NOTES

MORE THAN THE DAILY CATCH: HOW REGULATING THE FISHING INDUSTRY CAN HELP KEEP PLASTICS FROM THE OCEAN

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TABLE OF CONTENTS

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"It's crazy to think that earth really has no natural enemies other than people. But people problems call for people solutions."[1]

"I just want to say one word to you. Just one word… Plastics."[2]

I. INTRODUCTION

Approximately eight million tons of plastic waste enter the oceans every year,[3] accumulating into at least 79,000 metric tons of marine debris floating inside a 1.6 million square-kilometer area known colloquially as the Great Pacific Garbage Patch (GPGP).[4] If the GPGP goes unchecked, the amount of plastic pollution in the ocean could triple within the next thirty years.[5] The GPGP lies at least forty nautical miles away from any country's exclusive economic zone, meaning that it is within the "'High Seas,' also known as 'areas beyond national jurisdiction' where all nations are afforded the Freedom of the Seas."[6]

Because there are no defined private ownership rights or public jurisdiction over the GPGP, no single country, company, or person has an incentive to protect the ocean's resources and keep it clean.[7] Instead, international actors deplete the ocean's resources as quickly as possible at the expense of others - creating a "Tragedy of the Commons."[8]

The excessive plastic waste in the ocean is not only concerning to marine health and biodiversity, but recent studies showed that the plastic in the ocean accumulates in the fish we eat and the water we drink.[9] The build-up of BPAs (the basic building block of polycarbonate plastic) has significant

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[1] *Down to Earth With Zac Efron: London* (Netflix 2020).
[2] THE GRADUATE (Embassy Picture Corp. 1968).
[3] Lawrence J. McQuillan & George L. Tibbits, *How to Eliminate the Great Pacific Garbage Patch*, THE INDEPENDENT INSTITUTE (August 6, 2018).
[4] *See* L. Lebreton et al., *Evidence That the Great Pacific Garbage Patch is Rapidly Accumulating Plastic*, SCI. REP., March 22, 2018, at 7. *See also Great Pacific Garbage Patch*, NATIONAL GEOGRAPHIC (last updated July 5, 2019) https://www.nationalgeographic.org/encyclopedia/great-pacific-garbage-patch/.
[5] Laura Parker, *The Great Pacific Garbage Patch Isn't What You Think it Is*, NATIONAL GEOGRAPHIC, July 3, 2019. *See also*, Marcela Romero Mosquera, *Banning Plastic Straws: The Beginning of the War Against Plastics*, 9 ENV'T. & EARTH L.J. 5, 11 (2019) ("[B]y 2050 there will be more plastic in our ocean than fish.").
[6] Rachael E. Salcido, *Using International Property Law as a Lever to Evolve Toward Integrative Ocean Governance*, 47 U. PAC. L. REV 253, 257 (2016).
[7] *Id.* at 254.
[8] Jessica R. Coulter, *A Sea Change to Change the Sea: Stopping the Spread of the Pacific Garbage Patch with Small-Scale Environmental Legislation*, 51 WM. & MARY L. REV. 1959, 1964 (Apr. 2010).
[9] Arizona State University, *Impact of Plastics on Human Health and Ecosystems*, NEWS MEDICAL LIFE SCIENCES, Mar 20, 2010.

health ramifications, such as hormonal disruption, and can poison the digestive system.[10] In this Note, I will analyze existing international law regarding ocean waste. Through this analysis, I will find the holes in the existing legal hard and soft law regimes to create an International Plastic Treaty to overcome the tragedy of the commons.

II. BACKGROUND

A. Overview of the Great Pacific Garbage Patch

A yachtsman named Charles Moore discovered The Great Pacific Garbage Patch while traveling from Hawaii to California.[11] While crossing the North Pacific Subtropical Gyre, Moore and his crew sailed through the trash soup, detecting that millions of plastic pieces surrounded their ship.[12] The GPGP discovery confirmed what oceanographers and climatologists predicted for years – a large collection of trash circulating in the ocean.[13] However, the visible trash Moore found was just a portion of the problem; "Oceanographers and ecologists recently discovered that about 70% of marine debris actually sinks to the bottom of the ocean."[14] Like the iceberg that sunk the Titanic, there is an even bigger plastic problem lurking beneath the surface.

Many types of trash make up marine debris, but plastics account for most marine litter.[15] This is due to two reasons: "First, plastic's durability, low cost, and malleability mean that it's being used in many more consumer and industrial products. Second, plastic goods do not biodegrade but instead break down into smaller pieces."[16] Instead of fully decomposing, the sun, waves, and mechanical abrasion break down plastic into smaller pieces – a process called photodegradation.[17]

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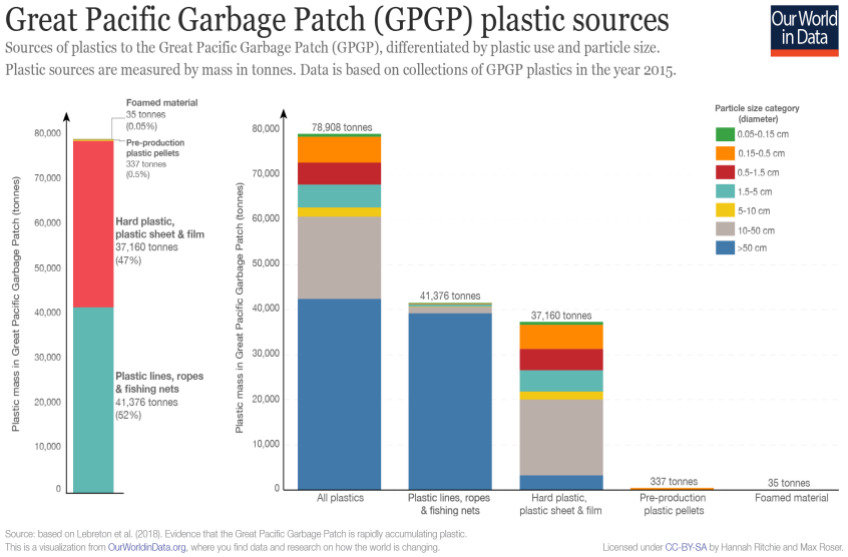
[10] *Id.*
[11] *Great Pacific Garbage Patch*, NATIONAL GEOGRAPHIC (last updated July 5, 2019) https://www.nationalgeographic.org/encyclopedia/great-pacific-garbage-patch/.
[12] *Id.*
[13] *Id.*
[14] *Id.*
[15] *Research Highlights True Impacts of Plastics on Our Planet, Ecosystem, People*, UN ENV'T PROGRAMME (Mar. 11, 2019), https://www.unenvironment.org/news-and-stories/press-release/research-highlights-true-impacts-plastics-our-planet-ecosystems (finding that 60-80% of marine litter is composed of plastic). *See also*, L. Lebreton et al., *supra* note 4 (finding that plastics represent 99.9% of the marine debris collected).
[16] *Great Pacific Garbage Patch*, *supra* note 11.
[17] *Id.*

Plastics take at least 400 years to fully decompose, meaning that "virtually every piece of plastic ever produced is still around."[18] "Plastic can be found on every beach in the world. Microplastics are found at 5,000 metres depth, and plastic bottles have been found at depths of 3,500 meters. It is actually 'raining' plastic in the ocean. Scientists are still far from mapping all the plastic pollution in the oceans."[19] However, a recent study found that microplastics, plastics less than five millimeters in length, "make up 94 percent of the estimated 1.8 trillion pieces of plastics in the patch. But that only amounts to eight percent of the total tonnage."[20] Fishing nets and other fishing industry gear compose the largest amount of marine debris by tonnage.[21] The different types of marine debris in the GPGP appear below: [22]



[18] Luisa Cortat Simonetti Gonçalves & Michael Gerbert Faure, *International Law Instruments to Address the Plastic Soup*, 43 WM. & MARY ENV'T L. & POL'Y REV. 871, 874 (2019) [hereinafter *Instruments*].

[19] *Id.* (citing *What is plastic soup? Gyres and Hotspots*, PLASTIC SOUP FOUNDATION, https://www.plasticsoupfoundation.org/en/files/what-is-plastic-soup/ [https://perma.cc/T2RX-WM84] (last visited Apr. 3, 2022)).

[20] Parker, *supra* note 5.

[21] *Id.* ("The study also found that fishing nets account for 46 percent of the trash, with the majority of the rest composed of other fishing industry gear, including ropes, oyster spacers, eel traps, crates, and baskets.")

[22] Hannah Ritchie & Max Roser, *Plastic Pollution*, OUR WORLD IN DATA (Sept. 2018).

B. Plastic from Land Sources

In 2015, the world produced 381 million tons of plastic, roughly equivalent to "the mass of two-thirds of the world population."[23] Cumulatively, the world produced 7.8 billion tons of plastic, more than a "tonne of plastic for every person alive today."[24] Out of all plastic created from 1950-2015, 30% is still in use, 55% went straight to a landfill or was improperly discarded, 8% was incinerated, and only 6% was recycled.[25] In 2015, the packaging industry produced the most plastic, producing 42%, and because plastics used for packaging have a short "in-use" lifetime, packaging also produced the most plastic waste.[26]

The 2015 statistics for the total plastic waste produced by country show that China produced the most plastic waste at 60 million tons, followed by the United States at 38 million tons, Germany at 14.5 million tons, and Brazil at 12 million tons.[27] However, the data should shift based on the effectiveness of the country's waste management to quantify the inadequately disposed waste.[28] By combining the sum of inadequately disposed waste with the share of littered plastic waste, researchers can quantify the amount of plastic that could eventually enter the ocean across the world, otherwise defined as mismanaged waste.[29] According to their estimates, "China contributes the highest share of mismanaged plastic waste with around [28%] of the global total, followed by [10%] in Indonesia, [6%] for both the Philippines and Vietnam," while "other leading countries include Thailand [3.2%]; Egypt [3%]; Nigeria [2.7]; and South Africa [2%]."[30] Around eight

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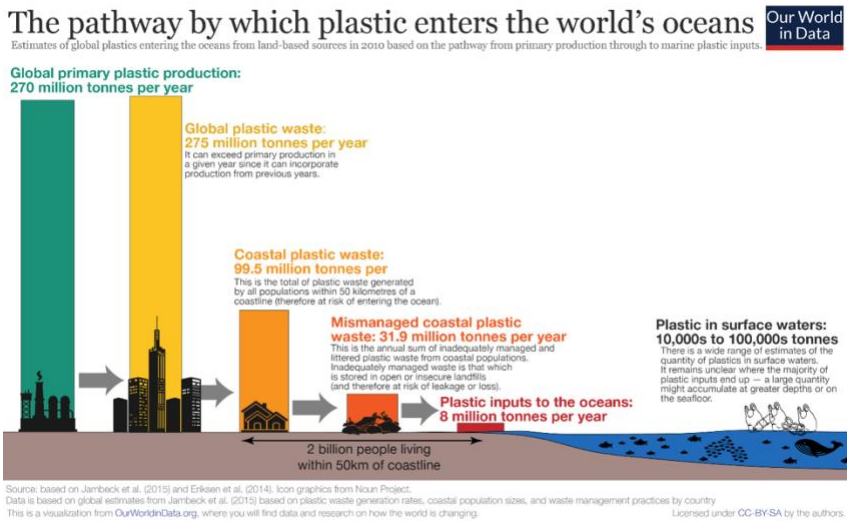
[23] *Id.*
[24] *Id.*
[25] Ritchie & Roser, *supra* note 22.
[26] *Id.* ("Packaging, for example, has a very short 'in-use' lifetime (typically around 6 months or less). This is in contrast to building and construction, where plastic use has a mean lifetime of 35 years.").
[27] *Id.*
[28] *Id.* Inadequately disposed waste is defined as follows:

> Inadequately disposed waste is that which has the intention of being managed through waste collection or storage sites, but is ultimately not formally or sufficiently managed. This includes disposal in dumps or open, uncontrolled landfills; this means the material is not fully contained and can be lost to the surrounding environment. This makes it at risk of leakage and transport to the natural environment and oceans via waterways, winds and tides.

[29] *Id.* ("Mismanaged waste is the sum of inadequately managed waste (that which is not formally managed such as disposal in dumps or open, uncontrolled landfills which could leak to the surrounding environment) and littered waste.").
[30] *Id.*

million tons of mismanaged waste then pollutes the ocean as depicted by the illustration below:[31]



The plastic in the ocean then undergoes the lengthy photodegradation process to transition into microplastics.[32] This is dangerous to both marine wildlife and human health.[33] Fish ingest the largest quantity of harmful microplastics, and humans then consume those fish, leading to contamination of our food and water sources.[34] While the harm caused by microplastics is not conclusory, the chemicals found in some plastics are linked to a variety of

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[31] *Id.*

[32] *Great Pacific Garbage Patch*, *supra* note 11.

[33] Marcela Romero Mosquera, *Banning Plastic Straws: The Beginning of the War Against Plastics*, 9 ENV'T. & EARTH L.J. 5, 11 (2019) ("Other studies showed that plastic waste kills at least 100 million marine animals every year, up to 1 million seabirds, 100,000 sea mammals, marine turtles, and countless fish . . . [C]oral reefs becom[e] diseased after coming into contact with plastic waste increases from four percent to eighty-nine . . . ."); *see also* Consumer Reports, *You're Literally Eating Microplastics. How Can You Cut Down Exposure to Them.*, THE WASH. POST (Oct. 7, 2019); *and* Damian Carrington, *Microplastic Particles Now Discoverable in Human Organs*, THE GUARDIAN (Aug. 17, 2020) ("The US Environmental Protection Agency is concerned about BPA because 'it is a reproductive, developmental and systemic toxicant in animal studies.'").

[34] *Instruments*, *supra* note 18, 883-884 ("This happens because this fish eats zooplankton, but, in their haste, the fish snap at everything they see, including microplastics.").

health problems, "including reproductive harm and obesity, plus issues such as organ problems and developmental delays in children."[35]

C. Marine Based Plastic

Fishing nets account for 46% of the ocean's seventy-nine thousand tons of trash, while other fishing industry gear accounts for the majority of the remaining 54%.[36] "More than 640,000 tonnes of nets, lines, pots, and traps used in commercial fishing are dumped and discarded in the sea every year."[37] Fishing gear that is lost or abandoned at sea is nicknamed "ghost gear."[38] In 2015, ghost gear consisted of approximately 10% of the ocean's plastic, but because of the prevalence of ghost gear from "illegal, unregulated, and unreported fishing" and poor fishery regulation, that amount has only increased.[39] Accordingly, a study found that an estimated 60% of garbage that washed up on an uninhabited island originated from industrial fisheries.[40]

Abandoned fishing gear is deadly to marine animals and marine habitats.[41] It also creates "ghost fishing," where a fish or animal gets stuck in an abandoned net or trap, causing unintended death of marine life.[42] Fishermen experience direct costs from ghost fishing, such as replacing the lost gear, increasing resources to capture the target fish, and losing revenue from competition from ghost fishing.[43] However, the impact varies depending on the type of gear used and the target organism.[44]

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[35] Consumer Reports, *You're Literally Eating Microplastics. How Can You Cut Down Exposure to Them*, THE WASH. POST (Oct. 7, 2019).
[36] L. Lebreton et al., *supra* note 4, at 10.
[37] Sandra Laville, *Dumped Fishing Gear is the Biggest Plastic Polluter in Ocean, Finds Report*, THE GUARDIAN (Nov 5, 2019), https://www.theguardian.com/environment/2019/nov/06/dumped-fishing-gear-is-biggest-plastic-polluter-in-ocean-finds-report.
[38] Hannah Gould, *Hidden Problem of 'Ghost Gear': The Abandoned Fishing Nets Clogging Up Oceans*, THE GUARDIAN (10 Sept. 2015), https://www.theguardian.com/sustainable-business/2015/sep/10/fishing-industry-vows-to-tackle-wildlife-deaths-from-ghost-gear.
[39] *Id.*; Laville, *supra* note 37; *see also,* L. Lebreton et al., *supra* note 4.
[40] Laville, *supra* note 37.
[41] *Id.* ("'Nets and lines can pose a threat to wildlife for years or decades, ensnaring everything from small fish and crustaceans to endangered turtles, seabirds and even whales'").
[42] NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, 2015 NOAA MARINE DEBRIS PROGRAM REPORT: IMPACT OF "GHOST FISHING" VIA DERELICT FISHING GEAR 2 (2015), https://marinedebris.noaa.gov/sites/default/files/publications-files/Ghostfishing_DFG.pdf.
[43] *Id.* at 4.
[44] NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, *supra* note 42.

D. Available Instruments to Restrict Pollution[45]

There are environmental instruments already implemented to help with marine pollution, but none of the instruments explicitly deal with plastic pollution.[46] These instruments constitute both hard and soft law,[47] and the main issues are that these attempts are poorly implemented and fail to bring countries to agree to the terms.[48]

i. United Nations Convention on the Law of the Sea

The United Nations Convention on the Law of the Sea (UNCLOS) "focuses on solving problems related to the economic exploitation of the oceans and correlated sovereignty issues."[49] UNCLOS recently adopted several approaches to control the pollution of the marine environment.[50] UNCLOS obliges participating states to take all necessary measures "to prevent, reduce and control pollution of the marine environment from any source, using for this purpose the best practicable means at their disposal . . . and they shall endeavor to harmonize their policies in this connection."[51] UNCLOS further defines the type of pollution that the states should take measures against,[52] and UNCLOS outlines the participating states' global and regional cooperation requirements.[53] UNCLOS requires participating states to monitor the risks and effects of pollution on the marine environment and to make the results available to all states.[54] UNCLOS further requires states to

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[45] This Note will not focus on recovering the plastic debris after it has polluted the ocean, defined as the *ex post* perspective. *Instruments*, *supra* note 18, 884-893. Instead, this Note will take an *ex ante* approach because the *ex post* perspective needs to be partnered with an institutional fix in order to prevent the problem from reoccurring. McQuillan & Tibbits, *supra* note 3.

[46] *Instruments*, *supra* note 18, 925.

[47] *Id.* at 905 (defining hard law as "interactions between states that consented to bind themselves . . . whether by treaty or recognizing a principle of customary law," and defining soft law as "instruments that function without the need for a binding element.").

[48] *Id.*

[49] *Id.* at 893.

[50] U.N. Convention on the Law of the Sea, Dec. 10, 1982, 1833 U.N.T.S. 397, arts. 192-195, 204-222, 237 [hereinafter UNCLOS].

[51] *Id.* at art. 194.

[52] *Id.* ("The Measures taken pursuant to this Part shall deal with all sources of pollution of the marine environment. These measures shall include, *inter alia*, those designed to minimize to the fullest possible extent . . . pollution.").

[53] UNCLOS, *supra* note 50, at arts. 197-201. ("States shall cooperate on a global basis and, as appropriate, on a regional basis, directly or through competent international organizations, in formulating and elaborating international rules, standards and recommended practices and procedures consistent with this convention, for the protection and preservation of the marine environment.").

[54] *Id.* at arts. 204-205.

adopt laws and regulations to "prevent, reduce and control pollution" in the following contexts: land-based sources of maritime environment pollution, pollution by seabed activities subject to national jurisdiction, pollution stemming from dumping, vessels, and further pollution throughout the atmosphere.[55]

Each state decides what laws to enact to follow UNCLOS, and they are not obliged to institute laws or enforcement mechanisms when another state "has already instituted proceedings in accordance with this [convention]" for enforcement purposes.[56] Moreover, Article 210(4) imposes an obligation on states to bind themselves to other international and regional instruments that assist in preventing, reducing and controlling marine pollution.[57] If a state fails to fulfill its international obligations to protect and preserve the marine environment, UNCLOS holds that state liable in accordance with international law. UNCLOS provides tools for dispute settlement and remedies through international establishments like the International Tribunal for the Law of the Sea.[58] All contracting parties are bound by the entirety of UNCLOS because states are not allowed to make reservations to any of its terms.[59]

Through defining "pollution of the marine environment,"[60] UNCLOS provides a comprehensive legal framework for protecting the marine environment from plastic and enables concern about plastic pollution to fall under UNCLOS's protection. UNCLOS places obligations on participating state actors "to establish global and regional rules, standards and recommended practices and procedures to prevent, reduce and control such pollution."[61] UNCLOS itself does not provide any framework for preventing plastic pollution of the ocean; instead, other conventions, regional treaties,

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[55] *Id.* at arts. 207-212. *See also*, *Instruments*, *supra* note 18, at 894 ("In other words, UNCLOS has approaches that cover all sources of plastic pollution.").

[56] *Id.* at arts. 213-222.

[57] *Id.* at art. 210(4). ("States, acting especially through competent international organizations or diplomatic conference, shall endeavour to establish global and regional rules, standards and recommended practices and procedures to prevent . . . such pollution.").

[58] *Id.* at art. 235(1) ("States are responsible for the fulfilment of their international obligations concerning the protection and preservation of the marine environment. They shall be liable in accordance with international law.").

[59] UNCLOS, *supra* note 50, at art. 309.

[60] *Id.* at art. 1(4).

> [T]he introduction by man, directly or indirectly, of substances or energy into the marine environment, including estuaries, which results or is likely to result in such deleterious effects as harm to living resources and marine life, hazards to human health, hindrance to marine activities, including fishing and other legitimate uses of the sea, impairment of quality for use of sea water and reduction of amenities.

[61] *Id.* at art. 210.

and standards set by competent international organizations inform all provisions within UNCLOS.[62]

However, because of UNCLOS's jurisdictional framework, it has little effect on the pollution done by fisheries, shipping, and trash on the high seas.[63] UNCLOS divides the seas and oceans into different zones – the Territorial Sea,[64] the Contiguous Zone,[65] the Exclusive Economic Zone,[66] the High Seas,[67] and the seabed and ocean floor of each jurisdiction.[68] For the purposes of this Note, it is enough to know that:

> (i) in the Territorial Sea, coastal States exercise control; (ii) in the Contiguous Zone, coastal States exercise control only when necessary to the specific purpose why the Zone was established; (iii) in the EEZ, the rights and jurisdiction of the coastal State and the rights and freedoms of other States are governed by UNCLOS, and the coastal State only has certain rights of exploitation at the EEZ; and (iv) the High Seas are open to all States and ruled by international law.[69]

All four zones contribute to the marine pollution problem, but the High Seas zone carries the highest trash concentration, as discussed earlier.[70] Also, the jurisdictional zones established by UNCLOS demand more resources from a national and regional approach than from an international one,[71] and the international approach places a large burden on the coastal states, even though the plastic pollution issue is global and not attributed to a specific state.

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[62] *Instruments*, *supra* note 18, 895.
[63] *Id.* at 897 ("This is not enough to solve the plastic soup problem, not only because the main concern is the land-based sources, but also because: (i) the so-called flags of convenience are a challenge to this solution; and (ii) preventing and recovering the plastic pollution will rarely happen inside a ship.").
[64] UNCLOS, *supra* note 50, at art. 3. ("Every State has the right to establish the breadth of its territorial sea up to a limit not exceeding 12 nautical miles, measured from baselines determined in accordance with this convention.").
[65] *Id.* at art. 33 (defining Contiguous zone "may not extend beyond 24 nautical miles from the baseline from which the . . . territorial sea is measured," and the control can only be extended for specific purposes, such as to punish and "prevent infringement of its customs, fiscal, immigration or sanitary laws and regulations within its territory or territorial sea.").
[66] *Id.* at art. 57 ("The exclusive economic zone shall not extend beyond 200 nautical miles from the baselines from which the breadth of the territorial sea is measured.").
[67] *Id.* at art. 86 (defining high seas as "all parts of the sea that are not included in the exclusive economic zone, in the territorial sea or in the internal waters of a State, or in the archipelagic waters of an archipelagic State.").
[68] *Id.* at art. 1(1)(1).
[69] *Instruments*, *supra* note 18, at 896.
[70] Salicido, *supra* note 6.
[71] *Instruments*, *supra* note 18, at 897.

Ships on the High Seas are regulated based on the flag they fly.[72] The flag connects the ship to the exclusive jurisdiction of its original state while the ship travels on the High Seas.[73] Enacting regulations based on national flags incentivizes shipowners to skirt those regulations by strategically choosing to fly another state's flag– a practice known as flying a "flag of convenience."[74] UNCLOS cannot remedy the flag of convenience issue because, amending UNCLOS requires unanimous approval from the member states (functionally making UNCLOS almost impossible to amend).[75]

ii. The 1972 London Dumping Convention

The Convention on the Prevention of Marine Pollution by Dumping Wastes and Other Matter – known as the 1972 London Dumping Convention – generally addresses the issue of marine waste.[76] It explicitly prohibits or limits the dumping of waste into the ocean, notably the "[p]ersistent plastics and other persistent synthetic materials, for example, netting and ropes, which may float or may remain in suspension in the sea in such a manner as to interfere materially with fishing, navigation or other legitimate uses of the sea."[77] The Convention states that contracting parties "undertake to develop procedures for the assessment of liability and the settlement of disputes regarding dumping."[78] To ensure compliance, the Convention establishes a review mechanism that differs depending on the states involved.[79] In 2007, the Convention also approved a Compliance Group which monitors the participating states to ensure the review mechanism is effective.[80]

However, the London Dumping Convention does not include provisions that solve technical, scientific, or financial obstacles needed to prevent sea dumping.[81] Its success hinges on states opting into the

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[72] UNCLOS, *supra* note 50, at arts. 91-92.
[73] *Id. See also Instruments*, *supra* note 18, at 897 ("Flags are especially important because ships travel in international waters, where it would be difficult to determine who is responsible and what rules would have to be followed.").
[74] *Instruments*, *supra* note 18, at 897 ("This behavior has relevant impacts on environmental protection, because it usually means lowering the environmental, safety, and labor standards.").
[75] UNCLOS, *supra* note 50, art. 313(2).
[76] Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, Dec. 29, 1972, 26 U.S.T. 2403, 1046 U.N.T.S. 120.
[77] *Id.* at Annex I, ¶ 4.
[78] *Id.* at art. X.
[79] 1996 Protocol to the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, 1972, art. 11-12, Mar. 24, 2006, S. EXEC. DEC. NO. 110-21 ("No later than two years after the entry into force of this Protocol, the Meeting of Contracting Parties shall establish those procedures and mechanisms necessary to assess and promote compliance with this Protocol.").
[80] *Instruments*, *supra* note 18, at 899.
[81] *Id.*

Convention, and it currently has eighty-seven contracting parties which is less than half of U.N. recognized countries.[82] Combined with UNCLOS's jurisdiction provisions, ships can still evade regulations outside of a participating state by flying a different flag. Given the new calculation of the proportion of fishing debris that constitutes marine waste, the Convention fails to address loopholes for fisheries and ships, lessening its effect on preventing plastic pollution.

iii. International Convention for the Prevention of Pollution from Ships

The International Convention for the Prevention of Pollution from Ships (MARPOL) prevents ships from polluting oceans.[83] Annex V specifically prohibits the "disposal into the sea of all plastics, including but not limited to synthetic ropes, synthetic fishing nets, and plastic garbage bags."[84] However, there is no mechanism to implement the prohibitions within MARPOL, and like UNCLOS and the London Dumping Convention, MARPOL only applies to countries that adopt the provisions.[85] This perpetuates the "flag of convenience" issue illustrated in UNCLOS,[86] making the terms optional in practice, especially for fisheries.

iv. The Global Programme of Action for the Protection of the Marine Environment from Land-Based Activities (GPA)

The Global Programme of Action for the Protection of the Marine Environment from Land-Based Activities (GPA) is the "only global intergovernmental mechanism directly addressing the connectivity between terrestrial, freshwater, coastal, and marine ecosystems."[87] The GPA focuses on land-based pollution, mainly marine litter, nutrient, and wastewater

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[82] *Ocean Dumping: International Treatise*, EPA, https://www.epa.gov/ocean-dumping/ocean-dumping-international-treaties (Nov. 15, 2021).

[83] *The International Convention for the Prevention of Pollution from Ships (MARPOL)*, AUSTRALIAN GOV'T, DEP'T OF INFRASTRUCTURE, TRANSP., REG'L DEV. AND COMMC'N, https://www.infrastructure.gov.au/maritime/environment/MARPOL.aspx (last visited Feb. 18, 2022).

[84] Australian Treaty Series 1990 No. 34, Annex V [Regulations for the Prevention of Pollution by Garbage from Ships] to the Protocol of 1978 relating to the International Convention for the Prevention of Pollution from Ships of 2 November 1973 [MARPOL Protocol], 1990 No. 34, Reg. 3, 1(a).

[85] *Instruments*, *supra* note 18, at 900.

[86] *Id.* at 900-901 ("this means that shipowners often choose to navigate under the flag that has lower regulatory standards or, in this case, is not a party to MARPOL.").

[87] *Why Does Addressing Land-based Pollution Matter?*, U.N. ENV'T PROGRAMME, https://www.unep.org/explore-topics/oceans-seas/what-we-do/addressing-land-based-pollution/why-does-addressing-land.

pollution, to implement sustainable action to prevent, reduce, control, and eliminate marine degradation from land-based activity.[88] The U.N. Environment Programme (UNEP) is the secretariat of the GPA, and it implements many soft-law programs such as Blue Economy, #CleanSeas, Planet Ocean, Beat the MicroBead, and others.[89]

While states agree that the GPA is an important initiative, it has struggled to gain sufficient state interest to implement its recommendations.[90] It also is non-binding to states, lacks funding and assistance for developing countries, and failed to noticeably improve the issues that the GPA intended to resolve.[91] However, the GPA does provide an important role in evaluating plastics and introducing the issue of plastic pollution at high political levels.[92]

v. FAO Code of Conduct for Responsible Fisheries

UNCLOS assigns fishery management to the Food and Agriculture Organization (FAO),[93] and the FAO created the Code of Conduct for Responsible Fisheries (The Code).[94] The Code attempts to regulate the fisheries on the High Seas by providing principles and standards for the conservation, management, and development of all fisheries.[95] It does not generally discuss plastic pollution, but it does provide for a management objective to reduce the amount of "pollution, waste, discard, catch by lost or abandoned gear, catch of non-target species, both fish and non-fish species, and impacts on associated or dependent species."[96] A 2013 study found The Code positively impacted states that adopted it; they saw a decrease in the loss in production index and an increase in the sustainability of their fisheries.[97]

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[88] *Id.*

[89] *Enabling Sustainable, Resilient and Inclusive Blue Economies*, UNITED NATIONS ENV'T PROGRAMME, https://www.unep.org/explore-topics/oceans-seas/what-we-do/enabling-sustainable-resilient-and-inclusive-blue-economies.

[90] *Instruments*, *supra* note 18, at 914.

[91] *Id.*

[92] *Id.* at 915; *see also* United Nations Environment Programme (UNEP), Inputs to the Secretary-General's Report on Marine Debris, Plastics and Microplastics 3, https://www.un.org/depts/los/general_assembly/contributions_2016/UNEP_Contribution_to_ICP_on_marine_debris.pdf ("the overall natural capital cost of plastics use in the consumer goods sector each year is US$75 billion—calculated as the negative financial impact of issues such as pollution of the marine environment or air pollution caused by incinerating plastics.").

[93] UNCLOS, *supra* note 50, art. 56.

[94] FOOD AND AGRIC. ORG. OF THE U.N, CODE OF CONDUCT FOR RESPONSIBLE FISHERIES v (1995) [hereinafter CODE].

[95] *Id.* at art. 1.2.

[96] *Id.* at art. 7.2.2 (g).

[97] *Instruments*, *supra* note 18, at 917.

However, The Code is completely voluntary, and it exemplifies the problem of the "flag of convenience."[98] There are also concerns regarding The Code's general efficiency, specifically combating illegal, unreported, and unregulated fishing.[99] There is no administrative coordination between participating states written into The Code, and there is a lack of political will and stamina for participating states.[100]

vi. Sustainable Development Goals

In 2000, the U.N. adopted the U.N. Millennium Declaration, a global partnership designed to reduce poverty by 2015 through eight goals .[101] Based on the success of the Millennium Declaration, after 2015 the U.N. pushed for the adoption of seventeen Sustainable Development Goals.[102] These goals aimed to eradicat poverty and deprivation, grow economies, protecting the environment, advance peace, and promote good governance.[103] Each SDG introduced specific targets with indicators that evaluate the progress on each goal.[104] The goals that most closely relate to plastic pollution of the oceans are Goals 6, 12, and 14.

Goal 6 is to ensure available and sustainable "management of water and sanitation for all."[105] This goal relates mostly to drinking water, but it also relates to the oceans because pollution in rivers flows into the ocean.[106] Target 6.3 hopes to improve "water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials."[107] The U.N. measures this target by looking at the proportion of wastewater safely treated to unsafely treated and the proportion of water with good ambient water quality to poor ambient water quality in a given area.[108] According to the Progress and Info Section, billions of people still lack access

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[98] CODE, *supra* note 94, at art. 1.1.
[99] *Instruments*, *supra* note 18, at 917.
[100] *Id.*
[101] G.A. Res. 55/2, (Sept. 18, 2000). *See also, Instruments*, *supra* note 18, at 918 ("Those eight goals are: '(i) eradicate extreme poverty and hunger; (ii) achieve universal primary education; (iii) promote gender equality and empower women; (iv) reduce child mortality; (v) improve maternal health; (vi) combat HIV/AIDS, malaria and other diseases; (vii) ensure environmental sustainability; and (viii) develop a global partnership for development.'").
[102] *Sustainable Development Goals (SDGs)*, JEFFREY SACHS CTR. ON SUSTAINABLE DEV., http://jeffreysachs.center/sdg.
[103] *Id.*
[104] *Sustainable Development Goals*, U.N SUSTAINABLE DEV. GOALS KNOWLEDGE PLATFORM, https://sustainabledevelopment.un.org/?menu=1300 (last visited Apr. 4, 2022).
[105] *Sustainable Development Goals 6*, U.N SUSTAINABLE DEV. GOALS KNOWLEDGE PLATFORM, https://sdgs.un.org/goals/goal6 (last visited Apr. 4, 2022).
[106] *Id.*
[107] *Id.*
[108] *Id.*

to safely managed water and sanitation services at home, and while the funding for this goal increased by 6% in 2018, the funding decreased by 9% the following year.[109] Countries noted a 61% funding gap between what is needed to achieve national drinking water and sanitation targets and available funding.[110]

Goal 12 ensures "sustainable consumption and production patterns."[111] Target 12.5 aims to "substantially reduce waste generation through prevention, reduction, recycling and reuse" by 2030, and Target 12 measures success by the national recycling rates and tons of material recycled.[112] If countries prevented more plastic from entering into the market through reducing, recycling, or reusing plastics, then less plastic would pollute our oceans every year.

Goal 12 continues to work towards reducing plastic waste through Target 12.6, which "[e]ncourage[s] companies, especially large and transnational companies, to adopt sustainable practices and to integrate sustainability information into their reporting cycle."[113] This goal measures success through the number of companies publishing sustainability reports.[114] The hope is that publishing these reports will force companies to become more sustainable, and increase the number of large companies that go green.[115]

Target 12.8 focuses on ensuring that "people everywhere have the relevant information and awareness for sustainable development and lifestyle harmony with nature."[116] The U.N. measures the success of this Target to the "[e]xtent to which (i) global citizenship education and (ii) education for sustainable development (including climate change education) are mainstreamed in (a) national education policies; (b) curricula; (c) teacher education; and (d) student assessment."[117]

Even with Goal 12 outlined and with many corporations taking positive steps toward a sustainable future reducing plastic use and reusing their plastics, the global domestic material consumption per capita rose by 7% from 2010 to 2017, "with increases in all regions except Northern American and Africa. However, domestic material consumption per capita in Europe

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[109] *Id.*
[110] *Id.*
[111] *Sustainable Development Goals 12*, U.N. SUSTAINABLE DEV. GOALS KNOWLEDGE PLATFORM, https://sdgs.un.org/goals/goal12 (last visited Apr. 4, 2022).
[112] *Id.*
[113] *Id.*
[114] *Id.*
[115] Rinkesh Kukreja, *17 Top Companies that are Going Green in 2020*, CONSERVE ENERGY FUTURE, https://www.conserve-energy-future.com/top-companies-that-are-going-green.php (last visited Apr. 4, 2022).
[116] *Sustainable Development Goals 12*, *supra* note 111.
[117] *Id.*

and Northern America is still forty percent higher than the global average."[118] [119]

Goal 12 achieved some success. 79 countries and the European Union "reported on at least one national policy instrument that contributed to sustainable consumption and production in their efforts towards the implementation of the 10-year Framework of Programmes on Sustainable Consumption and Production Patterns."[120] Also, the Montreal Protocol on Substances that Deplete the Ozone Layer was ratified by 198 states, and the Protocol projects "to return to 1980 values in the 2030s for norther hemisphere mid-latitude ozone."[121]

Goal 14 addresses the need to "conserve and sustainably use the oceans, seas and marine resources for sustainable development."[122] While the whole goal relates to plastic pollution of the oceans, only Targets 14.1, 14.4, 14.6, 14.B, and 14.C impact the amount of plastics pollution in the ocean.[123]

Target 14.1 attempts to "prevent and significantly reduce marine pollution of all kinds, in particular from land-based activities, including marine debris and nutrient pollution" by 2025.[124] The UN measures the success of this Target through the Index of Coastal Eutrophication and floating plastic debris density.[125] Target 14.1 helps reduce the amount of microplastics in the ocean because it focuses on land-based activity, and because eight million tons of plastic end up in the ocean from land based activity each year.[126] Target 14.A shows the need for more accurate data and information regarding plastic by increasing "scientific knowledge, develop[ing] research capacity and transfer[ring] marine technology."[127] By combining Targets 14.1 and 14.A, the U.N. allows for a more comprehensive view of the types of plastic in the ocean, where plastics come from, and how to stop plastic waste.

The goal of Target 14.4 is to "effectively regulate harvesting and end overfishing, illegal, unreported and unregulated fishing and destructive fishing practices and implement science-based management plans" by 2020.[128] Its success is measured by examining the proportion of fish stocks

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[118] *Id.*
[119] *Id.*
[120] *Id.*
[121] *Id.*
[122] *Sustainable Development Goals 14*, U.N. SUSTAINABLE DEV. GOALS KNOWLEDGE PLATFORM, https://sdgs.un.org/goals/goal14 (last visited Apr. 4, 2022).
[123] *Id.*
[124] *Id.*
[125] *Id.* (defining the Index of Coastal Eutrophication and floating plastic debris density as the comparison of nutrients in the coast to plastic in the coast as measured through particles/Km2).
[126] Ritchie & Roser, *supra* note 21.
[127] *Sustainable Development Goals 14*, *supra* note 122.
[128] *Id.*

within biologically sustainable levels.[129] This Target addresses illegal and unregulated fishing, and while it does not discuss plastic or marine debris from fisheries, abandoned fishing nets account for forty-six percent of the total tonnage of marine debris.[130] Therefore, the Target of ending illegal, unreported, and unregulated fishing will effectively reduce the amount of plastic in the ocean, but the indicator is not an effective measure of success because it does not take into account unregulated fishing.

Similarly, Target 14.6 attempts to "prohibit certain forms of fishery subsidies which contribute to overcapacity and overfishing, eliminate subsidies that contribute to illegal, unreported and unregulated fishing and refrain from introducing new such subsidies" by 2020.[131] This Target was measured by the "progress by countries in the degree of implementation of international instruments aiming to combat illegal, unreported and unregulated fishing."[132] This Target similarly addresses the plastic marine debris as Target 14.4 because "ghost gear" constitutes a large portion of the plastic marine debris.[133]

Target 14.B intends to "provide access for small-scale artisanal fishers to marine resources and markets."[134] The target measures success by the "[p]rogress by countries in the degree of application of a legal/regulatory/policy/institutional framework which recognizes and protects access rights for small-scale fisheries."[135] Small-scale fisheries provide a "critical source of employment, livelihood, food and nutrition for millions of coastal families and communities."[136] Small-scale fishermen utilize different fishing strategies than their larger counterparts because they operate on a limited radius from the home harbors, alternate zones so as not to deplete the local stock of fish, and use selective fishing gear to target various seasonal species.[137] This helps to rebuild the fishing resources, and small-scale fisheries have more incentive to keep their equipment because they are directly responsible for the cost of the equipment.[138]

Lastly, Target 14.C looks to "[e]nhance the conservation and sustainable use of oceans and their resources by implementing international

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[129] *Id.*
[130] Gould, *supra* note 38.
[131] *Sustainable Development Goals 14*, *supra* note 122.
[132] *Id.*
[133] Gould, *supra* note 38.
[134] *Sustainable Development Goals 14*, *supra* note 122.
[135] *Id.*
[136] *Sustainable Small-Scale Fisheries*, FOOD AND AGRIC. ORG. OF THE U.N., http://www.fao.org/policy-support/policy-themes/sustainable-small-scale-fisheries/en/#:~:text=Capture%20fisheries%20support%20the%20livelihoods,fish%20workers%20and%20their%20communities (last visited Apr. 4, 2022).
[137] *Sustainable Small Scale Fisheries*, MEDPAN, http://medpan.org/marine-protected-areas/themes-2/sustainable-fishing/ (last visited Apr. 4, 2022).
[138] *Id.*

law as reflected in UNCLOS, which provides the legal framework for the conservation and sustainable use of oceans and their resources."[139] The U.N. analyzes the "[n]umber of countries making progress in ratifying, accepting and implementing through legal, policy and institutional frameworks, ocean-related instruments that implement international law, as reflected in the United Nation Convention on the Law of the Sea, for the conservation and sustainable use of the oceans and their resources."[140] Even though there is no fixed way to measure Target 14.C's implementation, the hope of strengthening UNCLOS illustrates the effectiveness of international instruments in regulating the high seas because it illustrates the UN's belief in the effectiveness of these instruments.[141]

Goal 14 achieved mixed success since its implementation in 2015.[142] The sustainability of global fishery resources continues to decline, though at a reduced rate.[143] Also, 66 parties joined the Agreement on Port State Measures to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing, and almost 70% of the countries scored high on the implementation of the Agreement.[144] However, the current efforts to protect key marine environments and small-scale fisheries and to invest in ocean science are not meeting the U.N.'s Goals.[145] The main hurdle is that the implemented indicators do not measure the plastic pollution in the ocean directly, and they do not measure the "ghost gear" abandoned by fisheries. Also, the Sustainable Development Goals are non-binding upon UN Member States, and there are mixed results on meeting the Goals.[146] However, there is positive movement based on these Goals, specifically with many large companies implementing green initiatives.[147]

E. The Tragedy of the Commons

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[139] *Sustainable Development Goals 14*, *supra* note 122.
[140] *Id.*
[141] *Instruments*, *supra* note 18, at 921.
[142] *Sustainable Development Goals 14*, *supra* note 122.
[143] *Id.* ("The sustainability of global fishery resources continues to decline . . . with the proportion of fish stocks within biologically sustainable levels at 65.8 per cent in 2017, down from 90 per cent in 1974 and 0.8 percentage point lower than 2015 levels.").
[144] *Id.* (defining the Agreement on Port State Measures to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing as "the first binding international agreement that specifically targets illegal, unreported and unregulated fishing.").
[145] *Id.*
[146] *Id.*
[147] *See e.g., Environmental Sustainability,* DISNEY, https://impact.disney.com/environment/environmental-sustainability/ (last visited Apr. 4, 2022); *UN Sustainable Development Goals Index*, FORD, https://corporate.ford.com/microsites/integrated-sustainability-and-financial-report-2021/files/ir21-unsdg.pdf (last visited Apr. 4, 2022).

The Great Pacific Garbage Patch presents a tragedy of the commons.[148] The tragedy of the commons emerges from an absence of property rights and open access to resources. No defined property rights incentivizes individuals acting independently to maximize their value gained and deplete the resource before another party does.[149] The tragedy of the commons reappears in the context of pollution by reversing the analysis.[150] Under the presumption that people act as independent, rational free-enterprisers, "[t]he rational man finds that his share of the cost of the wastes he discharges into the commons is less than the cost of purifying his wastes before releasing them. Since this is true for everyone, we are locked into a system of 'fouling our own nest.'"[151]

The creation of property rights over the open access to resources diverts the tragedy of the commons.[152] Unlike land which invites the creation of property rights because of the surety of ownership or the concept of first

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[148] *Instruments*, *supra* note 18, at 937.

[149] Garrett Hardin illustrates the tragedy of the commons as follows:

> The tragedy of the commons develops in this way. Picture a pasture open to all. It is to be expected that each herdsman will try to keep as many cattle as possible on the commons. . . . As a rational being, each herdsman seeks to maximize his gain. Explicitly or implicitly, more or less consciously, he asks, "What is the utility to me of adding one more animal to my herd?" This utility has one negative and one positive component. 1) The positive component is a function of the increment of one animal. Since the herdsman receives all the proceeds from the sale of the additional animal, the positive utility is nearly +1. 2) The negative component is a function of the additional overgrazing created by one more animal. Since, however, the effects of overgrazing are shared by all the herdsmen, the negative utility for any particular decision making herdsman is only a fraction of -1. Adding together the component partial utilities, the rational herdsman concludes that the only sensible course for him to pursue is to add another animal to his herd. And another; and another . . . . But this is the conclusion reached by each and every rational herdsman sharing a commons. Therein is the tragedy. Each man is locked into a system that compels him to increase his herd without limit--in a world that is limited. Ruin is the destination toward which all men rush, each pursuing his own best interest in a society that believes in the freedom of the commons. Freedom in a commons brings ruin to all.

Garrett Hardin, *The Tragedy of the Commons*, 162 Science 1243, 1244 (Dec. 1968).

[150] *Id.* at 1245 ("Here it is not a question of taking something out of the commons, but of putting something in.").

[151] *Id.*

[152] *Id.*

mover advantage,[153] ocean water is not easily fenced or controlled.[154] Therefore, the tragedy of the commons created by pollution requires different preventative measures.[155]

Applying the tragedy of the commons to the Great Pacific Garbage Patch illustrates the need for an international law, regime, or device that makes the dumping of single use plastics and fishing gear into the ocean more expensive than properly managing the plastic waste.[156] The plastic pollution in the GPGP is a negative externality.[157] An externality is a "situation[] where the activities of one (or more than one) economic agent(s) have consequences on the economic well-being of other agents, without any kind of exchange or transaction occurring between them."[158] Fisheries and plastic packaging producers dumping the marine debris into the GPGP creates a negative externality with no proper sanctions in place, making the interaction inefficient.[159]

To analyze the negative externality of the GPGP, the traditional starting point is applying the Coase Theorem.[160] Assuming that the parties participating in the transaction are rational actors, the Coase Theorem states that what appears as a conflict between parties is really the independent interests of the two parties coming into conflict, and the parties will generally bargain to achieve an efficient result.[161] To achieve an efficient result, a property right should be given to the party that experiences higher damages to balance the parties interests.[162]

The issue of applying the Coase Theorem to the GPGP is that there is no single party that the fisheries and packaging producers could bargain with to achieve an efficient transaction.[163] As previously noted, a large amount of harm stems from the plastic in the ocean and impacts marine health and human

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[153] *Instruments*, *supra* note 18, at 937 ("[P]rivate ownership is simply established by the person who takes first access. The first mover advantage will in practice lead to a race whereby all try to harvest as much as possible, and as quickly as possible, from the resource in order to prevent others from getting there first.").
[154] Hardin, *supra* note 149, at 1245.
[155] *Id.*
[156] *Id. See also Instruments*, *supra* note 18, at 937.
[157] *Instruments*, *supra* note 18, at 937.
[158] Laura Centemeri, *Environmental Damage as Negative Externality: Uncertainty, Moral Complexity and the Limits of the Market*, 05 AS FUNDAÇÕES INSTITUCIONAIS DA ECONOMIA 21 (2005) (qualifying a negative externality as the actions of agents that have indirect consequences that decrease well-being.).
[159] *Id.* at 23.
[160] *Instruments*, *supra* note 18, at 938.
[161] *See generally* Ronald H. Coase, *The Problem of Social Cost*, 3 J. OF L. & ECON. 1 (1960).
[162] *Id.*
[163] Sandrine Maljean-Dubois & Benoit Mayer, *Liability and Compensation for Marine Plastic Pollution: Conceptual Issues and Possible Ways Forward*, 114 AJIL UNBOUND 206, 208 (2008) ("it is also far from obvious who should receive compensation for marine plastic pollution.").

health.[164] Marine life is not a party that can bargain for itself, and the ecological damage does not easily amount to a specific direct harm because the harm is global and diffuse.[165] Because the harm incurred by plastic marine debris is experienced on a global scale, the transaction costs[166] that the fisheries and packaging producers must incur to bargain with all possibly injured parties create an insufficient transaction.[167] With no clearly identifiable victims to bargain with the polluters and the corporations that pollute the oceans, the Coase Theorem fails to find a solution.[168]

F. Policy Approaches to Overcome The Tragedy of the Commons

States have long recognized the need to develop national and international laws to attach liability and provide compensation for the environmental harm to the marine environment.[169] The possible range of policy approaches to create liability for environmental harms to marine life and overcome the tragedy of the commons are the Five P's: prescriptive regulation, property rights, penalties, payments, and persuasion.[170]

G. Prescriptive Regulation

Prescriptive regulation is a common way to internalize externalities by mandating certain party behavior.[171] Prescriptive regulation efficiently mandates uniform compliance, and it is a common practice at all levels of environmental governance.[172] A notable example is the U.S. Clean Water Act's requirements for controlling discharges of water pollutants from

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[164] *Id.* ("the impact of marine plastic pollution appears far more diffuse, affecting coastal states but also landlocked ones where people rely upon the ocean as a food source.").
[165] *Id.*
[166] Transaction costs are defined as "the costs of identifying potential trading partners, negotiating contracts, monitoring for compliance and so forth." Timothy B. Lee, *The Coase Theorem is Widely Cited in Economics. Ronald Coase Hated It.,* THE WASH. POST (Sept. 4, 2013).
[167] *Instruments*, *supra* note 18, at 938 (concluding that the Great Pacific Garbage Patch "is also increasing. This indicates that the transaction costs are apparently not low enough to allow bargaining. This is natural in an international scenario, with so many countries, organizations, and other actors, which may inhibit efficient bargaining.").
[168] *Id.* at 939.
[169] Maljean-Dubois & Mayer, *supra* note 163.
[170] James Salzman, *Teaching Policy Instrument Choice in Environmental Law: The Five P's*, 23 DUKE ENV'T L. & POL'Y F. 363-376 (2013).
[171] *Id.* at 364.
[172] *Id.* at 365 (concluding that prescriptive regulation "prevent[s] problems of hold-outs, free riders, and collective action. If implemented across a broad geographic area, it can also prevent a 'race to the bottom,' in which regulated parties seek jurisdictions with less stringent requirements.").

buildings and facilities on waterways.[173] Prescriptive regulations can increase efficiency and productivity, resulting in process and design innovations that help a company become more competitive.[174] This theory is also based on the assumptions that regulators will set the correct regulation standard and can monitor compliance.[175]

While prescriptive regulation is common, it is often criticized for being "inefficient and unwieldy."[176] Critics often argue that it does not incentivize companies to find more efficient solutions to waste output once the regulated party satisfies the law.[177]

H. Property Rights

Creating property rights by privatizing the resource allows the owner to exclude others from using the property.[178] By privatizing the resource, the owner is now incentivized to use the resource in a more sustainable way, so it remains productive long into the future.[179] This approach has lower administrative costs when compared to prescriptive regulation because the government creates the property rights and initially allocates them, and then steps back and unleashes rational actors' self-interest to protect the environment.[180] But this method too, is imperfect.

Critics of "Free Market Environmentalism" note that many environmental resources are difficult to commodify.[181] Also, private-property owners typically only value monetarily lucrative property uses, so privatization might not lead to the most environmentally or socially beneficial land use.[182] To ensure that the land furthers an important public goals, the government may need to intervene and restrict the use of land, which would require the government to compensate the property owner for the loss of

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[173] 33 U.S.C. § 1316.
[174] Salzman, *supra* note 170, at 365.
[175] *Id.*
[176] *Id.*
[177] *Id.* ("'So long as the regulations require use of Filter X, we've bought Filter X, and it's working properly,' a plant manager might reason, 'there's no need to go further.'").
[178] *Id.* at 366.
[179] *Id.* ("In financial terms, to maximize profits you will safeguard your asset over the longer term. The same should be true whether the property rights are vested in individuals or in communities.").
[180] Salzman, *supra* note 170 at 367.
[181] *Id.* at 368.
[182] *Id.*

property value.[183] Privatization also introduces the issue of how to properly distribute the property in the first place.[184]

i. Tradable Permits

Prescriptive regulations can combine with property rights through using tradable permits in environmental markets.[185] The property rights are created for using the resource, and trading these permits makes prescriptive regulations more efficient.[186] These are specifically useful in the pollution realm because it internalizes the externalities of pollution by charging for the act of polluting.[187] However, the government must implement a smoothly functioning market in place for trade permits to work, and it allows for less government control over where the harmful activity will be concentrated.[188]

I. Financial Penalties

By implementing financial penalties for polluting and waste activities, the polluter is now forced to bear the cost of their activities.[189] This theoretically incentivizes the actor to regulate their own behavior according to the value of the polluting activities.[190] Financial penalties, like carbon taxes, also offer some flexibility depending on the government's goal in the penalty.[191] Financial penalties include charges, taxes, or civil liabilities.[192]

Unfortunately, the success of financial penalties lies on correctly evaluating the negative externalities and applying this evaluation to the action of each party.[193] Because there is no market for clean ocean water, the value of preventing plastic from entering the ocean can only be estimated. Financial

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[183] *Id.*

[184] *Id.* ("Any allocation mechanism will tend to favor some groups at the expense of others. Inevitably, who should be favored comes down to a contentious political decision, with winners and losers.").

[185] *Id.* at 369.

[186] Salzman, *supra* note 170 ("The government decides how much of a harmful activity to permit, . . . awards private rights to engage in the activity up to the regulatory cap, and then permits those rights to be traded.").

[187] *Id.*

[188] *Id.* at 370.

[189] *Id.*

[190] *Id.* at 370-371.

[191] Salzman, *supra* note 170, at 371 (noting that the penalty can be applied to different and specific activities and shifted up or down depending upon the desired level of polluting activity).

[192] *Id.* at 370.

[193] *Id.* at 371 ("Markets are efficient when the prices for goods accurately reflect their full environmental and social cost. A key aspect in internalizing externalities, then, is valuation.").

punishments are also difficult to pass politically, especially because modification of behavior requires higher charges.[194]

i. Liability Rules

Liability rules protect the destruction of initial entitlement of the property if a buyer is willing to pay an objectively determined value for that entitlement.[195] Whenever a conflicting interest presents between two or more parties, the state must decide which party to favor over the other, and this decision is protected by liability rules.[196] However, in the international context, liability rules are usually not effective or efficient because the law of international responsibility for environmental harm is a "complicated mix of customary law, sparse precedents from arbitral or judicial panels, liability provisions in international agreements, and domestic law."[197] A liability regime also requires definitions of what specific action to punish, who to hold liable, and the injured party that should receive payment.[198]

ii. Taxation

If transaction costs remain too high to prohibit bargaining between parties, a tax can correct a negative externality by charging the wrongdoer.[199] Taxation is revenue-generating and incentivizes specific actions depending on the tax.[200] A similar issue arises in the creation of liability regulation – how does one accurately identify the party responsible for the harm?[201] There is no international authority "with competence to establish a tax" over corporations or states in an international setting.[202]

J. Payment and subsidies

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[194] *Id.*
[195] Guido Calabresi & A. Douglas Melamed, *Property Rules, Liability Rules, and Inalienability: One view of the* Cathedral, 85 HARV. L. REV. 1089, 1091-1092 (1972) ("[I]t is because the state has granted the injurer an entitlement to be free from liability and will intervene to prevent the victim's friends, if they are stronger, from taking compensation from the injurer.").
[196] *Id.*
[197] *Instruments*, *supra* note 18, at 456.
[198] Maljean-Dubois & Mayer, *supra* note 169, at 207-208.
[199] *Instruments*, *supra* note 18, at 939.
[200] *Id.* ("In addition, such a solution would be consistent with the polluter-pays principle.").
[201] *Id.* at 940.
[202] *Id.*

Governments can use payments to incentivize more sustainable activities.[203] Payments and subsidies are similar to providing tax benefits for installing solar panels or the government buying high-polluting cars to get them off of the road.[204] However, many current subsidies implemented by the United States actually encourage environmental harm, making them expensive because the taxpayer must pay for them twice.[205] However, there are successful examples of a state-run subsidy through the Montreal Protocol Multilateral Fund.[206]

K. The Information Approach

Information illustrates a softer approach to influencing change through creating laws that require information dissemination and production to the public.[207] The theory behind the information approach centers on the idea that the "government can change people's behavior by forcing them to think about the harm they are causing and by publicizing that harm."[208] Information also presents through educational pamphlets or presentations on how to best manage the commons given to individual, state, or corporate actors.[209] Additionally, governments can use persuasion instruments to incentivize energy efficiency such as specific marketing or investment opportunities.[210]

Information is used when there is little political support for a regulatory scheme, or if current regulatory schemes are incompatible with the problem.[211] While Information is a relatively new answer to an environmental tragedy of the commons, it is effective without the threat of penalties or fines.[212]

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[203] Salzman, *supra* note 170, at 372 (Just as government can use penalties to capture negative externalities and make bad activities more expensive, it can use payments to capture positive externalities and make good activities less expensive.").

[204] *Id.*

[205] *Id.* ("perverse subsidies cost us twice - first, when we pay the initial tax to raise the funds needed for the subsidy and second, when we suffer the environmental damage encouraged by the subsidy.").

[206] *See generally, About the Multilateral Fund,* MULTILATERAL FUND FOR THE IMPLEMENTATION OF THE MONTREAL PROTOCOL, http://www.multilateralfund.org/aboutMLF/default.aspx (Last Visited Apr.4, 2022).

[207] Salzman, *supra* note 170, 373.

[208] *Id.*

[209] *Id.*

[210] *Id.* at 374 (providing examples such as "providing smiley-face encouragement on utility bills for better conservation than your neighbors.").

[211] *Id.* at 373.

[212] *Id.* ("The Toxic Release Inventory, for example, simply requires manufacturers who emit a number of substances to monitor, measure, and publicly report their annual emissions. Whether because of 'naming-and-shaming,' measuring emissions for the first

III. ANALYSIS

A. International Plastic Treaty

Addressing the plastic pollution crisis is beyond the ability of one country to handle, and it requires an international framework to coordinate action at a global level.[213] As previously discussed, other international legislation and agreements create basic pieces to prevent marine pollution, but there are gaps in global governance that require a more comprehensive agreement centered specifically on the issue of marine plastic litter.[214] The Environmental Investigation Agency advocated for developing a global plastic treaty at the fifth session of the United Nations Environment Assembly on February 22-26, 2021.[215] This agreement on plastic pollution must monitor and report the amount of plastic pollution and the reduction of plastic leakage into the environment by participating states.[216] It also needs to prevent plastic pollution from entering the environment through banning certain single-use plastic products, putting restrictions or a tax on new plastic production, monitoring the amount of ghost gear left by fisheries, or giving subsidies to companies for utilizing reusable or compostable products.[217] The new agreement should coordinate with existing international conventions and agreements to ensure smooth and continual implementation.[218] The provisions of the Agreement require a scientific basis and a socioeconomic assessment, which requires financial assistance to tackle the different aspects of the plastic problem.[219] The new Agreement needs technical and financial resources to

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time, or heightened consciousness, this persuasive instrument has led to significant reductions in emissions.").

[213] *Why do We Need an International Legally Binding Agreement on Plastic Pollution?*, ENV'T INVESTIGATION AGENCY, https://eia-international.org/ocean/plastic-pollution/legally-binding-agreement-on-plastic-pollution-faqs/ (Last visited Nov. 16, 2020).

[214] Karen Raubenheimer, et al., *Combating Marine Plastic Litter and Microplastics: An Assessment of the Effectiveness of Relevant International, Regional and Subregional Governance Strategies and Approaches*, U.N. ENV'T ASSEMBLY OF THE U.N. ENV'T PROGRAMME, U.N. DOC UNEP/EA.3/INF/5 (2017).

[215] *A Legally Binding Agreement on Plastic Pollution – FAQs*, ENV'T INVESTIGATION AGENCY, (Last visited Apr 4, 2022).

[216] *What Should a New Legally Binding Agreement on Marine Plastic Pollution Address?,* ENV'T INVESTIGATION AGENCY (Last visited Nov. 16, 2020) https://eia-international.org/ocean/plastic-pollution/legally-binding-agreement-on-plastic-pollution-faqs/.

[217] *Id.*; *See generally supra* POLICY APPROACHES TO OVERCOME THE TRAGEDY OF THE COMMONS.

[218] *What Should a New Legally Binding Agreement on Marine Plastic Pollution Address?, supra* note 216.

[219] *Id.*

support decision-making and assist developing countries in meeting the monitoring and reporting requirement of the Agreement.[220]

To best address plastic pollution in the oceans, the Agreement needs to efficiently prevent plastic from entering the oceans in the first place.[221] The largest amount of plastic pollution in the ocean comes from microplastics and fishing gear,[222] and the best way to prevent plastic from entering the oceans is to stop these two major pollutants. Much of the hard and soft international law discussed previously addresses the issue of sustainable fishing – specifically UNCLOS and Goal 14.[223] However, none of the existing international governance strategies and approaches specifically address the issue of abandoned fishing gear, and there is no specific regulatory regime that establishes an amount of ghost-gear that fisheries can abandon. It is important to note that the United Nations Environment Assembly recently passed a resolution to negotiate an international plastics treaty by 2024, and the end of this section will discuss the basic roadmap of the potential treaty, the implications, and possible issues that could arise during negotiation.

Microplastics are also not specifically addressed in existing international law, and non-profits or private companies, rather than states, accomplish most of the work in this area.[224] Some soft and hard law instruments address marine pollution, such as the 1972 London Dumping Convention, but these legal instruments failed to enact preventative measures to incite participating states to create a legal framework that prevents plastics from entering the ocean.

i. International Plastic Treaty

To best address the tragedy of the commons issue of the plastic in the ocean, this Note proposes making a treaty that creates a subsidy and taxation regime to incentivize corporations and fisheries to engage in sustainable practices called the International Plastic Treaty. The Treaty should incentivize corporations to recycle existing plastics and switch to more reusable materials such as aluminum and glass; the regime should punish the creation of new single use plastic through taxes. Corporations can forgo this tax by creating easily recyclable materials like aluminum and glass or by properly disposing plastics at recycling plants.[225] The Treaty should also encourage sustainable

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[220] *Id.*
[221] *Id.*
[222] Parker, *supra* note 5 ("The study also found that fishing nets account for 46 percent of the trash, with the majority of the rest composed of other fishing industry gear, including ropes, oyster spacers, eel traps, crates, and baskets.").
[223] *See generally* AVAILABLE INSTRUMENTS TO RESTRICT POLLUTION, *supra* note 45.
[224] *See generally,* THE OCEAN CLEANUP, https://theoceancleanup.com/ (last visited Apr. 4, 2022).
[225] Ritchie & Roser, *supra* note 22 (stating that only six per cent of plastic is recycled).

practices by requiring corporations to publish their plastic use and appoint a sustainability chair on the board of directors.

This separate international taxing regime should outline states' regulation of companies regarding sustainability. It is not the purpose of the international treaty to hinder corporations' ability to compete on the international level, but it instead creates a demand for recycled products. By making recycled plastic an economic commodity, the treaty is creating a property right over the plastic to make it a desired commodity rather than just discarded trash.

An International Plastic Treaty allows for more specific and obligatory prescriptive regulations for states to follow to overcome this global tragedy of the commons. Still, it is important to note the difficulty in ratifying international treaties. A way to overcome this is to add the portions of the International Plastic Treaty into the Paris Climate Agreement.[226] The Paris Climate Agreement does not mention plastic, instead it focuses on regulating greenhouse gas emissions, setting emission goals for participating states.[227] If the Paris Climate Agreement adds a portion regarding the regulation of plastics, it would bind all current parties to the Agreement.[228] However, this also makes it difficult to amend because every party must agree to the changes.[229] This also only addresses part of the issue with the plastic marine waste in the ocean because it does not include waste from fisheries nor does it address the plastic already in the ocean.[230]

ii. Amending UNCLOS

Because UNCLOS already attempts to regulate fisheries, there does not need to be an additional regime; the international community should amend UNCLOS to discourage fisheries from using plastic nets and other plastic fishing materials by taxing fisheries that fish with these materials. Fisheries can forgo this tax by relying on small, local fishermen where they wish to fish. Using local and smaller fishing fleets creates more sustainable fisheries,[231] and it also creates jobs in the participating states. The fisheries can also fish with nets that contain more natural fibers and biodegradable

[226] The Paris Agreement Regarding the United Nations Framework Convention on Climate Change, Apr. 22, 2016, T.I.A.S. No. 16-1104 (adopted Dec. 12, 2015). While some people may believe that the Paris Agreement has no teeth, the binding mechanisms of disclosure and implementation through a "bottoms-up" approach create a binding affect. *See generally*, Lavanya Rajamani & Jutta Brunnée, *The Legality of Downgrading Nationally Determined Contributions Under the Paris Agreement: Lessons From the US Disengagement*, J. Envt'l L. 29 (2017).
[227] *Id.* at art. 4(1).
[228] *Id.* at art. 22.
[229] *Id.*
[230] This is known as *ex post* and is not the main focus of this article.
[231] *Sustainable Small Scale Fisheries, supra* note 137.

equipment.[232] Because there are many international structures already implemented that attempt to regulate fishing on the high seas, it is unnecessary to add an additional jurisdictional element. However, UNCLOS failed in regulating illegal fishing or creating a regime to see how much debris these fisheries emit.

In the ideal situation, the international community would enact an enforcement regime like the International Criminal Court to ensure that illegal fishing does not occur.[233] However, developing a new enforcement regime would incur significant expenses for the international community, and it is probably a waste of resources for most states, especially landlocked states. To combat this, UNCLOS could extend to cover regulation of fishing markets to try and stop the demand for fish from these illegal fisheries. This would require a hefty, well-funded regime to regulate all fisheries in participating states. However, this would place the liability onto the fishing markets to try and regulate which fisheries sell fish to the fish market, and these fish markets are theoretically the best bearers of liability because they have the largest amount of control on how to access and sell fish.

iii. The UN Commitment to Negotiating a Plastics Treaty

At the time this article was written in 2021, a plastics treaty did not appear to be on the U.N.'s radar. However, the United Nations Environment Assembly (UNEA) confirmed the adoption of a legally-binding mandate towards a global treaty to address the full lifecycle of plastics from creation to disposal.[234] The resolution, titled "End Plastic Pollution: Towards a Legally Binding Instrument," secured the backing of all nations, and it will trigger negotiations with a view of finalizing the treaty by 2024.[235] The treaty will focus on land and water leaks, pollution that stems from virgin plastic production, and the use of the plastic products.[236] It is important to note that Rwanda and Peru, two countries from the global south, co-authored the resolution.[237]

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[232] *Eco-Friendly Fishing Gear*, SPORT FISH RESTORATION, https://www.takemefishing.org/how-to-fish/fishing-gear-and-tackle/sustainable-fishing-gear/ (Last visited Apr. 4, 2022).

[233] INT'L CRIM. CT., https://www.icc-cpi.int/ (last visited Apr. 4, 2022).

[234] *Success as UN Meeting Makes an Historic Commitment to Negotiate a Plastics Pollution Treaty!*, EIA ENVIRONMENTAL INVESTIGATION AGENCY, https://eia-international.org/news/success-as-un-meeting-makes-an-historic-commitment-to-negotiate-a-plastics-pollution-treaty/ (Mar. 2, 2022).

[235] *Id.*

[236] *Id.* It is important to note that this treaty, based solely on the resolution, will focus on the full lifecycle of plastics, not just on the disposal.

[237] *Id.*

While hopes are high based on this Resolution, countries are now entering into the difficult negotiation phase.[238] About 19 days after countries signed the Resolution, the roadmap illustrated that the treaty will most likely take a similar "bottom-up" approach to plastic regulation, meaning that states will be able to place targets for plastics through voluntary initiatives.[239] However, the roadmap illustrates a plan to create binding rules regarding a cap on the production of plastics, targets to increase waste collection and recycling, and the phasing out of single-use and virgin plastic use.[240] However, the roadmap is quiet regarding enforcement mechanisms. The U.N. has roughly two years left to iron out all of the details, and really only time will tell in what direction they decide to go in.

IV. CONCLUSION

The Great Pacific Garbage Patch is a symptom of a larger human problem, one that stretches from the sky to the depths of the ocean. Plastic reigns supreme in waste pollution, and if that waste is not disposed correctly, statistically that waste will likely end up in the oceans. This Note presents a thorough discussion of what experts know about the marine debris problem, already implemented international regimes that attempt to regulate the plastic in the ocean, and possible new solutions to the plastic marine debris problem. This issue is significant because microplastics present a problem not only for the ocean's ecosystem, but also for human health.

While current international attempts to address these issues have failed, the international community must implement an international plastic treaty to fill gaps in regulating the amount of plastic that not only ends up in the ocean, but into the general consumer market. If corporations and fisheries continue to produce plastic products and trash without transitioning to reusable materials, responsibility to clean up private plastic output will fall onto the states. Until either group of parties steps up to the environmental plate, the Great Pacific Garbage Patch will continue to grow until there is more plastic in the ocean than there are fish.

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[238] *Id.*

[239] *Update on Roadmap for a New Global Plastics Treaty*, GIBSON DUNN at 4, Mar. 21, 2022 https://www.gibsondunn.com/wp-content/uploads/2022/03/update-on-un-roadmap-for-a-new-global-plastics-treaty.pdf

[240] *Id.*