states and flag states with distant water fishing fleets, providing the states possess a “real interest” in the fisheries managed by the RFMO.¹⁹⁵ The language of the Fish Stocks Agreement requires that states fishing in the area covered by a particular RFMO either join that organization or at

188. According to The Pew Charitable Trusts, an RFMO is “an international body made up of countries that share a practical and/or financial interest in managing and conserving fish stocks in a particular region. These include coastal States, whose waters are home to at least part of an identified fish stock, and ‘distant water fishing nations’ (DWFN), whose fleets travel to areas where a fish stock is found. RFMOs are established by international agreements or treaties.” *FAQ: What is a Regional Fishery Management Organization?*, THE PEW CHARITABLE TRUSTS, Feb. 23, 2012, <http://www.pewtrusts.org/en/research-and-analysis/fact-sheets/2012/02/23/faq-what-is-a-regional-fishery-management-organization>.

189. U.S. COAST GUARD, *supra* note 47, at 40.

190. GLOBAL OCEAN COMM’N, *supra* note 169, at 4; SOHN ET AL., *supra* note 114, at 439.

191. SOHN ET AL., *supra* note 114, at 439.

192. *Id.*

193. *Id.*

194. Fish Stocks Agreement, *supra* note 183, art. 8.

195. *Id.* art. 8(3).

least give effect to the RFMO's fishery management measures.¹⁹⁶ If a flag state's vessel fishing within an RFMO area does not comply with the provisions of the Fish Stock Agreement, that flag state may no longer license its vessels to fish in the geographic area managed by that RFMO.¹⁹⁷

Generally, under the LOSC, only the flag state has the authority to board and inspect a vessel on the high seas.¹⁹⁸ In other words, the flag state alone is sovereign over its vessels on the high seas. But, under the Fish Stocks Agreement, parties to the Agreement imbue the RFMO with this sovereign right.¹⁹⁹ The Fish Stocks Agreement places RFMOs in the central enforcement role, requiring that "national measures imposed by flag states concerning "monitoring, control, and surveillance . . . yield to those established by regional fisheries management organizations."²⁰⁰ Under the Fish Stocks Agreement, all flag states that are members of the RFMO participate in a system of regional surveillance and enforcement.²⁰¹ Under this system, all members of an RFMO may board and inspect vessels of states that are party to the Fish Stocks Agreement.²⁰² And, all member flag states must enforce conservation and resource management measures adopted by RFMOs against their own vessels.²⁰³

While the Fish Stocks Agreement negotiations were underway, the Food and Agriculture Organization of the United Nations (FAO) also took action to protect high seas fisheries. Acting on authority from the Declaration of Cancun and Agenda 21 of the United Nations Convention on Environment and Development (UNCED), the FAO produced the 1993 FAO Flag State Compliance Agreement (Flag State Agreement).²⁰⁴ While the Fish Stocks Agreement focuses only on highly migratory species and straddling fish stocks, the Flag State Agreement applies to all fish species found within the high

196. *Id.* art. 8(3)-(4).

197. *Id.* art. 8(4).

198. LOSC, *supra* note 137, art. 92(1).

199. See SANDS ET AL., *supra* note 185, at 410.

200. SOHN ET AL., *supra* note 114, at 441 (emphasis added).

201. See Fish Stock Agreement, *supra* note 183, art. 21.

202. *Id.* art. 21(1). Other enforcement mechanisms include: Article 21(6-7) (stating that flag state retains a preemptive right to further investigate and take enforcement measures, but it may forgo this right and leave the task to the inspecting state), Article 21(8) (stating that "for serious violations, vessels may be taken to port if the flag state remains inactive"), and Article 23 (stating that port states have a general right/obligation to inspect documents, fishing gear, and catches when foreign vessels voluntarily enter their ports). *Id.* arts. 21(6-7), 21(8), 23.

203. SOHN ET AL., *supra* note 114, at 441.

204. *Id.* at 436.

seas.²⁰⁵ As its name implies, the Flag State Agreement seeks to address the problem of overfishing on the high seas by focusing on the rights and obligations of flag states.²⁰⁶

The Flag State Agreement places additional requirements, above and beyond those stipulated in the LOSC, upon flag states whose vessels fish on the high seas. Under the LOSC, the primary responsibility for ensuring that vessels comply with the Convention's conservation measures for high seas fisheries rests with the flag state.²⁰⁷ Unfortunately, flag states do not always fulfill this duty with respect to the vessels in their registry, particularly when it comes to deterring their vessels from engaging in destructive or illegal fishing practices.²⁰⁸ The Flag State Agreement requires states to take whatever measures necessary to ensure that vessels flying their flag do not undermine "the effectiveness of international conservation and management measures."²⁰⁹ For example, under this Agreement, flag states must not issue a license to a vessel if the flag state is unable to exercise sufficient control over that vessel. The Flag State Agreement also requires flag states to maintain a record of all fishing vessels that fly their flag, and provides that all vessels fishing on the high seas are required to provide detailed information about the volume and location of their fish catches and landings to the flag state.²¹⁰ Finally, the Flag State Agreement requires that information acquired by the flag state about its vessels be transmitted to the FAO,²¹¹ so as to enable the FAO to develop and maintain a global ship registry.²¹²

The Flag States Agreement has been criticized "for setting excessively broad obligations, for being applicable only to fisheries on the high seas, and for permitting the exclusion of vessels of less than [twenty-four meters], which is not a negligible size."²¹³ Although the Agreement entered into force in 2003, it has received a significantly

205. *Id.*

206. *Id.*

207. See SANDS ET AL., *supra* note 185, at 410.

208. SOHN ET AL., *supra* note 114, at 437.

209. Agreement to Promote Compliance with International Conservation and Management Measures by Fishing Vessels on the High Seas, G.A. Res. 15/93 U.N. FAO, 27th Sess., U.N. Doc. M/40, art. III(1)(a) (Nov. 24, 1993) [hereinafter Flag State Agreement], available at <http://www.fao.org/docrep/meeting/003/x3130m/x3130e00.htm#b4>.

210. *Id.* art. III(2).

211. *Id.* art. II.

212. SOHN ET AL., *supra* note 114, at 437.

213. SANDS ET AL., *supra* note 185, at 410.

low number of ratifications,²¹⁴ making the Agreement only marginally effective.²¹⁵ Accordingly, the Fish Stocks Agreement, with its RFMO scheme, remains the primary legal mechanism for managing high seas fish stocks.²¹⁶

III. LIMITATIONS OF REGIONAL FISHERIES MANAGEMENT ORGANIZATIONS

Although RFMOs are “generally acknowledged to play a critical role in the global system of fisheries governance,”²¹⁷ they have failed to meet the expectations of the international community because they have not managed to stem the decline of high seas fish stocks.²¹⁸ RFMOs are faced with the formidable challenge of policing the waters under their jurisdiction to ensure that no one is fishing illegally. Fisheries managers generally refer to illegal fishing as “illegal, unreported, and unregulated fishing” (IUU fishing).²¹⁹ IUU fishing “poses a serious threat” to many high seas fish stocks.²²⁰ The effects range from seriously impairing efforts to rebuild over-fished stocks to the total collapse of a fishery.²²¹ IUU fishing devastates both the resource itself and the fishing communities that depend on the resource for their livelihood.²²²

Scholars observe that RFMOs, as they are presently structured, may be unable to effectively manage high seas fisheries, particularly with regard to stopping IUU fishing.²²³ While it is true that RFMOs

214. *Id.* at 410 n.528. As of 2011, only thirty-eight states and the EU were a party to the agreement. *Id.*

215. *Id.*

216. GLOBAL OCEAN COMM’N, *supra* note 169, at 4.

217. MICHAEL W. LODGE ET AL., RECOMMENDED BEST PRACTICES FOR REGIONAL FISHERIES MANAGEMENT ORGANIZATION, at vii (Chatham House ed., 2007), available at <http://www.oecd.org/sd-roundtable/papersandpublications/39374297.pdf>.

218. SOHN ET AL., *supra* note 114, at 445. A 2006 FAO study found that “[s]trengthening RFMOs in order to conserve and manage fish stocks more effectively remains the major challenge facing international fisheries governance.” See FAO STATE OF WORLD FISHERIES, *supra* note 170, at 7.

219. GLOBAL OCEAN COMM’N, *supra* note 169, at 4.

220. See Fisheries & Aquaculture Department, *The Benefits of Ratifying and Implementing the 2009 FAO Port State Measures Agreement*, FOOD & AGRIC. ORG. OF THE U.N. (2015), available at <http://www.fao.org/fishery/topic/166283/en> [hereinafter *Benefits of the Port State Agreement*].

221. See *id.*

222. *Id.*

223. See HIGH SEAS TASK FORCE, CLOSING THE NET: STOPPING ILLEGAL FISHING ON THE HIGH SEAS 41–43 (2006), available at <http://www.oecd.org/sd-roundtable/papersandpublications/39375276.pdf>.

set quotas for their member states, additional fish—in amounts exceeding the set quotas—are routinely caught in RFMO waters through IUU fishing. The persistence of IUU fishing within RFMO boundaries negatively impacts the management efforts of RFMOs, because the RFMO's science-based management decisions are “stymied with false catch data.”²²⁴

The enforcement challenges faced by one well-established RFMO, the Northwest Atlantic Fisheries Organization (NAFO), provide a useful illustration of why the RFMO structure is inherently flawed. The NAFO is tasked with managing the fisheries in the high seas of the Northwest Atlantic Ocean.²²⁵ The NAFO seeks to ensure “the long-term conservation and sustainable use of the fishery resources in the Northwest Atlantic” by developing conservation, management, and enforcement measures.²²⁶ While these measures are binding on all parties by a single majority vote, any party can choose to “opt out” of the new measure by objecting in a timely manner.²²⁷ The NAFO's “opt-out” procedure has made effective management of the fish stocks under its authority particularly challenging, and created an especially difficult situation for the NAFO in the 1990s.²²⁸ At that time, the European Community (EC) elected to opt out of the Organization's agreement to reduce its catch quota for turbot by 50%.²²⁹ Turbot fishing grounds are primarily within the Canadian EEZ, but also partially within the high seas, where the fishery was managed by the NAFO.²³⁰ When the EC opted out of the NAFO's quota, Canada implemented unilateral measures, and arrested a Spanish fishing vessel, the *Estai*, on the high seas for violating the NAFO's provisions.²³¹ While the issue was finally resolved by direct negotiations between the parties, this conflict highlighted the NAFO's inability to resolve conflicts over how to properly manage straddling stocks between members of the Organization.²³²

224. GLOBAL OCEAN COMM'N, *supra* note 169, at 4.

225. See *Northwest Atlantic Fisheries Organization*, NORTHWEST ATLANTIC FISHERIES ORGANIZATION, <http://www.nafo.int/> (last visited Dec. 17, 2015) (describing the overall structure of NAFO).

226. *Id.*

227. SOHN ET AL., *supra* note 114, at 443.

228. *Id.*

229. *Id.* at 447.

230. *Id.*

231. *Id.* at 434–35.

232. *Id.* at 435.

The provisions of the Fish Stocks Agreement related to RFMO structure and management also lead to substantial enforcement gaps. For example, under the Fish Stocks Agreement, access to fisheries in the portion of the high seas under RFMO management is restricted to those states that are “either members of the competent regional fisheries management organization, or agree to apply the conservation and management measures established by such organization.”²³³ Also under the Fish Stock Agreement, RFMO member states may board and inspect ships on the high seas that are sailing under another state’s flag, even though the right to board a vessel on the high seas is a right generally afforded only to the flag state under the LOSC.²³⁴ But despite the apparent authority given to the RFMO by these provisions, only states that are party to the Fish Stocks Agreement are actually bound by these provisions, meaning that the rights of non-party states remain unaffected.²³⁵ Stated another way:

RFMOs are member-driven organisations. The regulations adopted by RFMOs only bind those nations that are Parties to the RFMO. Non-parties are free to do as they please, often with minimal repercussions While the offending non-Party vessels and countries are often subject to port- and market-access restrictions, fishing on the high seas in the waters managed by an RFMO is not a crime.²³⁶

Because an RFMO can only enforce the provisions of the Fish Stocks Agreement against its own members, its ability to effectively manage high seas fisheries can be significantly undermined by the fishing activity of non-member states.

A 2013 policy paper prepared for the Global Ocean Commission concluded that RFMOs continue to vary greatly in how effectively they manage high seas fisheries.²³⁷ The Commission observed that:

Many high seas fish stocks managed by RFMOs continue to decline or remain at low levels of abundance; bycatch of many associated or non-target species on the high seas remains high and in most cases unregulated or insufficiently

233. *Id.* at 451 (citing the Fish Stocks Agreement, *supra* note 183, art. 8(4)).

234. *Id.* at 452 (citing the Fish Stocks Agreement, *supra* note 183, art. 21(1)).

235. See Erik Franckx, *Pacta Tertiis and the Agreement for the Implementation of the Straddling and Highly Migratory Fish Stocks Provisions of the United Nations Convention on the Law of the Sea*, 8 TUL. J. INT’L & COMP. L. 49, 64–65 (2000).

236. GLOBAL OCEAN COMM’N, *supra* note 169, at 4.

237. *Id.* at 12.

regulated; and adverse impacts on the marine environment are not effectively addressed or assessed.²³⁸

Several factors contribute to the persistence of these management challenges, including “structural and governance weaknesses associated with RFMOs, lack of political will, lack of consequence for poor performance, and deficiencies in capacity.”²³⁹

A. Recommendations for Improving the Effectiveness of RFMOs

The international community has closely scrutinized the work of RFMOs, and has made recommendations to make these organizations more effective.²⁴⁰ For example, a Global Ocean Commission policy paper offers several recommendations for improving RFMO performance, including: (1) requiring biennial RFMO performance reviews; (2) requiring that the agreements governing the different RFMOs “fully incorporate the flag state obligations and conservation and management provisions of the Fish Stocks Agreement;”²⁴¹ (3) eliminating the opt-out options; and (4) establishing a new procedure for adopting regulations, requiring majority approval.²⁴² Other recommendations included: (1) improving adherence to international instruments by encouraging non-party states to ratify or accede to the Fish Stocks Agreement or other fisheries governance instruments; (2) recommending that RFMOs authorize fishing on the high seas only after it has been determined through the completion of an environmental impact assessment that fisheries can be managed so as to “prevent adverse impacts on the marine environment, ensure the sustainability of the target species, and have minimal impact on other species in the ecosystem”; and (3) establishing a freeze on any increase in fishing capacity and/or establishing a progressive reduction in fishing capacity over time.²⁴³

238. *Id.*

239. *Id.*

240. See, e.g., LODGE ET AL., *supra* note 217.

241. GLOBAL OCEAN COMM’N, *supra* note 169, at 12–13. Article 5 of the U.N. Fish Stocks Agreement sets out the general principles of the Agreement, and stipulates that all states fishing on the high seas must take measures to conserve fish stocks by promoting the objective of optimum utilization, using the best available scientific data, applying the precautionary approach, and adopting other conservation measures. Fish Stocks Agreement, *supra* note 183, art. 5. Article 6 stipulates that states shall apply the precautionary approach when managing high seas fish stocks. *Id.* art. 6.

242. GLOBAL OCEAN COMM’N, *supra* note 169, at 13.

243. *Id.*

While each of the recommendations listed above would likely improve RFMO performance to some degree, as long as opt-out provisions exist, the efficacy of RFMO management provisions will be undermined by the actions of members who “opt out.” Moreover, while RFMOs do improve the management of straddling fish stocks by allowing for an increased degree of surveillance and enforcement on the high seas, because the resources of the high seas are global commons, RFMO member states have no legal authority to enforce fishery management provisions against non-member states. That the management failure of RFMOs stems from both the opt-out provisions, and the fact that non-member states are not bound by RFMO requirements, has been well documented by scholars.²⁴⁴

B. The International Community's Continued Commitment to RFMOs

Despite the limitations inherent in RFMOs, the international community continues to express a commitment to the RFMO structure. Such commitment is manifest in a recent FAO fisheries agreement, the Agreement on Port State Measures to Prevent, Deter and Eliminate Illegal, Unreported, and Unregulated Fishing (Port State Agreement).²⁴⁵ Perhaps in response to the relative failure of its 1993 Flag State Agreement, the FAO sets forth a new approach in the Port State Agreement, one which relies on port state control (rather than flag state control) to curb illegal, unreported, and unregulated fishing.²⁴⁶ A state that is a party to the Agreement will apply its provisions to foreign fishing vessels seeking entry to its ports.²⁴⁷ When this Agreement enters into force, it could be a potent tool to combat IUU fishing within high seas areas governed by RFMOs. The Port State Agreement emphasizes the importance of regional cooperation

244. *Id.*

245. Agreement on Port State Measures to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing, U.N. FAO, 36th Sess. (Nov. 22, 2009) [hereinafter Port State Agreement], available at http://www.fao.org/fileadmin/user_upload/legal/docs/2_037t-e.pdf. While the Port State Agreement has been approved, it will not enter into force until twenty-five states have ratified or acceded to the Agreement. See Agreement on Port State Measures to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing, FOOD & AGRIC. ORG. OF THE U.N. http://www.fao.org/fileadmin/user_upload/legal/docs/037s-e.pdf (last updated Dec. 11, 2015) for an update on the current legal status of the Agreement.

246. *Benefits of the Port State Agreement*, *supra* note 220. See LOSC, *supra* note 137, art. 218 for information on the role of port states in enforcement related to the protection and preservation of the marine environment (including fisheries management).

247. See *Benefits of the Port State Agreement*, *supra* note 220.

through RFMOs, and aims to strengthen regional cooperation by placing specific duties on RFMOs, such as developing region-specific port state measures that “take into account the special needs and challenges of countries in the region.”²⁴⁸

The prominence of RFMOs in the Port State Agreement signals the international community’s interest in continuing to manage high seas fish stocks through these regional organizations. It is clear that the establishment of RFMOs allows for interested states to more effectively manage the fishery in question through implementing quotas and other conservation measures. Arctic states have welcomed the establishment of an Arctic RFMO, acknowledging that it would afford Arctic coastal states a greater ability to deter IUU fishing, and more opportunities to “influence international enforcement policies to protect vulnerable fish stocks and other living marine resources . . .”²⁴⁹ In July 2015, the Arctic Five signed a Declaration, committing to the implementation of a number of interim measures to deter unregulated fishing in the CAO. The Declaration’s interim measures clearly affirm the Arctic Five’s commitment to the RFMO model by stating that it is the intent of the Arctic Five “[t]o authorize their vessels to conduct commercial fishing in the high seas portion of the central Arctic Ocean only pursuant to one or more regional or sub-regional fisheries management organizations or arrangements that are or may be established to manage such fishing in accordance with recognized international standards.”

Although the international community supports the RFMO model, as long as RFMOs possess no way of enforcing their conservation measures against non-party states, and as long as any party may opt out of any measure, these organizations will continue to be seriously limited in their ability to effectively ensure that stocks are fished at sustainable levels.

There is presently no RFMO for the CAO, largely because most of the CAO is covered with ice for most of the year, thereby significantly deterring fishing activity. For reasons discussed above, however, it is reasonable to expect that fishing will increase in the CAO in the future. As one scholar explains:

Even though fishing opportunities in the high seas pocket of the central Arctic Ocean are likely to be very minimal in the near future, climate change may alter [those conditions].

248. *Id.*

249. U.S. COAST GUARD, *supra* note 47, at 40.

Consequently, it cannot be ruled out that fishing opportunities in the high seas of the Arctic Ocean will be substantial in the medium and long terms. Not only is the size of the high seas pocket enormous, but [past experiences have shown] that just a small area of the high seas may be sufficient [to lure distant water fishing nations to the Central Arctic Ocean's waters].²⁵⁰

Absent a functioning CAO RFMO, all states, including non-coastal states with distant water fishing fleets, would be free to fish in the CAO high seas.

Legal scholars have explored the feasibility of adjusting the geographic scope of one or both of the two RFMOs that presently border the CAO—the NAFO, and the Northeast Atlantic Fisheries Commission (NEAFC)—to encompass some part of the CAO.²⁵¹ One such scholar concluded that while spatial adjustments are possible, “only relatively small geographical adjustments” seem politically feasible.²⁵² For example, in the case of the NEAFC, it is not at all clear whether the two Arctic coastal states which are not presently members of the NEAFC (Canada and the United States) would agree with the RFMO's fishery management policies.²⁵³ In addition, the process of determining user interests for NEAFC member states that are not Arctic coastal states could prove politically problematic.²⁵⁴

In summary, a scheme that proposes to manage present and future CAO fisheries through the geographic expansion of an existing RFMO would likely prove to be too politically challenging. Moreover, because RFMOs focus on managing a handful of commercially significant fisheries, they likely will not provide the most appropriate management approach for today's CAO. The RFMO structure is based on a traditional, single-species approach to fisheries management, and this structure is neither sufficiently comprehensive nor sufficiently flexible to manage the living marine resources contained within a body of water that is constantly subject to new changes and stressors.²⁵⁵ Moreover, RFMOs also have significant limitations re-

250. Koivurova et al., *supra* note 117, at 282.

251. *See, e.g., id.* at 278–82.

252. *Id.* at 279.

253. *Id.* at 281 (stating that it is not known whether the United States or Canada would “have fundamental objections to NEAFC's practices on the establishment and allocation of the total allowable catch (TAC) for straddling fish stocks.”).

254. *Id.* at 282 (identifying these states as Belize, Cook Islands, Japan, and New Zealand, and “other states with large distant water fishing fleets, such as China and South Korea.”).

255. *See supra* Part I.B.1.

garding enforcement of IUU fishing because they lack enforcement power against non-member states, and because RFMO members can always opt out of specific management measures.

IV. PROTECTING ARCTIC FISHERIES THROUGH A CIRCUMPOLAR NETWORK OF MARINE PROTECTED AREAS

Legal scholars have observed that a majority of current fisheries management regimes are either “unstable or too structurally complicated and inflexible to deal with future ecosystem and social change.”²⁵⁶ Given the great degree of uncertainty surrounding the future of Arctic fisheries, scholars have identified “a clear need to implement . . . forward-thinking, dynamic, and adaptive governance regimes to oversee and manage future fishery issues.”²⁵⁷ One way to respond to both the problem of enforcement and the difficulties presented by the great degree of uncertainty surrounding the changing Arctic would be to formally designate a network of no-take MPAs throughout the Arctic. MPAs allow an ecosystem to increase its resiliency by designating areas where the living marine resources are not adversely impacted by intrusive human activities. Increasing the resiliency of the Arctic’s marine ecosystem is one of the best ways for fisheries managers to prepare for a future that is uncertain, yet certain to change. This approach would also complement the ongoing efforts of Arctic coastal states, the Arctic Council, and RFMOs to sustainably manage Arctic fisheries. A circumpolar network of no-take MPAs, including the establishment of several High Seas MPAs in the CAO, would provide the best protection for present and future Arctic fisheries.

A. Ecosystem-Based Management and Marine Protected Areas

MPAs are one form of a type of ocean management called ecosystem-based management (EBM).²⁵⁸ EBM is a management strategy that recognizes the dynamic and inherently uncertain nature of ecosystems.²⁵⁹ EBM seeks to protect and preserve ecological integrity by focusing on the management of human interactions with ecosystems, and strives to minimize adverse impacts arising from such in-

256. Jeffers, *supra* note 1, at 921.

257. *Id.*

258. Abate, *supra* note 139, at 257.

259. *Id.* at 258.

teractions.²⁶⁰ EBM's focus on protecting the "complex range of ecological relationships" that are present in marine ecosystems, by considering how activities like fishing or polluting affect the ecosystem, reveals a distinct departure from the historic single-species approach to fisheries management.²⁶¹

Coastal states began adopting EBM in response to the widely held recognition that "[t]he world's oceans are in crisis, plagued by problems ranging from pollution to overfishing to marine mammal depletion."²⁶² At the turn of the twenty-first century, two comprehensive assessments, surveying the state of the world's oceans, confirmed the severity of the crisis. In 2003, the Pew Commission released its report, *America's Living Oceans: Charting a Course for Sea Change*.²⁶³ In 2004, the U.S. Commission on Ocean Policy published *An Ocean Blueprint for the 21st Century*.²⁶⁴ Both reports acknowledged a widespread consensus that our oceans and marine resources were in crisis, and both reports advocated for a new approach to living marine resource management, "moving away from the current fragmented, single-issue way of doing business and toward ecosystem-based management [EBM]."²⁶⁵

In the past decade, policymakers in the U.S. and abroad have embraced EBM,²⁶⁶ and have recognized MPAs as an important component of an ecosystem-based approach to managing the world's living marine resources, including fisheries.²⁶⁷ MPAs provide a number of ecological, social, and economic benefits.²⁶⁸ For example, no-take

260. *Id.*

261. *Id.* at 257–58.

262. *Id.* at 256 (citing U.S. COMM'N ON OCEAN POLICY, AN OCEAN BLUEPRINT FOR THE 21ST CENTURY 38 (2004), available at http://www.opc.ca.gov/webmaster/ftp/pdf/docs/Documents_Page/Reports/U.S.%20Ocean%20Comm%20Report/FinalReport.pdf).

263. PEW OCEANS COMM'N, AMERICA'S LIVING OCEANS: CHARTING A COURSE FOR SEA CHANGE (2003), available at http://www.pewtrusts.org/~media/Assets/2003/06/02/Full_Report.pdf?la=en.

264. U.S. COMM'N ON OCEAN POLICY, *supra* note 262.

265. *Id.* at vii.

266. President Barack Obama made EBM the official management approach of the United States in the nation's first comprehensive National Ocean Policy. See NAT'L OCEAN COUNCIL, NATIONAL OCEAN POLICY IMPLEMENTATION PLAN 17 (2013), available at https://www.whitehouse.gov/sites/default/files/national_ocean_policy_implementation_plan.pdf (identifying "[e]stablish a framework for collaboration and a shared set of goals to promote [EBM]" as an action item).

267. See Abate, *supra* note 139, at 259; U.S. COMM'N ON OCEAN POLICY, *supra* note 262, at 104.

268. Abate, *supra* note 139, at 260 (citing *The Case for MPAs*, WORLD WILDLIFE FUND, http://wwf.panda.org/what_we_do/how_we_work/conservation/marine/solutions/protection/protected_areas/).

MPAs, wherein all fishing is prohibited, “not only eliminate the physical damage caused by fishing gear, but [also eliminate] the incidental bycatch of marine mammal species.”²⁶⁹ Moreover, no-take MPAs benefit the surrounding seas by providing a “spill over effect.”²⁷⁰ That is, when managers allow one particularly productive area of the ecosystem to remain undisturbed by human activities, the protected area benefits surrounding areas, as fish that have thrived in the no-take MPA often “spill over” into surrounding waters.²⁷¹ In recent years, the international community has begun to use MPAs on both regional and international scales to ensure that fisheries are sustainably managed.²⁷²

The Arctic Council called for the establishment of representative networks of marine protected areas in the Arctic Marine Strategic Plan in 2004.²⁷³ Ten years later, the Arctic Council’s Protection of the Marine Environment (PAME) Working Group is continuing to investigate the feasibility of such a network.²⁷⁴ PAME’s 2013–15 Work Plan calls for the development of a Framework for an Arctic MPA Network.²⁷⁵ Specifically, PAME commits to forming an MPA expert group “to explore the development of a frame-work for an Arctic marine protected areas network, for consideration by the PAME working group.”²⁷⁶ The U.S., Norway, and Canada will lead the effort.²⁷⁷

Although the Arctic Council’s work to establish MPAs has been slow, its continued interest in establishing a network of marine protected areas suggests that the Arctic nations have the political will to take proactive steps to ensure that the Arctic’s fisheries are sustainably managed. In their recent Declaration Concerning the Prevention of Unregulated High Seas Fishing in the Central Arctic Ocean, the Arctic Five affirmed their commitment to a sustainable approaching by “recalling the obligations of States under international

269. *Id.*

270. See Jennifer L. Schorr, Comment, *The Australian National Representative System of Marine Protected Areas and the Marine Zoning System: A Model for the United States?*, 13 PAC. RIM L. & POL’Y J. 673, 674 (2004).

271. See, e.g., *id.*

272. *Id.*

273. Timo Koivurova & David L. Vanderzwaag, *The Arctic Council at 10 Years: Retrospect and Prospects*, 40 B.C. L. REV. 121, 163 (2007).

274. ARCTIC COUNCIL, PAME WORK PLAN 2013–15, 10 (2013), available at http://www.pame.is/images/01_PAME/Work_Plan/2013_2015.pdf.

275. *Id.*

276. *Id.*

277. *Id.*

law to cooperate with each other in the conservation and management of living marine resources in high seas areas, including the obligation to apply to precautionary approach.”²⁷⁸

Because of the “spill over effect” of no-take MPAs, it would not be necessary for huge swaths of the Central Arctic Ocean to be designated as “no take” zones. On the contrary, if the Arctic coastal states worked cooperatively through the Arctic Council to designate MPAs within their respective EEZs, and then combined these efforts with an international effort to designate a high seas MPA in the Central Arctic Ocean, a network of MPAs could yield a very beneficial response.²⁷⁹ Moreover, several of the Arctic coastal states have taken steps to conserve Arctic fisheries by placing a moratorium on commercial fishing within their EEZs “until there is a scientific consensus on whether and to what extent these resources may be fished sustainably.”²⁸⁰ For example, in the Declaration Concerning the Prevention of Unregulated High Seas Fishing in the Central Arctic Ocean, the Arctic Five committed to fishing in only those parts of the CAO where “regional or subregional fisheries management organizations or arrangements” have been established.²⁸¹

The establishment of one or more no-take high seas MPAs in the CAO, when combined with the conservation measures already undertaken by the Arctic Five, would provide a strong foundation for protecting Arctic fisheries against the risks and uncertainty that a changing climate will bring.

278. Declaration Concerning the Prevention of Unregulated High Seas Fishing in the Central Arctic Ocean, *supra* note 18, at 1.

279. See, e.g., Koivurova & Vanderzwaag, *supra* note 273, at 170–71.

280. U.S. COAST GUARD, *supra* note 47, at 40 (“The North Pacific Fishery Management Council (NPFMC) is one of eight regional councils established by the Magnuson Fishery Conservation and Management Act of 1976 to manage commercial fisheries in U.S. waters. With jurisdiction over the 950,000-square-mile Exclusive Economic Zone (EEZ) off Alaska, the Council has primary responsibility for management of the commercial fishing industry in the Gulf of Alaska, Bering Sea, and Aleutian Islands Given the fragile Arctic environment, the NPFMC is monitoring the region closely. In 2009, the Council developed a plan, which the National Marine Fisheries Service later approved, providing that finfish, mollusks, crustaceans, and other marine animals are not open to commercial fishing north of the Bering Strait. This moratorium on commercial fishing will continue until research can prove how a commercial fishery industry in the Arctic region might be sustainable.”).

281. Declaration Concerning the Prevention of Unregulated High Seas Fishing in the Central Arctic Ocean, *supra* note 18, at 2.

B. Addressing the Enforcement Challenge

The designation of MPAs in the Arctic would only yield effective results if the governing bodies charged with overseeing the protected areas had some effective means of ensuring compliance and enforcing the areas' no-take requirements. Fortunately, establishing no-take MPAs would help with the enforcement issues that plague fishing on the high seas. If no-take MPAs are established, governing bodies could easily monitor activities in these areas because international law requires that most vessels be equipped with AISs, which alert the international community to the vessel's location at all times. If governing bodies discover a fishing vessel within an MPA, the governing bodies can quickly take steps to rectify the problem.

The international maritime community has made significant advances in recent years to improve maritime domain awareness by requiring that vessels be equipped with vessel tracking systems, such as vessel monitoring systems (VMSs) and AISs.²⁸² The IMO, through the Convention on the Safety of Life at Sea (SOLAS), requires that all passenger ships and all cargo ships of a certain size be equipped with AISs.²⁸³ In the U.S., navigational safety regulations expand upon these international regulations to require all commercial vessels over 65 feet in length, and all towing vessels over 26 feet in length and possessing 600 horsepower engines, be equipped with AIS domestically. The Coast Guard estimates that U.S. domestic regulations cover an additional 16,000 vessels.²⁸⁴

However, both the international and U.S. regulatory requirements for AIS on vessels include significant exemptions. For example, in U.S. waters, fishing vessels are not required to be equipped with

282. U.S. Coast Guard, *How Does AIS Compare and Contrast with VMS?* (2006), available at http://www.navcen.uscg.gov/pdf/AIS/Q_AIS_vs_VMS_Comparison.pdf (finding that while both VMS and AIS are communication protocols, "AIS is a digital VHF-based radio system that relies upon an open, standardized, internationally adopted, non-proprietary communication protocol that permits two-way exchange of information between ships and ship-to-shore; in a continuous, autonomous, and dependent on the information being transmitted, near real-time . . . manner," while "VMS is a satellite based communication system that operates using a variety of closed, proprietary . . . communication system protocols, that operate predominately as a one-way ship-to-shore system in either an assigned schedule or manual mode.").

283. INTERNATIONAL MARITIME ORGANIZATION, INTERNATIONAL CONVENTION FOR THE SAFETY OF LIFE AT SEA ch. 5, reg. 19.2.4 (1974), available at <http://www.navcen.uscg.gov/pdf/AIS/SOLAS.V.19.2.1-5.pdf> (requiring that "[a]ll ships of 300 tonnage and upwards engaged on international voyages and cargo ships of 500 gross tonnage and upwards not engaged on international voyages and passenger ships irrespective of size shall be fitted with an automatic identification system (AIS).").

284. 33 C.F.R. § 164.46 (2015); U.S. Coast Guard, *supra* note 282.

AISs,²⁸⁵ and in international waters, commercial vessels under 300 gross tons, including fishing vessels, need not carry AISs. This means that AISs are not a completely effective enforcement tool for Arctic no-take MPAs. AIS would enable MPA managers to easily monitor most vessel activity within an MPA, however, which would significantly aid enforcement of the designated no-take areas.

C. Legal Mechanisms for Establishing a Central Arctic Ocean Marine Protected Area

A High Seas MPA for the Central Arctic Ocean may be implemented through a number of different legal mechanisms and institutions. To be consistent with the LOSC, any high seas MPA would need to be consistent with the Convention's requirements for activities undertaken on the high seas.²⁸⁶ Fortunately, the LOSC provisions related to high seas living marine resource management include a number of conservation-oriented provisions that could form the basis for the creation of a Central Arctic Ocean High Seas MPA.²⁸⁷ For example, under the LOSC, all parties must work independently and cooperatively to conserve "the living resources of the high seas."²⁸⁸ The LOSC also requires that parties "protect and preserve the marine environment,"²⁸⁹ including "rare or fragile ecosystems."²⁹⁰ States must also refrain from activities that would interfere with measures taken by other states to preserve and protect the marine environment.²⁹¹

Further, as discussed above at length, the Fish Stocks Agreement, which is an implementing agreement of the LOSC, encourages states to manage high seas fisheries through the establishment of RFMOs.²⁹² The LOSC requires that RFMOs implement measures to manage fisheries in a sustainable manner.²⁹³ As an ecosystem-based

285. U.S. Coast Guard, *supra* note 282.

286. TOMME ROSANNE YOUNG, DEVELOPING A LEGAL STRATEGY FOR HIGH SEAS MARINE PROTECTED AREAS, 6 (2003), available at <http://www.uicnmed.org/web2007/CDGovernance/conten/3-hautemar/Atelier-sur-les-aires/2-Background-Papers-and-Documents/HighSeasMPAsLegalPaper.pdf>.

287. LOSC, *supra* note 137, arts. 117, 118, 192, 193, 194.

288. *Id.* arts. 117, 118.

289. *Id.* art. 193.

290. *Id.* art. 194.5 (stating that parties have an obligation to protect and preserve the habitats of "depleted, threatened or endangered species and other forms of marine life.").

291. *Id.* art. 118.

292. *See id.* art. 192.

293. *Id.*

management approach, MPAs would certainly be considered a sustainable approach to fisheries management.

MPAs would also be consistent with the Fish Stocks Agreement's goal of ensuring the "long-term conservation and sustainable use of straddling fish stocks and highly migratory fish stocks."²⁹⁴ The Fish Stocks Agreement requires parties to the Agreement to: "adopt measures to ensure the long-term sustainability of straddling fish stocks;"²⁹⁵ to implement "conservation and management measures for species belonging to the same ecosystem or associated with or dependent upon the target stocks, with a view to maintaining or restoring populations of such species above levels at which their reproduction may become seriously threatened;"²⁹⁶ to ensure that these measures are based on the best scientific evidence available;²⁹⁷ to apply the precautionary approach, "which requires proponents of resource exploitation to prove the sustainability of their actions;"²⁹⁸ and to protect biodiversity in the marine environment.²⁹⁹ All of these requirements would seem to support the idea of establishing MPAs within existing RFMOs.

However, scholars note that, "[t]he most important drawback to use of the [Fish Stocks Agreement] as a tool in the establishment and management of" high seas MPAs is that "many of the areas of the greatest concern are not primarily considered habitats of straddling" fish stocks.³⁰⁰ For example, the CAO is not currently a primary habitat for the commercially important sub-Arctic straddling fish stocks.³⁰¹ Accordingly, an alternative possible mechanism for the establishment of an MPA in the CAO may be the 1973 Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).³⁰² CITES protects wildlife via the establishment of an international system for regulating trade in endangered species.³⁰³ CITES defines trade broadly, as the "export, re-export, import[,] and intro-

294. Fish Stocks Agreement, *supra* note 183, art. 2.

295. *Id.* art. 5(a).

296. *Id.* art. 5(e).

297. *Id.* art. 5(b)-(c).

298. YOUNG, *supra* note 286, at 8 (citing Fish Stocks Agreement, *supra* note 183, arts. 5(d), 6, Annex II).

299. Fish Stocks Agreement, *supra* note 183, art. 5(g).

300. YOUNG, *supra* note 286, at 8-9.

301. *See supra* Part I.A.

302. Convention on International Trade in Endangered Species of Wild Fauna and Flora, Mar. 3 1973, 27 U.S.T. 1087, 993 U.N.T.S. 243 (entered into force July 1, 1975) available at <http://www.cites.org/eng/disc/text.shtml>.

303. *Id.* art. III.

duction from the sea," which includes "transportation into a State of specimens of any species which were taken in the marine environment not under the jurisdiction of any State."³⁰⁴ All eight Arctic states are party to CITES, and would be legally bound to enforce an MPA created under its auspices.³⁰⁵ CITES appendices list the endangered species covered by the Convention, and the Arctic high seas are home to several of these listed species, including whales, porpoises, dolphins, and seals.³⁰⁶

CONCLUSION

The establishment of a circumpolar network of no-take MPAs will provide the best protection for present and future Arctic fisheries. Fisheries managers presently face three serious problems in the Arctic. First, while there is no longer any dispute that the Arctic's climate is changing, there is a great deal of uncertainty surrounding the rate and nature of both present and future changes. A lack of historic and present-day data poses a huge challenge. This lack of scientific understanding suggests that managers should apply the precautionary principle. Second, as the cryosphere melts, multi-year sea ice becomes open water, and a new high seas emerges in the CAO. Because the LOSC codifies the historically established right to freedom of the seas on the high seas, unless states formally bind themselves to an agreement to abstain from fishing, the high seas of the CAO are fair game for anyone who wishes to fish them. Decades of international efforts to address overfishing on the high seas have resulted in several international agreements, but the international community has been unable to find a silver bullet to address the monitoring, enforcement, and reporting challenges associated with illegal, unregulated, and unreported fishing on the high seas. Finally, in recent decades, fisheries managers have acknowledged the failures of the single-species approach to fisheries management and have begun to embrace EBM, including MPAs, as a more holistic, more sustainable, and consequently more effective management approach.

The establishment of a circumpolar network of MPAs throughout the CAO provides the best solution to the three problems identified above. MPAs allow an ecosystem to increase its resiliency by desig-

304. *Id.* art. I.

305. *See id.*

306. Malloy, *supra* note 10, at 476.

nating areas where the living marine resources are not adversely impacted by intrusive human activities. Increasing the resiliency of the CAO ecosystem is one of the best ways for managers to prepare for a future that is uncertain, yet certain to change. MPAs would also help with the enforcement issues that plague fishing on the high seas. If no-take MPAs are established, it will be quite easy to monitor activity in these areas because international law requires most vessels to be equipped with AISs, which alert the international community to a vessels' location at all times. If fishing vessels are found to be within an MPA, the governing bodies can quickly take steps to rectify the problem. Finally, the establishment of a network of MPAs is consistent with the principles of EBM, an approach to fisheries management that considers all aspects of an ecosystem, including the effects of anthropogenic activity. Given the myriad of new activities in the region, Arctic fisheries will be managed most effectively through an ecosystem-based approach. A circumpolar network of no-take MPAs will increase the resiliency of the CAO ecosystem, affording present and future fisheries the best protection in this new era of change and uncertainty.