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The Legal Man in the Moon: Exploring Environmental Personhood for Celestial Bodies

William B. Altabef*

Abstract

The rise of the commercial space industry endangers the preservation of environments, such as the lunar surface and other celestial bodies, with the threat of contamination and resource exploitation. In the coming decades, flights to space will become commonplace—but at present, there is no way to hold outer space polluters accountable. The existing international legal regime is weak, with the United Nations' space treaties offering limited enforcement mechanisms against offenders. The increasingly popular concept of environmental personhood offers a solution by rethinking the meaning of a juridical person within the text of the United Nations Outer Space, Space Liability, and Moon treaties. Utilizing the International Court of Justice, outer space environmentalists can seek to recognize celestial bodies as juridical persons and gain third-party standing to protect the rights of the Moon and seek damages for environmental degradation. Through the exploration of contentious and advisory avenues within the International Court of Justice, this Comment advances a new way of thinking to save extraterrestrial environments.

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I. INTRODUCTION

Humanity is on the eve of a new era of industry, during which natural resources, manufacturing, and research will be conducted beyond terrestrial boundaries. This will include the mining of asteroids and the transformation or colonization of untouched celestial bodies for economic gain by human actors.¹ Presently, there is no effective way to enforce environmental regulation on celestial bodies, leaving them vulnerable to contamination and exploitation without repercussion.

This is an important issue as the vast mineral riches of outer space could fundamentally alter Earth's economy and existing geopolitical rivalries, extending them to outer space like during the Cold War. While it is unknown when and where the first human settlement on another celestial body will occur, the rising number of national and commercial actors interested in achieving such a goal make it seem probable.² The success of the multinational effort to maintain a human population on the International Space Station for nearly two decades demonstrates the feasibility of this vision.³ Space entrepreneur Jeff Bezos sees the utilization of space as critical to the resolution of global issues including hunger, poverty, and pollution.⁴ These hopes will all be moot if contamination or rapid exploitation of celestial bodies renders them unable to be used for a greater good. From a pessimistic perspective, a failure to introduce a regime for regulating the usage of celestial resources could lead to international conflict in space and on Earth.⁵

In order to understand the scope of the problem, Parts A and B of Section II of this Comment examine the threat posed by the contamination and exploitation of outer space resources. Part C of Section II discusses how the current international regime is lacking solutions and is unlikely to create a legislative solution given the national incentives to develop space industries. Part

¹ Brian Higginbotham, *The Space Economy: An Industry Takes Off*, U.S. CHAMBER OF COMMERCE (Oct. 11, 2018), <https://perma.cc/9KCW-7UGN>.

² Mike Brown, *SpaceX Here's the Timeline for Getting to Mars and Starting a Colony*, INVERSE (July 3, 2019), <https://perma.cc/JWN5-8JNN>; *Mars & Beyond: The Road to Making Humanity Multiplanetary*, SPACE X, <https://perma.cc/8CCK-7NQG>; see also *The Space Race is Dominated by New Contenders*, THE ECONOMIST (Oct. 18, 2018), <https://perma.cc/J59A-BRWS> (detailing the increasing frequency of Chinese, Indian, and private space launches).

³ Press Release, The European Space Agency, *First Crew Starts Living and Working on the International Space Station*, (Oct. 31, 2000), <https://perma.cc/YX4Q-9GY4>.

⁴ Soo Youn & Christine Theodorou, *Blue Origin, Jeff Bezos Unveils Plans for Space Colonization*, ABC NEWS (May 9, 2019), <https://perma.cc/WQ2T-B4Y8>.

⁵ David A. Wemer, *Can International Cooperation in Space Survive Geopolitical Competition on Earth?*, ATLANTIC COUNCIL (Nov. 20, 2018), <https://perma.cc/ML99-Y3EA>; Stuart Clark, *It's Going to Happen: Is the World Ready for War in Space?*, THE GUARDIAN, (Apr. 15, 2018), <https://perma.cc/PRG7-DD43>.

D of Section II frames the Comment's focus: solving the problem of standing for international litigation over extraterrestrial environmental damage. Section III Part A provides a more substantive legal background, first by detailing the relevant U.N. treaties: the Outer Space Treaty, the Space Liability Convention, and the Moon Treaty. Section III Part B introduces the legal concept of environmental personhood, an idea quickly gaining traction as national and local governments seek to preserve natural resources on Earth and protect against climate change. Environmental personhood bestows juridical personhood upon natural features, enabling them to have standing so that other entities or persons can bring claims on their behalf. Finally, Section IV hypothesizes the application of environmental personhood in the realm of outer space and how the existing legal framework can provide a system of regulation and justice for celestial natural resources. The proposed means of incorporating environmental personhood into the international law of space would be a judgment by the International Court of Justice (ICJ), either through an advisory opinion or a contentious case. While there are potential problems and alternative solutions, implementing environmental personhood through a judicial decision represents a rapid solution requiring limited consensus to a problem that could quickly grow beyond control.

II. THE PROBLEM

The introduction of new national space programs⁶ and commercial ventures⁷ has ensured that space will become even more crowded in the coming years. Activity will not be limited to mere scientific exploration. Already, commercial actors are planning to mine celestial bodies for profit.⁸ While the near-term future for spacefaring consumers appears to be tourism,⁹ the goal of national space programs and space entrepreneurs is resource extraction, lunar colonization, and beyond.¹⁰ The Moon is proposed to be an abundant source of Helium-3, a few

⁶ *Chandrayaan-2 Days Away from Moon's Orbit. What Next*, INDIA TODAY (Sept. 5, 2019), <https://perma.cc/ZP82-LKT5>.

⁷ See Higginbotham, *supra* note 1.

⁸ Chloe Cornish, *Interplanetary Players: A Who's Who of Space Mining*, FINANCIAL TIMES (Oct. 18, 2017), <https://perma.cc/KMR6-KEH3>; Jeff Foust, *A Trillion-Dollar Space Industry Will Require New Markets*, SPACE NEWS (July 5, 2018), <https://perma.cc/JG8H-MRCW>.

⁹ Alex Knapp, *With Virgin Galactic's Latest Flight, Has Space Tourism Finally Arrived?*, FORBES (Dec. 14, 2018), <https://perma.cc/CJ4T-HLWQ>; Jonathan O'Callaghan, *2019 Is the Year That Space Tourism Finally Becomes a Reality. No, Really*, WIRED (Jan. 24, 2019), <https://perma.cc/WM96-3XTK>.

¹⁰ Jackie Wattles, *NASA Wants Astronauts to Go Back to the Moon in 2024. Is It Possible?*, CNN BUSINESS (June 21, 2019), <https://perma.cc/2AC9-BMFM>; NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, *AMERICA TO THE MOON BY 2024, NASA'S FY 2020 BUDGET AMENDMENT SUMMARY*, <https://perma.cc/9NWL-SSR3>; Olivia Solon, *Elon Musk: We Must Colonize Mars to Preserve Our Species in a Third World War*, THE GUARDIAN (Mar. 11, 2018), <https://perma.cc/8W5B-BH7I>; see Youn & Theodorou, *supra* note 4; Brown, *supra* note 2.

hundred tons of which could meet Earth's energy needs for an entire year.¹¹ There is an incentive in the space mining and colonization industries to build a track record of success to lure investment in a capital-intensive field, making the nearby Moon's energy reserves an appealing target for early commercial missions. The private space race will potentially create the first trillionaire, leaving little room for the thought of the environmental effects on faraway places.¹²

First, this Section discusses the two main environmental threats associated with new commercial enterprises: exploitation and contamination. Then, this Section explains how the existing legal framework compounds the practical problems, leaving a gap for the articulation and measurement of the environmental harm in the commons of outer space.

A. The Practical Problems

Without actions causing direct harms, there is no need for a legal framework to regulate activity and hold bad actors accountable. In order to understand the problem that the legal solution of extraterrestrial environmental personhood is attempting to solve, first this Comment will introduce the practical problems of exploitation and contamination.

1. Exploitation

The risk of exploitation is exponentially rising as the prospect of harnessing resources in outer space becomes commercially viable. Exploitation in this context can be defined as the extraction and consumption of extraterrestrial resources for non-scientific purposes, potentially without research on the long-term impact of such activities. The global space economy currently produces revenues of \$350 billion, a number conservatively expected to rise to \$1 trillion by 2040.¹³ Traditional aerospace companies such as Boeing and Airbus continue to focus primarily on designing rockets for national program usage.¹⁴ Newer entrants such as Planetary Resources are explicitly focusing on the private exploitation of

¹¹ Niklas Reinke, *No Helium-3 from Moon – Commentary on the Current Moon Debate*, in DLR COUNTDOWN #3 25 (2007); see also Fabio Tronchetti, *Legal Aspects of Space Resource Utilization*, in HANDBOOK OF SPACE LAW (Frans von der Dunk & Fabio Tronchetti eds., 2015).

¹² Tiffany Terrell, *Physicist Says Asteroid Mining Ventures Will Spawn First Trillionaire*, GLOBAL NEWSWIRE (Jan. 30, 2018), <https://perma.cc/J75M-87NA>.

¹³ Foust, *supra* note 8; *Space: Investing in the Final Frontier*, MORGAN STANLEY (July 2, 2019), <https://perma.cc/9FUJ-432V>.

¹⁴ Andrea Shalal, *Airbus Seeks New Partners to Expand in U.S. Space Market*, REUTERS (June 18, 2019), <https://perma.cc/5TMP-XC9Y>; see also Joel Kowsky, *From Take Off to Landing, NASA and Boeing Work Together to Launch Commercial Crew*, NASA (Dec. 19, 2019), <https://www.nasa.gov/feature/from-take-off-to-landing-nasa-and-boeing-work-together-to-launch-commercial-crew>.

asteroids through space mining,¹⁵ while others, such as SpaceX and Blue Origin, have taken an ‘all of the above’ approach with broad goals to commercialize space and support the eventual colonization of outer space.¹⁶

Commercial actors may be less likely to concern themselves with implementing procedures to mitigate or prevent pollution, and they could perform launch operations from jurisdictions with minimal requirements in order to maximize profitability.¹⁷ Previous missions to space were conducted for scientific purposes by governments, with American and Soviet space programs implementing planetary protection precautions for landers to prevent forward contamination.¹⁸ The growing commercial industry raises the potential for a much more crowded outer space with less commitment to protocol. Already, commercial space ventures are launching thousands of satellites, endangering the low Earth orbit ecosystem, with little planning for the safe decommission of these satellites.¹⁹ While sustainable usage and extraction of extraterrestrial resources would be ideal, the risky nature of the space industry coupled with limited current enforcement is likely to produce a tragedy of the commons.²⁰

2. Contamination

Human exploration has a long history of contamination, and space is no exception.²¹ For the purposes of this Comment, contamination specifically refers to the introduction of foreign substances and lifeforms into extraterrestrial

¹⁵ *Redefining Natural Resources: Why Asteroids*, PLANETARY RECOURSES, <https://perma.cc/363C-ZKKZ>.

¹⁶ Meghan Bartels, *SpaceX Wants to Send People to Mars. Here's What the Trip Might Look Like*, SPACE.COM (May 26, 2020), <https://perma.cc/5Y3P-BYCD>; see also Youn & Theodorou, *supra* note 4; Erik Sofge, *The Most Innovative Space Companies of 2020*, FAST COMPANY (Mar. 10, 2020), <https://perma.cc/X8LS-JAYC>.

¹⁷ See Caroline Delber, *SpaceX Says There Are No Laws on Mars, So Maybe Elon Musk Will Be President*, POPULAR MECHANICS (Oct. 30, 2020), <https://perma.cc/338Z-TY6K> (discussing SpaceX's terms of service which claim Mars is a free planet and that no Earth-based government has authority over Mars).

¹⁸ LOTTA VIKARI, *THE ENVIRONMENTAL ELEMENT IN SPACE LAW: ASSESSING THE PRESENT AND CHARTING THE FUTURE* 51 (2008).

¹⁹ EUROPEAN SPACE POLICY INSTITUTE, *TOWARDS A EUROPEAN APPROACH TO SPACE TRAFFIC MANAGEMENT* (2020), <https://espi.or.at/publications/espi-public-reports/send/2-public-espi-reports/494-espi-report-71-stm>.

²⁰ See Jonathan O'Callaghan, *The FCC's Approval of SpaceX's Starlink Mega Constellation May Have Been Unlucky*, SCIENTIFIC AMERICAN (Jan. 16, 2020), <https://perma.cc/GVZ7-J87W> (detailing the launch of SpaceX's Starlink satellite system around the Earth has already begun to brighten the sky, inhibiting terrestrial stargazing).

²¹ See Megan Garber, *The Trash We've Left on the Moon*, THE ATLANTIC (Dec. 19, 2012), <https://perma.cc/SCC5-YGPL> (listing the many items left from the Apollo missions including human waste). For information about the potential future of contamination, see MARGARET S. RACE ET AL., NASA, *PLANETARY PROTECTION KNOWLEDGE FOR HUMAN EXTRATERRESTRIAL MISSIONS*, WORKSHOP REPORT (2015), <https://perma.cc/MF8N-C8GG>.

environments. Recent events further evidence the risks of contamination in an unregulated field. In February 2019, a private rocket carrying a lunar lander crashed on the surface of the Moon.²² The rocket was funded by the American nonprofit Arch Mission Foundation and was launched from Florida by the Israeli corporation SpaceIL.²³ Unbeknownst to international regulators at the time of launch, the rocket was carrying thousands of tardigrades, a terrestrial creature known for its ability to survive nearly anywhere.²⁴ Nova Spivack, the cofounder of the Arch Mission Foundation, admitted to placing the tardigrades on the SpaceIL lander at the last minute without disclosing the nature of the addition to SpaceIL.²⁵ Although there is no definitive analysis of the consequences of introducing the tardigrades into the lunar environment, they are the only creature known to survive the vacuum of space.²⁶ There is limited immediate threat posed by the tardigrades as they exist in a state of cryptobiosis in space, unable to reproduce with their metabolism held to a minimum, but the concern is that the next species sent to the Moon might not be as harmless.²⁷

Regardless, the actions of the Arch Mission Foundation violate existing planetary protection guidelines, practices set out by the international Committee on Space Research (COSPAR) and national space agencies to prevent cross contamination between planetary bodies.²⁸ There has been no reported sanction for the irresponsible private actors involved in the tardigrade launch, signaling a low risk to subsequent commercial actors and increasing the chance of future contamination or exploitation. National systems are disincentivized from

²² Loren Grush, *Why Stowaway Creatures on the Moon Confound International Space Law*, THE VERGE (Aug. 16, 2019), <https://www.theverge.com/2019/8/16/20804219/moon-tardigrades-lunar-lander-spaceil-arch-mission-foundation-outer-space-treaty-law>.

²³ *Id.*

²⁴ Hannah Osborne, *Thousands of 'Indestructible' Tardigrades Could Be Living on the Moon After Crashing on the Lunar Surface*, NEWSWEEK (Aug. 6, 2019), <https://perma.cc/8JDY-G8HU>.

²⁵ Chris Taylor, *'I'm the First Space Pirate!' How Tardigrades Were Secretly Smuggled to the Moon*, MASHABLE (Aug. 8, 2019), <https://perma.cc/98W5-JTVY> (noting that Spivack considers himself to be the first space pirate after his smuggling of the tardigrades).

²⁶ Joseph Stromberg, *How Does the Tiny Waterbear Survive in Outer Space*, SMITHSONIAN MAGAZINE (Sept. 11, 2012), <https://perma.cc/FNF2-74DT>; Jason Daley, *A Crashed Spacecraft Might Have Put Earth's Most Indestructible Organisms on the Moon*, SMITHSONIAN MAGAZINE (Aug. 7, 2019), <https://perma.cc/KR99-TW6Z>.

²⁷ Ari Shapiro, *Thousands of Tardigrades are Stranded on the Moon After a Failed Lunar Mission*, NPR (Aug. 8, 2019), <https://perma.cc/L4GB-J4CD>.

²⁸ COSPAR, *The COSPAR Panel on Planetary Protection Role, Structure and Activities*, 205 SPACE RSCH. TODAY 14 (Aug. 2019) (providing an overview of the planetary protection framework and examples of procedures, including the requirement that missions to other planetary bodies “adhere to stringent planetary protection measures to abide the first rationale for planetary protection to not interfere with ‘scientific investigations of possible extraterrestrial life forms, precursors, and remnants’ and not to impose terrestrial biological contamination to these objects of high astrobiological interest”).

regulating harshly, as launches can happen across the globe and fledgling space companies might take their businesses to friendlier jurisdictions.

While the Earth's atmosphere has proven to be relatively durable in the face of carbon emissions and other pollutants, the atmospheres of our neighbors are far more fragile. The emissions of twenty Apollo mission landings would have effectively doubled the lunar atmosphere; the Martian atmosphere is similarly tenuous.²⁹ When imagining the scale of a lunar mining operation or colony, it is easy to predict the potential human-caused climate change on the lunar surface. Introducing enough biological or chemical contaminants could produce carbon emissions that start a dangerous process.

Various actors have proposed larger environmental offenses, particularly terraforming, the process by which an Earthlike ecosystem is created on another planet. Already, small steps have been taken to test our ability to bring Earth to other surfaces, such as when China attempted to grow cotton on the Moon.³⁰ There is concern that an effort to terraform will damage the natural ecosystem of the targeted planet. Elon Musk, CEO of SpaceX, has suggested terraforming Mars and potentially nuking ice deposits on its surface.³¹ Musk's plan to bring life to Mars through terraforming has numerous critics and doubters in the scientific community, particularly astrobiologists.³² It could be that nuking Mars leads to the degradation of natural features that humanity might wish to preserve for future generations. Just as Americans have protected Yosemite and the Grand Canyon, perhaps future Martian settlers will wish that Olympus Mons had been protected.

Some amount of extraterrestrial resource usage is permissible to satisfy human needs for research and scientific gains, but there should be a contamination threshold beyond which there is some sort of legal ramification. The contamination threshold could be determined by considering the value of the contaminated body and the severity of the contamination. The value of the extraterrestrial body can be governed by the categories of planetary protection priority already established by COSPAR based upon the probability that those bodies have life on them.³³ For example, the contamination threshold might be

²⁹ See Manfred Hintz, *Environmental Aspects of Settlements on the Moon and Mars Planetary Protection*, 34 PROC. L. OUTER SPACE 59, 60 (1991).

³⁰ Amy Held, *China Tried to Grow Cotton on the Moon, but It Didn't Work*, NPR (Jan. 17, 2019), <https://perma.cc/R67A-BF2N>.

³¹ Doyle Rice, *NASA Says We Can't Terraform Mars. Elon Musk Disagrees*, USA TODAY (Aug. 1, 2018), <https://perma.cc/PB84-3THS>; see also Sissi Cao, *Elon Musk Wants to 'Nuke Mars' for Humans to Live—But There is One Problem*, OBSERVER (Aug. 16, 2019), <https://perma.cc/V5J7-9NL6>.

³² See, e.g., Lucianne Walkowicz, *The Problem with Terraforming Mars: What Do We Lose If We Make the Red Planet Hospitable to Humans?*, SLATE (Sept. 13, 2018), <https://perma.cc/HM3Y-LV5R>; Bruce M. Jakosky & Christopher S. Edwards, *Inventory of CO₂ available for terraforming Mars*, 2 NATURE ASTRONOMY 634 (2018).

³³ See COSPAR, *supra* note 28.

higher for a barren asteroid and lower for Europa, which is believed to have a subsurface ocean. There would be variation by the type of contaminant and the amount of exposure. Leaving sealed bags of human waste on the Moon from the Apollo missions might not be as harmful as releasing a school of fish into an extraterrestrial ocean.

B. The Legal Problems

The potential damage from exploitation and contamination could be mitigated if there was a sufficient regulatory regime or enforcement mechanism to curb the activities of future polluters. As outlined below, the current national and international regulatory regimes fail to control independent actors seeking a profit. Although it may be possible to craft regulations capable of protecting extraterrestrial environments through permitting and planetary protection systems, political capital requirements and national incentives make regulation a less likely solution. Instead, a few environmentally conscious actors can seek judgments through international litigation, lowering the potential political costs and providing a more immediate solution than the drafting of regulations. The issue that this Comment focuses on is how to cure potential defects in standing and causation in potential international litigation over environmental damage to an extraterrestrial environment, such as the Moon.

1. Lacking Regulatory Regime

Despite decades of increasing usage and dependency on outer space as a resource, the international regime governing outer space is weak. The United Nations Committee on the Peaceful Uses of Outer Spaces (COPUOS) oversees the United Nations Office for Outer Space Affairs (UNOOSA) and created the five current U.N. treaties covering outer space.³⁴ While the first space treaty from 1967 has 109 states parties,³⁵ subsequent treaties offering more specific regulation of space received much less support, with the Moon Treaty having only 18 states parties.³⁶ The five main space treaties were all introduced between 1967 and 1979, with no substantive development of an international regulatory regime in the subsequent years. This gap in regulation has increased along with the possibilities and realities of human use of space.

Many nations have supplemented the international agreements with their own space regulations. In the United States, the Federal Aviation Administration

³⁴ *Roles and Responsibilities*, U.N. OFFICE FOR OUTER SPACE AFFAIRS, <https://perma.cc/536N-7FQU>.

³⁵ Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies, Jan. 27, 1967, 18 U.S.T. 2410, 610 U.N.T.S. 205 [hereinafter *Outer Space Treaty*].

³⁶ Agreement Governing the Activities of States on the Moon and Other Celestial Bodies, Dec. 5, 1979, 1363 U.N.T.S. 3 [hereinafter *Moon Treaty*].

oversees the space launch licensing process,³⁷ and maritime jurisdiction extends to spaceships.³⁸ In the European Union,³⁹ Norway,⁴⁰ Sweden,⁴¹ Belgium,⁴² the Netherlands,⁴³ and France⁴⁴ have all passed laws to regulate private space enterprises. These laws, among many other examples at the national level, often require private actors to secure permission or comply with a national registry before launching objects into space. While these national regulations impose some restrictions on commercial actors, the international regime never reached a sufficient level of development to do so.

The development of independent national laws is not necessarily beneficial to the protection of celestial environments. Given the vast amount of resources and money at stake, it may be more likely that national legislation leads to a race to the bottom to enable domestic space corporations to engage in riskier but more profitable activities than their international competitors.⁴⁵ Increasing values of asteroid minerals in combination with lower barriers to entry as space technology improves will encourage more commercial players to enter the industry. Without an international regulatory regime in place, commercial actors will be incentivized to lobby against regulations as revenues increase and they gain more influence within national governments. National governments will also have limited incentives to regulate their own space industries if it will hurt their competitiveness in the broader market. Even if national governments were willing to create and enforce a working environmental system, the lack of uniformity between national standards still calls for an international approach.

Seabed mining provides a terrestrial example of this problem. After initial proposals to collect minerals from the sea floor developed in the 1960s,⁴⁶ the U.N.

³⁷ *Licensing Process*, FEDERAL AVIATION ADMINISTRATION, OFFICE OF COMMERCIAL SPACE TRANSPORTATION, <https://perma.cc/RU2Z-W6Q2>.

³⁸ 18 U.S.C. § 7(6).

³⁹ Frans von der Dunk, *The Legal Framework for Space Projects in Europe: Aspects of Applicable Law and Dispute Resolution*, in *CONTRACTING FOR SPACE: CONTRACT PRACTICE IN THE EUROPEAN SPACE SECTOR* 357 (Lesley Jane Smith & Ingo Baumann eds., 2011).

⁴⁰ Lov om oppskyting av gjenstander fra norsk territorium m.m. ut i verdensrommet, 13 juni 1969 nr. 38 (Nor.).

⁴¹ 2 § LAG OM RYMDVERKSAMHET, (Svensk författningssamling [SFS] 1982:963) (Swed.).

⁴² Loi relative aux activités de lancement, d'opération de vol ou de guidage d'objets spatiaux of Sept.17, 2005, MONITEUR BELGE [M.B.] [Official Gazette of Belgium], Nov.4, 2008 (Belg.).

⁴³ Wet rimtevaartactiviteiten, 24 januari 2007, Stb. 2007, 80 (Neth.).

⁴⁴ Loi 2008-518 du 3 juin 2008 relative aux opérations spatiales, JOURNAL OFFICIEL DE LA RÉPUBLIQUE FRANÇAISE [J.O.][OFFICIAL GAZETTE OF FRANCE], June 4, 2008, p. 9169 (Fr.).

⁴⁵ See Tronchetti, *supra* note 11, at 810.

⁴⁶ Julie Hunter, Pradeep Singh & Julian Aguon, *Broadening Common Heritages, Addressing Gaps in the Deep Sea Mining Regulatory Regime*, HARV. ENV'T L. REV. BLOG (Apr. 16, 2018), <https://perma.cc/N6XE-8K3H>.

enacted the United Nations Convention on the Law of the Sea (UNCLOS) in 1982.⁴⁷ UNCLOS established an international framework for several international maritime legal issues, including the establishment of the International Seabed Authority (ISA) under Part XI of the convention. Article 136 declares, “The [seabed] Area and its resources are the common heritage of mankind.”⁴⁸ The ‘common heritage of mankind’ language mirrors language that was used to describe the Moon in the Moon Treaty, which was being drafted contemporaneously.⁴⁹ The result of UNCLOS and the ISA has been far from ideal. The ISA has operated with limited transparency,⁵⁰ giving out twenty-seven contracts for the mining of 1.4 million square kilometers with limited assurances of the environmental controls desired by some conservationists.⁵¹ A small number of contracts for mining in international waters come from closed sessions of the ISA, while many larger contracts are given by national governments to mine the seabed within their exclusive economic zones with limited research on the ultimate environmental impact.⁵² The U.S. notably objected to parts of UNCLOS, undermining its effectiveness and leading to competing national regulatory systems.⁵³ It is not unreasonable to imagine the same dual licensing system taking hold in space, whereby some corporations are licensed by national launch authorities and others by an international body. The danger is much the same, that corporations will seek the nations willing to give early licenses in order to get ahead in space.

The interaction of actors incentivized to be the first to make a large profit in a risky industry with the lack of real regulation may lead to the contamination or exploitation of celestial resources with potentially irreversible consequences. A historical analogy would be that of the older oil wells in Texas, drilled without long-term concern for environmental impact, which are now leaking contaminants across the state.⁵⁴ When starting a risky natural resources venture,

⁴⁷ United Nations Convention on the Law of the Sea, Dec. 10, 1982, 1833 U.N.T.S. 397.

⁴⁸ *Id.* art. 136.

⁴⁹ See Frans G. von der Dunk, *The Dark Side of The Moon: The Status of the Moon: Public Concepts and Private Enterprise*, 40 PROC. L. OUTER SPACE 119, 121–22 (1997) (discussing the application of the “common heritage of mankind” principle to the Moon).

⁵⁰ Kirsten F. Thompson et al., *Seabed Mining and Approaches to Governance of the Deep Seabed*, FRONTIERS MARINE SCIENCE (Dec. 11, 2018), <https://perma.cc/8BGH-C78E>,

⁵¹ Kathryn A. Miller et al., *An Overview of Seabed Mining Including the Current State of Development, Environmental Impacts, and Knowledge Gaps*, FRONTIERS IN MARINE SCIENCE (Jan. 10, 2018), <https://perma.cc/P963-2GKQ>.

⁵² *Id.* (detailing contracts given to mine off the coast of Africa and Oceania).

⁵³ See James L. Malone, *The United States and the Law of the Sea after UNCLOS III*, 46 LAW AND CONTEMPORARY PROBLEMS 30 (1983) and Roncevert Ganan Almond, *U.S. Ratification of the Law of the Sea Convention*, THE DIPLOMAT (May 24, 2017), <https://perma.cc/V66U-GE68>.

⁵⁴ Jim Malewitz, *Abandoned Texas Oil Wells Seen as “Ticking Time Bombs” of Contamination*, TEXAS TRIBUNE (Dec. 21, 2016), <https://perma.cc/6EW2-UGQM>.

the first goal is to make a substantial return, and the fear of environmental liability is often an afterthought. If a wildcatter does not find oil or cannot get it out of the ground, they will be just as insolvent as if they were hit with large amounts of environmental liability. Additionally, there is a short-term bias to conducting many ventures as the environmental impact and full consequences often are not calculable until decades later, potentially long after the initial mining venture has concluded.⁵⁵ History cautions against the lack of regulation. A legal regime is needed to hold offending actors accountable in a time horizon short enough to create an incentivizing impact.

2. Unarticulated Basis for International Litigation

In the absence of either a working international regulatory framework or comparable national systems, pursuing environmental damages claims under the existing U.N. space treaties in the ICJ presents a viable path to create accountability and promote extraterrestrial conservation. The language of the treaties, detailed in the following Section, enables a nation to seek monetary damages when space debris from a second nation strikes the territory or property of the first nation. In the extraterrestrial context, the difficulty arises when the damage occurs to another planetary body, which no nation has a territorial claim to protect. There is a gap in the current practice and scholarship on international law to show how a litigant could have standing to sue for damage to extraterrestrial environments, such as that of the Moon. This Comment will focus on answering this problem by using the legal concept of environmental personhood to articulate what is damaged when the Moon is polluted and how third-party standing will hold bad actors accountable.

III. LEGAL BACKGROUND

A. Existing International Law for Celestial Bodies

The U.N. is the primary governing authority on international laws and regulations pertaining to outer space. Through the U.N. Office for Outer Space Affairs, the U.N. tracks satellites orbiting the Earth and works to implement the five adopted space treaties. The two treaties most relevant to this Comment are the Outer Space Treaty and the Moon Treaty. The Outer Space Treaty laid out an initial framework for international ambitions to regulate outer space activity, but it left gaps and ambiguities for subsequent treaties and regulations to fill in or refine. The Outer Space Treaty's general spirit provides a lodestar for subsequent laws to follow. The Space Liability Convention, for example, built upon the Outer Space Treaty to create a mechanism for nations to seek damages when debris fall into their sovereign territory, an important building block for nations seeking to

⁵⁵ *Id.*

protect extraterrestrial environments from contamination or exploitation. Finally, the Moon Treaty introduced additional protections for the Moon and represented the most progressive attempt to prevent exploitative usage of extraterrestrial resources.

While the Moon Treaty was less widely adopted, the Outer Space Treaty and Space Liability Convention can work in concert to provide a path for a case to be heard in the ICJ if the court were to adopt an environmental personhood reading of certain provisions of the treaties. The Moon Treaty still provides a persuasive example of where the international legal community might have gone had competitive intentions been removed.

1. The Outer Space Treaty

The Treaty on Principles Governing Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies (Outer Space Treaty) was the first attempt to establish an international regime for outer space, ratified just 10 years after Sputnik and two years before the Apollo 11 landing.⁵⁶ It has been ratified by 110 parties, including all major spacefaring nations, and serves as the most widely adopted source of international space law. Certain sections were later clarified by subsequent agreements such as the Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space.⁵⁷

The preamble of the Outer Space Treaty recognizes “the common interest of all mankind in the progress of the exploration and use of outer space for peaceful purposes.”⁵⁸ This language demonstrates the reliance on historic conceptions of nature serving human needs, an idea that will be countered by the concept of environmental personhood and subsequent U.N. treaty language. In the absence of any foundational law for outer space, it may have seemed natural to transplant the legal regime that governed the property of Earth to outer space.

Article I of the Outer Space Treaty establishes the broad jurisdiction of the treaty as “[o]uter space, including the Moon and other celestial bodies.”⁵⁹ Article II declares “[o]uter space, including the [M]oon and other celestial bodies, is not subject to national appropriation by claim of sovereignty, by means of use or occupation, or by any other means.”⁶⁰ However, some commentators have

⁵⁶ Outer Space Treaty, *supra* note 35.

⁵⁷ Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space, Apr. 22, 1968, 19 U.S.T. 7570, 672 U.N.T.S. 119 [hereinafter Rescue Agreement].

⁵⁸ Outer Space Treaty, *supra* note 35.

⁵⁹ *Id.* art. I.

⁶⁰ *Id.* art. II.

speculated whether resources are similarly unclaimable once they have been extracted.⁶¹

Under Article IX, “States Parties to the Treaty shall pursue studies of outer space, including the [M]oon and other celestial bodies, and conduct exploration of them so as to avoid their harmful contamination”⁶² The introduction of tardigrades is clearly a form of contamination, but the harm caused by their introduction is still unknown. Previous ventures to the Moon during the Apollo missions left bags of human waste, which some scientists have hypothesized could have introduced microbial life to the previously sterile lunar surface.⁶³ Terraforming a planet would almost certainly be a harmful contamination as it would purposefully change the ecosystem of a planet. The harm would be to the natural planet itself, rather than to the human interests that are traditionally at the core of human-centric Anglo-American property law. The environmental personhood concept requires that the protection from harm given to the celestial body be the same protection the law would give any human body. Even using the most stringent and narrow definitions of harm, requiring potentially irreversible decimation of any native lifeforms and the introduction of invasive species from Earth as proposed by terraforming advocates would meet these criteria. Yet, the current international framework has limited means to punish violations of this treaty.

2. The Space Liability Convention

Following the Outer Space Treaty, the U.N. enacted the Convention on International Liability for Damage Caused by Space Objects (Space Liability Convention) in 1972.⁶⁴ The Space Liability Convention clarified language regarding the consequences of damages derived from space travel. While the focus of the treaty appears to be on compensation for damages stemming from an object falling from space, much of the treaty is still operable for “damage being caused elsewhere than on the surface of the earth.”⁶⁵ Under Article I, damages can occur to “persons, natural or juridical”⁶⁶ The inclusion of juridical persons does not appear to be limited to persons who are a citizen of a state party. Rather the injury of any juridical person could be sufficient for a claim should the litigant have standing, enabling monetary damages for harm to juridical persons under the

⁶¹ See Eric Husby, Comment, *Sovereignty and Property Rights in Outer Space*, 3 J. INT’L L. & PRAC. 359, 366, 370 (1994).

⁶² Outer Space Treaty, *supra* note 35, art. IX.

⁶³ Andrew C. Schuerger, John E. Moores, David J. Smith & Günther Reitz, *A Lunar Microbial Survival Model for Predicting the Forward Contamination of the Moon*, 19 ASTROBIOLOGY 730, 752 (2019).

⁶⁴ Convention on International Liability for Damage Caused by Space Objects, Mar. 29, 1972, 24 U.S.T. 2389, 961 U.N.T.S. 187 [hereinafter Space Liability Convention].

⁶⁵ *Id.* art. II.

⁶⁶ *Id.* art. I.

environmental personhood model. Liability extends to “a State from whose territory or facility a space object is launched.”⁶⁷ Thus, had the SpaceIL rocket caused damage, the U.S. would be the liable nation as the rocket was initially launched from Cape Canaveral, Florida.⁶⁸

The Space Liability Convention suggests that diplomatic negotiations should be the primary means of settling damages claims. After stating a claim, a party “may also present its claim to the Secretary-General of the United Nations” under Article IX.⁶⁹ Articles XIV–XX outline the use of an international Commission to resolve disputes between the parties when negotiations fail. The Commission is listed as the tertiary option, less preferable to negotiation or the assistance of the Secretary-General. There has only been one resolution of a claim thus far under the Space Liability Convention. In 1978, a Soviet nuclear satellite scattered radioactive debris over Canada, leading Canada to claim several million dollars in damages under the Space Liability Convention.⁷⁰ The claim was then settled through diplomatic means before the point at which the Secretary-General would have made a recommendation. While this system worked for a state-sponsored satellite,⁷¹ it has tremendous shortcomings in dealing with the coming private space industry. In particular, the Space Liability Convention ostensibly requires the claims of private parties to be sponsored by a state party to the treaty.⁷²

Although not discussed in the text of the Space Liability Convention, the consultation of the ICJ appears to be a possible avenue under a recommendation by the Secretary-General. With no precedent demonstrating the mechanics of the Space Liability Convention at a more contentious or substantive procedural point, the Secretary-General would likely look to proven dispute resolution mechanisms. The ICJ would be at the top of the list given its proven record of equitable arbitration,⁷³ statutory status under the U.N.,⁷⁴ and reputation as the premier international court. Demonstrating its institutional capacity, the ICJ has decided claims over other extraterritorial areas, including a claim over whaling in Antarctic

⁶⁷ *Id.* art. I(c)(ii).

⁶⁸ See Grush, *supra* note 22; Osborne, *supra* note 24.

⁶⁹ Outer Space Treaty, *supra* note 35, art. IX

⁷⁰ Protocol on Settlement of Canada’s Claim for Damages Caused by “Cosmos 954”, Can.-U.S.S.R., 1981 Can. T.S. No. 8, art. 2 [hereinafter Claims Protocol].

⁷¹ ‘State-sponsored’ here describes space missions funded or executed by nation states rather than activities done for private profit without the inducement of a national government.

⁷² See Dan St. John, Comment, *The Trouble with Westphalia in Space: The State-Centric Liability Regime*, 40 DENV. J. INT’L L. & POL’Y 686, 696 (2012).

⁷³ *Cases*, INTERNATIONAL COURT OF JUSTICE, <https://perma.cc/CZ5G-CHWK> (“Between 22 May 1947 and 11 November 2019, 178 cases were entered in the General List.”).

⁷⁴ Statute of the International Court of Justice, April 18, 1946, 33 U.N.T.S. 993 [hereinafter ICJ Statute].

water under the International Convention for the Regulation of Whaling.⁷⁵ Hearing a case under the Space Liability Convention could become a routine practice for the ICJ in the coming decades as space traffic increases. An environmental personhood claim might eventually be heard as the ICJ produces substantially more precedent proving institutional expertise in extraterrestrial legal matters.

3. The Moon Treaty

The Agreement Governing the Activities of States on the Moon and Other Celestial Bodies (Moon Treaty)⁷⁶ was the final of the five U.N. space treaties. Since its introduction in 1979, the Moon Treaty has been significantly less adopted than the Outer Space Treaty, with only 18 states parties. While the Moon Treaty is the most progressive on environmental issues, the lack of widespread adoption “renders the instrument practically meaningless.”⁷⁷ India is the only Moon Treaty signatory to also have a significant national space program thus far.⁷⁸ France is an original signatory to the Moon Treaty and is also a member state of the European Space Agency, potentially tying one of the largest space agencies to the Moon Treaty through a key member. Other nations continue to slowly join the Moon Treaty with accessions by Turkey and Saudi Arabia in 2012, Venezuela in 2016, and Armenia in 2018. The slow pace of adoption has left a “vacuum” of international law over the Moon,⁷⁹ but the Moon Treaty still serves an important role as the best expression of the international objectives for a legal framework to govern the Moon.

The Moon Treaty’s status as the only treaty explicitly about the Moon should still guide behavior and inform any future discussions over the law governing the Moon. Most of the opposition to the Moon Treaty by the spacefaring powers at the time, the U.S. and the Union of Soviet Socialist Republics, was based upon reaction to the potential requirement to share extracted mineral wealth with other nations.⁸⁰ This Comment does not address the legality of lunar mining itself, instead focusing on the legal ramifications for the environmental impact of such activities. The Outer Space Treaty set principles broadly for outer space activity;

⁷⁵ Whaling in the Antarctic (Austl. v. Japan: New Zealand intervening), Judgment, 2014 I.C.J. 148 (Mar. 14).

⁷⁶ Moon Treaty, *supra* note 36.

⁷⁷ Lotta Viikari, *Environmental Aspects of Space Activities*, in HANDBOOK OF SPACE LAW, 717, 726 (Frans von der Dunk and Fabio Tronchetti eds., 2015).

⁷⁸ *Chandrayaan-2 Days Away from Moon’s Orbit. What Next*, *supra* note 6.

⁷⁹ Michael Listner, *The Moon Treaty: Failed International Law or Waiting in the Shadows?*, THE SPACE REVIEW (Oct. 24, 2011), <https://perma.cc/K6JA-GJ43>.

⁸⁰ See David Everett Marko, *A Kinder, Gentler Moon Treaty: A Critical Review of the Current Moon Treaty and a Proposed Alternative*, 8 J. NAT. RES. & ENV’T L. 293, 302–06, 311–13 (1992).

whereas subsequent treaties, such as the Moon Treaty, sought to fill in the gaps.⁸¹ The Space Liability Convention created the deeper legal framework initially called for in Article VII of the Outer Space Treaty covering liability for space activities. The Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space⁸² built out the vision set forth in Article V of the Outer Space Treaty. So, while the Moon Treaty received fewer initial ratifications, it can serve as an explanatory document for the framework that the signatories of the Outer Space Treaty had envisioned.

Article 1 of the Moon Treaty states that the treaty applies to the Moon and also “to other celestial bodies within the solar system other than the earth.”⁸³ The Moon Treaty recognizes that outer space law is not separate from the international law framework but rather a subset of it, as “[a]ll activities on the moon, including its exploration and use, shall be carried out in accordance with international law, in particular the Charter of the United Nations”⁸⁴ Under this conception, the broader international legal mechanisms, such as the ICJ and the Security Council, still govern the operations of space actors.

Later sections of the Moon Treaty deal more directly with the importance of environmental preservation. Article 7 § 1 states that “[i]n exploring and using the [M]oon, States Parties shall take measures to prevent the disruption of the existing balance of its environment, whether by introducing adverse changes in that environment, by its harmful contamination through the introduction of extra-environmental matter or otherwise.”⁸⁵ This represents a more specific and stronger version of the language seen in Article IX of the Outer Space Treaty of 1967. The examples of terraforming and the introduction of tardigrades would likely be considered violations of this language. Under Article 11 § 1, “[t]he moon and its natural resources are the common heritage of mankind”⁸⁶ Unlike the “province of all mankind” language from the Outer Space Treaty, the phrase “common heritage of mankind” is stronger and points to the Moon’s unique

⁸¹ Each of the preambles to the various space treaties refers to the prior agreements and the spirit of law the new treaty seeks to build upon. *See* Moon Treaty, *supra* note 35, ¶ 15 (“Recalling the Treaty on the Principles Governing the Activities in the Exploration and Use of Outer Spaces including the Moon and Other Celestial Bodies, the Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched in to Outer Space, the Convention on International Liability for Damage Caused by Space Objects, and the Convention on Registration of Objects Launched into Outer Space”).

⁸² Rescue Agreement, *supra* note 57.

⁸³ Moon Treaty, *supra* note 36, art. 1.

⁸⁴ *Id.* art. 2.

⁸⁵ *Id.* art. 7.

⁸⁶ *Id.* art. 11 § 1.

freedom from ownership.⁸⁷ This language reinforces the human-centric attitude toward natural resources, but also indicates a common interest in the regulation or sustainable usage of the Moon. By recognizing a common heritage value of the Moon to all humans, the Moon Treaty might create an avenue for a plaintiff to bring a claim for the degradation of the lunar environment. The common heritage aspect of the Moon can enable third parties to serve as guardian ad litem for the environmental person that is the Moon.

Article 11 § 3 states that “[n]either the surface nor the subsurface of the [M]oon, nor any part thereof or natural resources in place, shall become property of any State . . . or non-governmental entity or of any natural person.”⁸⁸ Based on this language, it seems that there should be no ownership or territorial claims to the Moon, creating a situation analogous to Antarctica.⁸⁹ Additionally, it would be hard to legally extract and sell material from the Moon if it cannot be owned. Prohibiting ownership may prevent transfer or encourage actors to adopt a parallel system more supportive of their commercial needs.

Article 11 § 5 requires that “States Parties to this Agreement hereby undertake to establish an international regime, including appropriate procedures, to govern the exploitation of the natural resources of the Moon as such exploitation is about to become feasible.”⁹⁰ Article 11 § 7 states that “[t]he main purposes of the international regime to be established shall include: (a) The orderly and safe development of the natural resources of the Moon; (b) The rational management of those resources; (c) The expansion of opportunities in the use of those resources”⁹¹ It is conceivable that these responsibilities could be delegated to UNOOSA or COPUOS, but no regime or delegation of authority exists yet to carry out the Moon Treaty’s vision. Article 15 §§ 2–3 set out methods for resolving disputes, including consultation with the offending nation, the assistance of the Secretary-General, or “other peaceful means of [the states parties] choice appropriate to the circumstances and the nature of the dispute.”⁹²

4. Interpreting the U.N. Treaties

While the U.N. outer space treaties provide a legal framework, judicial interpretation of the treaties’ terms can enable greater reach and regulation. In the

⁸⁷ See Nina Tannenwald, *Law Versus Power on the High Frontier: The Case for a Rule-Based Regime for Outer Space*, 29 YALE J. INT’L L. 363, 410 (2004).

⁸⁸ Moon Treaty, *supra* note 36, art. 11 § 3.

⁸⁹ Juan Francisco Salazar, *Antarctica and Outer Space: Relational Trajectories*, 7 POLAR J. 259, 261 (2017) (detailing how the Antarctic Treaty System and Outer Space Treaties both created “extraterritorial zones” in which no nation could claim sovereign territory).

⁹⁰ Moon Treaty, *supra* note 36, art. 11 § 5.

⁹¹ *Id.* art. 11 § 7.

⁹² *Id.* art. 15 § 2–3.

common law tradition, judges have the power to fill in the gaps of statutes and choose the rules that fulfill the enactor's intent.⁹³ While the U.N. treaties do not define "juridical person," the growing adoption of environmental personhood can fill a gap in the law by providing a legal mechanism for the environmental regulation envisioned by the treaties. Currently, commercial and national actors engage in environmentally hazardous behavior with limited fear of international sanction or economic penalty. Recognition of celestial bodies as juridical persons will create a more sustainable and just future for humanity in space.

B. Environmental Personhood

1. Introducing the Concept

Protecting nature from exploitation is not a new legal problem: numerous international agreements have sought to promote the conservation of the Earth's resources,⁹⁴ atmosphere,⁹⁵ and environments.⁹⁶ Treaties are often drafted with exceptions that later become problematic or offer nations the opportunity to reject specific provisions. Without standing, nature and the organizations seeking to protect it have no basis to seek remedy from those profiting from contamination and exploitation. The concept of "environmental personhood" presents a legal means for the preservation and regulation of natural resources and can be extended to the outer space context.

Environmental personhood was first introduced by Professor Christopher D. Stone in a law review article advocating a reconsideration of humanity's relationship with nature.⁹⁷ Stone's idea gained initial prominence when it was cited by U.S. Supreme Court Justice William O. Douglas in his dissent in *Sierra Club v. Morton*.⁹⁸ In *Morton*, the plaintiffs could not seek judicial review. They lacked standing because the injury identified was to the natural environment and not to the individuals themselves. Justice Douglas's dissent drew analogies to other juridical personhoods such as ships and corporations to illustrate that

⁹³ See generally Frank H. Easterbrook, *Legal Interpretation and the Power of the Judiciary*, 7 HARV. J. L. & PUB. POL'Y 87 (1984) (discussing the interpretive modes judges use to fill gaps in statutes).

⁹⁴ See Convention for the Conservation of Antarctic Marine Living Resources, May 20, 1980, 33 U.S.T. 3476, 1329 U.N.T.S. 48 for more information on the international environmental treaty system. See also Rakhyun E. Kim, *The Emergent Network Structure of the Multilateral Environmental Agreement System*, 23 GLOB. ENV'T CHANGE 980 (2013) (finding over 747 international environmental agreements since 1857).

⁹⁵ See Paris Agreement to the United Nations Framework Convention on Climate Change, Dec. 12, 2015, T.I.A.S. No. 16-1104.

⁹⁶ See Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, Dec. 29, 1972, 1046 U.N.T.S. 120 [hereinafter *The London Convention*].

⁹⁷ Christopher D. Stone, *Should Trees Have Standing—Toward Legal Rights for Natural Objects*, 45 S. CAL. L. REV. 450, 456 (1972).

⁹⁸ *Sierra Club v. Morton*, 405 U.S. 727, 741 (1972) (Douglas, J., dissenting).

environmental personhood could create a better sense of justice on behalf of a harmed ecosystem.⁹⁹

Stone subsequently expanded upon his initial article in a book of the same name, detailing the inspiration for his idea and the challenges he foresaw.¹⁰⁰ Stone noted that “[t]hroughout legal history, each successive extension of rights to some new entity has been, theretofore, a bit unthinkable,” citing the extension of the franchise and other protections to women and African Americans.¹⁰¹ In order to ensure the protection of an environmental person, a court would need to appoint a guardian ad litem or a representative as courts do in cases involving incompetent parties.¹⁰² The expansion of corporate rights is in many ways a precursor to the current growth of the environmental personhood movement,¹⁰³ and subsequent proponents of expanding rights to non-natural persons have followed this model.¹⁰⁴

2. Subsequent International Adoption

In the years since Stone introduced his theory, there has been significant discussion of the environmental personhood concept within academic circles, with over 1500 articles citing his original journal article alone. Beyond academic momentum,¹⁰⁵ various national and local governments have adopted forms of environmental personhood, either through legislative or judicial avenues. Around the world, there is a growing movement to preserve and secure the rights of nature.¹⁰⁶

Ecuador and Bolivia are the strongest adopters, implementing national environmental safeguards through juridical personhood. Ecuador adopted a constitutional amendment in 2008 to give nature the right to “exist, persist, maintain, and regenerate its vital cycles, structure, functions, and its processes in evolution.”¹⁰⁷ Further, everyone in Ecuador has the right to sue on behalf of the

⁹⁹ *Id.* at 741–43.

¹⁰⁰ *See generally* CHRISTOPHER D. STONE, *SHOULD TREES HAVE STANDING? LAW, MORALITY, AND THE ENVIRONMENT* (3rd ed. 2010).

¹⁰¹ *Id.* at 2.

¹⁰² *Id.* at 8.

¹⁰³ *See* Gwendolyn J. Gordon, *Environmental Personhood*, 43 *COLUM. J. ENV'T L.* 49, 50 (2018).

¹⁰⁴ *See, e.g.*, Cass R. Sunstein, *Standing for Animals (with Notes on Animal Rights)*, 47 *UCLA L. REV.* 1333 (2000) (arguing for the expansion of standing to animals).

¹⁰⁵ As with many legal concepts, there are both proponents of and detractors from environmental personhood. The merits are not fully discussed in this Comment; the focus is rather on the application of the concept.

¹⁰⁶ *See Rights of Nature*, COMMUNITY ENVIRONMENTAL LEGAL DEFENSE FUND, <https://perma.cc/M65Y-A8RW>.

¹⁰⁷ Constitution of the Republic of Ecuador 2008, Sept. 28, 2008, art. 71–74.

environment.¹⁰⁸ The principles of environmental personhood enshrined in their constitution have been upheld in Ecuadorian court, with the Provisional Court of Loja granting an injunction against the construction of a road and ordering the remediation of the Vilcabamba River in a 2011 decision.¹⁰⁹ The initial claim was brought by two natural persons on behalf of the environment, demonstrating the feasibility of environmental personhood claims in court.

Along similar lines, Bolivia introduced legislation granting “Mother Earth” rights equal to those of natural persons in 2010 and 2012.¹¹⁰ Bolivia authorized the creation of governmental agencies to litigate on behalf of the earth and oversee climate change related policies. These laws, like Ecuador’s, promote the right-to-life for natural ecosystems and enable litigation on behalf of nature.

The U.S. and New Zealand have used a more limited approach, granting juridical personhood to specific environmental features, rather than to the entire environment. Within the U.S., the most notable effort to introduce environmental personhood was the Lake Erie Bill of Rights passed by a ballot measure in the City of Toledo, Ohio.¹¹¹ The ballot measure gave Lake Erie the right to “exist, flourish, and evolve naturally” and empowered citizens to sue on behalf of the lake to enforce those rights against polluters.¹¹² However, this measure was later nullified by the Ohio General Assembly in a provision added to an annual budget.¹¹³ The law stated that “[n]ature or any ecosystem does not have standing to participate in or bring an action in any court of common pleas” and “[n]o person, on behalf of or representing nature or an ecosystem, shall bring an action in any court of common pleas.”¹¹⁴ Additionally, a U.S. district court later found the Lake Erie Bill of Rights to be unconstitutionally vague and exceeding the

¹⁰⁸ *Id.*; see also Andrew C. Revkin, *Ecuador Constitution Grants Rights to Nature*, DOT EARTH: N.Y. TIMES BLOG (Sept. 29, 2008), <https://perma.cc/TTS6-GYP3>.

¹⁰⁹ Natalia Greene, *The First Successful Case of the Rights of Nature Implementation in Ecuador*, GLOBAL ALLIANCE FOR THE RIGHTS OF NATURE, <https://perma.cc/23DE-AVUA>.

¹¹⁰ Ley de Derechos de la Madre Tierra, Law 071 (Dec. 2010) (Bol.); La Ley Marco de la Madre Tierra y Desarrollo Integral para Vivir Bien, Law 300 (Oct. 2012) (Bol.); see also John Vidal, *Bolivia Enshrines Natural World’s Rights with Equal Status for Mother Earth*, THE GUARDIAN (Apr. 10, 2011), <https://perma.cc/XZV2-ARMT>.

¹¹¹ Timothy Williams, *Legal Rights for Lake Erie? Voters in Ohio City Will Decide*, N.Y. TIMES (Feb. 17, 2019), <https://perma.cc/4H43-2DY9>; see also Dana Zartner, *How Giving Legal Rights to Nature Could Help Reduce Toxic Algae Blooms in Lake Erie*, SALON (Sept. 15, 2019), <https://perma.cc/KP2G-X6JH>.

¹¹² Jason Daley, *Toledo, Ohio, Just Granted Lake Erie the Same Legal Rights as People*, SMITHSONIAN MAGAZINE (Mar. 1, 2019), <https://perma.cc/BF9D-EBEA>.

¹¹³ OHIO REV. CODE ANN. § 2305.011 (West 2019).

¹¹⁴ *Id.* Additionally, a farmer filed a lawsuit challenging the Lake Erie Bill of Rights under 42 U.S.C. § 1983. See *Drewes Farms P’ship v. City of Toledo*, No. 3:19 CV 434, 2019 WL 1254011 (N.D. Ohio Mar. 18, 2019).

power of a municipal government in Ohio.¹¹⁵ Although this effort to introduce environmental personhood was thwarted, the fact that it passed democratically shows the growing appetite for such legal solutions in the U.S. A number of local ordinance proposals across the U.S. indicate interest among local environmental activists.¹¹⁶ New Zealand passed legislation granting environmental personhood to the Urewera Forest¹¹⁷ and the Whangangui River.¹¹⁸ The protection of the river is grounded in recognizing it as an ancestor of the Māori people. A representative of the Crown and a representative of the Whanganui iwi act as protectors of the river and its rights, giving them standing much like Justice Douglas envisioned.

Just days after the New Zealand parliament granted rights to the Whangangui River, a judicial ruling in India's Uttarakand High Court extended similar protections to the Ganges River.¹¹⁹ The court appointed two state officials to serve as guardians of the river and its rights. This represents an interpretation closer to the aim of this Comment: rather than granting new rights, the Indian high court recognized the existing importance of nature and, thus, expanded legal standing.

In 2016, the Constitutional Court of Colombia reached a result similar to that of the Indian court, declaring that the "Atrato River basin possesses rights to 'protection, conservation, maintenance, and restoration.'"¹²⁰ This decision created a joint guardianship between a representative of the government and a member the indigenous peoples living in the river basin. Following the Constitutional Court's decision, the Supreme Court of Justice of Colombia recognized the Colombian portion of the Amazon river as a "subject of rights."¹²¹ Colombia's

¹¹⁵ *Drewes Farms P'ship v. City of Toledo*, 441 F. Supp. 3d 551, 558 (N.D. Ohio 2020), *appeal dismissed sub nom.* *Drewes Farms P'ship v. City of Toledo*, OH, No. 20-3368, 2020 WL 3619934 (6th Cir. Apr. 14, 2020), *appeal dismissed sub nom.* *Drewes Farms P'ship v. City of Toledo*, OH, No. 20-3361, 2020 WL 3620205 (6th Cir. May 5, 2020).

¹¹⁶ Gordon, *supra* note 103, at 58–61.

¹¹⁷ Te Urewera Act 2014 (N.Z.).

¹¹⁸ Te Awa Tupua (Whanganui River Claims Settlement) Act 2017 (N.Z.); *see also* Kennedy Warne, *A Voice for Nature*, NATIONAL GEOGRAPHIC (Apr. 24, 2019), <https://perma.cc/HC9L-7XAM>.

¹¹⁹ *Salim v. State of Uttarakhand*, Writ Petition (PIL) No. 126 of 2014 in the High Court of Uttarakhand at Nainital (2017) (India); *see also* *After New Zealand, India's Ganges Gains Legal Status of a Person*, DHAKA TRIBUNE (Mar. 20, 2017), <https://perma.cc/4RAC-K83R>; Rina Chandran, *India's Sacred Ganges and Yamuna Rivers Granted Same Legal Rights as Humans*, REUTERS (Mar. 21, 2017), <https://perma.cc/45PP-Z29L>.

¹²⁰ Press Release, Community Environmental Legal Defense Fund, Colombia Constitutional Court Finds Atrato River Possesses Rights (May 4, 2017), <https://perma.cc/A9H3-LKCC>.

¹²¹ Nicholas Bryner, *Colombian Supreme Court Recognizes Rights of the Amazon River Ecosystem*, INTERNATIONAL UNION FOR THE CONSERVATION OF NATURE (Apr. 20, 2018), <https://perma.cc/9CSU-ERYV>. For the original opinion in Spanish, see Corte Suprema de Justicia [C.S.J.] [Supreme Court], Sala de Casación Civil, abril 5, 2018, M.P.: L. Villabona, STC4360-2018 (Colom.), <http://www.cortesuprema.gov.co/corte/wp-content/uploads/2018/04/STC4360-2018-2018-00319-011.pdf>.

decisions represent a model for a high court adjudicating a claim involving environmental personhood.

In 2019, the Supreme Court of Bangladesh issued an even broader decision, granting legal rights to all of Bangladesh's rivers to protect them from pollution and dredging.¹²² The Bangladeshi court appointed the National River Conservation Commission, a government agency, to serve as the legal guardian of the rivers and thus bring suits on the river's behalf.

As can be expected from their extremely strong stances on granting the environment juridical standing within their own borders, Ecuador and Bolivia lead the way in advocating for international adoption of the environmental personhood model. During a 2010 conference in Bolivia, the Universal Declaration of the Rights of Nature was drafted with the intention of creating a new international treaty similar to the laws found locally in Bolivia.¹²³ Similarly, Ecuador has supported the concept of an International Rights of Nature tribunal.¹²⁴ Neither of these ideas have gained substantial traction within the international governmental community, but there has been support from environmentalist organizations.¹²⁵

The legal background for this Comment is bifurcated. Currently, the international treaty regime fails to substantially address what appears to be an imminent problem, creating a grim outlook for extraterrestrial environments. In contrast, the potential solution for extraterrestrial environmental protection appears to be taking off on Earth. The next section hypothesizes the fusion of these two realities.

IV. RECOGNIZING ENVIRONMENTAL PERSONHOOD FOR CELESTIAL BODIES AS A SOLUTION

Judicial application of the environmental personhood concept to the outer space context can create an effective regulatory regime by utilizing the existing treaty framework. Enacting large scale international legislation instituting environmental personhood is unlikely as support for even the Moon Treaty has been limited and corporate interests would likely oppose potential liability.

¹²² Rina Chandran, *Fears of Evictions as Bangladesh Gives Rivers Legal Rights*, REUTERS (July 4, 2019), <https://perma.cc/4SRX-WSUM>.

¹²³ See Andres Schipani, *Grassroots Summit Calls for International Climate Court*, THE GUARDIAN (Apr. 23, 2010), <https://perma.cc/LSL3-PCQZ>; Brandon Keim, *Nature to Get Legal Rights in Bolivia*, WIRED (Apr. 18, 2011), <https://perma.cc/CE7E-X8TE>.

¹²⁴ Cormac Cullinan, *A Tribunal for Earth: Why it Matters*, International Rights of Nature Tribunal, <https://perma.cc/68VZ-LK8W>.

¹²⁵ See Linda Sheehan, *No One Is Above Nature's Rule of Law*, Leonardo DiCaprio Foundation, <https://perma.cc/68VZ-LK8W>; *Bolivia's Leadership*, GLOBAL ALLIANCE FOR THE RIGHTS OF NATURE, <https://perma.cc/RTF8-QYTH>.

Instead, environmentalists should pursue the judge-led expansion of rights for celestial bodies through legal action. Although the application to outer space might be new, the use of courts and judgments to enumerate and enforce rights is a proven tactic.

Utilizing the Outer Space Treaty and the Space Liability Convention, to which all major spacefaring nations are parties, can create a swift and clear result in favor of the environmental rights of celestial bodies. Through the texts of these two treaties, a case can be made that the ability to bring claims on behalf of celestial bodies already exists—it merely needs to be articulated by a judge.

Section A below explains the jurisdiction of the ICJ over the current treaties and environmental claims. Section B explores how a hypothetical plaintiff could have third-party standing in a contentious claim, with the ICJ either explicitly interpreting the term “juridical person” to include environmental person or using a common law approach to apply environmental personhood. Section C discusses the potential appeal for the ICJ to avoid a contentious decision that could be rejected by a defendant and instead issue an advisory opinion at the request of a specialized U.N. agency. The contentious claim is more binding but has less viability when compared to an advisory opinion. Subsections B and C will discuss their possibility of success weighed against their relative strengths. Section D explores the shortcomings of the ICJ adopting environmental personhood, and Section E discusses alternative solutions and their appeal.

Once environmental personhood for outer space bodies is implemented, there will be a deterrent effect of liability for actors that fail to prevent contamination through sufficient planetary protection protocols. A commercial space venture might implement better precautions if it believes precautions are a good investment to prevent or reduce potential liability. As a secondary benefit, the ICJ could order remediation efforts or funds as well, but once a contamination occurs it is hard to stop as we have seen with invasive species on Earth. Similarly, the value gained by exploiting space resources and diminishing the common heritage of mankind must be weighed against a potential judgment.

A. Jurisdiction of the International Court of Justice

Under the U.N. Charter, the ICJ has jurisdiction to issue advisory opinions and hear contentious cases.¹²⁶ Members of the U.N. are automatically subject to the authority of the ICJ, so it cannot be avoided the same way that so many nations have simply failed to ratify the Moon Treaty. Presently, 74 countries have accepted compulsory jurisdiction of the ICJ, including Japan, Canada, and many members

¹²⁶ U.N. Charter arts. 92, 94–96.

of the European Space Agency.¹²⁷ In recent years, the ICJ has heard contentious cases involving environmental claims, including a 2008 claim by Ecuador against Colombia for the aerial spraying of herbicides¹²⁸ and a claim by Argentina against Uruguay for the contamination of the Uruguay River.¹²⁹ Although both of those claims were eventually withdrawn, they demonstrate the initial willingness of the ICJ to adjudicate and potentially assess the compensatory damages for environmental claims. In February 2018, the ICJ decided its first case involving environmental injury, holding that Nicaragua had to compensate Costa Rica for damages to the ecology along the border of the two nations.¹³⁰ What is new to the court is not the idea of environmental claims, but rather the setting and idea of third-party standing on behalf of the environment.

B. Bringing a Contentious Claim

There is a growing belief that the ICJ can hear and settle disputes involving space law.¹³¹ The logic under the current regime is as follows: if disputes arising under the Outer Space Treaty fail to be resolved through diplomatic channels, then resolution must come from “international law, including the Charter of the U.N., in the interest of maintaining international peace and security and promoting international co-operation and understanding.”¹³² Article 33 of the U.N. Charter directs disputes between nations to be referred to the ICJ, granting the court jurisdiction over unsettled space claims.¹³³ The Space Liability Convention also holds nations responsible for the actions of private parties launching from within their borders. The International Law Association drafted a proposed “Convention on the Settlement of Space Law Disputes” in 1984 before revising the language and formally adopting the text in 1998. The drafted Convention states a preference for a proposed International Tribunal of Space Law but provides for adjudication by the ICJ as the next alternative means of dispute resolution.¹³⁴ This demonstrates a broader sentiment in the international

¹²⁷ *Declarations Recognizing Jurisdiction of the Court as Compulsory*, INT’L CT. JUST., <https://perma.cc/CB6H-8FUD>.

¹²⁸ *Aerial Herbicide Spraying (Ecuador v. Colom.)*, Order, 2013 I.C.J. 278 (Sep. 13).

¹²⁹ *Pulp Mills on the River Uruguay (Arg. v. Uru.)*, Provisional Measures, 2007 I.C.J. 3 (Jan. 23).

¹³⁰ *Certain Activities Carried Out by Nicaragua in the Border Area (Costa Rica v. Nicar.)*, Judgment, 2018 I.C.J. 150 (Feb. 2).

¹³¹ See Frans G. von der Dunk, *Space for Dispute Settlement Mechanisms – Dispute Resolution Mechanisms for Space? A Few Legal Considerations*, UNIV. OF NEB. COLLEGE OF LAW, SPACE, CYBER, AND TELECOMMUNICATIONS LAW PROGRAM FACULTY PUBLICATIONS (2001); see also VIKARI, *supra* note 18, at 287 (noting the availability of the Permanent Court of Arbitration for use by private parties).

¹³² Outer Space Treaty, *supra* note 35, art. III, with similar language in the Space Liability Convention.

¹³³ U.N. Charter art. 33; see also VIKARI, *supra* note 18, at 289–90.

¹³⁴ See VIKARI, *supra* note 18, at 307.

legal profession that the ICJ has the institutional competence to handle such a case.

The most important part of the case would not necessarily be the merits of the claim, but the underpinning of the plaintiff's standing. Examination of these processes shows the path toward environmental personhood for celestial bodies. The grounds for a contentious case could be based upon violations of the Outer Space Treaty, particularly the aforementioned language in Article IX directing parties to conduct their exploration and studies of celestial bodies while avoiding harmful contamination. Introducing tardigrades to the surface of the Moon could have negative consequences, as could plans to mine the lunar ice; a plaintiff would need to sue an actor causing some substantial effect of environmental degradation. If a private actor such as SpaceIL or the Arch Mission Foundation did contaminate the lunar environment and substantial environmental damage were subsequently proven, the U.S. would be the nation liable under the Space Liability Convention.

1. Bringing the Claim

A plaintiff-nation such as Ecuador could bring a contentious claim against the U.S. or Israel for their negligence in regulating their space industries and allowing the contamination of the lunar surface with tardigrades. The plaintiff-nation would need to sue the home country of any private actor rather than that actor themselves since the ICJ would not have jurisdiction over non-state parties. The defendant-nation could then seek to collect judgment from the private party responsible for the environmental damage. Ecuador could claim that it has standing based on the violation of the Outer Space Treaty through environmental personhood of the Moon and seek judicial interpretation by the ICJ of the relevant space treaties.

The Outer Space Treaty's terminology prohibiting "adverse changes in the environment" and "harmful contamination" are largely undefined.¹³⁵ The ICJ could conclude that exploitation or contamination of the lunar environment is a violation of the Outer Space Treaty. This presents a relatively straightforward way for a nation like Ecuador to bring a claim against offending nations. In order to seek damages though, it would be more useful to receive a ruling granting third-party standing.

2. Deciding a Case Explicitly Under Environmental Personhood

The Statute of the International Court of Justice includes sections determining the competence of the court and guiding the decision-making process.¹³⁶ Under Article 38, the ICJ is to apply law based on international

¹³⁵ See Viikari, *supra* note 77, at 729–30.

¹³⁶ ICJ Statute, *supra* note 74.

convention, international custom, “general principles of law recognized by civilized nations,” and “judicial decisions and the teachings of the most highly qualified publicists of the various nations.”¹³⁷ Utilizing this jurisprudential guidance, the ICJ could find that the international momentum is shifting towards recognizing environmental personhood as an increasingly accepted legal principle. Article III of the Outer Space Treaty makes all public international law applicable to space activities, so an international customary law of environmental personhood could be thought of as operating in the background of the Outer Space Treaty. The court would not have to reach far to see the many recent examples of high courts adopting the principle of environmental personhood and implement it in the international field of space law. Under this logic, the ICJ could recognize the Moon as a juridical person under the text of the Outer Space Treaty and enable other parties, such as Ecuador, to bring a claim on its behalf when the treaty has been violated.

Beyond the Outer Space Treaty, the ICJ could look to the Moon Treaty as the starting point for discussions regarding the laws governing the Moon.¹³⁸ Despite its limited adoption, the Moon Treaty serves as the best articulation of international law for the Moon and could be used as an explanatory companion of the Outer Space Treaty as discussed previously. The language of the Moon Treaty was the product of an extensive drafting process by the U.N., including the American and Soviet edits that were implemented.¹³⁹ While those nations ultimately declined to ratify the Moon Treaty as an objection to specific language, it still serves as the best demonstration of international intention in this area. In the same way that New Zealand explained its implementation of environmental personhood as recognition of the ancestry of the Māori people,¹⁴⁰ the ICJ could utilize the language of the Moon Treaty, which states that the Moon is part of the “common heritage of all mankind.”¹⁴¹ Enabling claims by third parties brought on behalf of the Moon validates the language of the Moon Treaty, with the New Zealand implementation as precedent.

3. Deciding a Case Using a Common Law Approach

Beyond the argument that environmental personhood is becoming an accepted principle, the judges could also be motivated by the even broader idea that the creation of common law principles can be a form of regulation. Professor

¹³⁷ *Id.* art. 38.

¹³⁸ See Richard B. Bilder, *A Legal Regime for the Mining of Helium-3 on the Moon: U.S. Policy Options*, 33 *FORD. J. INT'L L.J.* 243, 259 (2009).

¹³⁹ See James R. Wilson, Note, *Regulation of the Outer Space Environment Through International Accord: The 1979 Moon Treaty*, 2 *FORDHAM ENV'T L. REV.* 173, 176–77 (2011).

¹⁴⁰ See Te Urewera Act, *supra* note 117; Te Awa Tupua Act, *supra* note 118.

¹⁴¹ Moon Treaty, *supra* note 36, art. 11.

Fabio Tronchetti, a leading space law expert, has called for the development of a legal regime that can protect the environment through reviewing and even interrupting activity that threatens the environment.¹⁴² Tronchetti has theorized that this regime could be an instrument attached to the Moon Treaty, Outer Space Treaty, or an independent legal instrument.¹⁴³ Creating a liability system for environmental protection of celestial bodies would also be consistent with the Moon Treaty's call for the establishment of an international regime governing the Moon. The Moon Treaty does not state that the regime must be administrative in nature. A judicially constructed liability regime may qualify under the treaty as a sort of delegation of authority by the States Parties under Article 11 § 5 of the Moon Treaty. The regime would need to address the Moon Treaty's stated goals of safe and rational management of lunar resources and equitable benefits to all States Parties. Enabling standing for claims of harm to celestial bodies would allow states to sue when another state or private actor has acted in a manner that is not safe for the juridical person of the Moon. The use of a more common law approach through the ICJ would be a unique solution but still has the potential to satisfy many of Tronchetti's criteria. Under the common law framework, judges will alter and improve rules in order to create a regulatory system of liability.

Indeed, the pollution of outer space brings in several familiar situations that may be addressable based on common law tort and property theories. When a river is being polluted upstream, there is an expectation in tort law that someone will be able to show an ex post injury downstream, providing a regulating effect through the plaintiff's claim. Alternatively, a governmental authority can step in before an injury occurs and create an ex ante regulatory system.¹⁴⁴ But both avenues to liability and thus regulation are absent in outer space. There is no governmental authority with the power to regulate or levy fines. The ex post deterrent is also weaker as it will be hard for any individual or government to demonstrate their present harm from extraterrestrial pollution or even the certainty that potential future harm will impact them specifically. A plaintiff such as Ecuador would struggle to show causation for an environmental damage occurring on the other side of the Earth, and it would be even more difficult when that distance is multiplied nearly twenty-fold to the surface of the Moon. Through the lens of property law, the resources on the Moon and other celestial bodies are common resource pools and thus threatened by the tragedy of the commons.¹⁴⁵

¹⁴² Tronchetti, *supra* note 11, at 811.

¹⁴³ *Id.* at 812.

¹⁴⁴ See generally Susan Rose-Ackerman, *Regulation and the Law of Torts*, 81 AM. ECON. REV. 54 (1991) (discussing the relationship between "private" tort law and "public" statutes in regulatory frameworks).

¹⁴⁵ See generally Brian C. Weeden & Tiffany Chow, *Taking a Common-Pool Resources Approach to Space Sustainability: A Framework and Potential Policies*, 28 SPACE POL'Y 166 (2012).

Without some rule protecting their usage, these resources will be exploited. But again, judges would be hard pressed to find who could claim the resources in order to preserve them, and thus the common law approach at first appears to fall short.

These common law principles begin to work again when environmental personhood is introduced. Recognizing the juridical personhood of the Moon would allow individual or organizational custodians to sue on behalf of the damaged ecosystem. While it would be necessary for another nation to bring the claim, such as Ecuador, the ICJ could grant a custodianship to an organization or select group of individuals. This is consistent with the models pioneered in India,¹⁴⁶ New Zealand,¹⁴⁷ and Colombia.¹⁴⁸ The U.N. Committee on the Peaceful Uses of Outer Space or the U.N. Office for Outer Space Affairs could serve this role.

Grounding a decision in the tradition of the common law might be more appealing to ICJ justices. Rather than be accused of implementing a relatively new legal concept without international proof of concept and giving substantial power to single state-plaintiffs, the common law method is a smaller leap forward in judicial reasoning. The ICJ would be much closer to the customary international law sources of precedent in national courts and could draw on deeper wells of international precedent in the environmental and tort areas of law, demonstrated by *Costa Rica v. Nicaragua* and the Russian-Canadian settlement.

4. Prospect of Success

The potential of the contentious case strategy can be evaluated on two factors: the probability of securing a favorable judgment in the law and the ability to secure the desired remedy. Monetary damages are likely the best remedy for a claim of lunar environmental degradation. This form of penalization gives polluters an economic choice between adopting precautions and paying for remediation. Alternatively, an injunction would be too hard for the ICJ to enforce given that a defendant might choose to ignore the decision, knowing the ICJ lacks serious enforcement power. The contentious case strategy is weaker in its likelihood of success but stronger in its ability to provide a substantive remedy.

The probability of securing a judgment is undermined by the fact that it requires a plaintiff nation who is willing to finance the litigation, risk the diplomatic consequences of suing a powerful spacefaring nation, and lose future space industry revenue as a result of an anti-space industry reputation. Although Ecuador or Bolivia might be willing to take this step given their constitutional dedication to the environment and present lack of a space industry, the ICJ might

¹⁴⁶ See Chandran, *supra* note 122.

¹⁴⁷ See Warne, *supra* note 118.

¹⁴⁸ See Bryner, *supra* note 121.

be concerned about the legitimacy costs of adopting such a new concept. But, grounding the decision as common law progress could mitigate this concern.

Given the history of damages awarded in recent international environmental cases, the contentious case strategy provides a useful avenue to secure the desired remedy. The compensation paid to Canada by Russia evidences that monetary damages can be appropriate compensation for damage in space.¹⁴⁹ Instead of payment by the offending nation to the nation bringing the claim on behalf of a celestial body, the damages could be redirected toward lunar conservation or the funding of environmental impact research through COPUOS. Rather than require the direct sharing of economic benefits, which many industrialized countries found objectionable with the Moon Treaty, the contribution to lunar conservation could present a more acceptable tribute to the common heritage of all mankind. The relevant U.N. organs could manage an environmental conservation trust on behalf of the Moon. This idea combines the only precedent under the Space Liability Convention, the Russia-Canada settlement,¹⁵⁰ with the recent precedent of environmental rulings at the ICJ, including the Costa Rica-Nicaragua dispute.¹⁵¹ Directing the use of funds towards the appropriate destinations is consistent with the Costa Rica-Nicaragua ruling. If the ICJ continues to move in the direction of awarding damages for environmental claims, the prospect of using a contentious case for resolution will grow.

During contentious cases, States Parties not represented in the composition of the ICJ's bench have the opportunity to appoint an ad hoc judge pursuant to Article 31 of the Statute of the ICJ. Even if the court were to dismiss a case on the merits and not discuss the element of standing through environmental personhood, a judge appointed by the environmentalist nation bringing the claim could issue a dissenting or concurring opinion. An opinion approvingly citing environmental personhood would create kindling for future claims in the same manner as Justice Douglas in *Morton*.

C. Seeking an Advisory Opinion

Alternatively, the ICJ could reach a similar conclusion without the use of a contentious case through its capacity to issue advisory opinions. The advisory opinion offers several benefits: it would not require a single nation to initiate the process, it would avoid creating an immediate loser, and it would offer an opportunity to create a legal regime without limiting the ICJ to a presented set of facts. Advisory opinions are not binding, but the requesting agency or organ can

¹⁴⁹ Claims Protocol, *supra* note 70.

¹⁵⁰ *Id.*

¹⁵¹ Certain Activities Carried Out by Nicaragua in the Border Area (Costa Rica v. Nicar.), Judgment, 2018 I.C.J. 150 (Feb. 2).

adopt the opinion to make it international law.¹⁵² Additionally, advisory opinions carry the weight of the international court and can influence subsequent behavior for actors wishing to avoid a detrimental contentious case.

1. Requesting an Advisory Opinion

Article 96 of the U.N. Charter says that “[t]he General Assembly or the Security Council may request the [ICJ] to give an advisory opinion on any legal question.”¹⁵³ Further, “[o]ther organs of the United Nations and specialized agencies which may at any time be so authorized by the General Assembly, may also request advisory opinions of the Court on legal questions arising within the scope of their activities.”¹⁵⁴ Previous U.N. agencies that have received advisory opinions include the World Health Organization¹⁵⁵ and the Inter-Governmental Maritime Consultative Organization, now the International Maritime Organization.¹⁵⁶

The most relevant part of the U.N., COPUOS, would likely be an entity capable of asking for an advisory opinion as it operates as a subcommittee of the General Assembly. In order to bring a claim, members of the committee would need to pass a resolution asking the ICJ to clarify whether the term “juridical person” from Article I of the Space Liability Convention extends to environmental persons.¹⁵⁷ Alternatively, an agency could request an advisory opinion on the same question. There are currently 17 U.N. specialized agencies,¹⁵⁸ with the International Civil Aviation Organization and the U.N. Industrial Development Organization being the specialized agencies best positioned to request an advisory opinion given their normal areas of expertise. The most germane U.N. organ to request an advisory opinion would be UNOOSA, because of its outer space expertise, but it is below the specialized agency status and therefore lacks standing to request an advisory opinion. Generally, agencies might be the more likely to act, since committees can be paralyzed by protesting nations profiting from space exploitation.

The opinion would ideally come from an agency first requesting clarification as to whether the term “juridical person” in the various treaties could be interpreted as including environmental persons. The most important treaty for

¹⁵² *How the Court Works*, INT’L CT. JUST., <https://perma.cc/H85W-XHK7>.

¹⁵³ U.N. Charter art. 96.

¹⁵⁴ *Id.*

¹⁵⁵ *Legality of the Use by a State of Nuclear Weapons in Armed Conflict*, Advisory Opinion, 1996 I.C.J. 93 (July 8).

¹⁵⁶ *Constitution of the Maritime Safety Committee of the Inter-Governmental Maritime Consultative Organization*, Advisory Opinion, 1960 I.C.J. 43 (June 8).

¹⁵⁷ *Space Liability Convention*, *supra* note 64, art. I.

¹⁵⁸ *Funds, Programmes, Specialized Agencies and Others*, U.N., <https://perma.cc/4BME-UKSB>.

this part of the advisory opinion might be the Space Liability Treaty as it would then give rise to claims for damages. The next part of a request for an advisory opinion would seek to understand who can bring suit on behalf of juridical persons within the ICJ. While the ordinary answer might be based on the nationality of the juridical person, the space treaties would already prohibit the celestial bodies as being considered part of any country. The ICJ may recognize that any state party to the Outer Space or Space Liability treaties would have standing to bring a claim against a violator. It is possible that the ICJ would recognize the ability of natural persons to also bring suits on behalf of environmental persons under the idea of “common heritage” similar to the New Zealand example discussed previously, but this seems unlikely as the ICJ would probably caution against a deluge of claims from individuals. Beyond states parties, the next best plaintiffs would likely be the U.N. agencies themselves.

2. Advantages and Relative Value of an Advisory Opinion

In the context of an advisory opinion, the ICJ might be more willing to take a bigger leap in protecting the environmental futures of celestial bodies. The ICJ would be less afraid of losing legitimacy or seeing the immediate withdrawal of nations from its jurisdiction. Furthermore, issuing an advisory opinion is an inherently prospective exercise; it does not require adjudication between states parties and therefore avoids the potentially undesirable optics of creating an immediate loser in an area of previous legal uncertainty.

In comparison to a favorable contentious case opinion, securing a favorable advisory opinion is less valuable. The advisory opinion is not binding on specific parties and fails to deliver the precedent of monetary damages for extraterrestrial environmental damage. Partially redeeming the value of the advisory opinion is the limitation of the risk for the ICJ, with fewer political consequences for generating a potentially controversial ruling. Weighing the comparative benefits and risks, the contentious case likely offers the better strategy for environmentalists to attract significant international attention to the problem and potentially secure a remedy.

D. Shortcomings

Implementing environmental personhood for celestial bodies would be a substantial step forward for the jurisdiction of the ICJ. Ordering substantial damages or administrative action would likely stretch the boundaries of the court’s power. A stronger ICJ may be necessary as the world becomes more connected and some authority over space becomes essential to avoiding international conflict. In the absence of the international committee envisioned by the Moon Treaty, the ICJ may not be a perfect solution, but it might be one of the only available solutions at present. This Section will discuss several of the difficulties

associated with the proposed solution: national opposition, limits on institutional capacity, and alternative interpretation of the outer space treaties.

1. National Opposition

Nations are clearly interested in promoting the development of their space industries to grow their economies and acquire early dominance. The U.S. has repeatedly introduced legislation to economically incentivize the development of its space industry¹⁵⁹ and has recognized the potential growth limiting factors of cooperating with the international regime.¹⁶⁰ A critical flaw of the plan is the potential refusal or reluctance of the U.S. to comply with decisions of the ICJ.

After the ICJ ruled in favor of Nicaragua in *Nicaragua v. United States*,¹⁶¹ the U.S. refused to pay damages. The U.S. protested the court's jurisdiction despite decades of previous compliance.¹⁶² While the U.N. Security Council has the power to enforce judgments of the court, the U.S. is a permanent member with veto power, a status it used repeatedly against attempts to collect reparations. The undetermined level of compliance by the U.S., particularly given its withdrawal from the Paris Agreement,¹⁶³ may undercut the effectiveness of an ICJ judgment in favor of protecting celestial bodies. One commenter noted that an international regime regulating space would "be meaningless unless the U.S., the 800-pound gorilla in space, agrees to go along with the results."¹⁶⁴ Major commercial actors based in the U.S., such as SpaceX and Blue Origin, would be more shielded from a judgment, although the overall industry may be more global in nature. However, the language of the Outer Space Treaty, to which the U.S. is a party, does obligate it to cooperate in the international law of outer space. To the extent that the ICJ can dictate what the law is through advisory opinions and contentious holdings, the U.S. would be bound to it, at least in principle.

2. Institutional Capacity

Currently, there are a limited number of spacecraft and the focus of commercial spaceflight is on low Earth orbit, so it is conceivable to employ the

¹⁵⁹ See Space Frontier Act of 2019, S. 919, 116th Cong. (2018); Invest in Space Now Act, H.R. 2358, 108th Cong. (1st Sess. 2003).

¹⁶⁰ See Rosanna Sattler, *Transporting a Legal System for Property Rights: From the Earth to the Stars*, 6 CHI. J. INT'L L. 23 (2005) (discussing how the current space regime does not provide for property rights, a major impediment for space exploration, exploitation, and development).

¹⁶¹ Military and Paramilitary Activities in and Against Nicaragua (Nicar. v. U.S.), Judgment, 1986 I.C.J. 14 (Nov. 26).

¹⁶² See Abram Chayes, *Nicaragua, the United States, and the World Court*, 85 COLUM. L. REV. 1445 (1985) (noting that in 1985, the U.S. terminated its Declaration of Aug. 26, 1946, which had provided for the compulsory jurisdiction of the ICJ).

¹⁶³ Paris Agreement to the United Nations Framework Convention on Climate Change, Dec. 12, 2015, T.I.A.S. No. 16-1104.

¹⁶⁴ Tannenwald, *supra* note 87, at 421.

ICJ and state plaintiffs to establish an early common law system for governing outer space environmental liability. More space traffic is undoubtedly coming as outlined in prior sections, which may call into question the efficacy of using a litigation-based regime. Hoping for environmentally virtuous nations to bring claims requires that they track the movements of potentially thousands of spaceflights and mining activities and then fund their claims at the ICJ. Even asking for a U.N. body to perform a regulatory capacity of this magnitude could quickly strain the resources of the U.N.

One possible remedy is to implement a regime of plaintiff's attorney fees for bringing a successful claim on behalf of the environment to incentivize nations or organizations with standing to bring good claims. Attorney fees are common in international commercial arbitration,¹⁶⁵ although importing standards from commercial arbitration could seem initially discomfoting within the context of the ICJ. Such a proposal might seem unappealing in more controversial contexts such as war claims but could be acceptable in a specialized tribunal for space claims.

Turning from international arbitration to the custom in domestic legal systems, the English rule of loser pays is nearly universal outside the U.S.¹⁶⁶ The ICJ or another adjudicating entity could adopt loser-pays fees as customary international law, but this might also disincentivize plaintiffs fearful of footing a legal bill for a lost claim in an uncertain field of law.

There would be significant complications for a "polluter pays" liability regime as it is hard to track debris and other contaminants to the particular space craft depositing them.¹⁶⁷ Further, the cost of pollution is difficult to calculate and the resulting damages might exceed any economic benefit from space activity, chilling adoption since an absolute prohibition is incompatible with human need.¹⁶⁸ Determining the cost of pollution might require a determination about what has been taken from the commons entitled to all mankind or what cultural diminishment comes from altering a faraway surface.

3. Interpreting the Treaties' Gaps as Enabling Mining

A final issue would be a defensive claim that mining the Moon is legal under international law. The language of the Outer Space Treaty and Moon Treaties can be construed as allowing the extraction of resources from celestial bodies. While lunar resources cannot be claimed as property while still in the Moon, it could be

¹⁶⁵ John Yukio Gotanda, *Awarding Costs and Attorneys' Fees in International Commercial Arbitrations*, 21 MICH J. INT'L L. 1, 4 (1999).

¹⁶⁶ Jarno Vanto, *Attorneys' Fees as Damages in International Commercial Litigation*, 15 PACE INT'L L. REV. 203, 204 (2003).

¹⁶⁷ See Viikari, *supra* note 77, at 764.

¹⁶⁸ *Id.*

argued that extracted resources are claimable.¹⁶⁹ A ruling by the ICJ in favor of a defending extractor might occur under this interpretation, but it would not foreclose arguments based on contamination.

While it is conceivable that the text of the treaties could be used to enable private property, it requires creative and generous interpretation of the U.N. treaties to find sufficient loopholes. Article II of the Outer Space Treaty states that “[o]uter space, including the [M]oon and other celestial bodies, is not subject to national appropriation by claim of sovereignty, by means of use or occupation, or by any other means.”¹⁷⁰ This language, echoed in subsequent treaties, strongly places the Moon in an extraterritorial category and potentially precludes property rights over natural objects in outer space. The Outer Space Treaty also requires states parties to ensure their citizens comply with the treaty, prohibiting private property by extension. Arguments that the treaty only bans sovereign territorial claims and not individual property claims fail on this point.¹⁷¹ Attempts by private citizens to prospectively claim asteroids have been rejected by the U.S. Court of Appeals for the 9th Circuit, which held that an individual could not charge NASA for parking fees for landing on an asteroid he claimed to own.¹⁷² The district court had held that the fact that the U.S. was not a party to the more stringent Moon Treaty was not important; the plaintiff “failed to demonstrate that either statement establishes legal basis for his claim of a private property right on an asteroid.”¹⁷³

In practice, the U.S. and other spacefaring nations have taken possession of samples from outer space bodies, representing a form of property for national governments. Unlike the proposed large-scale mining operations, the samples taken by national space agencies thus far are relatively small amounts of material taken for scientific purposes with strict cross-contamination prevention protocols. Extraterrestrial sample collecting runs parallel with the scientific presence in Antarctica, pursuing scientific goals to benefit all with the resources belonging to the “common heritage of mankind.” Private exploitation and profit-seeking colonization does not fit within the spirit or straightforward reading of the U.N. space treaties.

Even if the ICJ or another body were to clearly state that the current outer space regime enables private property rights in what is meant to be an extraterritorial zone, the environmental personhood argument remains valid. Rather than deny the existence of private property rights in outer space, the

¹⁶⁹ See Bilder, *supra* note 138, at 268.

¹⁷⁰ Outer Space Treaty, *supra* note 35, art. II.

¹⁷¹ Berin Szoka & James Dunstan, *Space Law: Is Asteroid Mining Legal?*, WIRED (May 1, 2012), <https://perma.cc/CNN6-FK2C>.

¹⁷² *Nemitz v. NASA*, 126 F. App’x 343 (9th Cir. 2005).

¹⁷³ *Nemitz v. United States*, No. CV-N030599-HDM (RAM), 2004 WL 3167042, at *1 (D. Nev. Apr. 26, 2004), *aff’d sub nom.* *Nemitz v. NASA*, 126 F. App’x 343 (9th Cir. 2005).

juridical personhood of the Moon would enforce a common property right to lunar resources. Bringing claims on behalf of the Moon would vindicate these rights and collect damages for restoration or conservation efforts equal to what the individual infringer has taken from the commons. Private actors would retain rights to technology developed on the Moon, but any contamination caused by research would be grounds for a judgment for restoration of the natural state of the lunar environment.

E. Alternative Solutions

1. Establishing a Moon Authority

Many of the issues discussed in this paper, as well as other outer space legal problems, could be solved by the establishment of a lunar authority.¹⁷⁴ Such an authority could oversee permitting, conservation, and contamination prevention protocols. This authority is authorized by the Article 11 of the Moon Treaty, but the Moon Treaty's limited adoption is perhaps prohibitive of the creation of the organization. Any effort to organize an International Moon Authority would need to address the concerns that prevented the adoption of the Moon Treaty, namely the tension between nations with the capability to exploit celestial resources and those nations still developing space technology.¹⁷⁵ Utilizing the ICJ and environmental personhood may be preferable to establishing an administrative agency charged with the protection of celestial bodies. When the potential gains are trillions of dollars, the threat of regulatory capture of any administrative organization is grave.¹⁷⁶ It is possible that the administrative body could become used not to conserve the Moon but to conserve the opportunities for exploitation of celestial bodies for those actors with the necessary resources and influence.

2. Permanent Court of Arbitration

An often-discussed alternative to ICJ dispute resolution is the Permanent Court of Arbitration (PCA). Unlike the ICJ, the PCA can hear claims by private parties, eliminating the need for a state to agree to bring a claim in the ICJ.¹⁷⁷ If a claim were first brought in the PCA, it is less likely that the PCA would seek to progress international law and generate standing. The PCA also has fewer member states and lacks any form of compulsory jurisdiction. As a result, it would be better

¹⁷⁴ Blake Gilson, Note, *Defending Your Client's Property Rights in Space: A Practical Guide for the Lunar Litigator*, 80 FORDHAM L. REV. 1367, 1403–04 (2011).

¹⁷⁵ *Id.* at 1404.

¹⁷⁶ This refers to the idea that regulatory agencies can be “captured” by the influence of lobbyists from the industries they seek to regulate in order to coopt them to meet the industry's goals.

¹⁷⁷ *Dispute Resolution Services*, PERMANENT COURT OF ARBITRATION, <https://perma.cc/8VHG-MSVG>.

for a claim to first come in the ICJ, establish standing, and then allow parties to look to the PCA as a future alternative mechanism.

V. CONCLUSION

Even if a requested advisory opinion was not sufficiently clear on the issue of standing or a contentious claim failed on the merits, the act of bringing such a claim could lead to action within the international community. Faced with the possibility of liability for their extraterrestrial exploits, nations and private actors may begin to independently craft their own legal regime. While law enacted with the defendants might not be as appealing as a judicially crafted form of environmental justice, the discussion around a regulatory or legislative framework would at least bring attention to the risks already present. The U.S. and other nations may become more comfortable with the Moon Treaty if the alternative is a less predictable form of ICJ decision.

More broadly, outer space presents a *carte blanche* to explore a new way of considering humanity's relationship with nature. On Earth, we are tethered to tradition and fear the costs of moving away from the known principles of standing and torts. Yet, just as a pair of daring nations reached for the stars, now a few bold nations are reconsidering what it means to exist with nature. Embracing environmental personhood offers humanity an opportunity to test the legal concept as a way to preserve the environment and imagine a new way of coexisting with nature, rather than destroying it.

While the dividends of protecting celestial bodies may not be appreciated by extraterrestrial human inhabitants for generations, there is a potential collateral benefit to the adoption of environmental personhood of the Moon. It is possible that a ruling by the ICJ in favor for environmental personhood spawns a reflective impact on the international community of Earth. Nations may view environmental personhood as a new international norm to which they should conform. Alternatively, the success of an outer space regime for environmental regulation could provide a roadmap for the establishment of systems to combat climate change on Earth. The Paris Agreement sought to take an untested leap forward, but perhaps an experiment in space will provide an example of international environmental cooperation that can be replicated at home.