The Effectiveness of Environmental Laws in Preventing Transboundary Pollution from Oil Drilling in the Arctic

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I. INTRODUCTION

Sic utere tuo ut alienum non laedas. At the heart of international law is the balance between a state's right to extract resources within its sovereign boundaries and its obligation to prevent harm to other states.[1] Recent research suggests that offshore hydrocarbon extraction within a sovereign state's exclusive economic zone can cause transboundary pollution.[2] The Arctic Circle is estimated to contain over 90 billion barrels of oil, 17 trillion cubic feet of undiscovered gas, and 44 billion barrels of natural gas liquids, comprising significant portions of the world's undiscovered hydrocarbon resources.[3] Roughly 84% of undiscovered Arctic resources are expected to be found offshore.[4] In 2018, the United States Congress has opened parts of the Arctic to oil and gas drilling and repealed the offshore drilling safety regulations that were put in place after the Deepwater Horizon spill.[5] Other

1. MARTE JERVAN, THE PROHIBITION OF TRANSBOUNDARY ENVIRONMENTAL HARM. AN ANALYSIS OF THE CONTRIBUTION OF THE INTERNATIONAL COURT OF JUSTICE TO THE DEVELOPMENT OF THE NO-HARM RULE (Aug. 25, 2014).

2. Kim Martineau, *As Climate Stirs Arctic Sea Ice Faster, Pollution Tags Along - Contaminants More Likely to Cross National Borders, Study Shows,* EARTH INST. BLOGS (June 27, 2017), https://blogs.ei.columbia.edu/2017/06/27/as-climate-stirs-arctic-sea-ice-faster-pollution-tags-along/ [https://perma.cc/F69W-CHR5].

3. *See* D. L. GAUTIER ET AL., U.S. GEOLOGICAL SURVEY, USGS FACT SHEET 2008-3049, CIRCUM-ARCTIC RESOURCE APPRAISAL: ESTIMATES OF UNDISCOVERED OIL AND GAS NORTH OF THE ARCTIC CIRCLE (2008); *see also* M. E. BROWNFIELD ET AL., U.S. GEOLOGICAL SURVEY, USGS FACT SHEET 2012–3042, AN ESTIMATE OF UNDISCOVERED CONVENTIONAL OIL AND GAS RESOURCES OF THE WORLD (2012).

4. GAUTIER, *supra* note 3, at 3.

5. Lisa Friedman, *Trump Moves to Open Nearly All Offshore Waters to Drilling*, N.Y. TIMES (Jan. 4, 2018), https://www.nytimes.com/2018/01/04/climate/trump-offshore-drilling.html [https://perma.cc/M8YS-S97C]; Lisa Friedman & Hiroko Tabuchi, *U.S. to Roll Back Safety*

countries, including Norway and Russia, have similarly encouraged arctic oil exploration.[6] Yet, existing equipment is simply inadequate to deal with pollution accidents that will inevitably occur as such explorations continue.[7]

Despite the potential increases in drilling in the coming years, the Arctic does not have a coherent and effective legal regime to handle the threat posed by oil pollution.[8] It is therefore necessary and timely to assess the effectiveness of international environmental law in protecting Arctic biodiversity against oil pollution. This Note assesses the effectiveness of the current environmental regime in the Arctic along three axes: participation & liability, scientific, and cooperative. This Note argues that, despite their failure to meet participatory and liability standards, existing laws may be effective in protecting Arctic biodiversity against oil pollution if new implementation agreements are adopted. Adequate protection for Arctic biodiversity also depends on better operational practices and compliance with existing regulations.[9] As such, this Note recommends ways to improve the efficacy of arctic agreements.

Part II provides background on the Arctic environment, the possible impacts of oil pollution, and the current legal authority governing resource exploitation in the Arctic. Part III introduces and applies a theoretical framework for assessing efficacy of existing authorities by focusing on whether they modify state actors' utilities, whether they facilitate learning, and whether they

Rules Created After Deepwater Horizon Spill, N.Y. TIMES (Dec. 28, 2017), https://www.nytimes.com/2017/12/28/us/trump-offshore-drilling.html?module=inline.

6. *See* Richard Milne, *Norway opens up record 93 blocks for Arctic oil exploration*, FIN. TIMES (Jun. 21, 2017), https://www.ft.com/content/a120d578-567e-11e7-9fed-c19e2700005f [https://perma.cc/Z7MA-8NXF] (Norway has opened over ninety blocks in the Arctic for oil exploration); s*ee also* Tsvetana Paraskova, *Russia Goes All in on Arctic Oil Development*, USA TODAY (Oct. 24, 2017), https://www.usatoday.com/story/money/energy/2017/10/24/russia-goes-all-arctic-oil-development/792990001/ [https://perma.cc/6MS6-KVCF] (Russia's state-controlled oil entities have already started in the Russian Arctic shelf. Russia has also publicly stated that Arctic oil and Arctic development are a national priority.).

7. Lars-Otto Reiersen et al., *The Arctic—A Sentinel for Environmental Processes and Effects*, in ARCTIC SCIENCE, INTERNATIONAL LAW AND CLIMATE CHANGE 15, 31 (Susanne Wasum-Rainer et al. eds., 2011).

8. LILLY WEIDEMANN, INTERNATIONAL GOVERNANCE OF THE ARCTIC MARINE ENVIRONMENT 115 (Hamburg Studies of Maritime Affairs, Volume 27, 2014) ("[R]egulation of this sector is patchy. None of the international conventions on protection of the marine environment is solely concerned with the regulation of offshore oil and gas development.").

9. Reiersen et al., *supra* note 7, at 31.

facilitate coordination. Part IV recommends possible ways to improve the efficacy of the Arctic regime including an umbrella Transboundary Marine Pollution Treaty, an Arctic Insurance Agreement, and standardized Marine Protected Areas. Finally, Part V summarizes the importance of U.S. leadership in proposed solutions.

II. BACKGROUND

A. Arctic Geography

The legal, geographic boundaries of the Arctic are complex. There are eight Arctic States that have an interest in the Arctic Ocean: the United States, Russia, Canada, Greenland (Denmark), Iceland, Norway, Sweden, and Finland.[10] Under the United Nations Convention on the Law of the Sea ("UNLCOS"), each of these nations have control over an exclusive economic zone ("EEZ") that extends 200 nautical miles ("NM") off its shoreline.[11]

10. *Member States*, ARCTIC COUNCIL (Sept. 10, 2015), https://arctic-council.org/index.php/en/about-us/member-states [https://perma.cc/5PZ5-6CZC].

11. United Nations Convention on the Law of the Sea art. 57, Dec. 10, 1982, 1833 U.N.T.S. 397 [hereinafter UNCLOS].

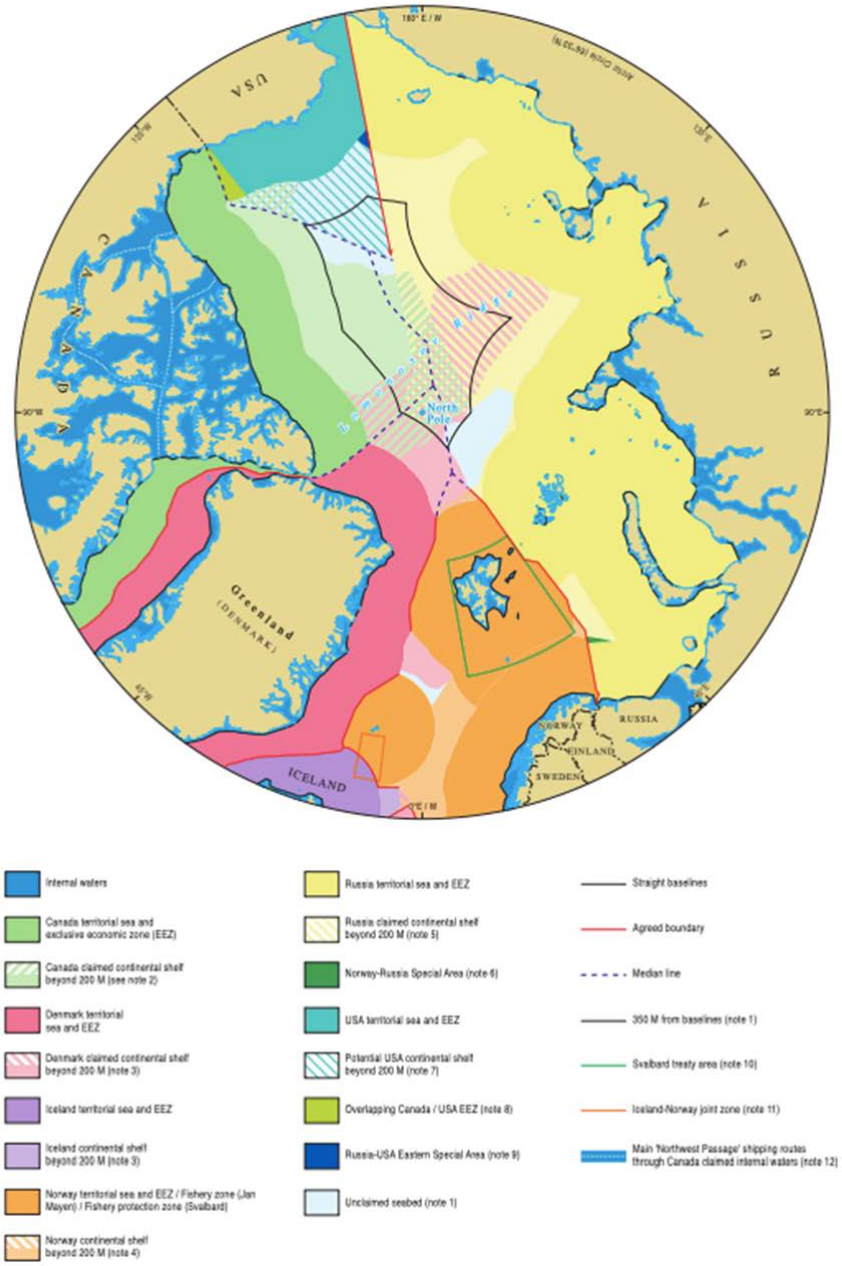

Figure 1: Map of maritime jurisdiction and boundaries in the Arctic region and accompanying notes **(Source:** IBRU: Centre for Borders Research, Durham University)

Parties to UNCLOS may also petition under Article 76(4)–(7) for sovereign rights beyond the 200 NM.[12] These petitions are directed to the Convention's Commission on the Limits of the Continental Shelf ("CLCS").[13] Many coastal Arctic States including Russia, Norway, and Iceland have done so.[14] Because it is not a party to UNCLOS, the United States cannot make such a petition.[15] The establishment of these extensions can prove invaluable given the vast petroleum resources expected to be found there.[16] Beyond the extended EEZs lie parts of the marine Arctic that are beyond national jurisdiction ("ABNJ") and are controlled under the High Seas provisions of UNCLOS.[17]

B. The Arctic Environment

The Arctic is one of the few pristine habitats remaining on this planet. It has diverse ecosystems—from sea ice to wetlands, mountains to the Arctic Ocean and the surrounding seas. Although the Arctic has such extensive landscapes, this Note will focus principally on ice sheets and maritime areas, as they are susceptible to oil pollution impacts and remediation efforts. The Arctic marine environment is home to a rich array of animal diversity including polar bears, salmon, seals, narwhals, and beluga whales.[18] Many of these species are endangered, including bowhead whales, polar bears, and ringed seals.[19] These animals rely on 25 million square kilometers of sea ice for

12. UNCLOS, *supra* note 11, at art. 76.

13. UNCLOS, *supra* note 11, at Annex II, art. 3

14. *Submissions, through the Secretary-General of the United Nations, to the Commission on the Limits of the Continental Shelf, pursuant to article 76, paragraph 8, of the United Nations Convention on the Law of the Sea of 10 December 1982*, UNITED NATIONS (Aug. 15, 2019), http://www.un.org/Depts/los/clcs_new/commission_submissions.htm [https://perma.cc/X22G-YQEM].

15. Marta Kolcz-Ryan, *An Arctic Race: How the United States' Failure to Ratify the Law of the Sea Convention could Adversely Affect its Interests in the Arctic*, 35 DAYTON L.R. 149–173 (2009).

16. WEIDEMANN, *supra* note 8, at 78.

17. UNCLOS, *supra* note 11, at art. 87.

18. *See Arctic Facts*, WORLD WILDLIFE FED'N, https://www.worldwildlife.org/places/arctic [https://perma.cc/CRD7-F447] (last accessed Sept. 09, 2019); *Arctic*, ENCYCLOPEDIA BRITANNICA, https://www.britannica.com/place/Arctic [https://perma.cc/FG2G-8JRL] (last visited Sept. 9, 2019).

19. Christina Nunez, *What Happens When Oil Spills in the Arctic?*, NAT'L GEOGRAPHIC (Apr. 24, 2014), https://news.nationalgeographic.com/news/energy/2014/04/140423-national-research-council-on-oil-spills-in-arctic/ [https://perma.cc/CK2M-QJPV].

foraging, hunting, and birthing.[20] Studies show that the thickness and extent of summer sea ice in the Arctic have declined dramatically over the past thirty years.[21] The impact of climate change in the Arctic is more drastic than anywhere else in the world.[22] The temperature increase in the Arctic is twice that of the rest of the globe, and the Arctic Climate Impact Assessment estimates that by 2100, the increase in temperature will vary between two and nine degrees Celsius.[23] As temperatures increase, the major obstacle to offshore drilling—sea ice in the Arctic—will "melt away."[24] Studies have also identified the area where sea ice is expected to last the longest, which is generally referred to as the "Last Ice Area," which will provide critical future habitats for species needing such ice.[25]

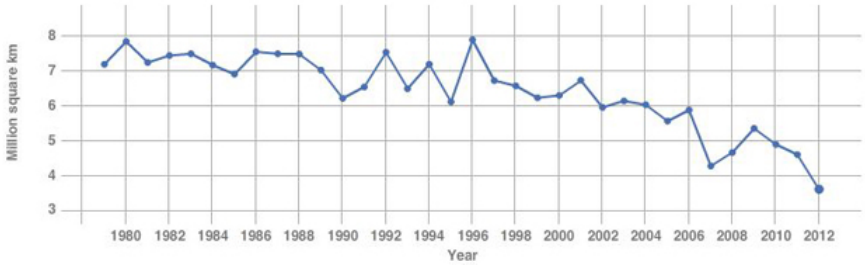

Figure 2: Decline of Sea Ice Over Time **(Source:** National Snow and Ice Data Center)[26]

20. Sea ice is frozen ocean water. Sea ice undergoes an annual cyclical pattern—it forms, grows, melts and circulates in the ocean. *Sea Ice*, WORLD WILDLIFE FED'N, http://www.wwf.ca/conservation/arctic/sea_ice/ [https://perma.cc/EB22-EYPG] (last visited Sept. 9, 2019).

21. *Quick Facts on Arctic Sea Ice*, NAT'L SNOW & ICE DATA CENTER, https://nsidc.org/cryosphere/quickfacts/seaice.html [https://perma.cc/GD4S-KSKR] (last visited Sept. 30, 2019).

22. *Climate Change in the Arctic*, NAT'L SNOW & ICE DATA CENTER, https://nsidc.org/cryosphere/arctic-meteorology/climate_change.html [https://perma.cc/44Z8-HWVM] (last visited Sept. 30, 2019).

23. SUSAN JOY HOSSOL, ARCTIC CLIMATE IMPACT ASSESSMENT, IMPACTS OF A WARMING ARCTIC (2004); *see* INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, WORKING GROUP II CONTRIBUTION, CLIMATE CHANGE 2007: IMPACTS, ADAPTATION AND VULNERABILITY (Martin Parry et al. eds., 2007).

24. Timo Koivurova & Kamrul Hossain, *Arctic: Can it be Done Sustainably?*, OIL, GAS & ENERGY L. INTELLIGENCE, Feb. 2012, at 1, 4.

25. *See* supra note 21.

26. Jonathan Masters, *The Thawing Arctic: Risks and Opportunities*, COUNCIL ON FOREIGN RELATIONS (Dec. 16, 2013), https://www.cfr.org/backgrounder/thawing-arctic-risks-and-opportunities.

C. The Environmental Problem of Offshore Drilling

Oil and gas activities in the Arctic are harmful and hazardous.[27] If large-scale oil production proceeds in the Arctic, both chronic and acute releases of oil will inevitably occur.[28] Physical drilling is highly polluting and there will be demonstrable effects on Arctic wildlife. Offshore rigs pollute their surrounding marine environment because of pipeline leaks and release of drilling fluid, metal cuttings including toxic metals such as lead, chromium, and mercury, and carcinogens such as benzene.[29] Oil exploration activities are hazardous to the extent that there is a high probability of a catastrophic spill and blowout.[30]

Should an oil spill occur in the Arctic, cold temperatures, low degradation rates, and hazardous conditions could interfere with the response.[31] The remoteness of the region, lack of existing infrastructure, and the region's vast size will likely hinder response times to future oil spills.[32] Increased storm surges could also mean that pollution is more likely to reach the shore, damaging coastal species.[33] Beyond the lack of capacity to immediately remedy any spills in the region, exposure to oil spills likely will injure or kill seals, contaminate prey populations such as sea birds and fish, and impact the entire food web of the Arctic system. Since fur contaminated with oil begins to mat and lose its ability to retain heat and water, marine mammals with fur are more vulnerable to oil spills than other aquatic life.[34] Where dispersants are used, fish

27. In this context, hazardous means risky and dangerous, while harmful means injurious and damaging to environments and marine species.

28. R. W. Macdonald & J. M. Bewers, *Contaminants in the Arctic Marine Environment: Priorities for Protection*, 53 ICES J. MARINE SCI. 537, 555 (1996).

29. *Impacts of Offshore Drilling*, OCEANA, https://web.archive.org/web/20180317201143/http://usa.oceana.org/impacts-offshore-drilling [https://perma.cc/9MZ3-NQ95] (last visited Sept. 9, 2019).

30. *Id.*

31. Reiersen et al., *supra* note 7, at 30.

32. *How would offshore oil and gas drilling in the Arctic impact wildlife?*, WORLD WILDLIFE FED'N, https://www.worldwildlife.org/stories/how-would-offshore-oil-and-gas-drilling-in-the-arctic-impact-wildlife [https://perma.cc/TH9F-UAD2] (last visited Sept. 9, 2019).

33. RACHAEL LORNA JOHNSTONE, OFFSHORE OIL AND GAS DEVELOPMENT IN THE ARCTIC UNDER INTERNATIONAL LAW 12–13 (Queen Mary Studies in Int'l Law, Volume 14, 2014).

34. ENVTL. RESEARCH INST, DENMARK MINISTRY OF THE ENVIRONMENT, POTENTIAL ENVIRONMENTAL IMPACTS OF Oil SPILLS IN GREENLAND 66 (Anders Mosbech ed., 2002); *see also* Jennifer Kennedy, *Effects of Oil Spills on Marine Life*, THOUGHTCO (Mar. 16, 2018).

eggs and larvae could be exposed to harmful concentrations of oil components.[35]

No major spills have occurred in the region to date.[36] Thus, there is no data and little to no understanding of the uncertainties related to such accidents in the region.[37] Weidemann further adds that "[e]xperience from the subarctic Exxon Valdez spill also shows that exposure to oil spills can last for decades for aquatic animals . . . and the long-term effects of such spills on ecosystems are still poorly understood."[38] However, the absence of a spill should not be taken to mean that it is safe to drill. With melting sea ice and the corresponding increase in extractive activities, pollution events are likely to increase.

Pollution in the Arctic is also unlikely to stay localized. A warming climate is not just melting the Arctic's sea ice; it is stirring the remaining ice faster.[39] During the winter months, it is possible for contaminants to be frozen into the sea ice and then transported across the ocean as sea ice drifts.[40] As a result, any oil pollution from shipping routes or offshore drilling may be ice-rafted to neighboring countries and their maritime boundaries. Thereafter, as sea ice melts in the summer, these contaminants will be released in new territories. It is an unfortunate coincidence that the release of contaminants in sea ice into the marine environment occurs at the site of maximum ocean productivity: along the ice edge.[41] Ice-edge phytoplankton form part of the bottom of the Arctic food web, and such pollution could impact the occurrence of phytoplankton blooms.[42]

It is worth noting that the Arctic region is a "sink" for a multitude of pollutants from all around the world, including, but not limited

35. ENVTL. RESEARCH INST, *supra* note 34, at 80.

36. Parul Tewari, *What would an oil spill mean for the Arctic?*, IIASA NEXUS (Aug. 16, 2017), http://blog.iiasa.ac.at/2017/08/16/what-would-an-oil-spill-mean-for-the-arctic/ [https://perma.cc/552U-SDP9] (noting that the 1989 Exxon Valdez spill in Prince William Sound came close to the Arctic Circle).

37. *Id.*

38. WEIDEMANN, *supra* note 8, at 33.

39. Robert Newton et al., *Increasing Transnational Sea-Ice Exchange in a Changing Arctic Ocean,* 5 EARTH'S FUTURE 633, 633 (2017).

40. *See id.* at 635.

41. Reiersen et al., *supra* note 7, at 18–19.

42. *Observing Arctic Ice-edge Plankton Blooms from Space,* SCI. DAILY (Mar. 4, 2011), https://www.sciencedaily.com/releases/2011/03/110304115609.htm [https://perma.cc/GZ62-UBJX].

to, persistent organic pollutants and radioactive waste.[43] It is extremely difficult to identify each type of pollutant and its source.[44] However, addressing all such global pollutants is beyond the scope of this Note. This Note focuses on the regional transboundary harm from Arctic States' extractive hydrocarbon activities in their exclusive economic zones.

D. Current Sources of Authority

1. Arctic Council

The Artic Council is composed of eight sovereign member states that hold Arctic territory.[45] Working groups within the Arctic Council assess the economic, environmental, and social conditions of the Arctic, and produce reports and recommendations for adoption by member States.[46] Both the Conservation of Arctic Flora and Fauna Working Group ("CAFF"), which addresses the conservation of Arctic biodiversity, and the Protection of the Arctic Marine Environment Working Group ("PAME"), which ensures the protection and sustainable use of the Arctic marine environment, are concerned with oil pollution in the Arctic.[47] Based on their reports and recommendations, the Council expects its members to undertake *voluntary* commitments and adoptions to protect the Arctic.[48] The Council does not and cannot impose mandatory obligations on its participants.[49] It also does not have any enforcement mechanisms.[50] While the lack of enforcement limits

43. *Arctic Pollution Issues 2014: Trends in Persistent Organic Pollutants, Radioactivity, and Human Health in the Arctic - Policy-makers Summary*, AMAP 1–2 (Mar. 2015) https://www.amap.no/documents/download/2222/inline[https://perma.cc/N5CS-WY9V].

44. *Id.*

45. *Member States*, ARCTIC COUNCIL (Sept. 10, 2015), https://arctic-council.org/index.php/en/about-us/member-states [https://perma.cc/SV7N-UCKW].

46. *See Working Groups*, ARCTIC COUNCIL (Sept. 10, 2015), https://arctic-council.org/index.php/en/about-us/working-groups [https://perma.cc/CB5B-WL9X].

47. *CAFF Working Group*, ARCTIC COUNCIL (Sept. 10, 2015), https://arctic-council.org/index.php/en/about-us/working-groups/caff; *PAME Working Group*, ARCTIC COUNCIL (Sept. 10, 2015), https://arctic-council.org/index.php/en/about-us/working-groups/pame.

48. Heather Exner-Pirot et al., *Form and Function: The Future of the Arctic Council*, THE ARCTIC INST. (Feb. 5, 2019), https://www.thearcticinstitute.org/form-function-future-arctic-council/ [https://perma.cc/5RZ5-QAUZ].

49. *Id.*

50. *The Arctic Council: A Backgrounder*, ARCTIC COUNCIL (Sept. 13, 2018), https://arctic-council.org/index.php/en/about-us [https://perma.cc/4XAZ-RUCG] ("The Arctic Council

the efficacy of the Arctic Council, the Council still has the capacity to provide a wide-angle lens to threats to the Arctic and can facilitate coordination among its member states to address a transboundary oil problem.[51] For example, the Arctic Council has published the Arctic Offshore Oil and Gas Guidelines in partnership with representatives of other governments, non-governmental organizations, industry, indigenous people, and the scientific community. Though the guidelines are non-binding, they are intended to encourage the highest standards currently available.[52]

For each of the treaties or conventions that follow, the following chart illustrates which of the Arctic Council States are parties.

	United States	Canada	Russia	Greenland (Denmark)	Finland	Iceland	Norway	Sweden
UNCLOS	X	✓	Partly	✓	✓	✓	✓	✓
ESPOO	X	X	X	✓	✓	X	✓	✓
OPRC	✓	Partly	X	✓	Partly	✓	✓	✓
OSPAR	X	X	X	✓	✓	✓	✓	✓
CBA	X	✓	✓	✓	✓	✓	✓	✓
ACPB	✓	✓	✓	✓	X	X	✓	X

Table 1: Treaties and their Status of Ratification by Arctic State[53]

does not and cannot implement or enforce its guidelines, assessments or recommendations. That responsibility belongs to each individual Arctic State.").

51. *See infra* Part III.

52. LINDA NOWLAN, INT'L UNION FOR CONSERVATION OF NATURE, ARCTIC LEGAL REGIME FOR ENVTL PROT., Policy and Law Paper No. 44 IUCN Environmental Law Program 36 (2001).

[53] Participants to Law of the Sea, United Nations Treaty Collection, available online at https://treaties.un.org/Pages/ViewDetailsIII.aspx?src=TREATY&mtdsg_no=XXI-6&chapter=21&Temp=mtdsg3&clang=_en [https://perma.cc/622J-ZZLG] (last accessed Dec. 23, 2019); Participants to Convention on Environmental Impact Assessment in a Transboundary Context, United Nations Treaty Collection, available online at https://treaties.un.org/Pages/ViewDetails.aspx?src=TREATY&mtdsg_no=XXVII-4&chapter=27&clang=_en [https://perma.cc/KF2B-PPP6] (last visited Dec. 23, 2019); Participants to International Convention on Oil Pollution Preparedness, Response, and Cooperation, United Nations Treaty Collection, available online at https://treaties.un.org/Pages/showDetails.aspx?objid=08000002800aada6 [https://perma.cc/MWB4-38YH] (last visited Dec. 23, 2019); Participants to OSPAR, OSPAR Commission, available online at https://www.ospar.org/organisation/contracting-parties [https://perma.cc/2Z8Z-PDNK] (last visited Dec. 23, 2019); List of Parties Convention on Biological Diversity, Convention on Biological Diversity, https://www.cbd.int/information/parties.shtml [https://perma.cc/Q4ZV-QHTQ] (last visited Dec. 23, 2019); Preamble, Agreement on Conservation of Polar Bears,

2. United Nations Convention of the Law of the Sea ("UNCLOS")

UNCLOS was developed to provide a framework to balance the exploitation of hydrocarbon resources and the prevention of marine pollution. Articles 194 and 195 of UNCLOS deal with oil pollution specifically, and others address the marine environment in the Arctic and emphasize the importance of minimizing oil pollution.[54] Articles 78, 206, and 208 govern the freedoms of "other States."[55] Article 78 specifically provides that in exercising its own rights on its continental shelf, a coastal State must not "infringe or result in any unjustifiable interference" with any rights and freedoms of other States. Article 206 requires that States that undertake polluting activities report any "significant and harmful changes to the marine environment." Article 194 requires States to take "individually or jointly as appropriate" all measures "to reduce and control pollution of the marine environment." It also mandates that member states take "all measures necessary" to ensure that any pollution from activities under their jurisdiction is minimized and does not cause transboundary damage to other States and their environments. Under Article 194, member states have to "harmonize their policies" on this front. Article 195 requires that the measures taken in Article 194 do not "transform one type of pollution into another" and do not indirectly transfer the pollution to another area. Finally, while Article 234 does relate to "ice-covered areas," it covers only the rights of coastal states to adopt and enforce regulations for preventing and controlling marine pollution from vessels *inside* ice-covered areas within their exclusive economic zones.[56] As detailed above, this article does not discuss transboundary pollution from drilling activities or vessels outside State EEZs. Under Article 208, member states should establish regional rules and periodically review the effectiveness of the implemented policies. When read together, articles 78, 206, 194, and 195, suggest that the eight countries that constitute the Arctic Council will need to coordinate their extractive activities in order to minimize marine pollution and impacts to each other.

http://pbsg.npolar.no/en/agreements/agreement1973.html [https://perma.cc/G8T8-N4KN] (last visited Dec. 23, 2019).

54. UNCLOS, *supra* note 11, at art. 194, 195.

55. *Id.* at arts. 78, 206, 208.

56. *Id.* at art. 234.

3. Espoo Convention

The Convention on Environmental Impact Assessment in a Transboundary Context ("Espoo Convention") sets out the obligations of Parties to assess the environmental impact of certain activities through a transboundary environmental assessment ("TEA").[57] In 2004, the Parties adopted an amendment qualifying the types of offshore hydrocarbon activities that would trigger the TEA requirement. Effective October 23, 2017, States must undertake a TEA when petroleum and natural gas extraction exceeds 500 metric tons/day for petroleum or 500,000 cubic meters/day for natural gas.[58]

Although the Espoo Convention is the primary legal basis for an Arctic TEA, it is not the only treaty that provides for TEAs. There are many applicable bilateral treaties between the Nordic states, between the U.S. and Canada, and between Canada and Denmark (Greenland).[59] However, there are also maritime zones that are not covered by treaties beyond Espoo, such as those between Russia and other Arctic States.[60] Like Espoo, these TEAs set out minimum requirements, but, unlike Espoo, there is no standardized approach across the States.

4. International Convention on Oil Pollution Preparedness, Response, and Cooperation ("OPRC")

The OPRC Convention applies to all vessels and submersibles operating in the marine environment, fixed or floating offshore installations or structures engaged in gas or oil exploration and exploitation, and sea ports and oil handling facilities.[61] Parties are required to have emergency plans in the event of a spill, and States are required to inform other States whose interests are affected, or

57. Convention on Environmental Impact Assessment in a Transboundary Context, Feb. 25, 1991, 1989 U.N.T.S. 309 [hereinafter Espoo Convention]; *About the ESPOO Convention*, UNECE, https://www.unece.org/environmental-policy/conventions/environmental-assessment/about-us/espoo-convention/enveiaeia/more.html [https://perma.cc/629A-ABHF] (last visited Sept. 30, 2019).

58. Espoo Convention Appendix I. https://www.unece.org/env/eia/about/eia_text.html#appendix1.

59. Timo Koivurova, *Transboundary Environmental Assessment in the Arctic*, 26 IMPACT ASSESSMENT AND PROJECT APPRAISAL 265, 269 (2008).

60. *Id.*

61. International Convention on Oil Pollution Preparedness, Responsiveness, and Cooperation art. 1, Nov. 30, 1990, 1891 U.N.T.S. 77 [hereinafter OPRC].

are likely to be affected.[62] While some cost sharing mechanisms to oil pollution remediation are detailed in the Annex of this Convention, larger questions of restoration, enforcement, and liability remain open.[63] Despite the Convention's promising title, it does not actually govern the substantive mechanisms of hydrocarbon extraction.

5. Convention for the Protection of the Marine Environment of the North-East Atlantic("OSPAR")

The OSPAR convention provides an ecosystem approach for protections against marine pollution in the North-East Atlantic.[64] Region I of OSPAR (which is approximately 40% of all of the OSPAR area) covers parts of the Arctic. In particular, Annex III deals with pollution from offshore resources, and Articles 4 and 5 consider the assessment and protection of ecosystems and biological diversity. OSPAR is guided by six strategies, including the OSPAR strategy on Environmental Goals and Management Mechanisms for Offshore Activities. OSPAR operates through a Commission that tracks the conditions of the maritime area and the effectiveness of the adopted measures.[65]

6. Treaties on Biological Diversity

The Convention on Biological Diversity ("CBD") and the Agreement on the Conservation of Polar Bears ("ACPB") both aim to protect critical wildlife in the Arctic ecosystem. While neither the Arctic, nor ice-covered areas are mentioned explicitly in the CBD, the convention does indirectly protect Arctic species through its articles governing conservation and sustainable use (Article 6), identification and monitoring (Article 7), and in-situ conservation (Article 8).[66] Article 8 of the CBD discusses the establishment of a system of protected areas to conserve biological diversity.[67] Article

62. OPRC, *supra* note 61, at art. III.

63. *Id.* at annex 1(a).

64. Convention for the Protection of the Marine Environment of the North-East Atlantic Annex III, Sept. 22, 1992, 2354 U.N.T.S. 67 [hereinafter OSPAR]; s*ee also*, WEIDEMANN, *supra* note 8 at 100.

65. *supra*. note 64, at Art. 10.

66. Convention on Biological Diversity arts. 6–8, Jun. 5, 1992, 2076 U.N.T.S. 579 [hereinafter CBD].

67. Donald R. Rothwell, *Global Environmental Protection Instruments and the Polar Marine Environment, in* PROTECTING THE POLAR MARINE ENVIRONMENT 57, 73 (Davor Vidas ed., 2000).

8 is therefore, the legal hook for developing a network of marine protected areas in the Arctic. Indeed, CAFF (the working group of the Arctic Council) has essentially "mirrored the function of the CBD in the Arctic."[68] The ACPB relies on each contracting party to take actions that they deem suitable to "protect the ecosystems of which polar bears are a part."[69] By taking an ecosystem approach, the ACPB aims to protect the polar bears as well as their food chains and habitats. Parties to the ACPB have explicitly agreed to reduce other stressors including habitat destruction and pollution.[70]

7. National Laws and Bilateral Treaties

Bilateral agreements and national laws are inadequate to address transboundary oil pollution.[71] Some Arctic States have strong management regulations for pollution abatement, while measures and laws in other States, such as Russia, remain painfully opaque.[72] This patchwork of national legislation over a transnational region is complicated for operators, insurers, and those policing industrial practices to navigate.[73] Importantly, the United States has the Oil Pollution Act ("OPA") that governs the offshore development of hydrocarbon resources.[74] While OPA protects waters of the United States from oil spills and other pollution from activities within its exclusive economic zone, the law, unfortunately, does not extend so far as to hold parties responsible for *transboundary* oil pollution.[75]

68. Gloria Dickie, *Taking the Pulse of the Arctic's Biological Diversity*, ARCTIC DEEPLY (Feb. 8, 2017), https://www.newsdeeply.com/arctic/articles/2017/02/08/taking-the-pulse-of-the-arctics-biological-diversity [https://perma.cc/27JY-9ADP].

69. Agreement on the Conservation of Polar Bears art. II, Nov. 15, 1973, 2898 U.N.T.S. 243 [hereinafter ACPB].

70. WEIDEMANN, *supra* note 8, at 107.

71. While there are bilateral agreements between Denmark-Canada, Russia-Norway, Russia-U.S., and Canada-U.S. regarding cooperation on pollution control in Arctic waters, these agreements lack mandatory obligation, enforcement and, dispute resolution mechanisms. Keil, Kathrin, *Spreading Oil, Spreading Conflict? Institutions Regulating Arctic Oil and Gas Activities*, 50 THE INT'L SPECTATOR: ITALIAN J. INT'L AFFAIRS 85, 100–106 (2015).

72. Sarah Gulas et al., *Declining Arctic Ocean Oil and Gas Developments: Opportunities to Improve Governance and Environmental Pollution Control*, 75 MARINE POL'Y 53, 58 (2017).

73. Erin King, *A critical review of hydrocarbon exploitation and shipping governance measures for oil pollution prevention and preparedness in the Arctic*, School of Marine Science and Engineering, Plymouth University, Drakes Circus, PL4 8AA (2016).

74. 33 U.S.C. § 2701 *et seq.* (1990).

75. 33 U.S.C. § 2702 (1990). This section makes clear that the discharge, or threat of a discharge of oil, must be "*into or upon* the navigable waters or adjoining shorelines or the

Indeed, while the waters of the United States within its EEZ may be affected by such transboundary pollution, under current international laws, there is no mechanism for actors to be sanctioned.

III. THEORETICAL FRAMEWORK AND APPLICATION

International environmental regimes, including the various rules and programs governing the Arctic, have emerged to respond to environmental concerns in the region. As Oran Young and Marc Levy describe, these regimes achieve their outcomes through a range of mechanisms. Young suggests several inquiries to assess the effectiveness of environmental regimes: Does the regime impose mandatory obligations, and does it affect the cost calculus of participants? Does the regime consider, monitor, and build on scientific understanding of the problem? Does the regime coordinate internally and externally with similar regimes?[76] This section will engage in these inquiries to assess the efficacy of existing Arctic authorities.

A. Utility Modifier

Regimes become effective at changing behavior when they can change a participant's rationale—i.e., when they can affect the costs and benefits of a participant's actions within the regime.[77] Especially where there are multiple actors, as in most transboundary pollution issues, agreements that aim to maximize participation, provide funding, and create liability schemes to keep all member states accountable will be more effective in addressing the problem.

Young suggests that state actors within a regime are self-interested utility maximizers who will comply with international arrangements to the extent that these regimes alter their costs and

exclusive economic zone." *Id.* (emphasis added). As such, ice rafted oil pollution would not be covered by OPA.

76. Oran R. Young & Marc A. Levy, *The Effectiveness of International Environmental Regimes*, *in* THE EFFECTIVENESS OF INTERNATIONAL ENVIRONMENTAL REGIMES 1, 3–10 (Oran R. Young eds., 1999).

77. Lawrence R. Helfer, *Nonconsensual International Lawmaking*, 2008 ILL. L.R. 91–96 (2008); *see also* David G. Victor et al., *Introduction and Overview*, *in* THE IMPLEMENTATION AND EFFECTIVENESS OF INTERNATIONAL ENVIRONMENTAL COMMITMENTS 1, 12 (David G. Victor et al. eds., 1998).

benefits.[78] In particular, mandatory obligations (such as monitoring, preventive technology, and cleanup obligations) add costs, while resource access provides benefits.[79] This section will thus investigate the extent to which the existing framework of regulations attaches liability and costs to prevent marine pollution on parties in the Arctic. Implicit in such an inquiry are questions of participation and funding, as well as liability.

1. Participation and Funding

Many of the treaties and laws that govern the Arctic do not have the complete participation of all Arctic States.[80] As described in Table 1 above, not all Arctic States are parties to all of the conventions governing marine pollution in the Arctic. Furthermore, some key treaties like UNCLOS, OSPAR, and ESPOO, have not been ratified by the United States.[81]

Even the Arctic Council, which is meant to be a representative body of States in the Arctic, has had participation problems. In the past few years, five Arctic littoral states have held exclusive meetings. At one of these exclusive meetings, these States signed the "Ilulissat Declaration," which not only rejected proposals for a new legal regime concerning the marine arctic, it also refused to engage with non-Arctic States in resolving Arctic issues.[82] Yet, these non-Arctic States may increasingly affect the Arctic environment. As the sea ice recedes and new shipping routes and resources become accessible, the Arctic will draw interest from many non-Arctic States including, importantly, China.[83] In order to protect the Arctic marine environment from all sources of pollution, including those by non-Arctic countries seeking passage, regime participation will have to accommodate these expanding interests. More broadly, limited participation makes it hard to uniformly

78. Oran R. Young, *International Regimes: Toward a New Theory of Institutions*, 39 WORLD POL 104, 118 (1986).

79. *Id.* at 119.

80. *See supra* Table 1.

81. The U.S. recognizes UNCLOS as a codification of customary international law. The U.S. accepted all the parts of the Convention except the Part XI to be customary law as well. MICHAEL BYERS, WHO OWNS THE ARCTIC?: UNDERSTANDING SOVEREIGNTY DISPUTES IN THE NORTH 90 (2009).

82. WEIDEMANN, *supra* note 8, at 58.

83. *Id.* at 60–62.

address marine pollution concerns with standardized mechanisms such as protected areas or transboundary pollution monitoring.

Furthermore, an assessment of participation is incomplete without analyzing the extent to which existing agreements have enabled the meaningful participation of indigenous groups. The special role for indigenous peoples as Permanent Participants is a unique feature of the Arctic Council.[84] Yet the participation of indigenous peoples is limited to presenting proposals for cooperative activities and attendance at all meetings.[85] Nevertheless, there has been some success in creating an indigenous peoples' knowledge database, a study on ice edge ecosystem and indigenous knowledge, and a set of ethical principles for research.[86] Indigenous groups also pushed the passage of the Persistent Organic Pollutants ("POPs") Treaty.[87] The POPs treaty "implements control measures for the production, use, import, export, and disposal of POPs."[88]

Development of hydrocarbon resources has the potential to threaten the traditional values and economies of indigenous societies.[89] Indeed, indigenous groups were involved in the drafting of the Arctic Council's Arctic Offshore Oil and Gas Guidelines.[90] These successes suggest that indigenous peoples have played an important role in transforming the scientific facts sponsored by the Arctic Council to give such scientific research more salience in international environmental diplomacy.[91] Their knowledge and values should be included in any new agreement addressing transboundary oil pollution, and in any regional guidelines on resource extraction. It is an unfortunate dilemma that treaty design forces a trade-off between participation and enforcement and liability.[92] Expanding the reach of the treaty to encompass new member states likely requires existing states to

84. NOWLAN, *supra* note 52, at 10.

85. *Id.*

86. *Id.* at 11.

87. "Indigenous peoples could show how persistent organic pollutants are deleterious to human health in the immediate and long term." Timo Koivurova, *The Arctic Council: A Testing Ground for New International Environmental Governance*, 19 BROWN J. OF WORLD AFF. 131, 135 (2012).

88. NOWLAN, *supra* note 52, at 24.

89. *Id.* at 38.

90. *Id.* at 36.

91. Koivurova, *supra* note 87, at 141.

92. *Supra* note 77, at 71–126.

compromise on enforcement mechanisms. Yet, on the other hand, increasing enforcement mechanisms, such as broadening what behavior is sanctionable or increasing the burden sanctions would impose, would likely limit participation.

2. Liability

For the purposes of this section, liability in utility modification addresses both the idea of enforcement mechanisms (holding a state actor accountable) as well as compensation for harms done to another state's marine environment. In the patchwork of regulations that come together to manage the Arctic, none have strong enforcement mechanisms, penalty clauses, or timeframes for environmental assessments.[93] The Arctic Council, founded by a soft-law declaration, has no power to establish legally binding duties for member states.[94] The Council relies entirely on voluntary actions and the goodwill of member countries. For example, with respect to oil and gas activities, the Council suggests that member states adopt the precautionary principle and provides guidelines on how to sustainably extract hydrocarbon resources.[95] Furthermore, the guidelines ask the Arctic governments to set domestic discharge standards resulting from oil and gas activities.[96] Yet, to date, no Arctic State has assessed operator compliance with domestic laws.[97] Similarly, with respect to Marine Protected Areas ("MPAs") in the region, the council asks each Arctic State to "pursue MPA development based on its own authorities, priorities and timelines."[98] As such, not only is the network limited to areas within each coastal state's EEZ, MPAs are not standardized across countries, there is no concerted effort to establish MPAs in the

93. *See supra* Part III.

94. Camille Escudé & Joël Plouffe, *How The Arctic Council Sets The Tone For International Cooperation*, WORLD POLICY (Apr. 12, 2017), https://worldpolicy.org/2017/04/12/how-the-arctic-council-sets-the-tone-for-international-cooperation/ [https://perma.cc/PR4P-CP5K].

95. *Arctic Offshore Oil and Gas Guidelines,* ARTIC COUNCIL (Apr. 29, 2009), www.pame.is/images/03_ Projects/Offshore Oil andGas/OffshoreOil-andGas/Arctic-Guidelines-2009-13th-Mar2009.pdf [https://perma.cc/Q2EJ-WL98].

96. *Id.* at 31, 35.

97. Helene Mayrand, *Arctic Community of Practice and Offshore Oil and Gas Activities: Determining the Legal and Political Dimensions of the Obligation to Prevent, Reduce, and Control Pollution*, 11 MCGILL INT'L J. SUST. DEV. L. & POL'Y 257, 280 (2015).

98. *Framework for a Pan-Arctic Network of Marine Protected Areas*, ARCTIC COUNCIL 5 (Apr. 2015), https://oaarchive.arctic-council.org/bitstream/handle/11374/417/MPA_final_web.pdf?sequence=1&isAllowed=y [https://perma.cc/EXZ7-TRRF].

Areas Beyond National Jurisdiction ("ABNJ"), and it is unclear when such MPAs will be established if at all.[99] Thus far, only Canada has set up an MPA.[100] The lack of a need to commit to limiting marine pollution in concrete regulations means that the Council can be seen as a "talking shop with no powers to prevent any individual state from pressing ahead with development in the Arctic."[101] Indeed, Arctic States have explicitly decided that no new Arctic specific legal mechanism is needed and instead choose to rely entirely on UNCLOS and the rights and obligations granted therein.[102]

The language of UNCLOS however, only goes so far. First, UNCLOS was designed to be an umbrella regulation. That is, it was meant to be read in conjunction with further implementing regulations.[103] It does not contain comprehensive prohibitive or protective regulations for the marine environment. The language of UNCLOS Art. 194 only sets minimum standards for pollution protection.[104] Keeping in mind the fragility and uniqueness of the Arctic ecosystem, and the limited scientific understanding of the impacts of oil spills and dispersion in these environments, these minimum standards are unlikely to be enough to protect the Arctic marine environment. As a liability mechanism for pollution within an EEZ, recourse through UNCLOS remains limited. Under Article 235(2), natural and legal persons should have access to remedies in court for damage to the marine environment. Yet, it is not clear where persons would derive standing, or in which courts they would be able to bring a claim for damages done to marine environments. Thus far, states have exploited and profited from this ambiguity.[105]

99. Marine Protected Areas Beyond National Jurisdiction, Pew Trust (Mar. 22, 2016); Governing areas beyond national jurisdiction, IUCN available online at https://www.iucn.org/resources/issues-briefs/governing-areas-beyond-national-jurisdiction (last accessed Oct. 21, 2019).

100. Sarah Gibbens, *Pristine Arctic reserves will benefit wildlife and Inuit communities*, NAT'L GEOGRAPHIC (Aug. 1, 2019), https://www.nationalgeographic.com/environment/2019/07/canadian-arctic-reserves-to-benefit-wildlife-inuit/ [https://perma.cc/Y6V2-4BDF].

101. WEIDEMANN, *supra* note 8, at 55.

102. Jon D. Carlson et al., *Scramble for the Arctic: Layered Sovereignty, UNCLOS, and Competing Maritime Territorial Claims,* 33 SAIS REV. OF INT'L AFF. 21 (2013).

103. WEIDEMANN, *supra* note 8, at 129.

104. UNCLOS, *supra* note 11, at art. 194.

105. JOHNSTONE, *supra* note 33, at 267.

Finally, UNCLOS does not explicitly detail how, and to what extent, states must monitor the consequences of their offshore extractive activities—both within their territorial waters or transboundary impacts. States have to monitor and report any polluting activity "as far as practicable" under Article 78. Article 206 also gives member states the discretion to determine when there is "substantial pollution" or "significant and harmful changes to the marine environment."[106] As outlined previously in Section 1.C, where the environmental effects and conditions are poorly understood, such discretion does not safeguard the Arctic from pollution. Further, "as far as practicable" gives States the opportunity to evade the continued transboundary environmental assessment entirely. Article 198 provides some rudimentary transboundary pollution assessment. It states that "when a State becomes aware of cases in which the marine environment has been damaged by pollution, it shall immediately notify other States it deems likely to be affected by such damage, as well as the competent international organizations."[107] Beyond these notice procedures, however, the polluting State's liability does not attach to the pollution under UNCLOS. While Espoo was meant to address such transboundary assessments, it remains unclear when a TEA is triggered.[108] The inherent vagueness of activities that are *likely* to cause *substantial harm* makes it difficult to evaluate cumulative impacts and can leave particularly sensitive areas unprotected.[109] Even if a TEA is conducted, Espoo doesn't outline what liability should attach to a country found to be responsible for transboundary pollution.[110] As such, the member state responsible for the pollution does not seem to have any attached obligation based on international convention to remedy the pollution, such as a polluter pays principle. A final problem inherent to all TEAs triggered by a "substantial" or "significant" requirement is a circularity problem. One cannot know that the impacts of an extractive activity are substantial or significant without an EIA.[111]

106. WEIDEMANN, *supra* note 8, at 133.

107. UNCLOS Art. 198.

108. Espoo Convention, *supra* note 57, art. III.

109. Rachael Lorna Johnstone, *Evaluating Espoo: What Protection Does the Espoo Convention Offer the Arctic Marine Environment?*, 5 Y.B. POLAR L. 337, 346 (2013).

110. *See* Espoo Convention, *supra* note 85.

111. *Id.* at 348.

OSPAR has similar liability issues as UNCLOS Articles 204-206. Firstly, while Article 5 and Annex III stress the importance of taking all possible measures to prevent and eliminate pollution and discuss the adoption of best available techniques and best environmental practice, they do not detail what liability should attach in the event of pollution. In Annex V, parties are only required to restore marine areas "where practicable," and States have the discretion to determine what measures are necessary.[112] The measures that member states must take to protect and conserve ecosystems (established in Article 5, Annex III, and Annex V) are not standardized. Indeed, discharges and emissions from offshore sources are regulated by the competent authorities of each State.[113] Countries will inevitably have various levels of enforcement on marine pollution. As such, the Arctic marine system will not be uniformly protected. Article 21 of OSPAR does go further than the previous agreements in addressing transboundary pollution. OSPAR provides for negotiation of a cooperation agreement through the Commission.[114] As previously detailed in Table 1, however, three key Arctic States are not members to OSPAR, and negotiated agreements through OSPAR would not apply to them.

The CBD and the ACPB both similarly lack enforcement powers. The CBD, for example, has language that requires protected areas to be established "where necessary" or "as far as possible and as appropriate."[115] The impact assessments required by the CBD and their reciprocity with other States mirrors that in UNCLOS. The CBD does not define "significant adverse effects" or "imminent or grave damage." CBD terms are vague, and implementation is uncertain.[116] While CBD disputes are settled by arbitration, the convention does not outline any liability or cost-sharing for actions that adversely affect biodiversity.[117] Given the migratory species that use the Arctic seascape, biodiversity impacts are likely to affect more than one State.[118] Yet, the CBD has no provision for

112. OSPAR, *supra* note 64, at Annex V.

113. *See id.* at art. 2 (states shall "adopt programs" to prevent pollution).

114. *Id.* at art. 21.

115. CBD, *supra* note 66, arts. 8–9.

116. WEIDEMANN, *supra* note 8, at 108.

117. *See* CBD, *supra* note 66.

118. *Arctic Migratory Birds Initiative*, CAFF, available online at https://www.caff.is/arctic-migratory-birds-initiative-ambi (the map indicates that Arctic migratory birds travel long

addressing such transboundary impacts. The ACPB, while laudable for its ecosystem approach to conservation of the marine environment, lacks both a standardized approach to protection and an ongoing mechanism for review or amendment.[119] The agreement gives states discretion on what constitutes "appropriate action" for protecting the ecosystem.[120]

Enforcement is but one side of the liability coin. Enforcement requires the polluting party to accept responsibility. The other component to liability is ensuring adequate compensation or penalty mechanism for remediating the pollution. Thus far, there is no international compensation mechanism for pollution from offshore drilling platforms.[121] This fact is particularly surprising since there is a very clear compensation mechanism for oil pollution from transportation tankers. Established under the auspices of the 1969 International Convention on Civil Liability for Oil Pollution Damage and the 1971 International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage (1971 Fund Convention), anyone in a member state of these conventions which has suffered pollution damage caused by oil transported by a tanker can claim compensation from the ship owner or insurer and, if applicable, the Supplementary Fund.[122]

Although Young suggests the utility modifier as an axis upon which to evaluate the effectiveness of a regime, in practice this may not yield the full picture as to why regimes may succeed or fail.[123] First, the outcomes of recent elections suggest that more than a mere cost calculus, states may choose to enter (or not enter) into

ranges covering many countries). Tero Mustonen & Violet Ford, *Indigenous Peoples and Biodiversity in the Arctic*, *in* ARCTIC BIODIVERSITY ASSESSMENT (Hans Meltofte ed., 2013), https://www.arcticbiodiversity.is/index.php/the-report/chapters/indigenous-peoples-and-biodiversity-in-the-arctic [https://perma.cc/D6U8-PMEC].

119. ACPB, *supra* note 69, at Art. II (outlining that States should "protect the ecosystem" but the treaty as a whole says nothing about how or when to monitor).

120. *Id.*

121. Robert Beckman & Zhen Sun, Ctr. For Int'l Law, Regulatory Gaps in Offshore Activities in the Arctic: Concerns and Lessons from Southeast Asia, Presentation Before the Arctic Energy Summit (Sep. 18–20, 2017), https://cil.nus.edu.sg/wp-content/uploads/2017/10/Regulation_Gaps-Sun-Zhen.pdf [https://perma.cc/J3DT-WWB7].

122. *Id.*; *see also Explanatory Note*, THE INT'L OIL POLLUTION COMPENSATION FUNDS (July 2019) https://iopcfunds.org/wp-content/uploads/2018/12/explanatory_note_e.pdf [https://perma.cc/969T-G8X4].

123. Young, *supra* note 75, at 22.

certain treaties and regulations based on the views of certain constituencies that managed to prevail in a national election.[124] Second, there are trade-offs between participation and liability. The more teeth a treaty has, the less likely it is to have more member States. For example, the Agreement on the Conservation of Polar Bears had to trade liability mechanisms for strong participation. Nevertheless, it is a useful first step in understanding how to improve existing agreements or to leverage gaps in understanding to convince state actors to achieve standardization in their approaches to tackling marine pollution.

From the analysis above, the frameworks which govern the Arctic are not strong utility modifiers. Indeed, in many treaties both participation and liability mechanisms are lacking. As such, solutions that improve the utility modification of the Arctic regime must consider ways to frame the problem that will enable a greater participation without compromising liability schemes. One way to do this may be to construct this problem as one of "mutual assured destruction" (MAD). The MAD theory hinges on finding a sweet spot in the balance of power between opposing states such that both sides are rationally deterred from beginning conflict for fear of retaliation.[125] In large part, the MAD theory assumes that States are self-interested actors who will avoid actions that can be turned against them.[126] Treaties such as the Nuclear Non-Proliferation Treaty and the Anti-Ballistic Missile Treaty are thought to have been based on MAD theories.[127]

124. *See, e.g.*, Ali Vitali, *Trump Pulls out of Paris Agreement*, NBC (Jun. 1, 2017), https://www.nbcnews.com/politics/white-house/trump-pulls-u-s-out-paris-climate-agreement-n767066 [https://perma.cc/JWW9-HUUQ].

125. John Swift, *The Soviet-American Arms Race*, HIST. TODAY (Mar. 2009), https://www.historytoday.com/archive/soviet-american-arms-race [https://perma.cc/KW9A-A56K]; *see also* Alexander J. Field, *Schelling, von Neumann, and the Event that Didn't Occur*, 5 GAMES 53, 77–78, 81 (2014). Note, however, that the success of mutual assured destruction framework requires asymmetric assumptions about the rationality of the two parties, i.e., "[e]ach had to believe that they were rational, but their adversary was not." In part this may require creating the perception that the other would be willing to explore in the Arctic. Without such asymmetric assumptions, deterrence cannot be achieved. Field, *supra,* at 78.

126. Field, *supra* note 125, at 81 ("[T]o assume rational choice is to assume that people (or countries) act so as efficiently to advance their material self-interest.").

127. HENRY D. SOKOLSKI, GETTING MAD: NUCLEAR MUTUAL ASSURED DESTRUCTION, ITS ORIGINS AND PRACTICE v–vi (2004), https://permanent.access.gpo.gov/websites/ssi.armywarcollege.edu/pdffiles/PUB585.pdf [https://perma.cc/VYM4-7GV7].

Given the transboundary nature of the problem and the gravity of harm that could result from an offshore oil spill, states may be more willing to participate and create a liability mechanism if they understood that, while a liability scheme may impose a cost on them for their extractive activities, it will also protect them from the extractive activities of other states. This mutually assured destruction framework may also incentivize states to pool together funds for collective and consistent monitoring in the EEZs and in the high seas beyond national jurisdiction. Collective monitoring can help avoid the problems of biased data gathering and cherry-picking data when a country self-polices. Creating this mutually assured destruction framework, however, requires significant data gathering and information sharing to understand exactly how oil spills can affect the marine environment and move across boundaries.

B. Learning Facilitators

Regimes can also prove to be effective by creating mechanisms for social learning leading to a better understanding of the science at the root of the problem, new ideas about measures that can combat this problem, and better ideas for implementation.[128] Such regimes often involve information sharing and are attentive to the recommendations provided by epistemic communities.[129] A regime that is effective as a learning facilitator must have the flexibility within the legal mechanism for adapting the existing regulations to new information.[130] Thus, it can be helpful to add the second dimension, scientific or learning, to understand efficacy.

First, the existing regimes do not cope well with the introduction of new information and lack the flexibility to incorporate new research. The Arctic environment is poorly understood: scientists do not have complete and accurate data on the biodiversity in the region, the long-term impacts of oil spills, the impacts of chemical dispersants used to remedy spills, and the cumulative impact of multiple drilling operations on the marine environment.[131] Effective regulations that address marine pollution in the Arctic

128. YOUNG, *supra* note 75, at 261–63.

129. *Id.*

130. *Id.*

131. NAT'L RESEARCH COUNCIL, RESPONDING TO OIL SPILLS IN THE U.S. ARCTIC MARINE ENVIRONMENT 2–6 (2014).

therefore require good baseline information to measure the extent of possible impacts. While the different regimes in the Arctic have strong scientific study programs, there are still many gaps that need to be addressed. The Arctic Council does not make clear how new scientific information will feed back into the regime. In particular, it is not clear that the Council's research has recognized the importance of ice-rafted pollution.[132] By assessing 239,000 parcels of ice from their formation to their eventual demise, researchers have demonstrated the mechanism by which transboundary pollution could occur in the Arctic.[133] The research suggests that there may be a similar mechanism to track where the ice source picked up pollutants and where it was transported.[134]

Second, the existing regime does not provide a science-focused, standardized approach to the creation of protective areas. As outlined above in Part I.D.1 of this Note, the Arctic Council does not provide any standards by which Marine Protected Areas are to be established. The designation of MPAs by their nature must be a scientific endeavor: determining areas of special ecological significance, buffer zones for potential pollution, and networking of the areas require scientific data and analysis. David Victor, Director of the Program on Energy and Sustainable Development at Stanford, argues that monitored activities should be reflexive and respond to problems of poor implementation.[135] OSPAR, to its credit, does impose *some* scientific guidelines on the selection of MPAs. Possible sites are identified and prioritized using the ecological criteria outlined in Appendix I of the treaty.[136] The criteria however, are very broad. For example, "ecological significance" is one of the factors, and it is not clear that the contracting party has to make a scientifically informed decision.[137] Furthermore, parties are free to determine which areas should be selected to be part of the OSPAR network of MPAs and how they

132. Ice rafted pollution has not been cited in the reports by the Council's working groups.

133. Kim Martineau, *As Climate Stirs Arctic Sea Ice Faster, Pollution Tags Along - Contaminants More Likely to Cross National Borders, Study Shows,* EARTH INST.: STATE OF THE PLANET (Jun. 27, 2017), https://blogs.ei.columbia.edu/2017/06/27/as-climate-stirs-arctic-sea-ice-faster-pollution-tags-along/ [https://perma.cc/7B5V-F9QQ].

134. *Id.*

135. VICTOR ET AL., *supra* note 77, at 16–20; *see also* YOUNG, *supra* note 75, at 3–10.

136. Guidance on Developing an Ecologically Coherent Network of OSPAR Marine Protected Areas, OSPAR Convention (2003) https://www.ospar.org/documents?d=7346.

137. *Id.*

should be shaped (i.e., what activities should, or should not, be restricted).[138]

It is not clear whether OSPAR requires monitoring within the MPAs once they have been established.[139] Without the collection of baseline scientific data and continuous monitoring, the efficacy of any established MPAs will not be well understood.[140] Similarly the EIAs required by UNCLOS are also lacking in such scientific information. As Johnstone argues, the EIA must be, at its heart, a scientific enterprise conducted by a team that includes adequate scientific expertise.[141]

OSPAR also aims to use a system of Ecological Quality Objectives or "EcoQO" which functions as an "overall expression of the structure and function of the marine ecosystem."[142] EcoQO take into account the biological community, geographic, climatic, and human factors.[143] However, there has only been a pilot project of this indicator and it has not been integrated into the other areas covered by the Convention.[144] Parties have questioned the usefulness of such an indicator and have had trouble funding such an enterprise.[145]

OPRC, which is the only treaty that governs response to an oil spill, does not mention any monitoring or scientific tools to understand the marine environment. OPRC specifies the actions that states must undertake upon receiving oil pollution reports to "assess the incident."[146] The lack of a scientific basis for remedial

138. *See* INGVILD ULRIKKE JAKOBSEN, MARINE PROTECTED AREAS IN INTERNATIONAL LAW: AN ARCTIC PERSPECTIVE 225 (Malgosia Fitzmaurice et al. eds., 2016).

139. OSPAR, *supra* note 64.

140. *See* Robin M. Warner, *Conserving Marine Biodiversity in Areas Beyond National Jurisdiction: Co-evolution and Interaction with the Law of the Sea*, 1 FRONT. MAR. SCI. 6, 3–8 (2014), https://doi.org/10.3389/fmars.2014.00006 [https://perma.cc/MT3Y-2E9L].

141. JOHNSTONE, *supra* note 33 at 166 ("An EIA prepared by politicians, secretaries, economists or lawyers, without scientific input would not be in good faith.").

142. OSPAR COMM'N, REPORT ON NORTH SEA PILOT PROJECT ON ECOLOGICAL QUALITY OBJECTIVES, 11–20 (2006), https://www.ospar.org/site/assets/files/1238/p00239_north_sea_pilot_project_on_ecoqo_report.pdf [https://perma.cc/XSH9-LSMU].

143. *Id.* at 5.

144. *Id.* at 5, 16.

145. OSPAR COMM'N, EVALUATION OF THE OSPAR SYSTEM OF ECOLOGICAL QUALITY OBJECTIVES FOR THE NORTH SEA (updated 2010), at 3, 12–23 (2009), https://qsr2010.ospar.org/media/assessments/p00406_Evaluation_EcoQO_2010_update.pdf [https://perma.cc/HG48-6F7M].

146. Kristian Cedervall Lauta, *A Drop in the Ocean: Marine Oil Pollution Preparedness and Response in the Arctic*, 5 ARCTIC REV. ON L. & POL. 227, 242 (2014),

operations is especially concerning in light of the issues posed by dispersants in the Deepwater Horizon case.[147] A Joint Industry Program has been researching the viability of using dispersants on Arctic Ocean oil spills.[148] Research suggests that Arctic test organisms did not show significant signs of toxicity and that the effects if any on the marine environment appeared to be "minor to insignificant."[149] Five oil companies pooled financial resources to conduct these tests and gather this information: Shell, ConocoPhillips, Statoil, ExxonMobil, and BP.[150] By contrast, government scientists at Senate hearings after the Deepwater Horizon Spill have testified that that the long-term effects of these chemicals remain a mystery.[151] As well-intentioned as these companies may be, independent research may be worthwhile in validating such assertions.

Third party actors—including insurance and risk management companies—have begun conducting their own research on the impacts of oil pollution in the Arctic. DNV GL, a Norwegian risk assessment company, recently produced an Arctic Risk Assessment Map. The Map, reproduced below in Figure 3, accounts for seasonal distribution of ice, biological assets, oil and gas resources, and accident history. The vulnerability assessment was performed for the different ecological uses in about one hundred areas of heightened ecological significance within the seventeen Arctic Large Marine Ecosystems. Maps such as these can be valuable as independent sources of authority that inform locations of MPAs.

The tracking of threats, pollution, and transboundary effects is only worthwhile if it creates changes in the behavior of the parties

https://arcticreview.no/index.php/arctic/article/view/1047 [https://perma.cc/HG48-6F7M].

147. *See Dispersants*, CTR. FOR BIOLOGICAL DIVERSITY, https://www.biologicaldiversity.org/programs/public_lands/energy/dirty_energy_development/oil_and_gas/gulf_oil_spill/dispersants.html [https://perma.cc/TS89-Q5GG] (last visited Sept. 9, 2019) (discussing the toxicity of dispersants and dispersed oil to aquatic life and humans, the long-term effects of which are considered unknown by the EPA).

148. *How Would Chemical Dispersants Work on an Arctic Oil Spill?*, NAT'L OCEANIC AND ATMOSPHERIC ADMIN. OFFICE OF RESPONSE AND RESTORATION (July 9, 2012), https://response.restoration.noaa.gov/about/media/how-would-chemical-dispersants-work-arctic-oil-spill.html [https://perma.cc/N3PM-HWC2].

149. *Id.*

150. *Id.*

151. Christopher Joyce, *Lasting Impact of Dispersants Unclear, Senate Told*, NAT'L PUB. RADIO (Aug. 4, 2010), https://www.npr.org/templates/story/story.php?storyId=128983162 [https://perma.cc/TN34-KY2E].

and prevents further marine pollution. Frameworks can and should be created with the flexibility to adapt to changing circumstances. Such a procedure would increase the effectiveness of a regime by improving the protections in response to better, more accurate data and assessments. However, none of the legal mechanisms described above have any avenue for amendment based on new scientific information. MPAs are not redrawn after understanding whether their existing boundaries work; liability and EIA schemes are not altered with knowledge of new transboundary effects.

Scientific information should inform what environmental assessments are appropriate, what comprehensive actions will effectively protect habitats, and what buffer areas are required for a successful MPA. Leaving decisions to States' discretion, without any scientific information or thresholds that trigger action, allows States to evade implementation of regulations. Such data requires continued monitoring and feedback on the implementation of existing mechanisms. Thus, any successful solution should explicitly specify the scientific processes and toolkits to be used for (1) taking baseline data, (2) measuring transboundary impacts, and (3) holistically creating MPAs. This will allow a standardized approach across the Arctic. These efforts outlined above require the Arctic States to communicate and to share information once gathered. Beyond utility modification and learning facilitation, effective regimes should also provide for coordination.

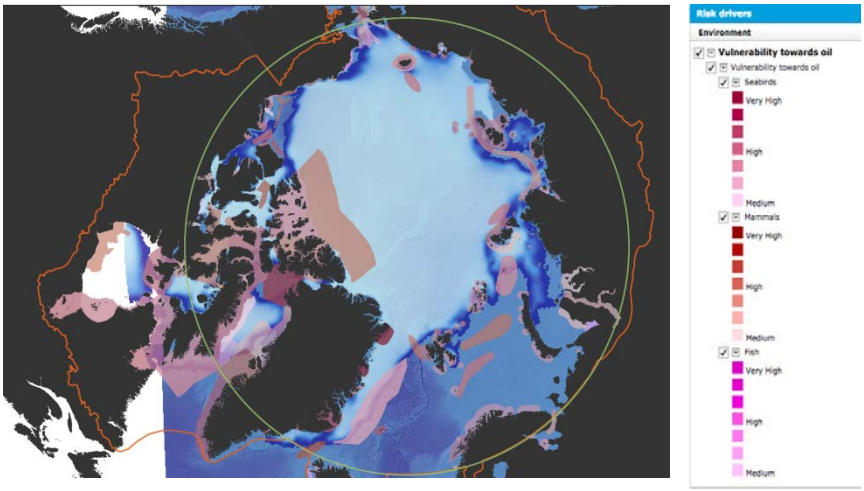

Figure 3: Vulnerability of Seabirds, Mammals and Fish Given June Ice Conditions[152]

C. Coordination

Commitments and accords become "effective in changing behavior if they create linkages with other issues and objectives."[153] Especially where there are collective action problems, as in most transboundary pollution issues, legal frameworks that enhance cooperation between their member States will be more effective in addressing the problem. These regimes allow parties to engage in interactive decision making to reap joint gains or avoid joint losses. Coordination needs to be achieved within each convention (internal consistency) and between conventions (external consistency).

The Arctic Council lacks both internal and external consistency. This is due, in part, to the fact that the Council operates through its siloed working groups instead of cooperative remedial action.[154] The Council's reliance on dedicated working groups hampers the overcoming of the sectoral division due to its very structure.[155] For example, CAFF and PAME should, in theory, work together to address pollution and the effects on wildlife. Yet, there is little indication that these working groups are indeed communicating.[156]

Despite the number of independent regulations governing the Arctic and a growing number of organizations that deal with Arctic matters, there is little cross-referencing and collaboration across groups and secretariats of treaties.[157] For example, in 2012, the International Maritime Organization Legal Committee addressed the issue of establishing an international regime covering liability and compensation for oil pollution damage resulting from offshore oil exploration and exploitation.[158] However, the committee concluded that bilateral and regional arrangements were the most

152. The Arctic Risk Map, available online at https://maps.dnvgl.com/arcticriskmap/.

153. VICTOR ET AL., *supra* note 77, at 12.

154. WEIDEMANN, *supra* note 8, at 54, 57.

155. *Id.* at 57.

156. *Id.*

157. *See* WEIDEMANN, *supra* note 8, at 119.

158. Jae Sundaram, *Offshore Oil Pollution Damage: In Pursuit of a Uniform International Civil Liability Regime*, 28 DENNING L.J. 66, 94 (2016).

appropriate way to achieve success in this area.[159] The committee did not specifically consider the impacts of transboundary oil pollution or how transboundary environmental assessments can help determine the sources of oil pollution.

As outlined in Part II, the hodge-podge of treaties governing the Arctic is a testament to this problem. Given the participation issues described above, this lack of coordination is not surprising. However, in light of the competing uses of the opening Arctic Ocean (shipping, oil and gas, fishing, etc.), there are multiple interactive and cumulative stressors that require a coordinated effort to address. Coordination not only saves interested states the cost of duplicative work in environmental monitoring and assessment,[160] it can also aid in ensuring that non-conflicting regulations are adopted by the different regimes working within the Arctic. Any effective solution must offer some way for these treaties to "speak with" one another and overcome the limits of treaty participation.

IV. SUGGESTED SOLUTIONS

Part IV of this Note describes three ways to protect the marine environment by incorporating utility modification, learning facilitation, and coordination. Given the gaps in governance previously identified, Part IV of this Note outlines new strategies for addressing transboundary marine pollution caused by extractive activities in the arctic. First, to address utility modification, a regime needs to (1) improve participation, (2) provide funding, and (3) account for liability. Second, a regime needs to be built on sound scientific information and must be flexible enough to accommodate changing scientific understanding. Third, a successful Arctic regime must be cooperative across all working entities.

159. *See* JULIEN ROCHETTE ET AL., IDDRI, SEEING BEYOND THE HORIZON FOR DEEPWATER OIL AND GAS: STRENGTHENING THE INTERNATIONAL REGULATION OF OFFSHORE EXPLORATION AND EXPLOITATION, 26 (2014) https://www.iddri.org/sites/default/files/import/publications/st0114_jr-et-al._offshore-en.pdf [https://perma.cc/FF9P-6DFM].

160. A great deal of coordination can be achieved between the Arctic Council and other environmental organizations researching and monitoring in the Arctic. For example, coordinated efforts between the International Arctic Science Committee, an observer to Arctic Council, and GRID-Arendal, UNEP's official center on polar environmental assessments, would maximize the information base about this poorly understood environment.

In particular, this Note suggests three strategies: first, a transboundary marine pollution agreement; second, a regional insurance standard; and finally, a coordinated and standardized MPA establishment program under a standardized timeline. The proposed transboundary marine pollution agreement seeks to take the best of each country's offshore environmental protection regulations and harmonize them. This aims to address the questions of participation, funding, coordination, and learning. The proposed regional insurance standard aims to bolster the liability scheme in the Arctic. Finally, the MPA program seeks to actively protect Arctic resources while the first two measures are addressed. Since States appear to favor a regional approach over an international agreement, the following measures are Arctic specific.

A. Long Range Transboundary Marine Pollution Regime ("LRTMP")

Some authors have suggested that Arctic coastal states should share information about their *existing* regulatory programs, their implementation stories, and their successes and failures.[161] They argue that such information sharing can work incrementally toward convergence of the policies that best work to protect the Arctic marine environment.[162] This process, called harmonization, works in a bottom-up manner. However, as a result of the delay in reaching harmonization of voluntary regimes, "efforts to protect and manage the Arctic can suffer from a 'lowest common denominator' effect, where a lack of action by one or more states can undermine or hinder the effective action of others."[163] In particular, environmental monitoring, pollution reduction decommissioning, and training of operators in the Arctic requires standardized approaches given the transboundary nature of the oil pollution.[164] Negotiations between Arctic Coastal states can result in an amalgam of successful strategies from different countries.

161. *See, e.g.*, Betsy Baker, *Offshore Oil and Gas Regulation in the Arctic: Room for Harmonization?*, 4 Y.B. OF POLAR L. IV 475 (2012).

162. *Id.*

163. Tavis Potts & Clive Schofield, *An Arctic Scramble? Opportunities and Threats in the (Formerly) Frozen North*, 23 INT'L J. MARINE & COASTAL L. 151, 172 (2008).

164. *See* Baker, *supra* note 161, at 497.

However, information exchange is the first step in harmonization discussions.[165]

The Long-Range Transboundary Air Pollution ("LRTAP") framework provides an interesting parallel and starting point to understand how to create a successful regime to address transboundary pollution issues. The LRTAP regime succeeded in reducing acid deposition through a tripartite framework: (1) information exchange, (2) cross sector collaboration and regulation through working groups, and (3) iterative management.[166] In 1969, OECD's Air Management Sector Group concluded that "the long range transport of air pollutants in Europe is primarily due to the emissions from the large industrialized areas."[167] These Sulphur emissions were the direct result of higher coal burning activities throughout Europe in the late 19th and early 20th centuries.[168] This transboundary risk led to *cooperative monitoring* over the next decade.[169] This information formed the basis of the LRTAP.[170] The Sulphur air pollution transport mechanism found in the LRTAP is very similar to the transboundary oil pollution flows in the Arctic. However, as discussed *infra*, the scientific information being compiled for the Arctic thus far does not monitor transboundary pollution. Arctic States need independent monitoring and research on the mechanism of ice-rafted pollution. This monitoring and reporting should be the first stage in the formation of a transboundary *marine* pollution regime.

Once such information is established, however, a LRTMP regime will likely face the same problems as the LRTAP regime with the

165. *Id.* at 498.

166. *See* Juan Carlos di Primio, Data Quality and Compliance Control in the European Air Pollution Regime *in* THE IMPLEMENTATION AND EFFECTIVENESS OF INTERNATIONAL ENVIRONMENTAL COMMITMENTS 283 (David G. Victor et al. eds., 1998). *See also*, Vladimir Kotov & Elena Nikitina, Implementation and Effectiveness of the Acid Rain Regime in Russia, *in* THE IMPLEMENTATION AND EFFECTIVENESS OF INTERNATIONAL ENVIRONMENTAL COMMITMENTS 519–49 (David G. Victor et al. eds., 1998); *see also*, Vladimir Kotov & Elena Nikitina, Regime and Enterprise: Norilsk Nickel and Transboundary Air Pollution, *in* THE IMPLEMENTATION AND EFFECTIVENESS OF INTERNATIONAL ENVIRONMENTAL COMMITMENTS 549–75 (David G. Victor et al. eds., 1998).

167. Brynjulf Ottar, Organization of Long Range Transport of Air Pollution Monitoring in Europe, Norwegian Institute for Air Research, available online at https://www.nrs.fs.fed.us/pubs/gtr/gtr_ne23/gtr_ne23_105.pdf.

168. *Id.*

169. *Id.*

170. *Id.*

implementation of pollution controls. In the LRTAP, net exporters of transboundary sulphur pollutants had a strong internal coal lobby preventing effective enforcement of these rules.[171] Unlike the LRTAP, however, the LRTMP has the benefit of being a relatively *preemptive* regime. That is, unlike the coal burning practices that the LRTAP was attempting to modify, offshore oil drilling in the Arctic is not the dominant method and source of oil reserves.[172] As such, countries that are likely to export oil pollution—e.g., Russia—will be easier to convince than those in the air pollution regime.[173] In contrast to exporters of pollution, net importers of transboundary oil pollution will require less convincing of the importance of a regime that controls transboundary pollution.

Parties to the LRTMP should add mandatory language that implements Articles 78 and 206 of UNCLOS. Laws under the LRTMP should include mandatory practices for oil drilling (safety protocols, seasonal restrictions, etc.), transboundary environmental impact assessments, and fines and penalties for any violations. Importantly, such regulations should specify the scientific bases for the environmental assessments. Such regulations should clarify the vague language under UNCLOS and specify what is meant by "substantial pollution," "significant and harmful changes to the marine environment," and the steps necessary to monitor and assess the effects as well as standardize such reporting requirements.[174] The third and final stage of setting up the LRTMP is requiring a conference for amendments every two years. Proposals for amendments to the LRTMP regime will be based on new scientific information, new transboundary pollution assessments (e.g., if a specific Arctic current changes direction thereby altering the directionality of oil pollution flows), or on Indigenous knowledge.

171. *Id.*

172. Venezuela and Saudi Arabia have the largest oil reserves in the world, with most of them in oil sands. *See* Jessica Dillinger, *The World's Largest Oil Reserves By Country*, WORLD ATLAS (Jan. 8, 2019), https://www.worldatlas.com/articles/the-world-s-largest-oil-reserves-by-country.html [https://perma.cc/R2NV-ZMFL] (last visited Sept. 9, 2019).

173. Rylin McGee, *Russia's Arctic Development: Problems and Priorities*, GEOHISTORY (Jan. 12, 2018), https://geohistory.today/russia-arctic-development-power/ [https://perma.cc/GLE8-DSAT] (Russia in particular has planned a large number of offshore drilling facilities.).

174. UNCLOS, *supra* note 11.

By requiring information exchange, the LRTMP regime encourages cooperation across all the Arctic entities and working groups. Indeed, the regime should run all information exchanged through the Arctic Council with Indigenous representation. The Council already has existing working groups which provide a useful starting point for the information exchange. Requiring party countries and indigenous communities to add to this repository will create a more complete understanding of transboundary oil pollution effects. The LRTMP regime also encourages participation by harmonizing the offshore drilling policies of all Arctic littoral States. Finally, by requiring continuous monitoring and iterative amendments, the regime also facilitates active learning of the marine environment.

B. Role of Insurance and Re-insurance Requirements

While the aforementioned LRTMP regime solves the coordination, participation, and learning facilitation parts of the Oran Young assessment from Section II, it does not satisfactorily address liability. Article 232 of UNCLOS requires States to be liable for damage or loss attributable to them.[175] The Greenlandic Prime Minister proposed the establishment of an industry-backed fund to ensure adequate compensation for damage caused by offshore hydrocarbon activities in the Arctic, but such an agreement has not found its place in any existing legal regime.[176] As such, any solution should incorporate a mechanism to achieve the required compensation levels and require extractive companies to take preventive action. This Section of the Note proposes that such a solution is to have a regional insurance treaty drafted and incorporated by insurance companies.

Even if a penalty scheme is established within LRTMP as outlined above, it suffers from one large weakness: the damages are assessed only *after* the environmental damage has occurred. It is entirely possible that, given the limited ecological understanding of the effects of oil pollution in the Arctic, actual damages from spills of extensive pollution will cost more to remediate than initially estimated. Most insurance companies "have deemed the Arctic too risky a market to cover, meaning that self-insurance and adequate

175. *Id.* at art. 232

176. JOHNSTONE, *supra* note 33, at 260.

contingency funds are of great importance in forming a credible risk management strategy."[177] If the damages exceed the insurance coverage, the loss will inure to the environment—especially if there are environmental damages to areas beyond national jurisdiction.[178] Indeed, "[s]elf-insurance has been deemed far too low and insufficient to cover such financial liabilities" as could occur in the Arctic environment.[179]

Currently, there are no regional insurance agreements governing the offshore hydrocarbon extraction in the Arctic.[180] Proposals for group insurance schemes to be shared across Arctic States have received a tepid response at best.[181] Nevertheless, insurance companies have begun to realize the risks associated with Arctic drilling activity and the need for financial security.[182] Lloyd's of London, one of the world's biggest insurer, recommends more investment in science and research to "close knowledge gaps, reduce uncertainties and manage risks."[183] Additionally, Lloyd's of London also "calls for sizeable investment in infrastructure and surveillance to enable 'safe economic activity' and argues that 'full-scale exercises based on worst-case scenarios of environmental disaster should be run by companies.'"[184]

The "polluter pays principle" and the "precautionary approach" have been cursorily identified by PAME in its Arctic Oil and Gas Guidelines for industry but have not been adopted in any binding legal obligations.[185] These approaches should support a new regional treaty that governs the insurance industry. "A precautionary approach does not . . . require a complete

177. LÁRA JÓHANNSDÓTTIR & DAVID COOK, INST. OF INT'L AFFAIRS: CTR. FOR ARCTIC POLICY STUDIES, AN INSURANCE PERSPECTIVE ON ARCTIC OPPORTUNITIES AND RISKS: HYDROCARBON EXPLORATION AND SHIPPING 20 (2014).

178. JOHNSTONE, *supra* note 33, at 261.

179. JÓHANNSDÓTTIR & COOK, *supra* note 177, at 17.

180. JOHNSTONE, *supra* note 33, at 265.

181. *Id.* at 265–66.

182. CHARLES EMMERSON & GLADE LAHN, CHATHAM HOUSE, ARCTIC OPENING: OPPORTUNITY AND RISK IN THE HIGH NORTH (2012).

183. *Insurance Giant Lloyd's of London Warns Of 'Unique and Hard-To-Manage Risk' Of Arctic Ocean Oil Drilling*, THINKPROGRESS (Apr. 12, 2012), https://thinkprogress.org/insurance-giant-lloyds-of-london-warns-of-unique-and-hard-to-manage-risk-of-arctic-ocean-oil-279c22a2a206/ [https://perma.cc/7UNF-XUK2].

184. Julia Kollewe & Terry Macalister, *Arctic Oil Rush Will Ruin Ecosystem, Warns Lloyd's of London*, THE GUARDIAN (Apr. 11, 2012), https://www.theguardian.com/world/2012/apr/12/lloyds-london-warns-risks-arctic-oil-drilling [https://perma.cc/K53N-VKQC].

185. *See* JOHNSTONE, *supra* note 33, at 152.

prohibition of activity in the absence of certainty, but it does require strong measures to mitigate the risk."[186] If such a treaty were to be adopted by states, it would require insurance companies within their jurisdictions to have insurance packages tailored to the environmental sensitivity of the Arctic. In particular, oil companies intending to explore hydrocarbon resources would have to demonstrate response capacity and adopt specific technology, emergency plans, monitoring systems, and other environmentally stringent criteria in order to obtain any insurance covering their activities. Indeed, risk-based drilling insurance premiums create incentives for firms to adopt a stronger safety culture in an effort to reduce the premiums they pay.[187] Indeed some have argued that "different national systems may lead to ambiguities and unnecessary delays in oil pollution responses and compensation payments."[188] Thus, a regional treaty would ensure that precautions taken by operators are standardized and limit pollution to the marine environment in the same way.

The regional insurance agreement will require insurance companies to perform their own due diligence and monitoring on the companies that they choose to insure. Such monitoring could yield actionable information, including whether firms are adopting the socially optimal level of safety culture, and ensure that protective measures are not weakened by lack of incidents.[189] The public release of such reports could also ensure that investors pressure companies to adopt more stringent measures to prevent incidents in the Arctic.[190]

Such requirements and regional agreements may not work effectively without the cooperation of the insurance industry. First, "the cost of monitoring could be too high for both insurance companies and drilling companies to remain profitable."[191] Energy insurers and reinsurers have the capacity to raise the required

186. *Id.* at 133.

187. Mark A. Cohen et al., *Deepwater Drilling: Law, Policy, and Economics of Firm Organization and Safety*, 64 VAND. L.R. 1853, 1857–58 (2011).

188. CHARLES EMMERSON & GLADA LAHN, CHATHAM HOUSE, ARCTIC OPENING: OPPORTUNITY AND RISK IN THE HIGH NORTH 40 (2012), https://www.chathamhouse.org/publications/papers/view/182839 [https://perma.cc/S54H-9REL].

189. Cohen et al., *supra* note 187, at 1896.

190. *Id.*

191. *Id.* at 1900.

coverage for a spill in the Arctic.[192] Indeed, coverages were raised and new insurance packages were created in response to the passage of the Oil Pollution Act and the Comprehensive Environmental Response, Compensation, and Liability Act ("the Superfund Act").[193]

Beyond a regional insurance agreement, the Convention on Oil Pollution Preparedness, Response, and Cooperation ("OPRC"), described in Part I.D.4 of this Note, could be amended to include a financial responsibility clause stating: to engage in activities that expose outside parties to risks, a firm must demonstrate that it has sufficient resources—either its own (self-insurance) or third-party insurance coverage—to compensate injured parties in the event of an accident.[194] While domestic laws, such as the Oil Pollution Act in the United States, have such a requirement, none of the international agreements referenced in this paper have such requirements.[195] Such a scheme would be readily implemented through OPRC. The coverage should include costs of cleanup and any permanent damages to the ecosystems.

Such an insurance agreement would work well with the Offshore Pollution Liability Agreement ("OPOL"), "an agreement between thirteen major oil companies designed to provide compensation to *victims* of oil pollution damage arising from an offshore oil well blowout."[196] Given the language of OPOL it is not clear that it is applicable to environmental damages.[197] Furthermore, OPOL is an entirely voluntary agreement with a limited liability scheme capped

192. *Id.* at 1901 ("Robert Hartwig of the Insurance Information Institute testified on June 9, 2010, that it would be impossible for energy insurers or reinsurers to raise $10 billion of coverage. He cited several reasons, including the difficulty of underwriting for unlikely, but extremely severe events that are difficult to predict.").

193. *See* James Boyd, *Financial Responsibility for Environmental Obligations: Are Bonding and Assurance Rules Fulfilling Their Promise?*, 34–38 (Res. for the Future, Discussion Paper No. 01-42, 2011).

194. *See* Tamara L. Lev, *Liability for Environmental Damages from the Offshore Petroleum Industry: Strict Liability Justifications and the Judgment Proof Problem*, 43 ECOLOGY L.Q. 483, 490–93 (2017).

195. *See* 33 U.S.C. § 2716 (2019); *see supra* note 54.

196. Sue Vern Tan, *License to Spill? Developing a Framework for International Liability and Compensation for Transboundary Pollution Arising from Offshore Drilling Activities*, 40 (2015) (emphasis added) (unpublished LL.M. thesis, University of Toronto) (on file with author); *see also* William N. Hancock & Robert M. Stone, *Liability for Transnational Pollution Caused by Offshore Oil Rig Blowout*, 5 HASTINGS INT'L & COMP. L. REV. 377, 393–94 (1982).

197. Vern Tan, *supra* note 196, at 41.

at US$250 million per incident.[198] As discussed above, there is a significant chance of spills in the Arctic whose cleanup costs would exceed $250 million.[199] A regional insurance agreement would not only complement the financial coverage but could also encourage greater participation in OPOL.

The regional insurance agreement therefore furthers the efficacy of the established LRTMP regime by ensuring there is a successful liability scheme. Liability created by these insurance agreements acts as a deterrent and is truly compensatory because it requires market actors to internalize the risks associated with offshore oil drilling.

C. Marine Protected Area Planning

Harmonizing laws of Arctic States, gathering transboundary oil pollution data, and establishing regional insurance agreements requires time. While these policies are being negotiated and implemented, offshore oil drilling efforts may continue along with its intendant risks to the Arctic. Thus, it is of paramount importance that the Arctic States immediately coordinate with one another to establish Marine Protected Areas ("MPAs") that will protect critical habitats in the Arctic. Under the CBD, a network of protected areas is of particular importance for the conservation of marine biodiversity.[200] In response to climate change, marine species migrate more than terrestrial species.[201] As such, a network of fully connected MPAs is needed to guarantee effective protection.[202]

While OSPAR and the Arctic Council have encouraged States to use their discretion to establish MPAs in their sovereign areas, there are no clear timelines and standards for doing so. Importantly, given the background of transboundary pollution, it is

198. *Id.* at 41.

199. *See* Rochette, *supra* note 159, at 24; The Offshore Pollution Liab. Ass'n, *Offshore Pollution Liability Agreement*, cl. 4(a) (Apr. 1, 2015) http://www.opol.org.uk/downloads/OPOL-Agreement-From-1april2015.pdf [https://perma.cc/R67L-UA2Q].

200. Secretariat of the Convention on Biological Diversity, *Technical Advice on the Establishment and Management of a National System of Marine and Coastal Protected Areas*, at 14, 20–21, CBD Technical Series No. 13 (2004), https://www.cbd.int/doc/publications/cbd-ts-13.pdf [https://perma.cc/LZ65-KMEC].

201. *See* Nick Bradford, *Marine Species on the Move*, NAT'L ENVTL. EDUC. FUND (2018), https://www.neefusa.org/weather-and-climate/marine-species-move [https://perma.cc/5AGM-XVMC].

202. JAKOBSEN, *supra* note 138, at 156; *see also supra* note 138.

not clear how activities of littoral states will affect the MPAs of other states or what scientific buffer zones should be established. The Council can and should propose guidelines for a standardized approach for marine protected areas including but not limited to buffer zones, coordination with and reports to other Arctic States, and specific timelines for establishing these MPAs. This is entirely in keeping with the Council's Strategic Plan that sets out a pan-Arctic network of MPAs as an important objective.[203] "However, no current plan exists to develop a marine spatial plan for the entire Arctic region."[204] None of the current frameworks consider the cumulative impacts of multiple drilling operations.[205] The designation of wildlife refuges and marine protected areas, shipping routes, and decisions to drill in coastal areas should all consider these transboundary impacts.[206] Transboundary oil pollution will determine the ultimate efficacy of such protected areas.[207] Importantly, where there are multiple stressors and transboundary effects from fishing, shipping, and hydrocarbon extraction, MPAs and their associated buffer zones should consider the cumulative impacts of different operations in the arctic.

The creation of a standardized approach should also include indigenous knowledge. As outlined above in Part III, indigenous communities around the Arctic have a depth of knowledge about critical and endangered habitats.[208] They can also qualify the designation of MPAs based on indigenous needs and values. "A

203. JAKOBSEN, *supra* note 138, at 128; s*ee also* PROTECTION OF THE ARCTIC MARINE ENV'T, ARCTIC MARINE STRATEGIC PLAN 2015-2025 (2015), https://www.pame.is/images/03_Projects/AMSP/AMSP_2015-2025.pdf [https://perma.cc/5WPU-F95N].

204. PROTECTION OF THE ARCTIC MARINE ENV'T, PAME WORK PLAN 2017–2019 (2017), https://pame.is/images/01_PAME/Work_Plan/PAME_Work_Plan_2017-2019.pdf [https://perma.cc/8L4Q-KAQE]; *see also* CHARLES N. EHLER, THE ASPEN INST., PART TWO: MARINE SPATIAL PLANNING IN THE ARCTIC 78 (2017), https://assets.aspeninstitute.org/content/uploads/files/content/docs/ee/Aspen_MSP_Report_II.pdf [https://perma.cc/TQK5-VP4M].

205. Elizabeth A. Kirk & Raeanne G. Miller, Offshore Oil & Gas Installations in the Arctic: Responding to Uncertainty through Science and Law, THE ARCTIC Y.B. at 9 (The Arctic EIA guidelines suggest that cumulative impacts to be taken into account, but these guidelines are only voluntary).

206. *See* Columbia University, *As Climate Stirs Arctic Sea Ice Faster, Pollution Tags Along*, PHYS.ORG (June 27, 2017), https://phys.org/news/2017-06-climate-arctic-sea-ice-faster.html#jCp [https://perma.cc/5EPN-K7V7].

207. *Id.*

208. LISA SPEER & THOMAS L. LAUGHLIN, IUCN/NRDC WORKSHOP TO IDENTIFY AREAS OF ECOLOGICAL AND BIOLOGICAL SIGNIFICANCE OR VULNERABILITY IN THE ARCTIC MARINE ENVIRONMENT 15 (2010).

systematic effort to gather and incorporate that knowledge would contribute significantly to this exercise and others."[209]

Priority should be given to ecologically critical and sensitive areas—such as the "Last Ice Area," located north of Greenland and Canada's Ellesmere Island.[210] This area harbors the largest concentration of Arctic wildlife dependent on arctic ice for survival, including bowhead whales, seals, narwhals, and polar bears.[211] The ice sheet is the thickest there, and given its thickness, is not likely to be exploited in the foreseeable future.[212] As such, it would be easier to implement international agreements towards designating this region as a protected area. The multilateral treaty focusing on the development of the marine protected area should also highlight mechanisms for its protection against oil pollution, including adaptive buffer areas.

The Council should also determine what, if any, areas should be protected in the ABNJ. However, the current international legal framework does not assign a clear mandate to specific organizations for designating holistic MPAs. It may be necessary to create an authority, similar to the International Seabed Authority, that has the capacity to create and govern Areas of Particular Environmental Interest in the seafloor of ABNJ.[213] Yet, such an organization would have to be contained within the auspices of UNCLOS, to which the U.S. is not a party.[214] The protection of critical habitats in the ABNJ from transboundary marine pollution will therefore remain open until U.S. participation is clarified or, indeed, ratified. Alternatively, instead of the creation of a new authority under UNCLOS, Arctic States could, by agreement, give the Arctic Council the power to create binding MPA regulations

209. *Id.*

210. *The Last Ice Area*, NAT'L GEOGRAPHIC, https://www.nationalgeographic.org/projects/pristine-seas/expeditions/the-last-ice-area/ [https://perma.cc/7EFX-5BBY] (last visited Sept. 26, 2019).

211. *Id.*

212. Tim Folger, *Here's Where the Arctic's Wildlife Will Make Its Lase Stand*, NAT'L GEOGRAPHIC (Jan. 2018), https://www.nationalgeographic.com/magazine/2018/01/arctic-wildlife-sea-ice/ [https://perma.cc/6QAC-F57Y]. The thickness of the Arctic ice sheet makes drilling currently impracticable.

213. *See About the International Seabed Authority*, INT'L SEABED AUTHORITY, https://www.isa.org.jm/authority [https://perma.cc/KJW4-VHQF] (last visited Sept. 26, 2019).

214. *See supra*, Table 1.

and the power to enforce the timely creation of standardized MPAs.

Since research indicates that ice-rafted pollution will move faster when there is less ice, there is also a need for more stringent buffer zones.[215] Research should be coordinated across the different regimes operational in the Arctic, and across various stakeholders. As outlined in the previous sections, research and maps created by independent third parties will be especially valuable in offering an apolitical basis for the designation of MPAs. Coordination between CAFF and PAME would also provide better cross-disciplinary research to understand the impact of marine pollution on biodiversity in the region.

V. THE ROLE OF THE UNITED STATES

The Arctic matters for the U.S. The Alaskan Arctic represents "the fourth coast of the United States."[216] However, the governing document for this region remains UNCLOS, to which the U.S. is not a party.[217] Thus, while Russia has aggressively staked its territory in the Arctic for resource extraction, the U.S. has remained powerless to deny Russia's Arctic expansion efforts because it cannot serve on the Commission on the Limits of the Continental Shelf.[218] Further, it remains unclear whether the U.S. can claim additional continental shelf territory for resource extraction as a non-party.[219] In the past, the U.S. has recognized the mismatch between the growing importance of the Arctic and the lack of American resources to adequately protect the region or its resources.[220] As of February 2019, Congress released an updated report on "Changes in the Arctic Environment" re-iterating the importance of the region and how oil and gas activities could affect

215. *See* Newton et al., *supra* note 39.

216. Jonathan Masters, *The Arctic Is Integral to U.S. National Security*, COUNCIL ON FOREIGN RELATIONS (Mar. 22, 2017), https://www.cfr.org/interview/arctic-integral-us-national-security [https://perma.cc/5B72-D4UF].

217. *Id.*

218. *See* Paraskova, *supra* note 6; *see also* McGee, *supra* note 173.

219. Jon M. Van Dyke, *U.S. Accession to the Law of the Sea Convention*, 22 OCEAN Y.B. 47–59 (2008) ("The United States may also be able to make an extended continental shelf claim in the Arctic region, perhaps claiming more than 200,000 square miles of additional undersea territories. Its ability to make such a claim credibly will be substantially weakened if it remains outside the Law of the Sea Convention.").

220. Todd L. Sharp, *The Implications of Ice Melt on Arctic Security*, 11 DEF. STUD. 297, 307 (2011).

the environment.[221] Concerns about the environmental impacts of offshore extractive activities have led to leasing bans enacted by Congress and the President in certain areas of the Arctic Ocean of special ecological significance.[222] However, because the U.S. is not a party to treaties that manage transboundary pollution,[223] it is exposed to environmental degradation in its Arctic territory caused by another state's extractive efforts and the Trump administration does not seem to be concerned with environmental protections in the Arctic or otherwise.[224] As such, even if the U.S. chooses not to ratify UNCLOS, it should take a leadership role in any Arctic regimes and solutions that are proposed. Binding itself to an international Arctic Treaty would "signal to all Arctic and maritime stakeholders that the U.S. is not simply a hegemonic state that abides by only its own rules, but a member of the global community that values and upholds international law."[225]

VI. CONCLUSION

The current legal frameworks from UNCLOS to OPRC do not effectively protect the Arctic environment from transboundary pollution resulting from extractive activities. Existing international agreements fail for three reasons: they fail to modify state actors' utilities, they fail to facilitate learning and are inflexible, and they fail in facilitating coordination.

This Note recommends three specific solutions. First, a binding agreement that focuses on long range transboundary marine pollution, which would harmonize approaches of all Arctic states and improve our understanding of the Arctic marine environment through research, data gathering and monitoring. Second, this Note proposes a mechanism by which private actors can be integrated into policies protecting the Arctic environment. The solution requires a regional insurance treaty drafted and

221. RONALD O'ROURKE ET AL., CONG. RESEARCH SERV., R41153, CHANGES IN THE ARCTIC: BACKGROUND AND ISSUES FOR CONGRESS, (Updated Feb. 7, 2019) ("The Trump Administration has stated its interest in promoting offshore development in the region.").

222. *Id.* at 31 (These leasing bans have seen been revoked by Executive Order by President Trump).

223. *See supra* Table 1.

224. *See id.*; *see also* Henry Fountain & Steve Eder, *In the Blink of an Eye, a Hunt for Oil Threatens Pristine Alaska*, N.Y. TIMES (Dec. 3, 2018), https://www.nytimes.com/2018/12/03/us/oil-drilling-arctic-national-wildlife-refuge.html [https://perma.cc/3NK5-RFQG].

225. Sharp, *supra* 220, at 308.

incorporated by insurance companies which would force companies undertaking extractive activities to internalize the costs of pollution. Finally, this Note proposes a scheme of conservation through marine protected areas with flexible buffer zones.

"Hydrocarbon development in the marine Arctic is already a reality."[226] There is a tendency for the law to be reactive rather than proactive, and this tendency ought to be corrected. As one key insurance agent commented in response to disasters, "[r]egulations rushed into force do not address underlying causes but public outrage, often generated by shocking images: . . . a soiled beach, an oil-covered seabird."[227] Collective action cannot wait for one of the last few pristine environments on this planet to be irreversibly contaminated. States have an obligation to prevent transboundary harm and to protect marine biodiversity. The last remaining sea ice has somewhat deterred extractive activity. States should use this time wisely and put into place the aforementioned protections.

226. JOHNSTONE, *supra* note 33, at 3.

227. *Marine Insurance and Arctic Risk*, HELLENIC SHIPPING NEWS: INT'L SHIPPING NEWS (Mar. 1, 2018), https://www.hellenicshippingnews.com/marine-insurance-and-arctic-risk/ [https://perma.cc/NS22-C3SW].