

The Right to the Night: New Legal Advocacy Strategies to Address Terrestrial Light Pollution

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We are losing the night. While this may seem like a strange statement, it reflects a growing reality that could severely impact many living things on Earth. The global spread of electric lights, combined with the round-the-clock nature of life and the launch of thousands of satellites, has rapidly “lightened” our world. Light pollution has increased so dramatically that, within a single generation, approximately half of the stars in the night sky visible to the unaided eye will disappear from view. This loss of darkness is having significant impacts on nearly all living things, including human health, animal behavior, and cultural and spiritual practices. Yet, to date, existing domestic and international laws have failed to address this urgent issue. In this paper, we propose new strategies that use domestic legal mechanisms, supported by international law, to protect the darkness. By combining the fields of law and astronomy, we outline three legal approaches to protect the night sky, each based on the concept of rights: individual rights, community rights, and rights of Nature. These approaches differ from those commonly used, particularly in the United States, but we argue they may provide better opportunities for communities to address the increasingly harmful amount of light pollution brightening the darkness.

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I.INTRODUCTION

I grew up in Dayton, a small town in rural Minnesota about an hour north of Minneapolis. When I was a kid, Dayton really was a world away from the glowing lights of the city. My childhood summers were spent playing outside in the balmy upper Midwestern evenings, catching fireflies and counting the stars as they, one by one, appeared in the night sky. In the winter, back in the days before climate change had really started to mess with the Minnesota seasons, night would fall by 4:00 p.m. and we would go out on the lake to skate in the blackness with just the light of the moon and a flashlight to guide us. You couldn’t see more than a few feet in front of you, which was part of the mysterious joy of being out there in the frigid air.

Kids growing up in my hometown today don’t get to have those experiences. Not only is Dayton and the surrounding area turning into a suburb of a suburb of Minneapolis, but companies such as Federal Express, Budweiser, Graco, and Bobcat have built huge manufacturing and distribution centers on what used to be farmland. These massive warehouses shine towers of light into the rural sky all night long, which are visible even at my childhood home three miles away. No more catching fireflies by starlight; no more skating in the dark of winter; no more marking the passage of the seasons with the rhythms of the night skies.²

This story is just one small example of how we are losing the darkness from our nighttime sky. While this may seem like a strange statement, it is a reality

² Reflection of author Dana Zartner, Summer 2024.

with profound potential to adversely affect many living things on Earth.³ The global spread of electric lights, combined with the round-the-clock nature of modern life as well as the launch of thousands of satellites, has rapidly ‘lightened’ our world.⁴ Scientists estimate that light pollution has increased by nearly 10% year to year over the past decade, with night-sky brightness doubling approximately every seven years.⁵ At this rate, within a single generation, about half of the stars once visible to the unaided eye at the time of their birth will vanish from the night sky.

Because we can block out artificial light with sleep masks, blackout curtains, and sunglasses, many may not recognize this as an urgent problem. However, the diminishing darkness is already having both tangible and intangible effects on nearly all living things.⁶ In terms of tangible effects, the increase in light pollution harms many aspects of human health by disrupting sleep cycles, interfering with hormonal processes, and affecting mental health.⁷ The widespread loss of natural nighttime darkness has also given rise to the concept of *noctalgia*, which reflects, in essence, ‘sky grief’ and captures the sorrow over the “accelerating loss of the home environment of our shared skies.”⁸ Just as the loss of darkness affects humans, it also harms other living organisms, including animals, plants, and entire ecosystems that rely on the natural cycles of light and darkness to survive and thrive. Beyond the tangible impacts of losing darkness, there is also a rich intangible heritage at risk. This includes community histories, origin stories and mythologies, spiritual cosmologies, cultural practices, and sky traditions grounded in dark skies.⁹ Some scholars have even labeled the ongoing loss of

³ Annika K. Jägerbrand & Kamiel Spoelstra, *Effects of Anthropogenic Light on Species and Ecosystems*, 380 *SCIENCE* 1125 (2023).

⁴ Christopher C. M. Kyba, et al., *Artificially Lit Surface of Earth at Night Increasing in Radiance and Extent*, 3 *SCI. ADV.* 1 (2017); John Barentine, et al., *Aggregate Effects of Proliferating Low-Earth-Orbit Objects and Implications for Astronomical Data Lost in the Noise*, 7 *NATURE ASTRONOMY* 252 (2023).

⁵ Christopher C. M. Kyba, et al., *Citizen Scientists Report Global Rapid Reductions in the Visibility of Stars from 2011 to 2022*, 379 *SCIENCE* 265, 267 (2023).

⁶ John Barentine, *Artificial Light at Night: State of the Science 2023*, ZENODO 1, 4 (June 22, 2023), <https://zenodo.org/records/8326891>.

⁷ See Miao Cao, et al., *Understanding Light pollution: Recent Advances on its Health Threats and Regulations*, 127 *J. OF ENV'T SCI.* 589 (2023); *Light Pollution Affects Human Health*, DARKSKY (updated Oct. 5, 2023), <https://darksky.org/resources/what-is-light-pollution/effects/human-health/>; Ron Chepesiuk, *Missing the Dark: Health Effects of Light Pollution*, 117 *ENV'T HEALTH PERSPECTIVE A20* (2009); Juan Lu, et al., *Association Between Nocturnal Light Exposure and Melatonin in Humans: A Meta-Analysis*, 31 *ENV'T. SCI. AND POLLUTION RSCH.* 3425 (2023); Yu-xiang Xu, et al., *Association Between Exposure to Light at Night (LAN) and Sleep Problems: A Systematic Review and Meta-Analysis of Observational Studies*, 857 *SCI. OF THE TOTAL ENV'T.* 159303 (2023).

⁸ Aparna Venkatesan & John C. Barentine, *Noctalgia (Sky Grief): Our Brightening Night Skies and Loss of Environment for Astronomy and Sky Traditions*, ARXIV (Aug. 28, 2023), <https://arxiv.org/abs/2308.14685>.

⁹ See Aparna Venkatesan et al., *Community Engagement Working Group Report*, REPORT OF THE SATCON2 WORKSHOP 1, 35-40 (July 12-16, 2021), <https://baas.aas.org/pub/enwrps6k> (discussing perspectives from indigenous communities); See also International Astronomical Union

nighttime darkness as a form of “cultural genocide,” particularly due to its impact on Indigenous peoples.¹⁰

This challenge of how best to address the rapid increase in light pollution mirrors those of many other environmental justice issues where rights clash. For example, how do we protect the environment, including the nighttime sky, when it is perceived to clash with peoples’ right to development, to have access to information, and to improve their lives and livelihoods? People have a right to seek a better future for themselves and their children and artificial light plays a role in that progress. Yet, as electric lighting, TVs, cars, phones, and other light sources proliferate and increase the amount of terrestrial light pollution, the negative effects on our health, well-being, and the environment continue to grow.¹¹ Striking a balance between these competing rights is crucial. We do not propose the complete elimination of artificial light at night (ALAN), but instead call for greater awareness, stronger collaboration, and more effective protections. Without these efforts, neither we, nor the planet, can endure the ongoing loss of nighttime darkness.

To address these challenges we must ask ourselves, How can we develop more respectful practices which allow for *responsible* use of outdoor lighting while still protecting the darkness? The answer is, of course, complex. Light pollution does not respect political or geographic boundaries, and light from one place can travel hundreds of kilometers from the light source, affecting distant communities.¹² As a result, the negative impacts of increased light pollution are a global problem requiring global attention.¹³ Despite ongoing international discussions, concrete and actionable solutions are not emerging quickly enough. Furthermore, as with many environmental justice issues, the negative impacts of light pollution are not shared equally. Marginalized communities, which are often those who contribute the least to the problem but at the same time experience the most negative effects, are being disproportionately impacted by the increase in light pollution and the loss of the darkness.¹⁴

Office of Astronomy, *The Cultural Relevance of Dark and Quiet Sky Protection*, YOUTUBE (May 31, 2023), <https://www.youtube.com/watch?v=7TlmznywUYU>.

¹⁰ Duane W. Hamacher, et al., *Whitening the Sky: Light Pollution as a Form of Cultural Genocide* ARXIV (Jan. 10, 2020), <https://doi.org/10.48550/ARXIV.2001.11527>.

¹¹ See Kevin J. Gaston, et al., *Anthropogenic Changes to the Nighttime Environment*, 73 *BIOSCIENCE* 280 (2023).

¹² Fabio Falchi, et al., *The New World Atlas of Artificial Night Sky Brightness*, 2 *SCIENCEADVANCES* (2016), <https://doi.org/10.1126/sciadv.1600377>; See also Mariana Mayer-Pinto, et al., *Light Pollution: A Landscape-Scale Issue Requiring Cross-realm Consideration*, 4 *UCL OPEN ENVIRONMENT* (2022), <https://doi.org/10.14324/111.444/ucloe.000036> (discussing the travel of light between terrestrial, marine and freshwater realms).

¹³ Salvador Bará & Fabio Falchi, *Artificial Light at Night: A Global Disruptor of the Night-Time Environment*, 378 *PHIL. TRANSACTIONS ROYAL SOC’Y B: BIOLOGICAL SCI.* (2023), <https://doi.org/10.1098/rstb.2022.0352>.

¹⁴ This issue has been referred to as the Light Justice movement. For additional information, see LIGHT JUSTICE, <https://lightjustice.org/>. See generally Shawna M. Nadybal, et al., *Light pollution inequities in the continental United States: A Distributive Environmental Justice Analysis*, 189 *ENV’T*

While the international community continues to work slowly toward a solution, more immediate action is needed. This paper offers a set of ideas that can be applied now using domestic legal mechanisms, supported by international law, to protect the night sky. By bringing together the fields of astronomy and the law, we explore how to advocate for darkness through innovative legal strategies that are both universally applicable and also adaptable to local contexts. At the same time, we emphasize the importance for advocates to recognize the diversity of legal cultures and institutions across communities and develop legal strategies reflective of them. While this paper emphasizes the importance of using legal advocacy to address this issue, we do not mean to imply that this the *only* solutions to combat the increase in light pollution. Rather, it is simply one tool in our interdisciplinary advocacy toolbox for protecting the right to darkness. People must continue to learn and speak out, march and petition. They need to engage with their elected officials, advocate for better policies, and take personal responsibility in their own homes and on their properties. No single action can solve the problem, but legal mechanisms like those proposed here can be a crucial part of an advocacy plan to protect our right to the night.

This article combines both legal and scientific expertise to explore and address these issues. First, we discuss in more detail the causes and consequences of unfettered terrestrial light pollution, examining its sources and the impact of diminishing darkness on human life and the natural world. Second, we highlight the role of law in interdisciplinary advocacy and the benefits of collaboration between law and science. Third, we examine current efforts to address light pollution and protect the darkness, outlining the challenges these initiatives face. Finally, the bulk of this paper highlights several creative legal strategies to advocate for the protection of the night skies as an environmental justice issue. We conclude by reiterating the urgency of safeguarding our night skies from the continued growth of terrestrial light pollution and identify areas for further exploration on this critical issue.

II. LIGHT POLLUTION AND THE LOSS OF DARKNESS

We've all seen the images of Earth at night from space, where vast areas are not dark at all and, in fact, often brighter than they are during the day, given the significant amount of artificial light. Europe and the East Coast of the United States shine particularly bright, but dominant clusters of ALAN are visible across every continent except Antarctica.¹⁵ This problem is compounded by sunlight

RSCH. 109959 (2020), <https://doi.org/10.1016/j.envres.2020.109959>; Qian Xiao, et al., *Artificial Light at Night and Social Vulnerability: An Environmental Justice Analysis in the U.S. 2012–2019*, 178 ENV'T INT'L 108096 (2023), <https://doi.org/10.1016/j.envint.2023.108096>.

¹⁵ For an example of such images, see <https://www.lightpollutionmap.info/>. See also Falchi, *supra* note 12; Kyba, *supra* note 4 (discussing trends across the world based on satellite remote sensing data).

reflecting from increasing numbers of orbiting satellites and space debris, further brightening the night sky.¹⁶

In recent decades, the amount of light pollution from terrestrial and space-based sources has increased tremendously. A recent report in *Science* notes that “sky brightness resulting from artificial light is increasing exponentially in the world with an alarming average of 10% each year and therefore doubled in less than eight years.¹⁷ Additionally, “more than 80% of the world and more than 99% of the U.S. and European populations live under light-polluted skies.”¹⁸ Since the early 2010s, emissions of light from outdoor sources reaching the night sky, either directly or indirectly, have increased globally by an estimated average rate of 2% annually.¹⁹ In some countries, especially in developing economies, the annual rate of increase has exceeded 10%.²⁰

Light pollution impacting darkness can be categorized into terrestrial and space-based sources. Terrestrial pollution comes from lights on the ground—the lights of homes, cities, business, cars, and all other human activities that use light. Space-based light pollution, on the other hand, comes from the rapidly growing numbers of satellites, both active and defunct, as well as debris and other objects orbiting our planet. While satellites generally do not emit their own light at optical (visible) light energies, they do reflect sunlight as they orbit the Earth.²¹ The accumulated light reflected by all these large and small space objects has made the night sky at the zenith (the point directly overhead) “up to 10% brighter” was prior to 1957 when there no artificial objects orbiting the Earth.²²

For humans, increased light pollution has a number of negative health impacts. It disrupts natural circadian rhythms, leading to insomnia and other sleep

¹⁶ See generally Tory Shepherd, *Picture Imperfect: Light Pollution from Satellites is Becoming an Existential Threat to Astronomy*, THE GUARDIAN (January 5, 2023), <https://www.theguardian.com/science/2023/jan/06/picture-imperfect-light-pollution-fromsatellites-is-becoming-an-existential-threat-to-astronomy>.

¹⁷ Fabio Falchi & Salvador Bará, *Light Pollution is Skyrocketing*, 379 SCIENCE 234, 6629 (2023), <https://www.science.org/doi/10.1126/science.adf4952>.

¹⁸ Falchi, *supra* note 12, at 4 (found that the visibility of the Milky Way with the unaided eye, cited as one indicator of the quality of the night sky with respect to light pollution, has diminished considerably in recent decades, and “the Milky Way is hidden from more than one-third of humanity, including 60% of Europeans and nearly 80% of North Americans.” Over 23% of the world’s land surfaces between latitudes 75°N and 60°S, including 88% of the land area of Europe, and about half of the United States, never achieve a natural level of darkness at night. People living in those places experience a kind of perpetual twilight.)

¹⁹ Kyba, *supra* note 5.

²⁰ *Id.*

²¹ Jan Hattenback, *Satellites and Space Debris are Polluting our Night Skies*, SKY & TELESCOPE (March 27, 2023), <https://skyandtelescope.org/astronomy-news/satellites-and-space-debris-are-polluting-our-night-skies>.

²² Miroslav Kocifaj, et al., *The Proliferation of Space Objects is a Rapidly Increasing Source of Artificial Night Sky Brightness*, 504 MONTHLY NOTICES ROYAL ASTRONOMICAL SOCIETY: LETTERS L40, L40 (2021), <https://doi.org/10.1093/mnrasl/slab030>; Cees Bassa, et al., *Analytical Simulations of the Effect of Satellite Constellations on Optical and Near-Infrared Observations*, 657 ASTRONOMY & ASTROPHYSICS, A75, 14 (2022), <https://doi.org/10.1051/0004-6361/202142101>.

disorders, and also can cause hormonal fluctuations, which may lead to number of mental and physical health issues.²³ Studies have shown that the loss of darkness also contributes to higher rates of human morbidity and mortality by affecting conditions such as obesity,²⁴ diabetes,²⁵ cardiovascular disease,²⁶ endocrine disorders,²⁷ and certain cancers such as those of the breast and prostate.²⁸ Just as insufficient daytime light can harm human health through Seasonal Affective Disorder,²⁹ excessive exposure to artificial light at night can negatively impact mental health.³⁰ It has also been linked as a potential factor contributing to the onset of dementia and Alzheimer's disease in older adults.³¹

An added layer to this issue, as with many environmental justice concerns, is that the impacts of light pollution disproportionately affect marginalized

²³ Yu-xiang Xu, et al., *Association Between Exposure to Light at Night (LAN) and Sleep Problems: A Systematic Review and Meta-Analysis of Observational Studies*, 857 SCI. TOTAL ENV'T. 159303 (2023); Jianghong Liu, et al., *Environmental Exposures and Sleep Outcomes: A Review of Evidence, Potential Mechanisms, and Implications*, 196 ENV'T RSCH. 110406, 11 (2021), <https://doi.org/10.1016/j.envres.2020.110406>.

²⁴ Nataliya Rybnikova, et al., *Does Artificial Light-At-Night Exposure Contribute to the Worldwide Obesity Pandemic?*, 40 INT'L J. OBESITY 815 (2016), <https://doi.org/10.1038/ijo.2015.255>; Ka Yan Lai, et al., *Exposure to Light at Night (LAN) and Risk of Obesity: A Systematic Review and Meta-Analysis of Observational Studies*, 187 ENV'T RSCH. 109637 (2020), <https://doi.org/10.1016/j.envres.2020.109637>.

²⁵ Daniel P. Windred, et al., *Personal Light Exposure Patterns and Incidence of Type 2 Diabetes: Analysis of 13 Million Hours of Light Sensor Data and 670,000 Person-years of Prospective Observation*, 42 LANCET REG'L HEALTH 100943, 6 (2024), <https://doi.org/10.1016/j.lanpe.2024.100943>.

²⁶ Xiangming Hu et al., *Outdoor Artificial Light at Night and Cardiovascular Disease in Adults: A Chinese Nationwide Cohort Study*, 44 EUROPEAN HEART J., (2023), <https://doi.org/10.1093/eurheartj/ehad655.3005>.

²⁷ Kathryn L.G. Russart & Randy J. Nelson, *Light at Night as an Environmental Endocrine Disruptor*, 190 PHYSIOLOGY & BEHAV. 82-89 (2018), <https://doi.org/10.1016/j.physbeh.2017.08.029>.

²⁸ Chunla He et al., *Circadian Disrupting Exposures and Breast Cancer Risk: A Meta-Analysis*, 88 INT'L ARCHIVES OCCUPATIONAL & ENV'T HEALTH 533 (2014), <https://doi.org/10.1007/s00420-014-0986-x>; Nataliya A. Rybnikova et al., *Is Prostate Cancer Incidence Worldwide Linked to Artificial Light at Night Exposures? Review of Earlier Findings and Analysis of Current Trends*, 72 ARCHIVES ENV'T & OCCUPATIONAL HEALTH 111 (2016), <https://doi.org/10.1080/19338244.2016.1169980>.

²⁹ Jia-Min Liu et al., *Regulation of Circadian Physiology and Behavior by Light in Mammals: Entrainment and Masking*, 7 LIFE RSCH 7, 4 (2024), <https://doi.org/10.53388/lr20240007>.

³⁰ Stefano Tancredi et al., *Artificial Light at Night and Risk of Mental Disorders: A Systematic Review*, 833 SCI. TOTAL ENV'T 155185 (2022), <https://doi.org/10.1016/j.scitotenv.2022.155185>; William H. Walker II et al., *Acute Exposure to Low-Level Light at Night is Sufficient to Induce Neurological Changes and Depressive-Like Behavior*, 25 MOLECULAR PSYCHIATRY 1080 (2019), <https://doi.org/10.1038/s41380-019-0430-4>.

³¹ Elena Mazzoleni et al., *Outdoor Artificial Light at Night and Risk of Early-Onset Dementia: A Case-Control Study in the Modena Population, Northern Italy*, 9 HELIYON e17837 (2023), <https://doi.org/10.1016/j.heliyon.2023.e17837>; Julia Karska et al., *Artificial Light and Neurodegeneration: Does Light Pollution Impact the Development of Alzheimer's Disease?*, 46 GEROSCIENCE 87 (2023), <https://doi.org/10.1007/s11357-023-00932-0>.

communities.³² As with other kinds of pollution, exposure to light pollution is not evenly distributed. Less affluent, non-white neighborhoods are more likely to be exposed to inadequately designed and inefficiently operated outdoor lighting sources, further contributing to the disproportionate harm.³³ These are also often the very communities without the economic means or political access to protect themselves.³⁴

Furthermore, it is not just human health that is impacted by the loss of darkness. The changing nature of the balance between the natural cycles of light and dark profoundly impacts all living things on the planet, each intricately intertwined with the other. ALAN is a biological challenge to much of the life on Earth, most of which has not had opportunity to adapt to this shifting dynamic.³⁵ For example, light pollution can negatively impact animal migration patterns and mating practices.³⁶ The influence of ALAN in lengthening the duration of the day may also affect birds' ability to navigate,³⁷ the growth cycles of some trees,³⁸ and the

³² Shawna M. Nadybal et al., *Light Pollution Inequities in the Continental United States: A Distributive Environmental Justice Analysis*, 189 ENV'T RSCH. 109959 (2020), <https://doi.org/10.1016/j.envres.2020.109959>; See also <https://lightjustice.org/>.

³³ Aries Keck, *Brighter Neighborhoods Harm Human Health*, NASA EARTH SCIS APPLIED SCI (Apr. 3, 2023), <https://appliedsciences.nasa.gov/our-impact/story/brighter-neighborhoods-harm-human-health>; Qian Xiao et al., *Artificial Light at Night and Social Vulnerability: An Environmental Justice Analysis in the U.S. 2012-2019*, 178 ENV'T INT'L 108096 (2023), <https://doi.org/10.1016/j.envint.2023.108096>.

³⁴ see generally Antonella Radicchi & Dietrich Henckel, *Planning Artificial Light at Night for Pedestrian Visual Diversity in Public Spaces*, 15 SUSTAINABILITY 1488 (2023), <https://doi.org/10.3390/su15021488>; Shawna M. Nadybal, et al., *Light Pollution Inequities in the Continental United States: A Distributive Environmental Justice Analysis*, 189 ENV'T. RSCH. 109959 (2020), https://www.sciencedirect.com/science/article/pii/S0013935120308549?casa_token=jrzy2wX16dgAAAAA:tt0Wvv84a2t6rWlpITu1i5pZZ0r65ZQRS37h4psIVUXTaXUypSGIFVSO6nkOIFhsEAoHB RVhQ

³⁵ See ECOLOGICAL CONSEQUENCES OF ARTIFICIAL NIGHT LIGHTING (Catherine Rich & Travis Longcore eds., 2005).

³⁶ Daniela Torres et al., *Artificial Skyglow Disrupts Celestial Migration at Night*, 30 CURRENT BIOLOGY R696, R697, R698 (2020), <https://doi.org/10.1016/j.cub.2020.05.002>. See Kyle G. Horton et al., *Artificial Light at Night is a Top Predictor of Bird Migration Stopover Density*, 14 NATURE COMM'NS (2023), <https://doi.org/10.1038/s41467023-43046-z>; Kyle A. Robert et al., *Artificial Light at Night Desynchronizes Strictly Seasonal Reproduction in a Wild Mammal*, 282 PROC. ROYAL SOC'Y. B: BIOLOGICAL SCIS. 20151745 (2015), <https://doi.org/10.1098/rspb.2015.1745>; Thomas Le Tallec et al., *Melatonin Concentrations and Timing of Seasonal Reproduction in Male Mouse Lemurs (*Microcebus Murinus*) Exposed to Light Pollution*, 97 J. MAMMALOGY 735 (2016), <https://doi.org/10.1093/jmammal/gyw003>; Davide M. Dominoni et al., *Artificial Light at Night, in Interaction with Spring Temperature, Modulates Timing of Reproduction in a Passerine Bird*, 30 ECOLOGICAL APPLICATIONS (2020), <https://doi.org/10.1002/eap.2062>.

³⁷ See Frank A. La Sorte et al., *Seasonal Associations with Urban Light Pollution for Nocturnally Migrating Bird Populations*, 23 GLOB. CHANGE BIOLOGY 4609 (2017), <https://doi.org/10.1111/gcb.13792>; Kyle G. Horton et al., *Bright Lights in the Big Cities: Migratory Birds' Exposure to Artificial Light*, 17 FRONTIERS ECOLOGY & ENV'T 209 (2019), <https://doi.org/10.1002/fee.2029/>.

³⁸ See Jana Škvareninová et al., *Effects of Light Pollution on Tree Phenology in the Urban Environment*, 25 MORAVIAN GEOGRAPHICAL REPORTS 127753, 282 (2017),

entire life rhythm of nocturnal creatures that rely on darkness for protection. Exposure to ALAN affects animals' ability to find mates and reproduce;³⁹ reduces their options for finding food;⁴⁰ and interferes with communication.⁴¹ Plants are also affected when exposed to these shifting light patterns. Plants' photoreceptors have evolved to sense the daily and annual variations of light quality and quantity. If this is disrupted it can lead to an inability to track seasonal changes in the length of the day that signal when to shed and grow leaves.⁴²

Light pollution is also closely related to other kinds of environmental pollution, such as air pollution,⁴³ which is increasing around the world and is damaging to human health.⁴⁴ Electricity powering outdoor light at night also represents about 6% of world carbon dioxide emissions, contributing to global climate change.⁴⁵ Despite the promise of highly energy-efficient solid-state lighting (SSL), introduced commercially on a wide scale in the late 2000s, the resulting energy savings in outdoor applications have yet to materialize. Instead, the proliferation of new light sources in the early 2010s has offset these gains.⁴⁶ Light pollution,

<https://doi.org/10.1515/mgr-2017-0024>; Monika Czaja & Anna Kolton, *How Light Pollution Can Affect Spring Development of Urban Trees and Shrubs*, 77 URBAN FORESTRY & URBAN GREENING 127753 (2022), <https://doi.org/10.1016/j.ufug.2022.127753>.

³⁹ See Lucy Katherine McLay et al., *Dim Artificial Light at Night Affects Mating, Reproductive Output, and Reactive Oxygen Species in Drosophila Melanogaster*, 329 JOURNAL OF EXPERIMENTAL ZOOLOGY PART A: ECOLOGICAL AND INTEGRATIVE PHYSIOLOGY 419 (2018), <https://doi.org/10.1002/jez.2164>; Emily K Fobert et al., *Artificial Light at Night Causes Reproductive Failure in Clownfish*, 15 BIO. LETTERS 20190272 (2019), <https://doi.org/10.1098/rsbl.2019.0272>.

⁴⁰ See Bridgette Farnworth et al., *Converting Predation Cues into Conservation Tools: The Effect of Light on Mouse Foraging Behaviour*, PLOS ONE (2016); Arnaud Da Silva et al., *Effects of Experimental Night Lighting on the Daily Timing of Winter Foraging in Common European Songbirds*, 48 J. AVIAN BIO. 862 (2017), <https://doi.org/10.1111/jav.01232>; Svenja Tidau et al., *Artificial Light at Night Reverses Monthly Foraging Pattern Under Simulated Moonlight*, 18 BIOLOGY LETTERS (2022), <https://doi.org/10.1098/rsbl.2022.0110>

⁴¹ Koert G Van Geffen et al., *Artificial Night Lighting Disrupts Sex Pheromone in a Noctuid Moth*, 40 ECOLOGICAL ENTOMOLOGY 401 (2015), <https://doi.org/10.1111/een.12202>; Renee M Borges, *Dark Matters: Challenges of Nocturnal Communication Between Plants and Animals in Delivery of Pollination Services*, 91 YALE J. BIO AND MED 33 (2018).

⁴² Škvareninová, *supra* note 38, at 288; Craig C. Brelsford & Thomas M. Robson, *Blue Light Advances Bud Burst in Branches of Three Deciduous Tree Species Under Short-Day Conditions*, 32 TREES 1157 (2018), <https://doi.org/10.1007/s00468-018-1684-1>; Gareth R. Hopkins et al., *Artificial Light at Night as a Driver of Evolution Across Urban-Rural Landscapes*, 16 FRONTIERS IN ECOLOGY AND THE ENVIRONMENT 472 (2018), <https://doi.org/10.1002/fee.1828>.

⁴³ See Harald Stark et al., *City Lights and Urban Air*, 4 NATURE GEOSCIENCE 730 (2011), <https://doi.org/10.1038/ngeo1300>; Miroslav Kocifaj & John C. Barentine, *Air Pollution Mitigation Can Reduce the Brightness Of The Night Sky in and Near Cities*, 11 SCI. REPORTS (2021). <https://doi.org/10.1038/s41598-021-94241-1>.

⁴⁴ See Jos Lelieveld, et al., *Air Pollution Deaths Attributable To Fossil Fuels: Observational And Modelling Study*. 383 BRIT. MED. J. e077784 (2023) <https://doi.org/10.1136/bmj-2023-077784>; Ioannis Manisalidis, et al., *Environmental and Health Impacts of Air Pollution: A Review*. 8 FRONT. PUB. HEALTH (2020) <https://doi.org/10.3389/fpubh.2020.00014>.

⁴⁵ Hector Linares Arroyo, et al., *Monitoring, Trends and Impacts of Light Pollution*, 5 NATURE REVS EARTH & ENV'T 417, 424 (2024), <https://doi.org/10.1038/s43017-024-00555-9>.

⁴⁶ See Kyba, et al., *supra* note 4, at 5.

therefore, also threatens both individual countries' energy independence and the ongoing worldwide transition to renewable energy sources, which continues to expose the environment to the harmful effects of fossil fuels.

In addition to these tangible effects, light pollution has intangible impacts, including on heritage, culture, creativity, and spirituality.⁴⁷ The night sky, the movement of the stars, the rhythms of dawn and dusk are all integral parts of some communities' cosmologies and cultural practices.⁴⁸ Skyglow from light pollution in and near cities reduces the number of stars in the night sky visible to the unaided eye, making it harder to locate constellations and asterisms associated with cultural sky traditions, ceremonies, and storytelling related to the stars and dark skies.⁴⁹ The millennia-old practice of celestial wayfinding, which is the non-instrument navigation by the stars practiced by many Pacific Islander communities, is now increasingly imperiled by skyglow.⁵⁰

Similarly, story-telling and ceremony associated with the stars, whether as metaphor, origin story, or ancestral beliefs, are foundational components of the history and culture of many communities. As light pollution increasingly obscures constellations and particular stars, these communities face difficulties in passing down their knowledges and traditions to future generations. This loss threatens not only their scientific traditions and cultural practices but also their very ways of life. Many Indigenous origin stories celebrate darkness in its many forms as a great void of unrealized potentiality—the source of all that is to come. For example, the Māori creation themes of Te Kore, Te Pō, and Te Ao, and the Hawaiian creation chant and cosmogonic genealogy, the Kumulipo reflect significant parallels to modern cosmology and the Big Bang Theory.⁵¹ The loss of darkness, therefore, threatens not only cultural practices but also the creative and spiritual lives of these communities.

The number of negative impacts—both tangible and intangible—resulting from the increase in light pollution changing the natural rhythms of day and night are

⁴⁷ See, e.g., Apama Venkatesan, astronomer, *The Cultural Heritage of Dark Skies at the 242nd Meeting of the American Astronomical Society* (June 2023).

⁴⁸ See Or Graur, *Light pollution has cut humanity's ancient connection with the stars – but we can restore it*, THE CONVERSATION (Feb. 9, 2023), <https://theconversation.com/light-pollution-has-cut-humanitys-ancient-connectionwith-the-stars-but-we-can-restore-it-198035>; Megan Eaves, *The remote Argentinean community that is saving the stars*, BBC (May 21, 2024), <https://www.bbc.com/travel/article/20240521-the-remote-argentinean-community-that-is-saving-the-stars#>.

⁴⁹ Laura Baisas, *'Skyglow' is rapidly diminishing our nightly views of the stars*, POPULAR SCI. (Jan. 20, 2023), <https://www.popsoci.com/science/star-night-sky-light-pollution>.

⁵⁰ *Wayfinding with the Night Sky*, FOUNTAIN HILLS DARK SKY PRESERVATION (last visited Dec. 14, 2024), <https://fhdarksky.com/wayfinding-with-the-night-sky/>; see generally Nikita Amir, *Light Pollution Threatens Millenia-old Indigenous Navigation Methods*, DISCOVER (Oct. 28, 2021), <https://www.discovermagazine.com/environment/light-pollution-threatens-millenia-old-indigenous-navigation-methods>; Anna Steidle & Lioba Werth, *Freedom from Constraints: Darkness and Dim Illumination Promote Creativity*, 35 J. OF ENV'T. PSYCH. 67 (2013).

⁵¹ See generally, MARTHA WARREN BECKWITH, *THE KUMULIPO: A HAWAIIAN CREATION CHANT* (1951) (ebook), <https://puke.ulukau.org/?a=d&d=EBOOKBECKWIT2.2.1.1>.

substantial and growing. Like other forms of pollution, light pollution causes harm beyond its immediate reach. Therefore, more must be done to halt the rapid increase in ALAN and its impact on the nocturnal environment and one available course of action is working through existing legal frameworks that can be enforced to protect the night sky.

III. LAW AS PART OF AN INTERDISCIPLINARY ADVOCACY STRATEGY

Given the urgency of addressing the growing problem of light pollution and loss of darkness, individuals, communities, and countries around the world must engage in multiple avenues of action.⁵² A multilevel, multifaceted advocacy approach is essential because, like many environmental justice issues, the loss of darkness is both a local and a global issue.⁵³ Light pollution, especially terrestrial light pollution, directly impacts communities and biodiversities exposed to its glow, making it a local issue. However, light pollution does not stay confined within borders, which also makes it a global concern.⁵⁴

The dual local and global nature of the negative impacts of light pollution presents a challenge for legal responses. Both international and domestic law have had some successes in addressing light pollution, but significant hurdles remain. However, these challenges, discussed in more detail in the next section, do not mean that legal advocacy is not worth pursuing. On the contrary, advocates for dark skies need to think creatively to address the problem, utilizing existing laws in innovative ways, while also pushing for new legal frameworks. Critics often argue that law, whether domestic or international, is an ineffective tool for environmental justice advocacy. Law can be slow and cumbersome, access is sometimes inequitable, and there is often a disconnect between the creation or enactment of new law and its effective implementation and enforcement. While these are valid concerns, without legal frameworks is nearly impossible to address environmental injustices.

Public protests, boycotts, marches, op-eds, and social media are all extremely important tools of activism, essential for generating dialogue, disseminating information, and providing checks and balances on those in power. But the law is the foundation that allows these forms of advocacy to turn into lasting action. History offers many examples where law and other strategies of activism have worked together to create change. For example, the U.S. Supreme Court decision in *Brown v. Board of Education*, which led to the start of desegregation, coincided

⁵² Alexandra Feathers, *Legal Avenues for Protecting Access to Starry Skies*, 12 WASH. J. OF SOC. & ENV'T JUST. 67, 95-101 (2022), <https://digitalcommons.law.uw.edu/wjsej/vol12/iss2/3>.

⁵³ See Martin Morgan-Taylor, *Regulating light pollution: More than just the night sky*, 380 SCIENCE 1118 (2023), <https://doi.org/10.1126/science.adh7723>.

⁵⁴ Emily Newton, *Shining a Spotlight on Why Light Pollution is a Global Problem*, REVOLUTIONIZED (Sep. 15, 2020), <https://revolutionized.com/why-is-light-pollution-a-problem-around-the-world/>.

with civil rights activists fighting systemic racism across the American South.⁵⁵ Did the law shape the action, or did the action shape the law? The reality is, of course, that they worked together to create meaningful institutional and cultural change. This is exactly why the law remains a crucial tool.

We propose a similar approach for addressing light pollution. A growing movement among scientists, astronomers, medical professionals, anthropologists, environmentalists and Indigenous leaders, among many others, has sounded the alarm about the increase in light pollution and the dangers of diminishing darkness. The information these groups disseminate, and their participation in conferences, workshops, and government fora, provide crucial information and generate conversation about the issue. Each of these efforts is extremely important. It is essential, for example, that scientists play a prominent role in advocating for the protection of nighttime darkness as they are the ones with the data to both demonstrate the problem and expertise to suggest solutions. But, it is necessary that scientific information be conveyed in a way that is understandable to those capable of making change as well as to the general public. Science is only as useful to the advocacy process as its ability to be communicated and understood. And, in fact, a key facet of the movement to address light pollution must be a shift in public perception of the problem away from one solely of astronomers to one of society as a whole.⁵⁶

At the same time, we must make room for other forms of communication, including art, music, and story-telling, to provide a full picture of the problem and to capture the diverse range of possible solutions.⁵⁷ People respond in different ways to messages conveyed through varied avenues. Bringing together all these different parts to generate conversation and convey the sense of urgency for solutions is one half of the equation.

Beyond these more conversational forms of advocacy, we also need legal frameworks and the enforcement and compliance mechanisms such frameworks provide. While some people may not like it, the law has been the foundation of nearly every society since the Code of Hammurabi was promulgated in 1750

⁵⁵ *Brown v. Board of Education*, 347 U.S. 483 (1954).

⁵⁶ Morgan-Taylor, *supra* note 53, at 1118. (finding that despite the wide-ranging effects of light pollution, “the problems of light at night are usually couched in terms of the loss of the night sky in the media, leading the public to believe that light pollution is an issue primarily concerning astronomy and star gazing, rather than being more immediately relevant to the average person through broader adverse effects. This public perception may be contributing to the relatively modest priority thus far placed on addressing ALAN in many jurisdictions.”)

⁵⁷ See generally Helen M. Prior, *How Can Music Help Us to Address the Climate Crisis?*, 5 *MUSIC & SCI.* 1-16 (2022); Sam Davis, *Art about Climate Change: The Power of Visual Storytelling for Environmental Advocacy*, DOGWOOD ALLIANCE (Nov. 7, 2023), <https://dogwoodalliance.org/2023/11/art-about-climate-change-the-power-of-visual-storytelling-for-environmental-advocacy/>; *The Art of Darkness: Music and the Night Sky*, DARKSKY (July 31, 2019), <https://darksky.org/news/the-art-of-darkness-music-and-the-night-sky>.

BC.⁵⁸ Sometimes, it is true, it takes a while for law to be effective, but every step forward nourishes the conversations among all the other stakeholders, and their continued efforts impact the law. Through this entire process, slowly but surely, we can produce not only institutional (legal) change, but also cultural shifts in how we understand our human connection to the natural world.

One of the primary challenges we face with any environmental justice issue is that people tend to think of responses to problems as a zero-sum game. Policy works or it doesn't. Law works or it doesn't. Activism works or it doesn't. Many still view it as a black/white, either/or situation and when there are the inevitable setbacks – the policy fails, the law isn't effectively implemented, or the marches and petitions fall on deaf ears – people throw their hands up. They assume these methods will *never* work, that they are too deeply ingrained in existing institutional structures, and are therefore useless. But loss of hope is never an effective solution.

Every advocacy method has its challenges. It is a mistake to think of advocacy as a series of discrete efforts that either succeed or fail. A more constructive way to think about possible avenues for action is to consider each of them as simply part of our overall toolbox of multilevel, multifaceted advocacy options. These options encompass all forms of advocacy including activism, law, policy, art, science, education, etc., at the local, state, regional, and international levels. While this paper focuses on the specific advocacy possibilities of law, we need to be adaptive and creative with established law, recognizing that the entire toolbox is often needed to fix overarching challenges unaddressed by broken systems.

Moreover, within the law itself there are various tools to use, including international, regional, and local laws in judicial and legislative forms, as well as comparative legal analysis. While it is crucial to recognize differences in the cultural and institutional attributes of law found within different communities, all legal systems maintain a common core recognizing law's role in ordering society.⁵⁹ Understanding where legal advocacy has been successful related to protecting darkness, and then adapting that advocacy platform to one's own legal system, can be an important step in achieving environmental justice goals.

International law, in particular, is often overlooked as a tool for advocacy. While on its own international law can be difficult due to the anarchic nature of the international system, its use can offer an additional layer of support for advocacy. This is especially true for issues, like protecting the darkness, that sit at the intersection of environmental justice, human rights, and protections of cultures and traditions. While international law is not so good at regulating the capitalist economic system that is, in great part, fueling the development leading to the loss of nighttime darkness, it can be very useful for bolstering claims

⁵⁸ DANA ZARTNER, *CODES AND CUSTOM: LEGAL TRADITION AND STATE RESPONSIBILITY TOWARDS INTERNATIONAL HUMAN RIGHTS AND ENVIRONMENTAL LAW 4* (Oxford Univ. Press 2014) [hereinafter *COURTS, CODES, AND CUSTOM*].

⁵⁹ *Id.* at 4-5.

surrounding rights protections, which in turn, facilitates advocates' ability to stand up to the economic arguments. As a tool for advocacy, international law works on two levels. First, it provides a basis for multilateral efforts through regional and international institutions. Second, it also creates shared ideas and values that trickle down to grassroots efforts and provide added support and an interpretative guide for reimagining the role of the law.

Local law, of course, is a crucial component of any legal advocacy, as it is at the local level where the most effective implementation of legal justice will take place. Advocating for creative interpretations of existing local laws and legal processes and bolstering them with support from international and comparative law can be an effective approach.⁶⁰ Not only can such advocacy provide legal impetus to address the increase in light pollution, but it may also reshape cultural ideas about nature and the need for darkness. Cultural shifts, while difficult and often slow, are as imperative as institutional shifts for sustainable change in how we think about nature. It is at the level of local law that we focus our suggestions later in the article.

Ultimately, the goal of law as an advocacy tool is to create concrete, impactful, and binding change for the better. Just the process of discussing law or working to implement new legal ideas can shift the perceptions of society towards a new way of thinking about environmental justice, in this case light pollution and darkness.⁶¹ It isn't a panacea, and as the next section will demonstrate, there are a number of existing laws related to the problem of light pollution that have been ineffective so far. But advocacy requires perseverance and the remainder of the article will turn to a discussion of three ideas that bring together international and domestic law to provide innovative avenues of legal advocacy that could protect darkness.

IV. THE CHALLENGES OF EXISTING LAWS

Reducing light pollution is not a new concept. Many towns, cities, and even countries, have already passed laws limiting the amount of light that can be used at night.⁶² As highlighted earlier, there are many reasons that we should want to

⁶⁰ See generally, Dana Zartner, *Internalization of International Law*, OXFORD RSCH. ENCYCLOPEDIAS: INT'L. STUD. (Sep. 28, 2020), <https://oxfordre.com/internationalstudies/internationalstudies/view/10.1093/acrefore/9780190846626.001.0001/acrefore9780190846626-e-225>.

⁶¹ See e.g. Dana Zartner, *Watching Whanganui and the Lessons of Lake Erie: Effective Realization of Rights of Nature Laws*, 22 VT. J. ENV'T L. 1, 8 (2021) (In the case of Lake Erie, while the legal efforts were ultimately unsuccessful, the process of the public referendum and the subsequent lawsuits put the environmental justice issue of the rights of nature in the news and increased awareness and communal discussions).

⁶² Some of these include Austria, Chile, Croatia, Czech Republic, France, Germany, Italy, Mexico, Slovenia, Spain, United Kingdom, as well as a few states within the United States. See DAVID WELCH, ET AL., *THE WORLD AT NIGHT: PRESERVING NATURAL DARKNESS FOR HERITAGE CONSERVATION AND NIGHT SKY APPRECIATION* 98-99 (2024).

reduce light pollution and protect darkness. And, contrary to what some critics might claim, this is not about prohibiting the use of light at night.⁶³ Of course human beings need light at night and should be able to use it. Rather this is about the *responsible* use of light and recognizing that we do not need to light up the entire night sky to the extent that we are doing. We need a balance between the amount of lighting used and the loss of darkness, otherwise we are needlessly harming ourselves and every living thing around us in the process.

There is both international and domestic law that could be relied on to advocate for darkness. To date, however, there has not been as much success as is needed to address the urgency of the issue. Globally, issues such as sovereignty, the lack of specificity and enforcement in international law, and the fact that international law does not apply to corporations, create challenges to stemming the tidal wave of light. While member states in the international system do not yet see ALAN as an environmental pollutant needing regulation, some countries are beginning to address this within their own borders.⁶⁴ Domestically, assessments are also still lacking for what constitutes safe exposure levels or thresholds for harm from loss of darkness, and there is yet no equivalent “Clean Night Skies Act” comparable to its domestic legal cousins for air or water.⁶⁵ Additionally, while it varies by community, in many places a variety of factors often outweigh the protection of the night sky. These include individualistic legal traditions and “dominant (Western) legal approaches that prioritize the human exploitation of natural resources”, as well as private property rights that are viewed as sacred and the desire for development – all of which often outweigh the protection of darkness.⁶⁶

At the international system level, while there are a number of treaties that focus on space, there are no international laws specifically addressing light pollution, especially terrestrial light pollution or its impacts on the night sky. Some of the existing space treaties do include provisions that could be used to address light pollution if interpreted in a certain way. However, this has not happened and given the age of the treaties and the modest number of state parties, they are unlikely to have much impact addressing current challenges. For example, Article I of the *Outer Space Treaty*, which entered into force in 1967 and currently has 115 state parties, requires that any use of space must be “carried out for the benefit and in

⁶³ Feathers, *supra* note 52 at 67 (describing the “impracticability” of eliminating artificial light entirely as one of the challenges facing the Dark Skies movement).

⁶⁴ See D. E. Lystrup, *The Dark Side of the Light: Rachel Carson, Light Pollution, and a Case for Federal Regulation*, 57 JURIMETRICS 505 (2017) (Explaining that 18 US states have laws in place to reduce light pollution); John C. Barentine & Amanda Gormley, *Mexico’s Environmental Law Will Now Include Regulation of Light Pollution*, DARKSKY (2019), <https://darksky.org/news/mexico-light-pollution-law/>.

⁶⁵ John C. Barentine, *Toward a “Clean Night Skies Act”: a roadmap for a U.S. national light pollution policy*, DARK SKY CONSULTING, LLC (Jan. 1, 2024), <https://www.darkskyconsulting.com/blog/toward-a-clean-night-skies-act>.

⁶⁶ John C. Barentine, *Who speaks for the night? The Regulation of Light Pollution in the ‘Rights of Nature’ Legal Framework*, 22 INTERNATIONAL JOURNAL OF SUSTAINABLE LIGHTING 28, 30 (2020).

the interests of all countries ... and shall be the province of all mankind.”⁶⁷ This implies that activities that drastically increases light pollution and its harmful effects would be contrary to the treaty.

Similarly, the *Outer Space Treaty* goes on to call for, among other things, the promotion of international cooperation and understanding in relation to outer space and for states, as well as entities under their control, to “avoid harmful contamination and also adverse changes to the environment of the Earth.”⁶⁸ While light pollution is not specifically mentioned, it could be interpreted as falling under this provision but, to date, there has been little to no successful action at the international level based on such an interpretation of the provisions of this treaty.⁶⁹

There are other treaties that are similar to the *Outer Space Treaty* in that they don’t refer to the issue of terrestrial light pollution or the need for darkness specifically, but they contain provisions that could, theoretically, be used to argue for such protections.⁷⁰ There are also a number of soft law instruments related to outer space, including the *Declaration of the Legal Principles Governing the Activities of States in the Exploration and Use of Outer Space*⁷¹ and the *Declaration on International Cooperation in the Exploration and Use of Outer Space for the Benefit and in the Interest of All States, Taking into Particular Account the Needs of Developing Countries*.⁷² These documents could be used to craft arguments regarding light pollution, but are not strong options as they are not binding in and of themselves and would have to be supported as customary

⁶⁷ Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies, 8 U.S.T. 2410, art. I, Jan. 27, 1967 [hereinafter *The Outer Space Treaty*]; see also d’Estries, *infra* note 80. For data on the status of ratifications, see *Status of Int’l Agreements relating to Activities in Outer Space*, U.N. OFFICE FOR OUTER SPACE AFFAIRS (last updated 14 May 2024), <https://www.unoosa.org/oosa/en/ourwork/spacelaw/treaties/status/index.html>.

⁶⁸ *Outer Space Treaty*, *supra* note 67, Article IX.

⁶⁹ See *id.* (discusses how there is no legal recognition that astronomy and similar human pursuits requiring access to dark night skies are part of the “peaceful exploration and use of outer space”); See, e.g., Christopher D. Johnson, *The Legal Status of MegaLEO Constellations and Concerns About Appropriation of Large Swaths of Earth Orbit*, HANDBOOK OF SMALL SATELLITES 1337, 1353 (2020), (discussing that Article IX has not been expanded to be applied to small satellites in Low Earth Orbit (LEO)); Giuliana Rotola & Andrew Williams, *Regulatory Context of Conflicting Uses of Outer Space: Astronomy and Satellite Constellations*. 46 AIR AND SPACE LAW 545 (2021); Information on the activities of international intergovernmental and non-governmental organizations relating to space law, at 3-4, U.N. Doc. A/AC.105/C.2/121 (2024). U.N. Committee on the Peaceful Uses of Outer Space, *Astronomical Observations are an Exercise in the Exploration and Use of Outer Space*. 24-03352 U.N. GENERAL ASSEMBLY A/AC.105/C.2/121, 3-4 (2024), https://www.unoosa.org/res/oosadoc/data/documents/2024/aac_105c_2/aac_105c_2121_0_html/AC_105_C2_121E.pdf.

⁷⁰ See generally Convention on International Liability for Damage Caused by Space Objects, Mar. 29, 1972, 24 U.S.T. 2389; Convention on the Registration of Objects Launched in Outer Space, Jan. 14, 1975, 28 U.S.T. 695 (went into force Sep. 15, 1976).

⁷¹ G.A. Res. 1962 (XVIII) (Dec. 13, 1963).

⁷² G.A. Res. 51/122 (Dec. 13, 1996).

international law. And none of these international legal frameworks have yet succeeded in providing universal agreement or concrete mechanisms to address the increase in light pollution. There also does not currently seem to be any political will among states to do so. Although new documents drafted are increasingly becoming more targeted towards the problem, the difficulty remains that there is little in the way of meaningful enforcement and internalization by states.

There have been some other soft law efforts outside of the realm of “space law” to more specifically tackle the issue of light pollution. The United Nations Committee on the Peaceful Uses of Outer Space (COPUOS), a global collaboration between the UN Office of Outer Space Affairs and the International Astronomical Union, has created a “Dark and Quiet Skies” initiative.⁷³ This effort has a goal of raising awareness of the issues surrounding the diminishing darkness and advocating for the prevention and reduction of light pollution.⁷⁴ But, to date, it has not had any dramatic effect. A number of other efforts by various groups have also more specifically mentioned the need to protect the night sky. For example, the *Declaration in Defense of the Night Sky and the Right to Starlight (La Palma Declaration)* was put together by a group of entities, including the Starlight Initiative, the La Palma Biosphere Reserve, the government of the Canary Islands, and the Spanish Ministry of the Environment among others, to address the need to protect the night sky.⁷⁵ The Declaration states that an unpolluted night sky is a human right (Article 1) and that the progressive degradation of the night sky must be addressed (Article 2). But, again, the Declaration is non-binding on states and their activities.

None of these efforts, therefore, provide clear, binding legal mechanisms to address the detrimental effects the loss of darkness is having on the living things on the earth. Some of the failures of these international laws may be due to most of them being written at a time when light pollution was nowhere near as extensive as it is now. As stated above, the amount of light pollution has increased dramatically since global awareness of this issue began around 2001. But, international law is also often slow to catch up to existing realities, which is a recognized difficulty when it comes to rapidly increasing environmental degradation.

Additionally, there is the long-standing issue that international law largely remains a law by and for states, where states remain the subjects of the law, and individuals, groups, and entities like corporations are the objects of the law. This

⁷³ See generally *Dark and Quiet Skies*, INT’L ASTRONOMICAL UNION, <https://www.iau.org/public/darkskiesawareness/> (last visited Oct. 6, 2024).

⁷⁴ Magnus L’Argent, *United Nations prioritizes discussion of Dark and Quiet Skies*, ASTROBITES (Mar. 15, 2024), <https://astrobites.org/2024/03/15/united-nations-dark-and-quiet-skies/>.

⁷⁵ *Declaration in Defense of the Night Sky and the Right to Starlight (La Palma Declaration)*, FUNDACION STARLIGHT (2007), https://fundacionstarlight.org/docs/files/33_english-declaration-in-defense-of-the-quality-of-the-night-sky-and-the-right-to-starlight.pdf.

means that international law does not usually regulate the behavior of individuals and corporations independently from the state. For example, while states may require, through their domestic laws, that corporations protect human rights or minimize greenhouse gas emissions, international law itself does not generally apply to corporations.⁷⁶ This causes a significant problem with many environmental issues, including light pollution, because the greatest contributions to these issues arise from the inability to enforce existing laws against some of the largest contributors to the problem.⁷⁷ These factors, coupled with the general difficulty of international law in providing enforceable guidance for state actions, make these existing international laws related to space ineffectual to address the issue of light pollution.

Some legal efforts have also occurred at the domestic level to try and address the increase in light pollution, to varying degrees of success.⁷⁸ These laws differ by jurisdiction, reflecting the legal cultures and institutions present within a place, but in general require efforts to minimize light pollution in the face of the increasing brightness of the night sky and its detrimental effects. France, Italy, Croatia, the Czech Republic and Spain among a small number of countries (mostly in Europe), that have enacted such measures. A small, but growing, number of jurisdictions are also going even further and not just codifying limits on light pollution, but actually recognizing the need to protect the night skies.⁷⁹ Niue was the first country to recognize the need to protect the darkness and New Zealand, with the leadership of several of its Māori communities, is in the process of becoming certified as a “Dark Sky Nation”.⁸⁰

While these laws are important, in that they are pushing the ideas of legal protections for night skies forward, many of them are relatively new and untested. A more common existing domestic mechanism to address the issue of light pollution, and the one most utilized in the United States, is common-law “nuisance” provisions. Frequent examples of a “nuisance” include excessive noise, bad odors, blocking public pathways, and uncontrolled animals.⁸¹ A situation under these types of provisions usually involves one person bringing a claim that some action from a neighbor is disturbing one’s enjoyment or use of

⁷⁶ See generally Michael J. Kelley & Luis Moreno-Ocampo, *The Corporation as a Subject of International Law*, PROSECUTING CORPORATIONS FOR GENOCIDE (2016).

⁷⁷ See Andrea L. Johnson, *Blinded By the Light: Addressing the Growing Light Pollution Problem*, 2 TEX. A&M J. PROP. L. 461-462 (2015).

⁷⁸ WELCH, ET AL., *supra* note 62, at 100, table 7.1 (describing various efforts to address light pollution in California, Michigan, and Hawaii).

⁷⁹ According to DarkSky, there are now more than 200 “dark sky” places recognized in 22 countries worldwide. See *International Dark Sky Places*, DARKSKY, <https://darksky.org/what-we-do/international-dark-sky-places/> (last visited Oct. 17, 2024).

⁸⁰ Michael d’Estries, *New Zealand Aims to Become World’s Largest ‘Dark Sky Nation’*, TREEHUGGER (Dec. 7, 2022), <https://www.treehugger.com/new-zealand-dark-sky-nation-6836341>.

⁸¹ See, e.g., Cal. Pen. Code § 370 (defining a public nuisance in California as “[a]nything which is injurious to health, or is indecent, or is offensive to the senses, or an obstruction to the free use of property”).

their property. The underlying idea in these situations is generally that the light, noise, or smell is “trespassing” on your property. In this scenario, light pollution would be considered a nuisance if it interferes with an individual’s or community’s use or enjoyment of their property or public space.

While domestic law has more concrete mechanisms for compliance and enforcement than international law, existing laws have still not proven particularly successful for addressing the issue of increased light pollution and promoting respect for, and protection of, darkness. Part of the issue is that nuisance claims are usually narrowly targeted, with the two parties being neighbors or members of the same community. Cities, governments, and other bigger public entities are not generally the defendants in nuisance cases. Moreover, most nuisance claims do not wind up in court, and even if they do, the reach of any decision is likely to be very specific to the parties involved and narrowly tailored so as not to have much of a broader impact. This limits any potential effectiveness in helping to address the overarching issue of light pollution and its harms beyond a strictly local scale and does nothing to promote the benefits of the night sky. Both of these elements are necessary to address the broader underlying concerns and create the shifts necessary in public views on the issue to make substantive and sustainable change.

A second problem with existing domestic mechanisms is that, even when there are laws concerning light pollution that allow broader legal action based on general harm to the community, these kinds of cases can be very difficult to win. There are a number of reasons for this. One is that there are often financial and power asymmetries between the parties in these types of cases; with individuals or communities going up against the corporations or governments who are the primary emitters of light pollution. A second reason stems from differences in legal culture and institutions that we see in countries around the world. For example, in a country like the United States, there can be difficulty demonstrating standing, which affects the ability of the plaintiff to file a lawsuit. In the U.S., standing usually requires a direct link between the action of the defendant and harm to the plaintiff, and this direct connection can be difficult to prove in the case of light pollution. In fact, in many cases where an environmental harm is the nexus of a suit, courts have dismissed for lack of standing because they cannot determine that the defendant caused the particular environmental harm to the plaintiff.⁸²

⁸² *Native Village of Kivalina v. Exxon Mobile Corp.*, 663 F. Supp. 2d 863 (N.D. Cal. 2009) (The district court held that Kivalina lacked standing to bring the public nuisance lawsuit because they could not demonstrate a “substantial likelihood” that the defendants’ conduct caused the plaintiff’s injury nor that the “seed” of its injury could be traced to the defendant. Additionally, the court held that Kivalina could not establish that it was within sufficient geographic proximity to the defendants’ alleged “excessive” discharge of greenhouse gases to demonstrate causation).

In other countries, however, the rules about who can bring environmental justice-related cases before the courts are more open. In both India⁸³ and Bangladesh⁸⁴, for example, there is the mechanism of Public Interest Litigation (PIL), which allows any person or group of persons to file a claim on behalf of the public interest. And in many civil law countries, there is a form of *actio popularis* or public interest litigation for the communal good, allowing for a similar, more open avenue for action.⁸⁵ Given these differences, it is important for advocates to understand, and draw on, the particular legal tradition in a community to develop the most effective course of advocacy.⁸⁶

While this section by no means provides a complete view of the challenges facing what little existing international and domestic law there is related to the issue of light pollution and the loss of darkness, these examples are illustrative of the difficulties with both legal options. The point here is not that advocates should stop using space treaties, working through international organizations, filing nuisance suits, or petitioning to recognize dark skies, but rather that the paths currently in use are limited. These current options would benefit from additional, more innovative, legal advocacy strategies that both address the issue of increasing light pollution and also promote the benefits of, and seek to protect, the night sky.

V. INNOVATIVE LEGAL ADVOCACY TO PROTECT THE DARKNESS USING THE RIGHTS OF COMMUNITIES, RIGHTS OF INDIVIDUALS, AND THE RIGHTS OF NATURE

While all of the laws outlined above have their place in the overall effort to halt the increase in light pollution and protect the night sky, it is clear that new legal strategies are also needed. Communities can, and should, continue to use existing domestic and international legal methods, but it is also important to think outside the box and develop additional, and perhaps more creative, strategies. In the remainder of this article, we will outline three such legal strategies, each of which

⁸³ See Mohd. Salim v. State of Uttarakhand & others, Case No. 126/2014, Uttarakhand High Court at Nainital (Mar. 20, 2017), https://elaw.org/system/files/attachments/publicresource/in_Salim_riverpersonhood_2017.pdf [hereinafter Mohd. Salim].

⁸⁴ See Human Rights and Peace for Bangladesh v. Government of Bangladesh and Others, Supreme Court of Bangladesh (High Court Divisions), Writ Petition No. 13989/2016 (English Translation, *currently unofficial*).

⁸⁵ In the Netherlands *see* Urgenda Foundation (on behalf of 886 individuals) v The State of the Netherlands (Ministry of Infrastructure and the Environment), First instance decision, HA ZA 13-1396, C/09/456689, ECLI:NL:RBDHA:2015:7145, ILDC 2456 (NL 2015) [hereinafter Urgenda Foundation], 24th June 2015, Netherlands; The Hague; District Court; in Colombia, *see* Demanda Generaciones Futuras v. Minambiente, Corte Suprema de Justicia (April 5, 2018), STC4360-2018, [hereinafter Demanda Generaciones Futuras].

⁸⁶ COURTS, CODES, AND CUSTOM, *supra* note 58 at 27. (Legal tradition is the “set of deeply rooted, historically conditioned attitudes about the nature of law, the role of law in society and the polity, and the proper organization and operation of a legal system in existence within a state.”)

is centered in some way on the idea of rights: rights of individuals, rights of communities, and rights of Nature. These are somewhat different frameworks from those that have been used so far, particularly within the United States, but which may create better opportunities among communities to address the issue of light pollution.

There has long been a debate among environmental advocates over whether legal principles of environmental justice should draw on human rights or use any kind of rights framework.⁸⁷ On one hand, doing so makes the law meaningful to people, and they may care more or pay more attention because it is immediately relevant to them. On the other, centering environmental justice solely on a rights framework – especially one grounded in individual rights may perpetuate the notion that human beings are superior to all other living things on earth, rather than part of an interconnected whole. In many instances where issues are urgent, however, as they are with the rapidly increasing amount of light pollution and its dangerous effects, structuring legal action through a rights framework may be an effective approach.

The three strategies suggested here are the use of the public trust doctrine and the corresponding notion of protecting future generations; using international human rights frameworks to bolster support for the individual rights that may be infringed upon because of light pollution; and developing a right to darkness through the growing rights of Nature movement. All three draw on recent legal developments pertaining to issues of environmental justice that have both local and global impacts. While the discussion of these strategies in this article will largely be focused on the United States, each of them is applicable globally, with the ability to be modified as necessary based on an individual community's legal tradition. All provide additional avenues of advocacy to address the issues of increasing light pollution and accelerating loss of darkness, grounded on more enforceable aspects of fundamental rights and existing domestic and international legal principles.

A. *Public Trust and the Rights of Future Generations*

In the past two decades, a new legal approach utilizing the public trust doctrine has gained traction related to environmental justice issues, and has been used to some effect by plaintiffs in climate change-related cases. The public trust doctrine establishes “that certain natural and cultural resources are preserved for public

⁸⁷ Yann Aguila, *The Right to a Healthy Environment*, IUCN (Oct. 29, 2021), <https://iucn.org/news/world-commission-environmental-law/202110/right-a-healthy-environment>; See generally Matt Ridley & Bobbi S. Low, *Can Selfishness Save the Environment?*, THE ATL. MONTHLY (1993) <https://www.theatlantic.com/past/politics/enviro/selfish.htm>; Bridget Lewis, *Human Rights and Environmental Wrongs: Achieving Environmental Justice through Human Rights Law*, 1 J. FOR CRIME, JUST. AND SOC. DEMOCRACY 65 (2012).

use.⁸⁸ Plaintiffs in a number of countries have successfully invoked this principle, arguing that governments have failed in their responsibility to protect the public from environmental harm. Notable cases such as *Urgenda Foundation v. State of the Netherlands*⁸⁹, *Future Generations v. Ministry of the Environment and Others*⁹⁰, *Sheikh Asim Farooq v. Federation of Pakistan*⁹¹, *Mohd. Salim v. State of Uttarakhand & others*⁹², and *Held v. Montana*⁹³ all center on the idea that the state has broken public trust by failing to protect the public from environmental harm.

While the details and the kind of environmental harm at issue across these cases vary, they all incorporate the principle that the government has a responsibility to protect the environment for the public good, now and for the future. For example, in *Held v. Montana*, decided in summer 2023, the plaintiffs relied on provisions in the Montana Constitution that reflect the concept of public trust. The Montana Constitution provides for “the right to a clean and healthful environment” and holds the state, as well as individuals, responsible for maintaining and improving the environment “for present and future generations.”⁹⁴ In rendering its decision, the Court held that certain natural resources are common property that the government has a responsibility to preserve and maintain for the public good and use. Finding in favor of the plaintiffs, the court stated that “young people have a constitutional right to a healthful environment and that the state must consider potential climate damage when approving projects” to ensure the natural environment is preserved and protected.⁹⁵

The public trust doctrine is an ancient legal principle found in some form in many jurisdictions around the world, including India, Pakistan, the Philippines, Uganda, Kenya, Nigeria, South Africa, Brazil, and Ecuador, as well as all common law countries like England, Canada, New Zealand, Australia, and the

⁸⁸ *Legal Information Institution: Public Trust Doctrine*, CORNELL LAW SCHOOL (May 2022) https://www.law.cornell.edu/wex/public_trust_doctrine.

⁸⁹ *Urgenda Foundation* (the Dutch Court held that the government was responsible for not doing enough to address the negative impacts of climate change).

⁹⁰ *Demanda Generaciones Futuras* (the Colombian Court held that the right to a healthy environment is a fundamental right and protecting the rights of the Amazon is a key component of ensuring the right to a healthy environment, as well as other rights, are protected.)

⁹¹ *Sheikh Asim Farooq v. Federation of Pakistan*, Lahore High Court, Judicial Department Writ Petition No. 192069 of 2018 (2019). <https://climatecasechart.com/non-us-case/sheikh-asim-farooq-v-federation-of-pakistan-etc/> (the Lahore High Court upheld the right to a healthy environment and that the government is responsible for protecting the environment in order to ensure this right).

⁹² *Mohd. Salim* (the Court held that the Ganges and Yamuna rivers are legal persons and have the right to exist, flourish, and protect themselves from pollution).

⁹³ *Held v. Montana*, No. CDV-2020-307 (Mont. Dist. Ct. Aug. 14, 2023) [hereinafter *Held v. Montana*].

⁹⁴ MONT. CONST. arts. II § 3, IX § 1. *See also* David Gelles & Mike Baker, *Judge Rules in Favor of Montana Youths in a Landmark Court Case*, NEW YORK TIMES (August 16, 2023), <https://www.nytimes.com/2023/08/14/us/montana-youth-climate-ruling.html>.

⁹⁵ Gelles, *supra* note 94.

United States.⁹⁶ Unlike the tort of nuisance, which, as described above, is often how light pollution has been handled to date, the public trust doctrine is about more than just narrow interference with one individual. Rather, it is about the protection and well-being of an entire space, common, or resource where a harm has the potential to impact everyone within that community.⁹⁷ The public trust doctrine has two key components: one, there is a public good at issue and two, the government has somehow been negligent in its responsibilities towards that good, which, in turn, has been harmful to the public.⁹⁸ In public trust cases, the defendant is usually the state, which also means that a decision has the potential for greater impact. This is different from many nuisance cases where the defendant is often a private individual and the impact of redressing any violation could be very narrow.

In some ways the concept of public trust in relation to environmental harm is grounded in the underlying idea of the Commons: certain spaces or goods that are universal and available for the enjoyment of all. But, the Commons are also the responsibility of all. While originally developed with an eye towards protecting economic concerns rather than environmental ones, safeguarding the Commons has emerged as an environmental concept as well.⁹⁹ According to Joseph Sax, a leading legal scholar on the public trust doctrine, it is a legal tool that any citizen could use to fight exploitation of resources that should rightfully be protected common property.¹⁰⁰

Similar to the underlying idea of the Commons, the public trust doctrine views public goods as those natural and cultural resources and spaces that belong to no one, but are important for everyone; and these public goods include the night sky.¹⁰¹ Historically, the public trust concept was most often used in the environmental realm to advocate for clean air and clean water.¹⁰² But, in recent years, the concept has been expanded to other kinds of issues related to the public good for which the government is responsible.¹⁰³ More recent examples include

⁹⁶ Michael C. Blumm & Rachel D. Guthrie, *Internationalizing the Public Trust Doctrine: Natural Law and Constitutional and Statutory Approaches to Fulfilling the Saxion Vision*, 44 U.C. DAVIS L. REV. 1, 4 (2012).

⁹⁷ See generally David Takacs, *The Public Trust Doctrine, Environmental Human Rights and the Future of Private Property*, 16 N.Y.U. ENV'T. L. J. 711 (2008).

⁹⁸ *Id.* at 715-716.

⁹⁹ *Id.*

¹⁰⁰ *Id.* at 715.

¹⁰¹ See generally ELINOR OSTROM, *GOVERNING THE COMMONS: THE EVOLUTION OF INSTITUTIONS FOR COLLECTIVE ACTION* (1990); Terrel Gallaway, *The Value of The Night Sky, in URBAN LIGHTING, LIGHT POLLUTION AND SOCIETY* (1st ed. 2014); Fabio Falchi et al., *A Call For Scientists to Halt the Spoiling of The Night Sky with Artificial Light and Satellites*, 7 NATURE ASTRONOMY 237 (2023), <https://doi.org/10.1038/s41550-022-01864-z>.

¹⁰² Takacs, *supra* note 97, at 713.

¹⁰³ For a list of ongoing public trust cases related to environmental issues, see the Climate Change Litigation Database, *Climate Case Chart: Public Trust*, <https://climatecasechart.com/principle-law/public-trust-doctrine/>.

the atmospheric public trust utilized in the *Juliana* where the atmosphere is viewed as a public trust natural resource, and the natural environment as public trust in the *Held* case, where Montana's Constitution provides for a clean and healthy environment.¹⁰⁴

Around the world, the concept of the public trust has been expanded even further to include the recognition of governmental responsibility to do more to prevent climate change and reduce its corresponding harms (*Urgenda v. the Netherlands*); to protect rivers from pollution and overdevelopment (*Human Rights and Peace for Bangladesh v. Government of Bangladesh and Others*); and to ensure that the Amazon rainforest and basin, recognized as the “lung of the world”, continue to exist (*Demanda Generaciones Futuras v. Minambiente, Colombia*). In all of these cases, courts have made the connection between the needs of the people and the government's responsibility to care for such public goods including ensuring clean air, clean water, adequate food and health, and a healthy environment. The need for darkness falls into a similar vein, necessary for the health and well-being of people, as well as all other living things.

The foundation of the public trust doctrine is that the government or state is responsible for protecting common areas held in the public trust. But this legal concept also contains an additional component that is relevant when advocating for the reduction of light pollution: the protection of the rights of both present and future generations and the recognition of intergenerational equity. Many of the cases with public trust elements reference the special responsibility that governments have to protect future generations and vulnerable populations, such as children and the elderly, who are particularly at risk from environmental harms.¹⁰⁵ Protecting the rights of future generations has been a key component of laws on the environment and sustainability since the 1970s. First mentioned in the *Stockholm Declaration on the Human Environment*, international environmental law has consistently recognized state obligations to protect present and future generations.¹⁰⁶ The concept is elaborated on in UNESCO's *Declaration on the Responsibilities of Present Generations towards Future Generations*:

The present generations have the responsibility to bequeath to future generations an Earth which will not one day be irreversibly damaged by human activity. Each generation inheriting the Earth temporarily should take care to use natural resources reasonably and ensure that life is not prejudiced

¹⁰⁴ *Juliana v. United States*, 339 F. Supp. 3d 106 (9th Cir. 2020); *Held v. Montana*.

¹⁰⁵ United Nations Environment Program, *Intergenerational Equity*, <https://leap.unep.org/en/knowledge/glossary/intergenerational-equity>; See also *Held v. Montana*, *Urgenda Foundation*; *Demanda Generaciones Futuras*.

¹⁰⁶ Paris Agreement to the United Nations Framework Convention on Climate Change, *Stockholm Declaration on the Human Environment*, UN Doc. A/Res/2994 (XXVII), 16/06/1972, Art. 6 (June 16, 1972); See also Rio Declaration on Environment and Development, Jun. 13, 1992, 31 ILM 874 (1992); See also Paris Agreement to the United Nations Framework Convention on Climate Change, Dec. 12, 2015, T.I.A.S. No. 16-1104.

by harmful modifications of the ecosystems and that scientific and technological progress in all fields does not harm life on Earth.¹⁰⁷

Similar ideas were echoed 25 years later in the *Maastricht Principles on the Human Rights of Future Generations*.¹⁰⁸ Drafted by leading legal and human rights experts, including Davis Boyd, then UN Special Rapporteur for Human Rights and the Environment, the *Maastricht Principles* emphasize the need to consider state obligations to protect human rights for present as well as future generations. Moreover, within this framework, the Principles recognize that a healthy environment is a crucial underpinning of human rights and that to meet their obligations, states “must necessarily impose reasonable restrictions on activities that undermine the rights of future generations, including the unsustainable use of natural resources and the destruction of Nature.”¹⁰⁹ While declarations and principles like these are not binding in and of themselves, they serve as aspirational guidelines. Over time, they can become recognized as soft law instruments in which the protection of future generations has become persuasive or perhaps even customary international law.¹¹⁰

Domestic law has also started to recognize the rights of present and future generations and intergenerational equity. A number of the court decisions protecting the environment through concepts of public trust have an intergenerational element. Colombia’s Supreme Court of Justice held that the government failed in its obligation to protect present and future generations from the harms of climate change, violating not only fundamental rights but also the rights of intergenerational equity protected by the Colombian Constitution and international law.¹¹¹ Protecting the well-being of future generations was also discussed in the *Held* case outlined above. In the *Juliana* case, the group of youth plaintiffs who filed the complaint argued that young people (future generations),

“have a substantial, direct, and immediate interest in protecting the atmosphere, other vital natural resources, their quality of life, their property interests, and their liberties. They also have an interest in ensuring that the climate system remains stable enough to secure their constitutional rights to life, liberty, and property, rights that depend on a livable Future.”¹¹²

¹⁰⁷ UNESCO, Declaration on the Responsibilities of the Present Generations Towards Future Generations, Art. 4., (Nov. 19, 1997), <https://www.unesco.org/en/legal-affairs/declaration-responsibilities-present-generations-towards-future-generations>.

¹⁰⁸ *Maastricht Principles on The Human Rights of Future Generations*, adopted on 3 February 2023, <https://www.ohchr.org/sites/default/files/documents/new-york/events/hr75-future-generations/Maastricht-Principles-on-The-Human-Rights-of-Future-Generations.pdf>

¹⁰⁹ *Id.* at 6.

¹¹⁰ See generally Josiah David F. Quising, *Beyond OPOSA: Courts reinforcing intergenerational equity as customary international law*, 29 EUROPEAN LAW JOURNAL 422-44 (2024).

¹¹¹ Demanda Generaciones Futuras

¹¹² *Juliana v. United States*, No. 6:15-cv-01517-TC (D. Or. Sept. 15, 2015). https://climatecasechart.com/wp-content/uploads/case-documents/2015/20150910_docket-615-cv-

In fact, in the United States, the rights of present and future generations is one of the underpinnings of the National Environment Policy Act (NEPA), which calls on the government to promote efforts that will prevent damage to the environment and protect the health and welfare of people.¹¹³ It is also the responsibility of the government to “use all practicable means and measures to create and maintain conditions under which humans and nature can exist in productive harmony and fulfill the social, economic, and other requirements of present and future generations of Americans.”¹¹⁴ Given the extensive use of the public trust doctrine, and its corresponding protection of the environment for future generations, applying these same arguments to address the negative impacts from increasing light pollution is a logical extension.¹¹⁵

The sky and space are commons. These spaces are owned by no one and belong to all.¹¹⁶ Their preservation, therefore, is the responsibility of all states, in the same way the protection of the oceans or Antarctica as commons is the responsibility of all.¹¹⁷ As such, preservation of the sky must be considered an obligation, and dark skies are a part of this. All living things on this planet – present and future – are entitled to natural nighttime darkness. As with other commons like the ocean, this does not mean there can be no use of these spaces, but it means that any such use may not infringe upon either the sustainable health of the resource or the enjoyment of, and reliance on, it by all living things. When it gets to the point we see now of increased sky-glow that is infringing on the darkness, it is clear governments are failing in their responsibilities to protect the public trust and safeguard the most vulnerable populations and, therefore, must be held responsible.

1517_complaint-2.pdf (First Amended Complaint for Declaratory and Injunctive Relief. On May 1, 2024, the 9th Circuit Court of Appeals dismissed the case due to lack of standing, however the decision was based largely on the Court’s contention that addressing climate change was an issue for the other branches of government. The court did not refute the idea of intergenerational equity.)

¹¹³ NATIONAL ENVIRONMENT PROTECTION ACT, 42 U.S.C. § 4331(a).

¹¹⁴ *Id.*

¹¹⁵ See Alexander Q. Gilbert & Monica Vidaurri, *Major Federal Actions Significantly Affecting the Quality of the Space Environment: Applying NEPA to Federal and Federally Authorized Outer Space Activities*, 44 ENVIRONS 233 (2021), <https://environs.law.ucdavis.edu/sites/g/files/dgvnsk15356/files/media/documents/ENV-44-2-Gilbert.pdf>; John C. Barentine, *Who speaks for the night? The regulation of light pollution in the rights of nature framework*, 22 INT’L J. OF SUSTAINABLE LIGHTING 28, 32 (2020).

¹¹⁶ Aparna Venkatesan et. al., *The Impact of Satellite Constellations on Space as an Ancestral Global Commons*, 4 NATURE ASTRONOMY 1043, 1947 (2020), <https://www.nature.com/articles/s41550-020-01238-3>.

¹¹⁷ 1959 Antarctic Treaty, Jan. 12 1959, 12 U.S.T. 794; United Nations Convention on the Law of the Sea, Dec. 10, 1982, 1833 U.N.T.S. 397; Agreement under the United Nations Convention on the Law of the Sea on the Conservation and Sustainable Use of Marine Biological Diversity of Areas beyond National Jurisdiction, at ¶ 5 (Jun. 19 2023) (Not yet in force).

B. *The Right to Darkness as an Element of Human Rights Law*

Another way to approach advocating for action to limit light pollution is through the lens of international environmental justice protections that already exist as provisions in human rights, environmental, and Indigenous treaties and declarations. International human rights treaties offer a number of protections that are impacted by the loss of darkness, including the right to health, the right to a healthy environment, freedom to engage in one's cultural practices, freedom of religion, and the rights of Indigenous peoples to free, prior and informed consent. All of these rights are impacted by the loss of the night skies due to increased light pollution.

Each of these internationally recognized principles may be used to argue that states have an obligation to ensure that light pollution is minimized so it doesn't impact these rights. For advocates interested in using this strategy, it is important to recognize that there will be variance by jurisdiction in the extent to which international law may provide a successful legal strategy.¹¹⁸ Some countries, which lean towards a more monist approach to international law, may provide a more feasible forum for this option because international treaties and customary law are readily justiciable. Other countries, such as the United States, are strongly dualist and therefore may have a more difficult process by which international law is internalized into the domestic legal system. This type of system will require additional efforts to use international law within the domestic legal system to address the harms from increasing light pollution.¹¹⁹

Regardless of where a state stands on the monist-dualist spectrum, however, it is important to remember that using international law is just one of many advocacy tools for addressing the loss of darkness. In a number of cases, including *Urgenda*, *Future Generaciones*, and *Human Rights and Peace for Bangladesh*, international law was used by the courts to help define the required protections and support interpretations of domestic legal provisions favorable to the environment. The cases themselves weren't decided solely on the basis of international law, but using the global provisions was helpful in providing additional legal support for the protections handed down in the final judicial determinations. The same strategy can be used by advocates in cases regarding the impacts of light pollution as there are norms recognized in international law that support the case for protecting darkness.

¹¹⁸ Zartner, *supra* note 60

¹¹⁹ COURTS, CODES, AND CUSTOM, *supra* note 58 at 39-43. See generally Paola Andrea Acosta Alvarado & Daniel Rivas Ramírez, *A Milestone in Environmental and Future Generations' Rights Protection: Recent Legal Developments before the Colombian Supreme Court*, 30 J. OF ENV'T L. 519, 525 (2018).

1. The Right to Health & the Right to a Healthy Environment

Numerous international treaties, as well as many domestic laws, provide for a right to health and/or a right to a healthy environment.¹²⁰ Both of these rights provide a basis for the legal argument that light pollution needs to be limited and access to darkness protected. The right to health is a fundamental human right recognized from the inception of the contemporary international human rights regime in Article 25 of the *Universal Declaration of Human Rights* (UDHR). As described earlier in this paper, decreasing darkness can have a significant impact on peoples' health, disrupting hormone balances and sleep cycles, and contributing to mental and physical illnesses.

According to the World Health Organization (WHO), all 194 WHO member states have "ratified at least one treaty that recognizes the right to the highest attainable standard of physical and mental health."¹²¹ Since 1948, the right to health has been codified in half a dozen major multilateral human rights treaties¹²² and regional conventions¹²³, as well as in the national laws of over 100 states.¹²⁴ And if a state is not bound through any of these treaty provisions, the UDHR, mentioned above, is recognized as customary international law.¹²⁵

While the wording of these different legal documents varies, the underlying thread is that there is a recognition that human beings have the right to health and states are responsible for protecting that right. The increase in light pollution and its concomitant harms on human health fall squarely within this domain. Governments are responsible for protecting the health of their citizens. This includes taking action to reduce harmful light pollution and ensure there is an adequate amount of natural darkness. Not doing so is akin to violating a fundamental right that can be taken up by advocates in court.

Related to the right to health is the right to a healthy environment. While not as prevalent in international law as the right to health, a right to a healthy

¹²⁰ See e.g. G.A. Res. 2200A (XXI), International Covenant on Economic, Social and Cultural Rights, at Art. 12(b) (Dec. 16, 1966); G.A. Res. 44/25, Convention on the Rights of the Child, at Art. 29(e) (Nov. 20, 1989); ILO Convention, No. 169, Additional Protocol To The American Convention On Human Rights In The Area Of Economic, Social And Cultural Rights "Protocol Of San Salvador," at Art. 11 (Nov. 17, 1988); See also Aguila, *supra* note 87.

¹²¹ *Human Rights*, WORLD HEALTH ORGANIZATION (2024), https://www.who.int/health-topics/human-rights#tab=tab_1.

¹²² See G.A. Res. 2200A (XXI), art. 12 (Dec. 16, 1966); G.A. Res. 2106 (XX), art. 5 (Dec. 21, 1965); G.A. Res. 34/180, art. 11, 12, 14 (Dec. 18, 1979); G.A. Res. 44/25, art. 24 (Nov. 20, 1989); G.A. Res. 45/158 art. 28, 43, 45 (Dec. 18, 1990); G.A. Res. 61/106, art. 25 (Dec. 12, 2006).

¹²³ *Fact Sheet No. 31: The Right to Health*, U.N. OFFICE OF THE HIGH COMMISSIONER FOR HUMAN RIGHTS (2008) <https://www.ohchr.org/en/publications/fact-sheets/fact-sheet-no-31-right-health>. See also African Charter on Human and Peoples' Rights ("Banjul Charter"), Jun. 27, 1981, 21 I.L.M. 58; Additional Protocol to the American Convention on Human Rights in the Area of Economic, Social and Cultural Rights: Protocol of San Salvador, Nov. 4, 1988, 28 I.L.M. 156; European Social Charter, Oct. 18, 1961. 529 U.N.T.S. 89.

¹²⁴ United Nations Office of the High Commissioner for Human Rights, *supra* note 123.

¹²⁵ WILLIAM A. SCHABAS, *The Belated Emergence of The Customary International Law of Human Rights*, in THE CUSTOMARY INTERNATIONAL LAW OF HUMAN RIGHTS, 9-39 (2021).

environment is still incorporated into multiple international and regional treaties, as well as customary international law. It is also found in the national laws of some countries and “appears to be moving, slowly but surely, to a higher degree of relevance.”¹²⁶ According to David Boyd, former UN Special Rapporteur on Human Rights and the Environment, the right to a healthy environment is found in “regional human rights treaties and environmental treaties binding more than 120 States” and also in the constitutions and legislation of “more than 100 States. In total, 155 States have already established legal recognition of the right to a healthy and sustainable environment.”¹²⁷

Additionally, global institutions have reiterated the right to a healthy environment in a variety of ways. In October 2021, the UN Human Rights Council adopted a resolution recognizing that the right to a clean, healthy and sustainable environment is a human right.¹²⁸ In July 2022, the UN General Assembly also passed a resolution stating that everyone has the right to a clean, healthy, and sustainable environment.¹²⁹ While not binding on states, these efforts are a testament to the continuously growing reach and relevance of this legal concept. International court cases have also recognized the right to a healthy environment. One of the most recent decisions from the Inter-American Court of Human Rights found that the government of Peru had violated the right to a healthy environment of residents of the town of La Oroya.¹³⁰ In this case, toxic pollution from a mine and smelter was found by Peru’s Ministry of Health to have so polluted the town that “99.9 percent of children under six years old who were tested had high lead levels in their blood.”¹³¹ The Inter-American Court found the Peruvian government was responsible for allowing these serious health harms, causing the deaths of two residents, and failing to provide adequate health care.¹³²

There are also six U.S. states that recognize a right to a healthy environment in some capacity: Hawai’i, Illinois, Massachusetts, Montana, New York, and Pennsylvania.¹³³ In fact, the provision in the Montana State Constitution

¹²⁶ David Takacs, *supra* note 97, at 725. For international legal documents recognizing the Right to a Healthy Environment, see United Nations Office of the High Commissioner for Human Rights, *supra* note 123.

¹²⁷ Aguila, *supra* note 87.

¹²⁸ *Id.*

¹²⁹ John C. Dembach, *The Environmental Rights Provisions of U.S. State Constitutions: A Comparative Analysis*, in ENVIRONMENTAL LAW BEFORE THE COURTS (Springer, forthcoming), WIDENER L. COMMONWEALTH Research Paper No. 23-05, SSRN (Apr. 13, 2023), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4390853.

¹³⁰ Katherine La Puente, *Landmark Court Ruling Upholds Right to Healthy Environment*, HUMAN RIGHTS WATCH (April 18, 2024), <https://www.hrw.org/news/2024/04/18/landmark-court-ruling-upholds-right-healthy-environment>.

¹³¹ *Id.*

¹³² *Id.*

¹³³ Romany Webb, *Environmental Rights in State Constitutions*, CLIMATE LAW: A SABIN CENTER BLOG (August 31, 2021), <https://blogs.law.columbia.edu/climatechange/2021/08/31/environmental-rights-in-state-constitutions/>.

recognizing a right to a healthy environment played a crucial role in the *Held v. Montana* case, referenced above. In this case the plaintiffs won their claim that the Montana government wasn't doing enough to address climate change and its negative impacts. While *Held* more broadly addressed the impacts of climate change, the same logic used by the plaintiffs in that case could be used to argue that light pollution is an increasing environmental harm being caused by human action that interferes with the rights of present and future generations to a clean and healthy environment.¹³⁴ This is especially true for children. As the *Held* court noted, children are particularly vulnerable to the effects of the changing environment, including harm to physical and mental health.¹³⁵ As discussed above, the increase in light pollution and the loss of darkness also has negative effects on both physical and mental health.

For advocates interested in addressing the human rights impacts of light pollution, focusing on the adverse health and environmental harms protected under international law is one way to bolster whatever domestic laws may be available. It also may be a particularly effective avenue for advocacy given that most people pay attention to situations like their own health, even if they might not pay as much attention to the broader implications of an issue like light pollution.

2. Freedom to Engage in One's Cultural Practices & Freedom of Religion

As with the rights to health and a healthy environment, most legal systems, and international law, have provisions providing for freedom of religion, as well as the right to engage freely in one's cultural practices. While these rights often exist within domestic legal systems, international law can be a useful tool for providing new interpretations of these rights to support the protection of darkness as a cultural or spiritual element. Often these ideas are closely associated with Indigenous peoples, many of whom have legal traditions or worldviews that emphasize the relationship between nature, culture and spirituality. But there are also many other communities that deeply center the environment and the holistic relationship between all living things as part of their cultural or spiritual practices and which may be harmed by the loss of the night skies.

There is a great deal of international, regional, and domestic law that protects the freedom of religion.¹³⁶ Approximately 80% of UN member states have a constitutional provision in some form protecting freedom of religion.¹³⁶ That does not mean, of course, that everyone in every country is free to practice any religion. There are states that have restrictions regarding the practice of religion within

¹³⁴ *Held v. Montana*, at 46-64.

¹³⁵ *Held v. Montana*, at 30.

¹³⁶ For a comprehensive list of international documents that contain the freedom of religion, please see *International Standards: Special Rapporteur on Freedom of Religion or Belief*, U.N. HUMAN RIGHTS (last visited Oct. 17, 2024) <https://www.ohchr.org/en/special-procedures/sr-religion-or-belief/international-standards>.

their territories, provide protections for only certain religions, or limit one's ability to change religions. But, the general recognition that people have a right to practice their religion is widespread, and the broad working of the right leaves room for interpretation supporting the protection of darkness as a fundamental component of this freedom.

For many peoples the freedom of religion, or the ability to engage in one's spirituality, is deeply connected to the dark skies and the rhythm of the day and night. For millennia, the night sky has been part of the heritage of many peoples, who have used the stars to mark the changing of the seasons and the passage of time, for navigation, to determine the time for harvest, and to pray. In fact, many religious rituals include "stargazing and celestial observations" as core practices¹³⁷ These traditions related to the sky, while perhaps not immediately recognizable to some followers of monotheistic religions, are important components of spirituality for many cultures and traditions.

Given the relationship between spirituality, culture, and the night sky, a number of international agreements already protect the right to practices that include the dark sky as cultural heritage.¹³⁸ Generally, cultural rights are thought of as those that "protect the rights for each person ... as well as groups of people, to develop and express their humanity, their world view and the meanings they give to their existence and their development through ... values, beliefs, convictions, languages, knowledge and the arts, institutions and ways of life."¹³⁹ These rights are often particularly important to Indigenous groups for whom the relationship between their cultures and the natural environment is deeply linked.

For example, the *International Covenant on Civil and Political Rights* recognizes that "states have special responsibility towards ethnic, religious, or linguistic minorities" and members of these groups have the right to "enjoy their own culture, to process and practice their own religion, and to use their own language."¹⁴⁰ Similarly, the *Convention on the Elimination of All Forms of Racial Discrimination* (CERD) requires recognition for the special obligation states have to ensure that Indigenous peoples are not more greatly affected by policy

¹³⁷ *Global Restrictions on Religion*, PEW FORUM ON RELIGION & PUBLIC LIFE (Dec. 2009) <https://www.pewresearch.org/religion/2009/12/17/global-restrictions-on-religion/>.

¹³⁸ International Covenant on Economic, Social and Cultural Rights, *opened for signature* Dec. 16, 1966, 999 U.N.T.S. 171 art. 15; International Covenant on Civil and Political Rights, *opened for signature* 19 December 1966, 999 U.N.T.S. 171 art 27 (entered into force 23 March 1976); Universal Declaration of Human Rights, G.A. Res. 217 (III) A, U.N. Doc. A/RES/217(III) (Dec. 10, 1948), Art. 27

¹³⁹ *Night Skies: A Cultural Resource*, NAT'L PARK SERV., <https://www.nps.gov/subjects/nightskies/cultural.htm> (Aug. 27, 2024); *The Connection between Stars and Religion*, SPARKLING STAR REGISTER, <https://starregister.org/the-connection-between-stars-and-religion.php> (Last visited Oct. 8, 2024).

¹⁴⁰ International Covenant on Civil and Political Rights, *opened for signature* 19 December 1966, 999 U.N.T.S. 171 art 27 (entered into force 23 March 1976).

decisions than the broader population.¹⁴¹ According to Professor James Anaya, the former UN Special Rapporteur on the Rights of Indigenous Peoples, CERD requires states to consult with Indigenous peoples about any decision that can potentially affect them in ways not felt by others.¹⁴²

The loss of darkness has the potential to affect Indigenous peoples more than other groups due to their close cultural and spiritual connections with the stars and the sky. According to some Indigenous participants in the Satellite Constellations 2 (2) Workshop, organized to discuss mitigation measures related to protecting the night sky, “satellites literally interrupt our relationship with the stars and ceremonial ways of connecting with them.”¹⁴³ In presentations before the Community Engagement Working group, they went on to say: “Stars are our ancestors and erasing them is erasing our tellings and scientific-cultural traditions.”¹⁴⁴ Additionally, peoples with oceanic wayfinding traditions shared their deep concerns regarding the preservation of “the health and integrity of the ocean above us as well as the ocean between our lands.”¹⁴⁵

In some places, these international legal principles have been readily used to address environmental harms that are interfering with cultural and spiritual practices. For example, the Inter-American Court of Human Rights has heard a number of cases against states whose activities, largely related to extractive industries, have interfered with the cultural and spiritual practices of Indigenous peoples.¹⁴⁶ In India, in the case brought before the High Court in the State of Uttarakhand, a key element of the argument for the protection of the rights of the Ganges River was the spiritual importance of the river to the country’s Hindus.¹⁴⁷

In the United States, the freedom of religion is protected by the U.S. Constitution, though the specific language in the document does not encompass notions of spirituality related to different kinds of worldviews. However, there is national and state legislation that reflects some of the broader meanings found in international law recognizing the different traditions of spiritual practices. For

¹⁴¹ International Convention on the Elimination of All Forms of Racial Discrimination, Dec. 21, 1965, 660 U.N.T.S. 195 art. 1.

¹⁴² James Anaya, *Promotion and Protection of All Human Rights, Civil, Political, Economic, Social, and Cultural Rights, Including the Right to Development*, U.N. Doc. A/HRC/12/34, at 12 (2009).

¹⁴³ Venkatesan, et al., *supra* note 8.

¹⁴⁴ *Id.*

¹⁴⁵ *SATCON2 Community Engagement Report*, NAT’L SCI. FOUND. & AM. ASTRONOMICAL SOC’Y, https://en.wikisource.org/wiki/Page:SATCON2_Community_Engagement_Report.pdf/36 (Oct. 16, 2024).

¹⁴⁶ See *The Mayagna (Sumo) Awas Tingni Community v. Nicaragua*, Inter-Am. Ct. H.R. (ser. C) No. 79, para. 82 (Aug. 31, 2001) (The Court states in its decisions: “The lands of the Indigenous peoples constitute a space which is, at the same time, geographical and social, symbolic and religious, of crucial importance for their cultural self-identification, their mental health, their social self-perception”).

¹⁴⁷ *Mohd. Salim v. State of Uttarakhand & others*, Case No. 126/2014, Uttarakhand High Court at Nainital (Mar. 20, 2017), https://elaw.org/system/files/attachments/publicresource/in_Salim_riverpersonhood_2017.pdf.

example, the American Indian Religious Freedom Act has as one of its objectives ensuring that Native Americans are able to “freely practice their faith, according to their own customs, and have access to their sacred sites.”¹⁴⁸ This provision is supported by the interpretations of international legal provisions such as Articles 1 and 18 of the *International Covenant on Civil and Political Rights* and the International Labor Organization’s *Convention on Indigenous and Tribal Peoples in Independent Countries* (known generally as ILO 169).¹⁴⁹ Both treaties are binding on the U.S. and coupled with the *United Nations Declaration on the Rights of Indigenous Peoples*, which was endorsed by President Obama in 2010 and recommitted to at an OAS meeting in 2016, create strong legal arguments for the protection of broader spiritual practices.¹⁵⁰

This more holistic understanding of religious and spiritual practice has also been upheld by the U.S. Supreme Court in *Lyng v. Northwest Indian Cemetery Protection Association*.¹⁵¹ This case concerned the construction of a U.S. Forest Service road through undeveloped federal lands sacred to Northern California tribes. Lower courts ruled in favor of the Yurok, Karok, and Tolowa peoples, stating the road would impact their religious practices. While the U.S. Supreme Court ultimately allowed the road, Justice William Brennan’s dissenting opinion clearly highlights the connection between Indigenous peoples, their spirituality, and the land, stating:

[F]or Native Americans religion is not a discrete sphere of activity separate from all others.... [F]or most Native Americans worship cannot be delineated from social, political, cultural and other areas.... While traditional Western religions view creation as the work of a deity who institutes natural

¹⁴⁸ Dana Zartner, *Justice for Juristac: Using International and Comparative Law to Protect Indigenous Lands*, 18

SANTA CLARA J. INT’L L. 175 (2020), <https://digitalcommons.law.scu.edu/scujil/vol18/iss2/2/>; Rosalyn R. LaPier, *Why Native Americans Struggle to Protect Their Sacred Places*, THE CONVERSATION, <https://truthout.org/articles/why-native-americans-struggle-to-protect-their-sacred-places> (Aug. 28, 2018).

¹⁴⁹ International Labour Organization (ILO), *C169 - Indigenous and Tribal Peoples Convention*, 1989, No.169, 27 June 1989, <https://www.refworld.org/legal/agreements/ilo/1989/en/19728>.

¹⁵⁰ The White House: Office of the Press Secretary, *Remarks by the President at the White House Tribal Nations Conference* (Dec. 16, 2010), <https://obamawhitehouse.archives.gov/the-press-office/2010/12/16/remarks-presidentwhitehouse-tribal-nations-conference>; Org. of Am. States [OAS], Gen. Assembly Res. 2888, American Declaration on the Rights of Indigenous Peoples, at 47 n.1, OAS Doc. AG/RES. 2888 (XLVI-O/16) (June 15, 2016) (In a footnote during discussions on the American Declaration on the Rights of Indigenous Peoples, the U.S. said: “The United States reiterates its longstanding belief that implementation of the United Nations Declaration on the Rights of Indigenous Peoples (“UN Declaration”) should remain the focus of the OAS [Organization of American States] and its member states. OAS member states joined other UN Member States in renewing their political commitments with respect to the UN Declaration at the World Conference on Indigenous Peoples in September 2014. ... [t]he United States intends to continue its diligent and proactive efforts, which it has undertaken in close collaboration with Indigenous peoples in the United States and many of its fellow OAS member states, to promote achievement of the ends of the UN Declaration.”).

¹⁵¹ *Lyng v. Northwest Indian Cemetery Protective Ass’n*, 485 U.S. 439, 460 (1988).

laws which then govern the operation of physical nature, tribal religions regard creation as an ongoing process in which they are morally and religiously obligated to participate. ... Native Americans fulfill this duty through ceremonies and rituals designed to preserve and stabilize the earth and to protect humankind from disease and other catastrophes. Failure to conduct these ceremonies in the manner and place specified, adherents believe, will result in great harm to the earth and to the people whose welfare depends on it.¹⁵²

The problem of light pollution and the loss of darkness can infringe on anyone's freedom to enjoy their culture and spirituality. While this is certainly true for many Indigenous communities, as described here, it can also be the case for all peoples whose cosmologies or spiritualities take into account the night skies. The star-filled dark sky has an incredibly important place in many cultures and “[h]as shaped the beliefs and traditions of societies, from the Native American origin and cultural landscape stories, to the celestially-aligned architecture of ancestral Puebloan civilizations, to agricultural harvest festivals and nautical navigation records of sea voyages.”¹⁵³ The loss of darkness due to increasing light pollution is therefore a violation of one of the most fundamental rights in both international and domestic laws. While many domestic legal systems do have provisions encompassing the freedom of religion, the international law on this issue is broader. The freedom of religion in international law recognizes not only the monotheistic religions, but also spiritualities and cultural practices that encompass nature – including the stars and the night sky – in their practices.

3. Free, Prior & Informed Consent

Another international human rights principle that advocates can use to argue for the protection of darkness is free, prior, and informed consent (FPIC). FPIC is a concept that was first codified internationally in ILO 169 and has since become a significant component of human rights law, especially in regard to Indigenous peoples.¹⁵⁴ The four components of FPIC include: the absence of any coercion or

¹⁵² *Lyng v. Northwest Indian Cemetery Protective Ass'n*, 485 U.S. 439, 460 (1988).

¹⁵³ *Night Skies: A Cultural Resource*, *supra* note 139.

¹⁵⁴ ILO No. 169, ARTICLES 6, 15; ICCPR; CERD; CERD General Comment 23 of 1997 calls upon state parties to “ensure that members of Indigenous peoples have equal rights in respect of effective participation in public life and that no decisions directly relating to their rights and interests are taken without their informed consent.”; UNDRIP, at arts. 10, 11(2), 19, 28(1), 30(1), 32(2). Article 32(2) is particularly relevant to situations with extractive industries and states: “States shall consult and cooperate in good faith with the Indigenous peoples concerned through their own representative institutions in order to obtain their free and informed consent prior to the approval of any project ... in connection with the development, utilization or exploitation of mineral, water or other resources.”; European Parliament, Directorate-General for External Policies, *Indigenous Peoples, Extractive Industries and Human Rights*, EXPO/B/DROI/2013.23 (2014), at 6.; *Kichwa Indigenous People of Sarayaku v. Ecuador*, Inter-Am. Ct. H.R. (ser. C) No. 245, (June 27, 2012); *Tsleil-Waututh Nation v. Canada*, 2018 F.C. 153, para. 6.

pressure when making decisions (free); ample time to gather information and engage in a fully-informed discussion before a project starts (prior) based on all the relevant information reflecting all views and positions (informed); and the demonstration of clear and compelling agreement, including traditional consensus procedures (consent).¹⁵⁵ FPIC also requires a duty to engage in meaningful consultation with Indigenous peoples before beginning a project that may have an impact on them. As stated by the United Nations Expert Mechanism on the Rights of Indigenous Peoples:

Free, Prior and Informed Consent (FPIC) is one of the most important principles that Indigenous Peoples believe can protect their right to participation. It is embedded in the right to self-determination. The duty of States to obtain Indigenous Peoples' FPIC entitles Indigenous people to effectively determine the outcome of decision-making that affects them, not merely a right to be involved.¹⁵⁶

In this context, meaningful consultation is “not just a process of exchanging information” but “entails testing and being prepared to amend policy proposals in light of information received and providing feedback.”¹⁵⁷

Several cases across various jurisdictions have recognized the importance of FPIC when activities may adversely impact Indigenous peoples. In 2006, for example, the Inter-American Commission heard a case involving the granting by the government of logging and mining concessions in the territory of the Saramaka people in Suriname without free, prior, and informed consent. In issuing its recommendation, the Commission stated unambiguously that “in light of the way international human rights legislation has evolved ... the Indigenous people’s consent to natural resource exploitation activities on their traditional territories is always required by law.”¹⁵⁸ Similar decisions have been made by the African Commission on Human and Peoples Rights, which, in the case of the Endorois of Kenya, held that:

[i]n terms of consultation, the threshold is especially stringent in favor of Indigenous peoples.... [T]he African Commission is of the view that in any development or investment projects that would have a major impact within

¹⁵⁵ Zartner, *supra* note 148; International Indian Treaty Council, *Indigenous Peoples and the Right to Free, Prior, and Informed Consent* (2013), https://www.iitc.org/wp-content/uploads/2014/07/Indigenous-Peoples-and-the-Right-to-Free-Prior-and-Informed-Consent_121013-WEB.pdf

¹⁵⁶ Expert Mechanism on the Rights of Indigenous Peoples, Human Rights Council Res. 33/25 U.N. Doc. A/HRC/RES/33/25 (September 30, 2016) (quoted at International Indigenous Peoples’ Forum on Climate Change, <https://www.iipfcc.org/key-issues>)

¹⁵⁷ *Tsleil-Waututh Nation v. Canada*, [2018] F.C. 153, para. 501 (Can.) (quoting *Haida Nation v. British Columbia*, [2004] S.C.R. 73, para. 46 (Can.)).

¹⁵⁸ Inter-American Commission on Human Rights, *Application to the Inter-American Court of Human Rights in the Case of 12 Saramaka Clans v. Suriname*, Case 12.338, Inter-Am. Comm’n H.R., ¶ 154 (2006).

the Endorois territory. The State has a duty not only to consult with the community, but also to obtain their free, prior, and informed consent, according to their customs and traditions.¹⁵⁹

Additional cases have arisen in jurisdictions around the world concerning whether Indigenous peoples were given adequate opportunity for engaging in free, prior, and informed consent. Often, these situations involve attempted infringement on the local environment, just as increased light pollution does. While there have been no specific cases yet in the United States that have relied on FPIC, the U.S. is a member of the Organization of American States, a party to ILO 169, and has formally endorsed UNDRIP. All of which gives weight to this as a legal principle and which could be used to address projects that increase light pollution that adversely impact Indigenous spaces. This may be especially impactful when combined with existing requirements to carry out environmental impact assessments, including impacts on cultural heritage spaces and those encompassing the natural environment.¹⁶⁰

FPIC may be relevant in cases where light pollution and the loss of darkness are having an adverse impact on Indigenous communities. For example, when proposed development projects or changes to city planning are near Indigenous lands or sites of cultural and spiritual importance, the duty to consult prior to the commencement of these projects is an opportunity to mitigate some of the negative effects of light pollution. While not a binding judicial or legislative proceeding, the movement to ensure FPIC is gaining ground around the world and may be a vital space for advocates to consider at the nexus of international and domestic law.

C. The Right to the Night under the Emerging Rights of Nature Movement

A final avenue for advocacy that we would like to suggest is one of the newer legal ideas to develop related to issues of environmental justice: the rights of Nature movement. While ideas about the rights of Nature have existed for millennia as part of the cosmologies of some peoples and cultures, it wasn't until Christopher Stone's seminal 1972 article *Should Trees Have Standing?* that this concept started to develop through contemporary legal systems.¹⁶¹ The concept of the rights of Nature does not imply that Nature should have the same rights as human beings. Rather, as a legal strategy, it is about recognizing the importance of each living thing on the planet and providing legal mechanisms by which they

¹⁵⁹ Centre for Minority Rights Development (Kenya) & Minority Rights Group International (on behalf of Endorois Welfare Council) v. Kenya, Communication No. 276/2003, Afr. Comm'n on Hum. & Peoples' Rts., ¶¶ 226, 291 (Feb. 4, 2010).

¹⁶⁰ National Preservation Institute, *The National Environmental Policy Act (NEPA)*, <https://www.npi.org/national-environmental-policy-act-nepa>.

¹⁶¹ Christopher D. Stone, *Should Trees Have Standing? Toward Legal Rights for Natural Objects*, 45 SOUTH. CALIF. LAW REV. 450 (1971).

can protect themselves.¹⁶² This usually takes the form of the creation of legal personhood for the natural entity, the recognition of its right to exist and flourish in its natural state, and options for redress should the natural entity be harmed.¹⁶³ Communities that have implemented rights of Nature laws include New Zealand (Te Urewera forest, the Whanganui river, and soon, Taranaki maunga), Bangladesh (recognizing the rights of all its rivers), Colombia (the rights of the Amazon), and Ecuador (rights of *Pachamama*), among others.¹⁶⁴

One example of existing rights of Nature law that may be especially relevant to the creation of such a framework for the night sky is the Colombian case *Demanda Generaciones Futuras v. Minambiente*.¹⁶⁵ This case, as described earlier in this article, involved a group of youth plaintiffs who filed a complaint against the Colombian government for violating their fundamental and collective rights by not doing enough to address environmental issues. While the plaintiffs did not include the rights of Nature in their complaint, presiding Justice Luis Armando Tolosa Vilabona recognized these rights for the Amazon as necessary to ensure its preservation as a fundamental part of the young peoples' right to live in a healthy environment. In doing so, Judge Vilabona stated: "The conservation of the Amazon is a national and global obligation, as it is the main environmental axis of the planet, and as such has been called the "lung of the world. . ." ¹⁶⁶ He went on to conclude:

Therefore, in order to protect this ecosystem vital for our global future ... the Colombian Amazon is recognized as a "subject of rights," entitled to protection, conservation, maintenance and restoration led by the State and the territorial agencies.¹⁶⁷

This provides a good example of how the rights of Nature can be used to protect the night skies. While the Colombia decision only applied directly to the part of the Amazon rainforest in Colombia, the Amazon as a resource, and the environmental impacts upon it, are shared by multiple countries and are of importance to the whole world. A similar analysis could be made with an argument to grant rights to the night sky. The conservation of darkness is a national *and* global obligation. It is a key natural structure guiding the rhythms of life on this planet. Therefore, to protect this ecosystem vital that is vital for our global future, the night sky could be recognized as a 'subject of rights', entitled to protection, conservation, maintenance, and restoration. There are some

¹⁶² Zartner, *supra* note 61.

¹⁶³ *Id.*

¹⁶⁴ Te Awa Tupua (Whanganui River Claims Settlement) Act 2017 (2017); Constitution of the Republic of Ecuador (2008); Human Rights and Peace for Bangladesh v. Government of Bangladesh and Others, Supreme Court of Bangladesh (High Court Divisions), Writ Petition No. 13989/2016 [English Translation, currently unofficial].

¹⁶⁵ *Demanda Generaciones Futuras*

¹⁶⁶ *Id.*

¹⁶⁷ *Id.*

challenges for advocates interested in arguing for a rights of Nature framework, including the fact that it is still relatively new and requires a community to acknowledge a more holistic human-Nature relationship. It can also raise questions about conflicts of rights and requires the political and public will for effective implementation. One of the ways to address some of these challenges is to be really clear and specific in the language used to construct the rights of the natural entity, whether through legislation or judicial decision.¹⁶⁸ In the case of nighttime darkness, advocates would have to decide how to define “darkness,” what that term encompasses, and who may represent the natural entity in any legal proceedings or speak on its behalf. Drawing on existing laws like New Zealand’s *Te Awa Tupua* legislation and the White Earth Band’s law providing rights for *Manoomin* (wild rice),¹⁶⁹ a right for the Night could look something like this:

The night skies, or natural darkness, possesses inherent rights to exist and flourish, as well as inherent rights to restoration, recovery, and preservation. These rights include, but are not limited to, the right to be free from light pollution, both terrestrial and orbital; the right for protection from overcrowding due to satellites, as well as the right to be free from future human activity that may adversely impact the Night.

Additionally, to increase the likelihood of community acceptance and effective implementation, laws espousing the rights of the Night would need to ensure that there is a place at the table for all relevant stakeholders. Careful consideration would also have to be made regarding the fate of existing actions that create light pollution and plans in place in the event of a conflict of rights.

Unlike the international treaties that outline individual rights or tie global ideas like the Commons to domestically justiciable ideas like the public trust, the rights of Nature has, up to this point, been a purely domestic endeavor. The number of countries with rights of Nature laws is steadily growing, but they still comprise only a small fraction of the community of states. In places that have shown themselves open to rights of Nature law, however, this might be a possible avenue for action for legal advocates.

Even without a community ready to actually recognize the rights of the night skies, including this advocacy strategy in the conversation about addressing the negative effects of increasing light pollution can be very powerful. One of the biggest challenges advocates face in seeking to achieve improved environmental protections is the need for shifts in cultural understandings of the human relationship to the natural world and to our environment. These shifts can be very difficult to accomplish. They often require a rethinking of worldviews, shifting from the idea that Nature is merely a commodity to one where it is recognized as

¹⁶⁸ Zartner, *supra* note 61.

¹⁶⁹ Winona LaDuke, *The White Earth Band of Ojibwe Legally Recognized the Rights of Wild Rice*, Yes!, Feb. 2019, <https://www.yesmagazine.org/environment/2019/02/01/the-white-earth-band-of-ojibwe-legally-recognized-the-rights-of-wild-rice-heres-why>.

an independent living being. Rights of Nature efforts, even in places like Toledo, Ohio and Orange County, Florida where they have not been successful, have succeeded in generating new conversations about how we best protect our natural resources.¹⁷⁰ In the case of the Lake Erie Bill of Rights, for example, the underlying premise behind recognizing the rights of the lake was that agricultural runoff was causing algae blooms that were poisoning the drinking water for over 12 million people and potentially endangering public health.¹⁷¹ This is similar in some ways to the negative health impacts of increased light pollution and the need to better protect this natural resource in order to, in turn, protect human health.

While ultimately the bill for Lake Erie was struck down for being too vague and violating constitutional rights to due process, the efforts by citizens of Toledo generated a great deal of conversation about the problem and the need to find a better solution. A similar effect can be seen in the Colombian case, where concerns over health due to environmental degradation was one of the issues raised by the plaintiffs. While the Colombia case was successful on the rights of Nature front, effective implementation of the court's ruling is taking time. In the meantime, however, it continues to push conversations about the importance of protecting the Amazon into the spotlight. The same thing could be done for the protection of the night sky.

VI. CONCLUSION

The night sky is many things. It is Nature, science, culture, art, storytelling, language, and creativity. Our night sky is a shared origin story and a shared identity. We take comfort in knowing that we look upon the same Sun, Moon and stars that our ancestors have for millennia. Darkness is part of planet-wide ecosystems that rely on each other and that have adapted to the reliable flow of night and day. Like a musical arrangement, its rhythms guide us and like in any piece of music, when the rhythm is off, the whole piece unravels. The night sky, the stars, and the darkness – these are cornerstones of life on this planet as we know it. We need to reclaim our ancient relationship with darkness and work to ensure its protection.

In this article, we have shared an urgent yet solvable issue of our time, that through creative use of newer legal strategies may address this environmental justice issue and support the need to protect darkness. While it is true that the law

¹⁷⁰ Zartner, *supra* note 61; Katie Surma, *Two Lakes, Two Streams, and a Marsh Filed a Lawsuit in Florida to Stop a Developer from Filling in Wetlands. A Judge Just Threw it Out of Court*, INSIDE CLIMATE NEWS (July 7, 2022), <https://insideclimatenews.org/news/07072022/two-lakes-two-streams-and-a-marsh-filed-a-lawsuit-in-florida-to-stop-a-developer-from-filling-in-wetlands-a-judge-just-threw-it-out-of-court/#:~:text=A%20Florida%20judge%20late%20Wednesday,as%20healthy%20ecosystems%20protected%20against>.

¹⁷¹ Dana Zartner, *How Giving Legal Rights to Nature Could Help Reduce Toxic Algae Blooms in Lake Erie*, THE CONVERSATION (September 10, 2019), <https://theconversation.com/how-giving-legal-rights-to-nature-could-help-reducetoxic-algae-blooms-in-lake-erie-115351>.

is just one tool in our advocacy toolbox, and the ideas shared here may not work everywhere, if they are successful at changing existing laws and broadening cultural ideas about the importance of nighttime darkness in even a few communities, it would be a step in the right direction. Moreover, like all long-term changes, every time a community, government, NGO, group of international lawyers or scientists, or anyone thinks about this issue and explores these possibilities, it encourages conversation on this topic. Conversation facilitates needed cultural shifts in how we think about the impacts of increasing light pollution and what we are losing with decreasing darkness.

The legal options offered here are a small part of the efforts needed to truly address the issues of increasing light pollution, the loss of darkness, and the implications both have for all living things that call the earth home. While engaging the law to the full extent of its possibility, advocates from all fields need to come together to draw attention to the profoundly relational aspects of the web of life and environments connected by the loss of the night. This holds true whether we view the skies and space as a revered ancestor and relation or whether we simply acknowledge our need for dark night skies. Light pollution is growing much faster than anticipated or easily mitigated, and with climate change, the Earth is showing us every day that natural systems are far less tolerant of rapid, anthropogenic change. Many living ecosystems that humanity relies on are already responding to accelerating global light pollution, and much of this response is not positive. The skies and space are cornerstones of life on this planet as we know it, and part of what makes us deeply human. We need to partner in new, creative ways to ensure the protection of the ancient darkness, and center what future generations, as well as the night, are asking of us today.