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The Suitability of the Proposed Global Pact for the Environment in the Changing Earth Conditions of the Anthropocene.

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Table of Contents

1. Introduction and Methodology

1.1 Introduction

The process which may ultimately lead to the adoption of a Global Pact for the Environment is currently underway, under the auspices of the United Nations General Assembly. The proposal for the Pact is an ambitious one with objectives ranging from constituting a binding instrument of international environmental law (IEL) to the creation of the first global environmental human rights instrument. At the same time as this process is occurring, the proposed new geological era, the Anthropocene, is becoming a concept ever more widespread. The Anthropocene recognizes that human are now major agents of global environmental change, rivalling other geological forces. As will be demonstrated below this has far-reaching implications for IEL and it is necessary to use the Anthropocene hypothesis to critically analyze this law as a means to regulate the impact that humans have on the Earth systems in their entirety. The aim of the following thesis is firstly, to discuss several important features and principles of IEL to assess their suitability in the Anthropocene. The conclusions of this discussion will then be used to create several proposals for the Global Pact to help make it suited to governing the human impacts on the Earth system in the Anthropocene. The implications of the Anthropocene are wide-ranging, and it is beyond the scope of this work to discuss all the required changes to IEL. The discussion is thus limited to the chosen topics identified below with the aim of contributing to the discussion on the suitability of the Global Pact for the Environment in this regard. The topics identified for discussion are interlinked and deal with broad questions relating to the purpose of IEL and what its focus should be in this new geological age.

1.2 Methodology

The following work is divided into three main parts. Section 2 introduces the Anthropocene and its major hypotheses. These are then briefly applied to international environmental law to create a proposal; that in IEL there is limited appreciation that humans have begun to impact on Earth systems in their entirety. Following this, a basic proposal is made about the ability of IEL to manage the relationship between human activities and the impact that these have on the global Earth system.

Section 3 then takes this proposal and applies it firstly to some general issues relating to governance in the Anthropocene and then to four features and principles of IEL that are particularly relevant for the Anthropocene; the proposed Planetary Boundaries Framework, sustainable development, fragmentation in IEL, and ecological integrity.

The first is the proposed Planetary Boundaries Framework (PBF) that builds on Earth system science to create objective eco-standards or limits that can be measured on a planetary scale. This feature is chosen because it incorporates a planetary dimension that is currently lacking in IEL and is shown in the following discussion to provide an improved framework of regulation capable of effectively managing the impact on the global Earth system. The second part of this section then deals with the concept of sustainable development, as sustainable development is

important in the Anthropocene given that humans are now recognized as major agents of ecological change. Sustainable development is the means by which human economic and societal development is integrated with ecological concerns and is therefore a vital aspect of effectively managing the human impact on the Earth system. The third part then discusses the feature of fragmentation in IEL and the implications of this structural characteristic on IEL in the Anthropocene. This feature is of significant relevance in the Anthropocene because of the global viewpoint that the Anthropocene hypothesis encompasses, and it will be shown that effective planetary governance requires an analysis of the structure of IEL as this impacts its effectiveness. The final part of this section then discusses the principle of ecological integrity. This closes the discussion in Section 3 as it is proposed that ecological integrity offers a solution to, or forms a central part, of the previous three parts of this section.

The aim of the discussion in Section 3 is to identify issues in IEL as it currently exists and to review some proposed solutions to these issues. Section 4 uses this discussion and proposes features of a Global Pact for the Environment which build upon the preceding analysis to provide a Pact that would be suited to governing the human impacts on the Earth system in the Anthropocene. The proposal will begin by placing ecological integrity as the objective of the Pact. This will build upon the discussion in Section 3.5 to demonstrate that using the concept as the objective of the Pact will place it as a core objective of IEL with the effect of solving the issues related to the PBF, sustainable development, and fragmentation. The proposal will then suggest that the Global Pact provide for a PBF by incorporating several provisions which would establish it and define its parameters in the Global Pact, with a discussion of what the proposed provisions would look like. The proposal will then move on the suggest the wording of an article on sustainable development, re-conceptualized as strong sustainability. The final section will then propose an Article related to fragmentation of IEL. This section will also discuss the institution created by the Pact and how this institution is to operate in relation to the proposed features by enforcing the PBF and the provision on problem-shifting. The features of the proposal are mutually supportive and work best when they are coherent, and this will be a key feature of the following proposal. The result of the proposal will be to outline how the Pact can effectively manage the issues outlined in Section 3 and thus be a document suited to governance in the Anthropocene.

2. What is the Anthropocene?

2.1 An Introduction to the Anthropocene

The Anthropocene is a proposed new geological epoch,[1] it is based on the observation that human impacts on essential planetary systems have reached a level where they have caused the end of the Holocene epoch in which complex human societies have developed.[2] This is due to "human activity [which] now rivals geological forces in influencing the trajectory of the Earth

[1] P Crutzen and E Stoermer, 'The "Anthropocene"', (2000) 41 *IGBP Newsletter* 17.
[2] W Steffen and others, 'Trajectories of the Earth System in the Anthropocene', (2018) 115(33) *PNAS* 8252, at 8252.

System."[3] There are different arguments concerning the start date of the Anthropocene,[4] however, the most relevant point for the following discussion is that humans are now one of the primary agents of change impacting on global planetary systems.

2.2 The Anthropocene and International Environmental Law

The report of the Secretary General of the United Nations entitled "Gaps in international environmental law and environment-related instruments: towards a global pact for the environment",[5] states that "[t]he proliferation of multilateral environmental agreements and the resultant distinct and separate mandates ignore the unity, interconnectedness and interdependence of the Earth's ecosystem".[6] This creates the potential for overlap, conflict, and institutional and policy incoherence.[7] This report demonstrates that in international environmental law (IEL) there is limited recognition that humans have begun to impact Earth systems in their entirety, and often in ways that have cross sectoral impacts. It is no longer the case that law can treat specific environmental problems as distinct issues that can be fixed with targeted interventions. As the Anthropocene lens reveals, humans now rival geological forces in their ability to impact earth systems. As a result of this growing human footprint on the biosphere the Earth is moving into a more unstable state, with Earth systems gradually becoming less predictable, non-stationary, and less harmonious.[8] It is proposed that this has far-reaching implications for IEL, and it is necessary to use the concept of the Anthropocene to critically analyze this law as a means to regulate the impact that humans have on the Earth systems in their entirety. The concept of the Anthropocene and the report of the Secretary General will be shown to demonstrate that IEL is presently unsuited to managing the relationship between human activities and the impact these have on the Earth system.

[3] Ibid.
[4] W Ruddimann, 'The Anthropocene', (2013) *Annu. Rev. Earth Planet. Sci.* 45.
[5] UN General Assembly *A/73/419 Gaps in international environmental law and environment-related instruments: towards a global pact for the environment.*
[6] Ibid at [80].
[7] Ibid.
[8] L Kotzé, *Environmental Law and Governance for the Anthropocene,* (Oxford, Hart Publishing, 2017) at Preface, page vii; See also infra note 44; supra note 2.

3. IEL in the Anthropocene

3.1 The Difficulty of Governing in the Anthropocene

3.1.1 Uncertainty

The immediate problem that the Anthropocene presents in terms of international governance is uncertainty.[9] Simply put, "because the Anthropocene has barely begun, we are unable to base present and future interventions on reliable predications from our past experiences".[10] The Anthropocene itself is characterized by uncertainty as Earth systems buckle under the pressure from human activities. There is much uncertainty, scientific and otherwise, as to what such destabilization of the Earth system will result in.[11] The Anthropocene means acknowledging that humans are now able to change the basic processes of the planet in dramatic ways.[12] Based on our past experiences of the Holocene, with relatively stable conditions, international law is based on fundamental assumptions of stability and certainty which must now be questioned as we transition into the Anthropocene.

3.1.2 Fundamental Assumptions of International Law

State sovereignty exists as a fundamental of public international law with its application in the environmental sphere relating to the exercise of State jurisdiction and State responsibility.[13] More specifically, "[t]he principle of state sovereignty allows states within limits established by international law to conduct or authorise such activities as they choose within their territories".[14] State sovereignty as a general principle has a multitude of applications in international environmental law. One important implication of sovereignty is the duty of states to co-operate. The Anthropocene viewpoint recognizes that the Earth functions as an interconnected planet with Earth systems operating through multiple territories and in areas beyond State jurisdiction. This obligates states to, for example, consult with neighboring states when planning activities that may have transborder effects. As Vidas notes, elaborating on the duty to co-operate "may prove essential to prevent deteriorating environmental conditions during the Anthropocene."[15] This highlights a further question about the essence of state sovereignty in the Anthropocene, that of

[9] For example, see the uncertainty regarding the exact place of the planetary boundaries, infra note 44; see also infra note 167 at 52-53, for an example of EU's struggle with taking action on the basis of scientific uncertainty in the Anthropocene.

[10] L Kotzé, 'Rethinking Global Environmental Law and Governance in the Anthropocene', (2014) 32(2) *Journal of Energy & Natural Resources Law* 121, at 137.

[11] Supra note 2.

[12] T Stephens, 'Reimagining International Environmental Law in the Anthropocene', in L Kotzé, *Environmental Law and Governance for the Anthropocene Book* (Oxford, Hart Publishing, 2017) at 31.

[13] C Redgwell, 'International Environmental Law', in M Evans, *International Law*, 4th ed., (Oxford, Oxford University Press, 2014) at 688.

[14] P Sands and others, *Principles of International Environmental Law*, 3rd ed. (Cambridge University Press, Cambridge, 2012) at 191.

[15] D Vidas and others, 'International Law for the Anthropocene? Shifting Perspectives in Regulation of the Oceans, Environment and Genetic Resources', (2015) *Anthropocene* <http://dx.doi.org/10.1016/j.ancene.2015.06.003> at 8.

how to deal with a minority of countries that do not comply with measures that a majority of countries see as fundamentally required, such as an activity leading to the transgression of a planetary boundary (see Section 3.2).[16] The principle of state sovereignty protects, as a default position, the rights of states to object to certain parts of treaties. This leads to the contention that it is questionable whether "full national sovereignty can be upheld for the most essential environmental standards that are needed to protect the planetary boundaries."[17] Thus, the emergence of the Anthropocene raises the question of whether we should amend fundamentally aspects of state sovereignty,[18] as it is questionable whether full national sovereignty can be upheld for "the most essential environmental standards that are needed to protect the planetary boundaries."[19]

The operation of state sovereignty is perhaps the principle of international environmental law most affected by the uncertain and unstable state that the Earth system is on course for. The need to holistically address the negative impact on the global biosphere questions fundamentally the right of states to conduct activities as they choose within their territories. While the right is limited in relation to activities that have transboundary effects, this has not prevented the crossing of three planetary boundaries with resultant effects on the entire Earth system, and therefore the limitation is clearly not effective at preventing transboundary harm. As the Earth becomes more unstable and unpredictable this problem becomes even greater as the activities conducted by states within their own territories will have increasingly unforeseen and globally pervasive effects. The question arises as to whether it is even legitimate to allow states to conduct or permit activities that have negative effects on the global Earth system which causes, often extreme, harm to the environment and its inhabitants, including humans, in other parts of the world. State sovereignty and its related principles are currently unsuited to preventing the collapse of aspects of the Earth system. In fact, even the focus of the Anthropocene on treating the Earth as a global ecological system implies that states cannot be permitted to destroy the environment of their own territory, even if that has no obvious ecological impact on the rest of the world, as that part contained within the state territory is inherently part of a larger inter-dependent global ecological system.

Stability is deeply embedded as a fundamental objective of international law. This is a "conscious objective of working towards legally guaranteed stability in international relations".[20] This idea of stability is also implied, as current international law is a system of rules resting on foundations that evolved under the circumstances of the Holocene, which are assumed to be ever-lasting. International law takes these circumstances for granted.[21] Thus, the change introduced by the Anthropocene to this element of stability undermines some of the fundamental assumptions that current international law rests on. The transition from this state has the potential

[16] F Biermann, 'Planetary Boundaries and Earth System Governance: Exploring the Links', (2012) 81 *Ecological Economics* 4, at 7.
[17] Ibid at 8.
[18] Supra note 15 at 7.
[19] Supra note 16 at 8.
[20] Supra note 15 at 4.
[21] Ibid.

to aggravate existing tensions of political stability and create new ones from drastic changes to Earth systems. For example, anthropogenic climate change has the potential to induce mass migration of humans as a result of changing climatic conditions which affect food supply and sea level rise. This obviously has ramifications for political stability[22] as demonstrated by the recent migration crisis in Europe.

Vidas's response to these changing circumstances, and the undermining of the basis of international law, is to more deeply incorporate geography in its core, as challenges to stability are increasingly recognized as consequences of natural change. This goes as far as to suggest that humanity may have to organize society differently from what we have known before.[23] Speth and Haas similarly contend that at best, current IEL is effective only to a limited extent, calling for major new initiatives to address the underlying drivers of deterioration.[24]

Clearly, changes are occurring to the fundamental assumptions upon which international law is built, namely the stable earth conditions, state sovereignty and the ability of states to regulate their own territory in an interconnected Earth-system. This will have pervasive affects and will undermine current environmental law and governance, worsening its already limited effectiveness, and have an even wider effect as it will impact the political stability which international law has as a conscious objective. Accepting the Anthropocene hypothesis means accepting that changes to the fundamental assumptions are required in international law.

3.1.3 Eco-centrism

The question of what form these structural changes must take is informed by an eco-centric approach. An eco-centric approach, instead of separating humans from nature and promoting the domination of nature to satisfy human desires,[25] recognizes the interdependence of humans and the environment. The Anthropocentric approach lies at the core of the current environmental crisis, by reducing all other forms of life to objects in a market-based world.[26] The expression of the Anthropocene in climate change, loss of biodiversity, and environmental destruction generally have suggested the as Earth a legal subject[27] and an anthropocentric commodifying approach cannot be reconciled with the needs of nature and its symbiosis of all life. An eco-

[22] See J McAdam, 'Climate Change Displacement and International Law: Complementary Protection Standards', (2011) *Legal and Protection Policy Research Series*, for a discussion of the consequences of climate change induced migration.

[23] Supra note 15 at 4.

[24] J Speth and P Haas, *Global Environmental Governance* (Island Press, Washington, 2006) at 139; See also supra note 10 at 124.

[25] A Geisinger, 'Sustainable Development and the Domination of Nature: Spreading the Seed of the Western Ideaology of Nature', (1999) 27 *Boston College Environmental Affairs Law Review* 43, at 44-46.

[26] S Vermeylen, 'Materiality and the Ontological Turn in the Anthropocene: Establishing a Dialogue between Law, Anthropology and Eco-Philosophy', in L Kotzé, *Environmental Law and Governance for the Anthropocene Book* (Oxford, Hart Publishing, 2017) at 138.

[27] See for example, E Fitz-Henry, 'The Natural Contract: From Levi-Strauss to the Ecuadorian Constitutional Court', (2012) *Oceania* 264; Chapter 7 of the Ecuadorian Constitution 2008 on the Rights of Nature.

centric approach, which incorporates these concerns, is, thus, necessary given the characteristics of the Anthropocene epoch, including the realization that humans now have the power to destabilize the Earth's life support systems. As a result of this new power to be the primary agents of environmental change comes the necessity of putting the protection of the Earth systems above human interests such as economic growth. For instance, if this power is not recognized and respected as a geophysical force it will have devastating impacts far beyond the anthropocentric human-orientated world. In addition to describing a new epoch, the Anthropocene describes the new context in which we are going to have to consider how we should deal with the effects of human induced ecological change.[28] This presents a moral challenge that requires a paradigm shift. Bosselmann opines that the morality that places humans over nature, and its ecological arrogance and ignorance, spells our collective downfall. Thus, the moral challenge is to move from a human centric to an eco-centric paradigm.[29] This is what the Anthropocene lens reveals. In a similar vein, Kotzé notes that "[a]n essential part of the response also involves transforming people and the socio-institutional constructs through which we attempt to mediate the human-environment interface".[30] If part of the solution to the problems that arise in the Anthropocene lies in socio-institutional intervention, then we must turn to law as a human construct in our efforts to respond to these challenges.[31] It appears therefore, that law must incorporate this eco-centric approach as a fundamental assumption.

3.1.4 Interconnectedness

A major difficulty of governing in the Anthropocene is mentioned above in the report of the Secretary General. IEL is currently organized sectorally, with little regard for the Earth's ecosystem as a whole. This is in part due to the fundamental way in which the global political system is organized. It is therefore necessary to examine whether the global political system of states causes problems for managing the Earth system.

Evans describes the world in two ways, firstly in terms of its physical and biological geography, and the other in terms of its political geography, as a world divided by the territorial parameters of States.[32] Humans have divided the Earth into artificial constructs and disseminate power and responsibility in this way. This forms the basis for the international legal order and thus how humans deal with collective global challenges, as members of individual states with differing interests. Albeit simplistic, this is essentially how the international legal order fundamentally works.

The Anthropocene presents a challenge to this fundamental operational quality. It highlights the interconnectedness of natural Earth processes, the reciprocity of those processes and the many

[28] Supra note 10 at 123.
[29] K Bosselmann, 'The Rule of Law in the Anthropocene', in M Bigdeli and others, *In the Search for Environmental Justice* (Cheltenham, Edward Elgar Publishing, 2015) at 47.
[30] Supra note 10 at 124.
[31] Ibid.
[32] M Craven, 'Statehood, Self-Determination and Recognition', in M Evans, *International Law*, 4th ed., (Oxford, Oxford University Press, 2014) at 201-202.

linked cause-and-effect relationships that exist on a global scale. Instead of focusing on individual groups of humans it is concerned with the totality of the earth system, including humans.[33] This raises challenges for global environmental law as the responses would need to address the various issues simultaneously and holistically, on a collective basis,[34] and experience has shown that the differing interests of states ineffectively cooperate on a global scale. This does not go as far as to require the dissolution of that fundamental assumption of international law that organizes the world into states, but it does show that international law must become more sensitive to this interconnectedness. At the minimum, the state-based global order must develop closer co-ordination in the regulation of the human impact on the Earth-system.

States already cooperate in a global manner on environmental issues that are globally pervasive. This generally takes the form of treaties and agreements which ultimately attempt to divide responsibilities fairly, an example being the climate change regime which is formed under the umbrella of the United Nations Framework Convention on Climate Change (UNFCCC). However, despite the attempt of this regime to collectively deal with a global problem that has many sources, the Anthropocene lens points out that further thought about interconnectedness is required as a result of "environmental problem shifting across multiple planets' biophysical subsystems of processes."[35] For example, due to its place in the global order as the 'regulator' of carbon dioxide but its ignorance of ocean acidification as an effect of climate change, the UNFCCC has inadvertently facilitated the transformation of climate change to ocean acidification.[36] Similarly, biofuel crop plantations, while contributing to reduction in CO2 emissions, decrease the proportion of land areas covered by forest, and replacing HCFCs with HFCs to reduce ozone depletion exacerbates climate change because HFCs have a high global warming potential.[37] Problem shifting is a prime example of the lack of an interconnected approach in our legal systems. The interconnected nature of these systems cannot be ignored if these systems are to continue to operate. The global focus of the Anthropocene requires supranational responses and interventions which are sensitive to cause-and effect relationships and which transcend brief timescales.[38] Kotzé notes that the challenge of holism that the Anthropocene presents to global environmental law requires lawyers to reconsider a variety of issues that prevent a holistic response, including the divisions caused by state sovereignty.[39]

The temporal character of state actions regarding individual environmental problems is highlighted by the above examples of problem-shifting. The sacrifice of long-term sustainability in favor of short-term gain, even in tackling individual environmental problems, "gives us a clue about where our thinking about the Anthropocene must focus."[40] The fundamental assumption of

[33] Supra note 10 at 132; infra note 35 at 195; supra note 16 at 4; supra note 15 at 2.
[34] Supra note 10 at 132; infra note 35 at 200; infra note 50 at 81-82.
[35] R Kim and K Bosselmann, 'Operationalizing Sustainable Development: Ecological Integrity as a Grundnorm of International Law' (2015) 24(2) *RECIEL* 194, at 200.
[36] R Kim, 'Is a New Multilateral Environmental Agreement on Ocean Acidification Necessary?', (2012) 21:3 *RECIEL* 243.
[37] Supra note 35.
[38] Supra note 10 at 134; infra note 50 at 81.
[39] Supra note 10 at 149.
[40] Supra note 29 at 54.

statehood and sovereignty that forms the backdrop of the international legal order has led to the lack of holistic thinking regarding global environmental problems. Therefore, the global political system of states causes legal problems for management of activities affecting Earth systems in that there is a clear lack of effectiveness, in terms protecting the Earth system, of current regulation efforts. Mere cooperation between states on individual environmental issues is insufficient to protect the Earth's systems and processes which are vital for life to thrive on the planet. Now that humans have become a major driver of ecological change in a world with interconnected systems and processes, it is necessary that the regulation of human activities which affect these processes recognizes and incorporates this interconnectedness, otherwise the issues related to ineffective regulation will continue to pervade and the uncertain and potentially drastic consequences of destabilizing the Earth system[41] will become certain through experience. To avoid this, efforts will need to be made to increase the holistic response to the protection of the Earth system. Whether this comes from a reorientation of the global political system or some other method[42] is beyond the scope of the current discussion, and is examined further below, but clearly efforts must made to incorporate a planetary dimension to the fundamental operation of global political structures or the interaction and co-operation between states through IEL.

3.2 Planetary Boundaries as the Core of the Governance Structure in the Anthropocene

3.2.1 The Planetary Boundaries Framework

The PBF is the result of work published in 2009 by leading Earth system and environmental scientists who identified nine global environmental systems essential for maintaining the integrity of the planet. This framework "identifies levels of anthropogenic perturbations below which the risk of destabilization of the earth system is likely to remain low".[43] The identified systems are climate change, biodiversity loss, interference with the nitrogen and phosphorous cycles, ozone depletion, ocean acidification, global freshwater use, changes in land-use, chemical pollution, and atmospheric aerosol loading.[44] These boundaries, if crossed, "could generate unacceptable environmental change",[45] and thus, serve to define the safe operating space for humanity.[46] There is some uncertainty with respect to the position of the boundaries for several of the Earth systems, but for others there is a good level of agreement. Importantly, three of the thresholds; climate change, biodiversity loss and the nitrogen cycle, have already been crossed. The authors conclude that if the thresholds are not crossed, humanity has the freedom to pursue

[41] See, supra note 2; infra note 44.

[42] See the arguments for a global environmental constitutional order in L Kotzé, 'Global Environmental Constitutionalism in the Anthropocene', and K. Bosselmann, 'The imperative of Ecological Integrity: Conceptualising a Fundamental Legal Norm for a New 'World System' in the Anthrpocene', in L Kotzé, *Environmental Law and Governance for the Anthropocene Book* (Oxford, Hart Publishing, 2017).

[43] W Steffen and others, 'Planetary Boundaries: Guiding Human Development on a Changing Planet', (2015) 347(6223) *Science* 736, at 736.

[44] J Rockstrom and others, 'A Safe Operating Space for Humanity' (2009) 461 *Nature* 472, at 472.

[45] Ibid.

[46] Supra note 43.

social and economic development.[47] The boundaries thus act as a "non-negotiable bottom line for all human activities",[48] as a strict limit to the impact that humans should be permitted to have on the Earth.

With the PBF now described I will turn to a discussion of the suitability and potential for these planetary boundaries to be used as the core of the governance structure of IEL. The PBF has been subject to much academic discussion[49] as a solution to governance issues in the Anthropocene. The aim of the following analysis is to examine its feasibility and suitability as a governance tool in the Anthropocene, and to examine its potential to solve the fundamental issues noted above in relation to Earth system regulation.

3.2.2 Planetary boundaries as the Core of the Governance Structure.

3.2.2.1 The Measurability

The planetary boundaries are directly measurable and strongly normative.[50] The boundaries measure the integrity of the functionality of the Earth's systems, which are necessary for life to flourish. Thus, the measurability of the boundaries allows the integrity of the Earth's life-support system to be used as a direct measure of the legality of state behavior.[51] A related issue with this is the nature of scientific certainty, the quantification of the planetary boundaries will always be founded scientifically and thus will never be fully certain. However, this is not to say that the boundaries do not have the potential to evolve in to a powerful political narrative. The simplicity provided by a fixed target has had comparable success in other realms of international law, for example, Biermann remarks that the success of the world trade regime is related to the simplicity of its commitments, including quantitative targets.[52]

The usefulness of simple measurable targets can also be demonstrated in the environmental sector. The Paris Agreement, heralded at the time as an historic step forward in climate negotiation, contains at the heart of the treaty a fixed limit of 2 degrees Celsius for global warming.[53] Additionally, simple indicators such as the presence of certain species (e.g. orangutans in relation to biodiversity loss associated with palm oil) as indicators of healthy ecosystems have become powerful tools for action towards resolving much more complex issues such as ecosystem degradation.[54]

The application of the PBF as a basis of environmental protection is entirely feasible in a treaty context. The limit contained in the climate regime has already been pointed out and the ozone regime performs a similar function in relation to the consumption and production of inert gases.[55]

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[47] Supra note 44.

[48] R Kim and K Bosselmann, 'International Environmental Law in the Anthropocene: Towards a Purposive System of Multilateral Environmental Agreements' (2013) 2:2 *Transnational Environmental Law* 285, at 287.

[49] Infra note 50; Supra note 48; Supra note 16; Supra note 15.

[50] V Galaz and others, '"Planetary Boundaries" - Exploring the Challenges for Global Environmental Governance', (2012) 4 *Current Opinion in Environmental Sustainability* 80, at 81.

[51] Supra 48 at 308.

[52] Supra note 16 at 6.

[53] Paris Agreement, Art 2.1(a).

[54] Supra note 16 at 6.

[55] See Montreal Protocol on Substances that Deplete the Ozone Layer 1987.

Similarly, the Aichi biodiversity targets set a number of measurable targets for biodiversity.[56] In the context of transnational marine protection, Vidas has remarked about the potential feasibility of making activities conditional upon respecting certain planetary scale boundaries.[57] The limits imposed by the planetary boundaries are feasible as a method of environmental regulation and the measurability of these planetary boundaries is a characteristic which provides support for their usefulness as the core of regulation of human activity which impacts the key Earth-systems.

3.2.2.2 Interactions Between Multiple Boundaries

The separation of the earth systems into individual boundaries or limits should not be taken to suggest that a separate response for each boundary is needed. Furthermore, effective governance does not need to cover the overall human impact, regulation of certain types of behavior may only cover parts of the overall human impact. However, it is important to note that specific rules are needed to address interactions,[58] as the different earth systems are interconnected.[59] This is particularly relevant given the discussion above pointing to the need to include greater interconnectedness in IEL. Biermann opines that overarching principles are needed to govern the interactions between different institutions and to increase effectiveness by providing general standards of behavior. In this regard "a special role should lie with international organizations as integrating actors".[60] They would have a key responsibility of identifying and coordinating the necessary responses to the integration requirements of the planetary boundaries.[61] Interaction between boundaries is a key aspect of planetary boundaries governance and incorporates the idea that humans are impacting the Earth as a whole, rather than individual problem areas. In this regard international institutions play an important role in taking a step back from territorial governance, where states are primarily concerned with environmental issues in their own territory, and assessing the bigger picture of the Earth system as a whole and what cumulative measures need to be taken to ensure the limits of the planetary boundaries are respected.

3.2.3 Sustainable Development in the Context of the Planetary Boundaries

The implication of the PBF for IEL has already been noted in that the individual boundaries must never be crossed, as Bosselmann's "non-negotiable bottom line for all human activities".[62] However, another implication is that, within the context of sustainable development, which is analyzed in greater detail below, the concept suggests a "hierarchical order for the elements of

[56] See Strategic Plan for Biodiversity 2011-2020.
[57] D Vidas, 'The Anthropocene and the International Law of the Sea', (2011) 369(1938) *Philosophical Transactions of the Royal Society* 909, at 923–924.
[58] Supra note 16 at 7.
[59] Supra note 44.
[60] Supra note 16 at 7.
[61] Ibid.
[62] Supra note 48 at 289.

sustainable development".[63] This hierarchical order is a reordering of the elements,[64] with the biophysical environment coming first, and human society and economic development second. The planetary boundaries are limits which cannot be transgressed if the Earth is to remain in a stable condition, this necessarily gives the environmental pillar a higher importance when human activities come close to crossing the thresholds, and thus, overall, the environmental pillar is given precedence. The Anthropocene thus requires IEL to reflect this hierarchy in its design and interpretation. This reorientation is well expressed in the report 'Harmony for Nature', prepared by the UN Secretary General for the General Assembly:

> "Numerous scientists, economists, and legal experts have decried the escalating destruction of the Earth's natural systems...[t]hey are insisting that, rather than people and planet serving the infinite growth of the economy, economy must recognize its place as servant to the larger well-being of humans and the Earth itself".[65]

3.2.4 Conclusion

The aim of the preceding analysis was to examine the PBF's feasibility and suitability as a governance tool in the Anthropocene, and to examine its potential to solve the fundamental issues noted above in relation to Earth system regulation.

It is evident from the foregoing analysis that the PBF is effective in terms of protecting the Earth-system and realistic as a method of regulation in IEL. The normative certainty that a measurable limit provides is suited to governance and in the context of human activities which are threatening to, or have already crossed certain planetary limits, it provides clear guidance as to where the focus and goal of regulation should be. The PBF provides a solution to the issues noted in Section 3.1. It has a planetary dimension that incorporates a holistic view of the functionality of the Earth system. This deals with the issue arising due to concept of individual states with differing interests. It also includes, by the nature of the concept of an ecological 'limit', an eco-centric approach at its core, which was shown to be a necessary fundamental alteration to IEL. The introduction of a PBF also has the advantage of avoiding the uncertainty of transgressing certain limits of the Earth system and thus avoiding the majority of the ecological uncertainty which was noted to threaten the fundamental goal of political stability in international law.

[63] Ibid.

[64] For a criticism of the way in which states invoke sustainable development to strive for short term economic benefits at the expense of the environment, see Supra note 10 at 143.

[65] UN Report, *Sustainable Development Harmony with Nature of the Secretary General, A/67/ 17,* at [45].

3.3 Sustainable Development in the Anthropocene

3.3.1 Introduction

Following on from the previous discussion, this section expands on the discussion of sustainable development. Sustainable development provides for an integration of environmental concerns with developmental ones[66] and is therefore of significant importance in the Anthropocene as it is increasingly important to manage human activities within the capabilities of the Earth system, particularly with the perspective of humans as a major agent of ecological change. The focus of the discussion of sustainable development is on the analysis of whether sustainable development can ensure genuine 'sustainable' development in a world where there are clear finite limits to the impact that human can be permitted to have on the Earth system. This is shown to not be the case and the discussion then turns to a legal reformulation of sustainable development as strong sustainability; a proposed concept which, as will be shown, is much better suited to governing in the Anthropocene.

Sustainable development gained recognition with the publication of the Brundtland Commission's report 'Our Common Future' in 1987, and since then has been the most widely used concept in IEL.[67] The concept contains three "interdependent and mutually reinforcing pillars",[68] those being "economic development, social development and environmental protection".[69] However, despite numerous soft law declarations,[70] the jurisprudence of the International Court of Justice (ICJ) suggests that sustainable development has not yet reached the status of a principle of normative value in international law.[71] Despite this, sustainability has been at the center of IEL,[72] seeking to integrate the needs of the economy, society and the environment. However, given the current environmental crisis[73] in which the world now finds itself, it is fair to say that sustainable development has not been successful in ensuring that the needs of the present are met without compromising the ability of future generations to meet their own needs.[74] Sustainable development has not acted within planetary boundaries and the crossing of several thresholds is empirical evidence for this.[75]

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[66] ILA, *Committee on International Law on Sustainable Development, Resolution 07/12.*

[67] P Dupuy and J Viñuales, *International Environmental Law (Cambridge University Press, Cambridge,* 2015) at 79.

[68] *Report of the World Summit on Sustainable Development, A/CONF.199/20* (2002) Chapter 1, item Political Declaration at [5].

[69] Ibid.

[70] Declaration of the UN Conference on the Human Environment, Principle 13; Rio Declaration on Environment and Development, Principle 4.

[71] See *Pulp Mills on the River Uruguay (Argentina v Uruguay)*, Judgment, ICJ Reports 2010, at [75-77], where the majority was of the opinion that it is a concept that must guide the negotiations between the parties. This reaffirms the position taken in *Gabcikovo-Nagymaros Project (Hungary v Slovakia)*, Judgment, ICJ Reports 1997, at [140].

[72] See discussion of sustainable development as the most recent of three distinct phases of environmental regulation in D Bodansky, *The Art and Craft of International Environmental Law* (Harvard University Press, Massachusetts, 2010) at 22.

[73] Supra note 44.

[74] Report of the World Commission on Environment and Development: Our Common Future (1987) at [27].

[75] Supra note 35 at 197.

3.3.2 Problems with Sustainable Development in the Anthropocene

Kotzé points to a number of the fallacies of sustainable development. Firstly,

> "its disingenuousness and its complacent promise of sufficient resources in a time of global ecological crisis and resource scarcity, which it promotes through deep socially entrenched rhetoric and (corporate and state) practices."[76]

Secondly,

> "that it is based on false assumptions. One of these is that it accepts as correct the fact that humans are capable of assuming how much ecological capital is needed to satisfy socio-economic demands of the present and, more worryingly, future generations."[77]

Kotzé's contention that it is based on false assumptions is relevant for the Anthropocene as a key assumption of sustainable development is that assumes a generally steady state of earth systems.[78] However, the Anthropocene, in its nature, suggests that the earth and its systems are becoming highly unpredictable. It thus "exposes sustainable development for the fraud that it is".[79] The orthodox approaches to sustainability, namely the tolerating of decisions with potential ecological impact to be made based on the need for development,[80] or the rhetorical use of promises of sustainable development to cover 'business as usual' approaches to economic growth, cannot be allowed in the Anthropocene. The general bias towards economic growth over environmental concerns in today's economies means that striking the balance between the three pillars of sustainable development has not been successful[81] and this has yielded a situation where humans are disrupting vital earth systems, leading to great uncertainty in the operation of those systems.

Building upon the previous discussion of the need for greater integration in international law, it is important to point out the role of sustainable development in this regard. Sustainable development seeks to integrate economic, social and environmental concerns. In fact, this is the main means by which sustainable development is to be achieved.[82] However, sustainable development cannot succeed in integrating these concerns "as long as it remains detached from the ecological reality".[83] In this regard the lack of a direction or purpose to the integration requirement of sustainable development means that the balancing of the three pillars is an "empty exercise".[84] Sustainable development must strengthen its valuation of the environmental

[76] Supra note 10 at 136.
[77] Ibid.
[78] R Craig and M Benson, 'Replacing Sustainability', (2013) 46(4) *Akron Law Review* 841, at 879.
[79] Supra note 10 at 136.
[80] Supra note 10 at 152; infra note 84 at 156.
[81] Supra note 35 at 197); infra note 84 at 147.
[82] Rio Declaration on Environment and Development, Principle 4.
[83] Supra note 29 at 54.
[84] C Voigt, 'The Principle of Sustainable Development: Integration and Ecological Integrity', in *Rule of Law for Nature: New Dimensions and Ideas in Environmental Law* (Cambridge University Press, Cambridge, 2013) at 149.

pillar and consider what is actually required in terms of environmental protection which will prevent crossing the thresholds of the PBF.

It is apparent that sustainable development is ill equipped to deal with the realities of the Anthropocene. It is detached from the ecological reality the Earth system can provide. It is a disingenuous attempt to integrate economic, social and environmental concerns with economic concerns taking precedence, while simply green-washing environmental ones.[85] It is thus apparent that it needs a reorientation which will allow for proper integration of environmental concerns in decision-making and will stop the business as usual approach to untethered economic growth. The following is thus a discussion of a reimagined sustainable development for the Anthropocene.

3.3.3 Ecological Integrity

The notion of ecological integrity is discussed in much greater detail below. Briefly however, at least at the planetary scale, the integrity of the Earth's ecosystem refers to the conditions of the Holocene, those which "preceded the anthropogenic global environmental change that began with the Industrial Revolution."[86] Bosselmann contends that that a reference to ecological integrity is the missing planetary dimension to the conventional definition of sustainable development, it "contributes to an updated definition of sustainable development tailored to the Anthropocene".[87] Similarly, Voigt contends that integration in the context of sustainable development must be made subject to the goal of ecological integrity in order to be meaningful.[88] This view is in line with the previously mentioned report 'Harmony for Nature', which insisted that the economy must become the servant of the larger well-being of humans and the Earth.[89]

Currently, the concept is not suited for the Anthropocene as the planetary boundaries and humankind's new capabilities as the primary actor of ecological change are not considered. These considerations require a reorientation of sustainable development by including ecological integrity as a core of the concept. This would create a default position of "ecological sustainability",[90] and would safeguard the thresholds of the planetary boundaries by limiting development to proceed only within the limits of the Earth systems, thus ensuring that sustainable development is truly sustainable.

[85] Ibid at 147.
[86] Supra note 48 at 307.
[87] Ibid.
[88] Supra note 84 at 148.
[89] Supra note 65.
[90] Supra note 29 at 53.

3.3.4 Strong Sustainability

The discussion of ecological integrity playing a key part in a redefined conception of sustainable development leads to a further discussion about what sort of sustainable development, or more broadly 'sustainability', is required in the Anthropocene. Clearly the current conception falls short in several vital aspects, which overall mean that is cannot secure the ability of future generations to meet their needs.

There have been numerous calls from scholars and nongovernmental organizations that with the emergence of the Anthropocene, our current understanding of sustainable development should be replaced by a concept of "strong sustainability".[91] This could arguably have a profound effect on our perceptions and design of global environmental law and the re-envisioned and redesigned IEL and governance effort may be better suited to achieve strong sustainability.[92]

Strong sustainability suggests a hierarchical order of the three pillars of sustainable development, with the natural environment coming first, human society second, and economic prosperity third.[93] It acknowledges that there is only ecological sustainable development or no sustainable development at all.[94] Ecological integrity also plays a vital role[95] in strong sustainability as the three pillars are informed by the respect for the planetary boundaries required by the concept on a planetary scale.[96] Strong sustainability in the Anthropocene requires IEL to extend its focus beyond these traditional three pillars to the issue of ecological integrity itself, leading to a greater consideration of the concept beyond the application of sustainable development.

3.3.5 Conclusion

It is evident from the previous sections that sustainable development is not capable of ensuring genuine sustainability in its current conception. It is therefore unsuitable as a legal tool in the Anthropocene as it is incapable of effectively managing the relationship between human development and the impact that this development has on the Earth system. With humans acting as a major ecological force it is imperative that sustainable development is reoriented to ensure that the impact humans have on the Earth system occurs within the permissible boundaries, thus ensuring that the uncertain and potentially more violent circumstances of transgressing those boundaries do not occur. It is argued that strong sustainability provides an answer to this problem and therefore, there is a need to legally alter the definition and priorities of sustainable development.

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[91] Supra note 16 at 8.

[92] Supra note 10 at 137.

[93] Supra note 29 at 48-49.

[94] K Bosselmann, *The Principle of Sustainability: Transforming Law and Governance* (Ashgate, Aldershot, 2008) at 23.

[95] Supra note 84 at 148; supra note 35 at 201-204.

[96] Note the discussion above of respecting the integrity of the Earth's ecosystem by ensuring the baseline conditions of the Holocene remain operative; see also supra note 35 at 201-206.

3.4 The Fragmented Nature of IEL

3.4.1 Introduction

IEL is institutionally fragmented and managed by a governance network of heterogeneous actors, including states, treaty bodies, non-governmental organizations and private actors.[97] It is necessary to examine the result of this governance structure in terms of its ability to effectively manage the human-environment relationship globally, and whether this results in improved environmental performance overall. The following discussion will demonstrate that the incoherence of IEL negatively impacts on Earth systems globally.

3.4.2 Fragmentation

Fragmentation in IEL is a problem of effectiveness, resulting from the tendency to treat interconnected environmental matters on a sectoral and individualistic basis. This results in issue-based legal responses that produces a multitude of differing or contradictory positions.[98] Instead of coherence around a singular goal, "the nature of medium specific environmental problems has encouraged institutional diversification at every level of governance".[99] With environmental problems becoming increasingly globalized in recent years, the multilateral environmental agreements covering them have become global in the scope of applicability and membership. However, despite this broadening of geographical scope there remains sectoral divisions in IEL,[100] particularly when addressing global issues.[101] Separate treaty regimes have developed independently of each other "without reference to the ways in which they would interact or create regulatory gaps and overlap."[102] The result of the way in which IEL developed has led to the current situation where there is "piecemeal international legal responses to the larger pattern of global environmental change".[103] While the fragmentation in IEL is given a level of consistency and conformity thanks to general principles, the network of Multilateral

[97] Supra note 5 at [77].
[98] Supra note 48 at 286; UN Environment Programme, *Future shape of international law to address pollution of global significance affecting the Earth's ecosystems: Consolidated report of initial consideration by experts* (2018) at [10-12].
[99] Supra note 48 at 293; UN Environment Programme, *Future shape of international law to address pollution of global significance affecting the Earth's ecosystems: Consolidated report of initial consideration by experts* (2018) at [10-12].
[100] Supra note 48 at 293; Y Kerbrat, 'Effective Implementation of Environmental Law' in Y Aguila and J Vinuales, *A Global Pact for the Environment - Legal Foundations* (Cambridge Centre for Environment, Energy and Natural Resource Governance, C-EENRG Report 2019-1) at 130; Supra note 5 at [81].
[101] Supra note 5 at [81]; See also UN Environment Programme, *Future shape of international law to address pollution of global significance affecting the Earth's ecosystems: Consolidated report of initial consideration by experts* (2018) at [12].
[102] Supra note 48 at 293; Supra note 5 at [80]; UN Environment Programme, *Future shape of international law to address pollution of global significance affecting the Earth's ecosystems: Consolidated report of initial consideration by experts* (2018) at [11].
[103] Supra note 48 at 293); UN Environment Programme, *Future shape of international law to address pollution of global significance affecting the Earth's ecosystems: Consolidated report of initial consideration by experts* (2018) at [12].

Environmental Agreements (MEA) has hundreds of objectives that point in different directions, resulting in inefficiency and "sub-optimization".[104]

With governance fragmented, it appears that more could be accomplished if the different institutions and treaty regimes worked more closely together.[105] The lack of integration is unsuitable for the current challenges faced,[106] including those the Anthropocene poses.[107] This latter assertion becomes clear from a consideration of the needs of a PBF. As noted previously, the individual boundaries are tightly linked[108] where actions either transgressing or seeking to prevent transgression of one boundary may impact another.[109] These interconnected earth subsystems show that in the Anthropocene, the governance challenge goes beyond the traditional integration debate of development and environmental policies,[110] a concern which was worryingly not even acknowledged as an emerging issue by the United Nations Environment Programme .[111]

This is not to say that there exists no co-operation between different MEA regimes. There is a multitude of environmental treaty regimes that co-operate on technical matters,[112] however, this technical co-operation avoids more fundamental questions of a normative nature, thus demonstrating the limits to this form of co-operation.[113] While technical co-operation better co-ordinates joint institutional response to environmental problems, the fact that these institutions have differing objectives that have no hierarchical ordering means that this form of co-operation does not resolve the issues outlined above, where the operations of the different regimes have negatively impacted on planetary boundaries which are not the concern of their objectives.

This demonstrates the inefficiency. Kim *et al.* describe this issue as resulting from "problem shifting".[114] Problem shifting is "improving the performance of one system by degrading another".[115] Applying this concept, examples of which have been provided above,[116] provides support for a hierarchical goal system which would improve the result of the sum of individual

[104] Supra note 48 at 302.
[105] UN Environment Programme, *21 Issues for the 21st Century: Results of the UNEP Foresight Process on Emerging Environmental Issues* (2012) at 6.
[106] Ibid at (v).
[107] Supra note 48 at 286.
[108] Supra note 44 at 472; supra note 2 at 8256; supra note 48 at 292.
[109] See supra note 48 at 291. For example, changing climate has serious impacts on biodiversity, but palm oil plantations to produce biofuel to combat climate change also have devastating impacts on biodiversity at both species and ecosystem level; see also infra note 193 at 17.
[110] Supra note 48 at 292; See also supra note 50; In relation to this debate see supra note 84; and supra note 105.
[111] See supra note 105
[112] Supra note 5 at [80].
[113] Supra note 48 at 296-297.
[114] Supra not 35 at 200.
[115] M Nilsson and Å Persson, 'Can Earth System Interactions Be Governed? Governance Functions for Linking Climate Change Mitigation with Land Use, Freshwater and Biodiversity Protection', (2012) 81 *Ecological Economics* 10, at 12.
[116] Section 3.1.4.

actions taken to protect the environment. Such an approach could help solve the currently outlined issue that the whole is smaller than the sum of its parts.[117]

3.4.3 A Hierarchical Goal

It has been shown that, in the Anthropocene, the closely connected planetary systems are not efficiently protected by the sectoral approach taken. Despite certain technical co-operation between regimes, the issue of problem shifting highlights the need for much greater co-operation. There is a lack of overall direction towards a goal which allows the differing objectives of some 900 multilateral environmental agreements[118] to hold each other back. There are several potential solutions to this such as greater co-operation provisions built into the treaties or a World Environment Organization overseeing the co-operation between different regimes and encouraging or enforcing a holistic approach of the various treaty bodies.[119] However, there have been calls for the emergence of a single goal, which "gives all international regimes and organizations a shared purpose to which their specific treaty objectives must contribute."[120] This would ensure that the individual objectives of each specific treaty would do less hindering to others and would prevent problem shifting across different planetary systems.

3.4.4 Conclusion

Clearly the fragmented nature of IEL worsens its performance and effectiveness and, in terms of managing the impact on the whole Earth system, is limited by the differing objectives and concerns of different regimes. The lack of an integrated response to impacts on the Earth system has been noted by the UN[121] and it is proposed that a hierarchical ordering of priorities is required to resolve this proliferation.

3.5 Improving the Place of Ecological Integrity

3.5.1 Introduction

So far, several issues with the governance of the human impact on the Earth system globally have been outlined. The lack of an interconnected approach and the resulting fragmentation and ineffectiveness of differing objectives in MEA regimes is one of the primary failings of this governance structure. It was suggested that a hierarchical ordering of priorities would provide a solution. Similarly, in the context of the discussion on sustainable development, it was shown that there is a need to legally alter the definition and priorities of the concept to include

[117] Supra note 35 at 200.
[118] Supra note 111 at 6. Although note that according to the Environmental Law Information Service (ECOLEX), there are currently more than 500 multilateral environmental agreements, see www.ecolex.org.
[119] F Biermann, 'The Case for a World Environment Organization', (2000) 42(9) *Environment* 24.
[120] Supra note 48 at 294.
[121] Supra note 5 at [80].

ecological integrity at its core as a guiding principle. Finally, the PBF was proposed a means of solving the fundamental issues of adapting IEL to Earth system regulation. The principle of ecological integrity has the potential to offer much towards a solution to these issues and proposals. The following section will thus begin with a description of ecological integrity and its prevalence in IEL. Then the concept will be analyzed to conclude whether there is any reformulation or adaption of the concept required in the Anthropocene, particularly in relation to its ability to operate on a planetary scale and considering the requirement of holistic management of the Earth system. Following this, the discussion will demonstrate the usefulness of the concept for the PBF, the fragmentation issue and sustainable development. Finally, the section will finish with an analysis of the most appropriate form that ecological integrity should take if it is to improve its normative standing and fulfil its potential to impact on these issues and, therefore, improve the ability of IEL to manage the relationship between human activities and the impact that these have on the Earth system.

3.5.2 Ecological Integrity

Ecological integrity is a widespread concept in IEL, including in Article 2 of the International Union for Conservation of Nature's (IUCN) Draft International Covenant on Environment and Development where it states that "[t]he integrity of the Earth's ecological systems shall be maintained and where necessary restored."[122] This inclusion is particularly relevant because the Covenant "provides a blueprint for an international framework agreement consolidating and developing existing legal principles related to environment".[123] Principle 7 of the Rio Declaration on Environment and Development obligates states to "cooperate in a spirit of global partnership to conserve, protect and restore the health and integrity of the Earth's ecosystem."[124] The Earth Charter includes ecological integrity as Principle II of its core principles where it urges the protection and restoration of "the integrity of Earth's ecological systems".[125] Principle 4 of the World Charter for Nature, adopted by the UN General Assembly in 1982, provides that ecosystems and other resources shall not be managed in a way that endangers "the integrity of those other ecosystems or species with which they coexist."[126] These examples of soft law codification of ecological integrity show its prevalence in IEL and that it has the potential to become a norm of greater importance as it already exists in such plentitude. Indeed, ecological integrity has arguably become "the most entrenched [term]...in the language of international agreements and treaties" on the environment.[127]

The concept of integrity implies wholeness or a characteristic that, once lost, implies the loss of the integrity. However, a key characteristic of the Anthropocene is change, particularly with

[122] IUCN, Draft International Covenant on Environment and Development, 5th ed., Art 2.
[123] Ibid, foreword.
[124] Rio Declaration on Environment and Development, Principle 7.
[125] Earth Charter, Principle II, [5].
[126] UN General Assembly, *World Charter for Nature A/RES/37/7* (1982), Part I, [4].
[127] S Woodley, 'Ecological Integrity and Canada's National Parks', (2010) 27 *George Wright Forum* 151, at 151–52, in infra note 128 at 63.

humans as the primary drivers of such change. Thus, any discussion of ecological integrity must acknowledge that all is changing and that such change may not be conducive with a conception of ecological integrity that is based on a definition of what is natural.[128] So far, ecological integrity has been used to define the objectives of protected areas. For example, the mentioning of ecological integrity by the Conference of the Parties to the Convention on Biological Diversity (CBD) is connected mainly with its program of work on protected areas.[129] As the current understanding of ecological integrity may be incompatible with the complex change, instability, the planetary dimension of governance and the place of human as a major geographical force in the Anthropocene,[130] it is necessary to alter the concept somewhat to make it useful for Anthropocene governance.

The point of the PBF is to ensure a "safe operating space for global societal development".[131] Considering this, Bosselmann proposes a reformulated ecological integrity that should focus on "a continued delivery of goods and services from the ecosystem or ecosystems present in the area."[132] This provision of services can occur even with changes in biodiversity or ecosystem processes. Taking the Holocene as the reference point in time,[133] at the global level, ecological integrity concerns "the combination of the biodiversity and ecosystem processes that characterize the biosphere as a whole during the Holocene".[134] The Holocene is chosen as the reference point based on a precautionary approach as it is the "the only state of the Earth System that we know for sure can support contemporary society."[135]

This altered conception of ecological integrity, based on the provision of ecosystem services, is suited to the PBF as the planetary boundaries "define the parameters of the biosphere integrity of the Holocene epoch".[136] The reformulation provides an essential function when taken at the global level. It ensures that the overall functioning of the Earth system and the services it provides are protected.

As previously noted, "[a]t the planetary scale, the integrity of Earth's ecosystem would refer to the biophysical conditions of the Holocene".[137] This use of Holocene conditions as a reference point for ecological integrity is ideally suited to respect the thresholds of the PBF as it would ensure that the boundaries are not crossed. As the planetary boundaries are quantifiable, integrity

[128] P Bridgewater and others, 'Ecological Integrity: A Relevant Concept for International Environmental Law in the Anthropocene?', (2015) 25(1) *Yearbook of International Environmental Law* 61, at 62.
[129] Ibid at 65.
[130] Consider, for example, the potentially unknown implications of large-scale geoengineering projects undertaken to ensure that planetary boundaries are not crossed.
[131] Supra note 43.
[132] Supra note 128 at 72.
[133] Ecological integrity should not be based on some imagined, perfect state, but measured at a point in time. See supra note 128 at 72.
[134] Supra note 128 at 73.
[135] W Steffen and others, 'The Anthropocene: From Global Change to Planetary Stewardship', (2011) 40 *AMBIO* 739, at 739.
[136] Supra note 128 at 73.
[137] Supra note 48 at 307.

can be used to measure the legality of state behavior.[138] It has already been noted that ecological integrity is widely used in IEL, as such it can potentially aid the cause of the PBF further by serving as an entry point for the framework.[139] The reformulated conception of ecological integrity is much informed by the concept of the PBF and the two go together as it is evident that this altered conception has much to offer the framework in return.

In addition to its apparent usefulness for the planetary boundaries, ecological integrity provides a solution to the need to prioritize and organize the objectives of the different MEA regimes. Safeguarding the ecological integrity of the Earth system as a guiding policy or overall goal would guide the actions of differing regimes and ensure that an individual regime did not undertake an action in pursuit of its own objective which resulted in worse overall management of the Earth system by negatively impacting on another objective. Similarly, the integration of the concept into the priorities of sustainable development would provide a default position of ecological sustainability, thus ensuring that economic development could only proceed in a truly sustainable manner that would not disrupt the provision of services by the Earth system.

In conclusion, ecological integrity is a useful concept in the Anthropocene, its application at the global level ensures that the Earth systems continue to function as they have done in the Holocene.[140] Bosselmann's reformulated proposal adds to the effectiveness of ecological integrity on a planetary scale by focusing on the provisions of services as the characteristic that gives the Earth system integrity. Perhaps most importantly however, ecological integrity has the potential to solve the issues noted in relation to fragmentation, interconnectedness, and sustainable development. The discussion now turns to the form that improvement of the normative status of ecological integrity should take.

3.5.3 Normative Elevation

The PBF has a strong normative characteristic of measurability, which cannot be transgressed. This strongly suggests the existence of a foundational environmental principle[141] or the development of new peremptory norms of *jus cogens* status which protect the boundaries.[142] The following discussion will analyze which is the more appropriate solution.

There is the potential of fashioning the planetary boundaries thresholds into norms of *jus cogens* status. However, the fragmentation of MEAs supports the concept of a single unifying goal, which would enhance institutional coherence.[143] To allow multiple environmental rules and

[138] Ibid at 309.
[139] Supra note 128 at 74.
[140] It has even been suggested that if ecological integrity does not become accepted as a fundamental norm of the legal system as a whole, the default choice is collapse of the Earth systems. See K Bosselmann, 'The Imperative of Ecological Integrity: Conceptualising a Fundamental Legal Norm for and New "World System"' in the Anthropocene', in L Kotzé, *Environmental Law and Governance for the Anthropocene,* (Oxford, Hart Publishing, 2017).
[141] Supra note 48 at 290.
[142] Supra note 50 at 83.
[143] Supra note 48 at 292.

principles to guide state behavior, even where some have *jus cogens* status, still runs the risk of a lack of coherence and consistency in IEL as the objectives of differing regimes or sectors will still work in different directions.[144] To address the fragmentation issue highlighted by problem shifting, it is necessary to somehow order priorities or address cross-boundary interactions.

There is also the problem in relation to *jus cogens* that these norms must be grounded in *opinio juris*, and at present there are no specifically environmental rules or principles with such status.[145] O*pinio juris* also presents another problem; that it is likely that specific sectoral commitments are the most likely candidates for *jus cogens* status,[146] and this does not provide a solution for the lack of systemic integration, which is critical for prioritizing the integrity of the planetary systems over individual sectoral objectives.[147] Therefore, it is likely that individual *jus cogens* rules protecting specific planetary boundaries will not suffice to effectively ensure that the planetary boundaries are not crossed and is thus an unsuitable answer to the requirements of IEL in the Anthropocene.

The foundational principle or 'grundnorm' idea provides a solution to the fragmentation problem while ensuring that the planetary boundaries are respected. It would provide a "point of reference for legal reasoning and interpretation, thereby enhancing institutional coherence across Earth's subsystems."[148] Given the PBF and its importance in the Anthropocene, the overall goal should seek to protect these to safeguard the "biophysical preconditions that are essential for human existence and development."[149]

The proposal for a grundnorm takes the Kantian perspective of common interest based on reasonableness and general acceptance,[150] only that which can reasonably reflect the common interest can be considered as a grundnorm. For Kim *et al*., "the preservation of natural conditions of life or integrity of Earth's life-supporting systems reflects common interest in this sense."[151]

With regard to sustainable development, a potential solution to the need for an eco-centric hierarchy discussed above is ecological integrity. The use of the concept as an overall goal focused on promoting ecological integrity at the global scale solves the hierarchy issue, as individual objectives would then be "bound by a priority goal but be given a degree of flexibility to self-organize".[152] As ecological integrity protects the thresholds of the PBF, within which economic development must remain if it is to properly be sustainable, it acts as solution to the issues that currently pervade sustainable development.[153]

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[144] See D Shelton 'International Law and "Relative Normativity"', in M Evans, International Law, 4th ed., (Oxford, Oxford University Press, 2014) at 142, these norms can be amended by a general norm of the same value.
[145] Supra note 35 at 205.
[146] Ibid at 204.
[147] Supra note 48 at 304.
[148] Ibid at 292.
[149] Ibid at 303.
[150] Ibid at 290.
[151] Supra note 35 at 205.
[152] Supra note 128 at 75.
[153] See Section 3.3.

Grundnorms in this sense set default positions for legal decision-making.[154] The default position taken by states, state sovereignty, is problematic in the Anthropocene. It fails to take into account the interconnectedness of the planetary systems and it constrains the proper application of sustainable development. Resetting the default position to ecological sustainability or integrity would alter this fundamental aspect of international law.[155] It is thus relevant to point out that ecological integrity would be better suited as such a default position, given the requirements of the Anthropocene and the planetary boundaries.

3.5.4 Conclusion

In conclusion, the principle of ecological integrity has much relevance in the Anthropocene and, due to its ability to both introduce and support the PBF, its importance as a principle of normative status should be improved. Indeed, there are certainly reasonable calls for it to be given a similar status in law as human rights and the rule of law.[156] Elevating ecological integrity to a norm of *jus cogens* is more unlikely than the elevation of individual sectoral commitments, and these do not solve the fragmentation issue. Elevating the principle to the status of the overall goal of IEL, while admittedly seeming even more unlikely, does act as a solution to the three issues highlighted above, fragmentation, sustainable development, and the PBF. If sustainable development incorporated the idea that there are finite limits to what can be permitted in terms of development and this was informed by the requirement of ensuring ecological integrity this would do much towards ensuring a truly 'sustainable' sustainable development. This does not go as far as to suggest the need for ecological integrity to be elevated to the position of overall goal of IEL. However, it is really the issues highlighted in relation to the fragmentation of the governance structure of IEL that demonstrates this requirement. It is obvious that an overall goal would provide coherence in action taken by different sectoral regimes and that this cannot be solved by simply requiring different MEA regimes to give due regard to ecological integrity, they must be bound by a requirement greater than that of their individual objective. Otherwise, the need to holistically manage the human impacts on the whole Earth system will not be fulfilled, and there is no guarantee that IEL will be able to prevent and subsequently manage unstable and violent responses by the Earth system.

[154] Supra note 35 at 205.
[155] A Jóhannsdóttir, 'The Significance of the Default: A Study in Environmental Law Methodology with Emphasis on Ecological Sustainability and International Biodiversity Law', (Upsala University, Faculty of Law 2009) <http://www.diva-portal.org/smash/get/diva2:173192/FULLTEXT01.pdf> (date accessed: 24th April 2019).
[156] K. Bosselmann, 'The Imperative of Ecological Integrity: Conceptualising a Fundamental Legal Norm for and New 'World System' in the Anthropocene', in L Kotzé, *Environmental Law and Governance for the Anthropocene,* (Oxford, Hart Publishing, 2017).

4. Global Pact for the Environment

4.1 Introduction to the Global Pact

4.1.1 History and Objectives

On 10 May 2018, the UN General Assembly (UNGA) adopted resolution 72/277 entitled "Towards a Global Pact for the Environment". This resolution established an ad-hoc open-ended working group to consider a technical and evidence–based report that assesses possible gaps in IEL with a view to strengthening their implementation.[157] The origin of this project is long-standing, beginning in 1987 when the Brundtland Report called for the adoption of such a treaty.[158] In 1995, the International Union for the Conservation of Nature presented a similar project which is currently in its fifth edition, named the International Covenant on the Environment and Development.[159] As a continuation of these works, exactly twenty-five years after the Rio Summit, an initiative that aims to codify the major environmental principles of the Rio Declaration on Environment and Development was launched at the Sorbonne University in Paris in June 2017. The Pact has received the explicit support of the International Union for the Conservation of Nature (IUCN),[160] as well as the support of French President Emmanuel Macron, who resolved to push the Pact through the United Nations General Assembly.[161] This resulted in the above-mentioned UNGA Resolution, which could result in convening an intergovernmental conference to adopt a Global Pact for the Environment[162].

The normative consequences of the Anthropocene are far reaching[163] and an instrument such as the Pact has the potential to play a significant normative and governance role in "navigating humanity through the Anthropocene."[164] Section 3 outlined several issues with, and potential solutions to, governance in the Anthropocene. These will now be used to propose features which should be included in the Pact to make it a suitable basis for IEL in the Anthropocene.

[157] UN General assembly resolution A 72-277 at [1-2].
[158] Supra note 74.
[159] IUCN, Draft International Covenant on Environment and Development, 5th ed.
[160] The Draft Covenant on Environment and Development constitutes the most advanced attempt to compile international environmental principles and rules and thus will be a valuable reference point for analysis of the Draft Global Pact.
[161] Le Club des Juristes, *White paper: Toward a Global Pact for the environment* (2017), at 3.
[162] Hereinafter [the Pact].
[163] S Dalby, 'Framing the Anthropocene: The Good, the Bad and the Ugly', (2016) 3(1) *The Anthropocene Review* 33, at 34.
[164] L Kotzé and D French, 'A Critique of the Global Pact for the Environment: A Stillborn Initiative or a Foundation for Lex Anthropocenae?', (2018) 18 *Int Environ Agreements* 811, at 813.

4.2 Ecological Integrity as the Objective of the Pact

4.2.1 Introduction

Section 3.5 concluded that ecological integrity offers a solution to the problems associated with sustainable development in that it prioritizes the three pillars, ensuring that the environmental one takes ultimate precedence, thus ensuring true sustainability. Similarly, in relation to fragmentation and problem-shifting, the principle offers a prioritizing guidance role for activities seeking to manage human impacts on the Earth system. Finally, it was shown that ecological integrity has much to offer the protection of the planetary boundaries, by taking a central role in the PBF and possibly providing a means of introduction for a PBF. It is thus proposed that ecological integrity is made the objective of the Global Pact. This section demonstrates that the Pact is ideally suited to promote the place of ecological integrity as a concept central to the effective governance of the human impact on the Earth.

4.2.2 The Wording of the Objective

If the Pact is to take a central place in IEL then it naturally provides an ideal place to increase the coherence of the individual effects of environmental regulation efforts across the planet. In other words, the objective of the Pact would become a central objective of IEL if the Pact acts as an authoritative reference point or centrality for IEL. Therefore, building upon the discussion in Section 3.5, it is proposed that ecological integrity takes the place of the objective of the treaty. This could be worded several ways, but it is important that the focus be on the delivery of goods and services from the ecosystem at a planetary scale,[165] as this ensures coherence with the PBF proposed *infra.* Specifically, the ecological integrity of the planet refers to the biophysical conditions of the Holocene and the wording of the objective must reference this. The objective should refer to these conditions so that the success of the objective be measurable. Nature is not static but dynamic,[166] and the integrity (i.e. the provision of goods and services) of the Earth system can change based on what time you are measuring it. It is thus necessary to include a reference point in time and, as explained in Section 3.5.2, the biophysical conditions of the Holocene are certain and necessary for life to flourish on the Earth and for human societal development. They are thus a suitable reference point for ecological integrity.

Therefore, the objective of the treaty should be the protection and restoration of the global biophysical conditions of the Holocene, in order to ensure the delivery of goods and services provided by the Earth system. Such an objective would help ensure that Earth systems continue to function as they have in the Holocene.

[165] See Section 3.5.2; and Supra note 128 at 72.

[166] C Folke and others, 'Resilience Thinking: Integrating Resilience, Adaptability and Transformability', (2010) 15 *Ecology and Society* 20.

4.2.3 Impact on the PBF

The coherence of the wording of this objective with that of a PBF is important. The aim of the PBF is to maintain Holocene-like conditions[167]and so, the specification of integrity as the protection and restoration of those conditions is perfect for proper application of the PBF. Further, the specification of what those conditions are, and thus what is to be protected by the objective, takes the form of the planetary boundaries themselves, which will be elaborated below. Therefore, the proposed objective and the proposed PBF are closely linked and form the core of the proposal to make the Pact suitable for the Anthropocene.

4.2.4 Impact on Sustainable Development

Making ecological integrity the objective of the treaty influences the interpretation of the proposed provision on sustainable development, which will be discussed below. Briefly however, the provision provides a conception of sustainable development characterized by its focus on giving environmental consideration the highest priority and the protection of ecological integrity using this principle is closely linked with what the principle seeks to do itself. The two are thus coherent and the objective integrates the economic, social and environmental considerations by giving them a priority goal to be achieved.

4.2.5 Impact on the Structural Issues

Section 3.5 concluded that placing ecological integrity as a grundnorm of IEL would substantially alter the default positions for legal decision-making. Making ecological integrity the objective of the Pact does not make it a grundnorm of IEL. However, the making it the objective of a global legally-binding document does have the effect of providing a reference point for legal reasoning and interpretation, one of the main benefits of the grundnorm idea. As the objective, it would inform the interpretation of other principles and environmental regulation that are affected by the provisions of the Pact. In this regard the objective has the advantage of addressing problem-shifting by providing an interpretive lens through which problem-shifting will be prohibited. This will be elaborated below, but essentially such a lens would exclude certain actions that result in problem-shifting as these would not work towards the objective of the Pact.

[167] E Fernández and C Malwé, 'The Emergence of the "Planetary Boundaries" Concept in International Environmental Law: a Proposal for a Framework Convention', (2019) 28 *RECIEL* 48, at 49.

4.3 The Proposed PBF

4.3.1 Introduction

This section proposes a PBF that is established by either one or several provisions in the text of the Global Pact. This section will compare three different proposals for integrating the planetary boundaries with IEL and conclude which is the most suitable to be included in the Global Pact. The proposal will seek to incorporate the PBF as the core the of the governance structure created by the Pact as this was shown to be important in section 3.2 and the discussion will thus examine what the PBF would do in terms of regulation and how the Pact should provide this. Finally, the PBF has an obvious planetary dimension and it will firstly be necessary to examine how the current conception of the Pact effects this.

4.3.2 The Symbolic Relevance of the Pact to the Planetary Boundaries

Firstly, it is necessary to examine the title of the Pact in terms of providing for the regulation of the impacts on the planetary system. The word 'environment' is increasingly lacking in its ability to describe the appropriate lens with which to view the protection of the planetary system.[168] The PBF incorporates scientifically informed limits on Earth systems and seeks to protect the integrity of the Earth system and understand its high degree of complexity.[169] The use of the word 'environment' in the name of the Global Pact itself underscores how far behind the Pact is in addressing the intertwined aspects of the Earth system that the planetary boundaries concept reveals. The UNGA itself has shown support for such an Earth system approach, as in 2014 it stated that Earth system science, of which the planetary boundaries are a core concept, has paved the way for Earth system governance, law and economics.[170]

The use of 'environment' in the title does not offer IEL a new perspective in this regard. It provides little by way of altering the epistemological framework necessary for viewing the Earth as an intertwined planetary system, with the relevant planetary system boundaries, of which humans are a part. This epistemological failing of the Pact ignores the eco-centric quality of the PBF. The Global Pact would better incorporate an Earth systems approach if it replaced the word 'Environment' with 'Earth', for example.

4.3.3 The Three Approaches

4.3.3.1 Biermann's Approach

The first approach to planetary boundaries governance is proposed by Biermann. This approach is focused on regulating specific impacts rather on an overall planetary boundary.[171] It also reconciles the normative and institutional conflicts between planetary boundaries through the

[168] Supra note 164 at 818-820.
[169] See generally supra note 44; and supra note 2.
[170] Supra note 65 at [12].
[171] Supra note 16 at 7.

> "development of overarching principles, coordination policies, or the influence and steering role of central international organizations than by creating new specific institutions at the interface of distinct planetary boundaries."[172]

The overall coordinated effort to protect the planetary boundaries "would take the form of general statements of principles and the set up of scientific assessment and advisory bodies rather than of a more detailed global framework agreement that covers all boundaries."[173] Finally, Biermann proposes that certain standards which are essential for not exceeding the planetary boundaries are given the status of *jus cogens*.[174]

Firstly, this approach does not directly address specific boundaries and does not define them, it leaves this to a scientific assessment body. This has both advantages and disadvantages. Firstly, if the limits of the planetary boundaries were excluded from the text of the Pact, this would cause greater uncertainty in relation to the other provisions which rely on the limits, for example the provision on sustainable development discussed below. However, it is possible that this would be easily reconciled by including a reference that the exact limits of the planetary boundaries are deemed to be those currently understood by the scientific assessment body. This then turns this element of Biermann's approach into an advantage by allowing for regular updates and revisions in relation to the exact position of the boundaries, an important element given the nature of scientific uncertainty and the element of change inherent in the Anthropocene.

Secondly, this approach would mean that in the Pact there would be no provisions specifically relating to individual planetary boundaries and their protection would instead be addressed by overarching general principles. This has the advantage of sticking more closely to the original conception of the Pact as an overarching framework of principles. However, it would require some method of overseeing the global protection of the planetary boundaries, such as the advisory body proposed by Biermann. It is possible that this could be established by the Pact and the body be given a mandate to advise Parties on the coordination of general principles and sectoral rules to ensure the overall protection of specific planetary boundaries. However, this approach seems like weak and uncertain enforcement. If the general principles needed were agreed and included in the Pact there is much uncertainty as to what these would include and if they would, in the long term, protect the boundaries sufficiently. Related to this is the problem that these principles would be difficult to change once agreed and therefore this approach present the problem of flexibility.

Finally, issues relating to giving specific essential standards the status of *jus cogens* was discussed above in Section 3.5.3. These rules are difficult to create, especially using a Global Pact, and they would again suffer from inflexibility if the nature of the required protection changed, as it would be likely in the Anthropocene.

In conclusion, the most promising element of Biermann's approach is the set-up of scientific advisory bodies which would be able to regularly update the exact limit of the planetary boundaries and this should be included in the PBF created in the Pact.

[172] Ibid.
[173] Ibid.
[174] Ibid at 8.

4.3.3.2 The Grundnorm Approach

Kim and Bosselmann propose protecting the planetary boundaries by using the concept of ecological integrity as the grundnorm by which other legal norms can be assessed and validated.[175] To facilitate this, they propose a constitution for IEL, which would have an institution to enforce it and which would allow states to prosecute other states before a court.[176]

Fernández and Malwé contend that this is politically unlikely to occur given the lack of consensus between parties concerning the enforcement mechanism in the Paris Agreement, which eventually decided on a facilitative approach.[177] It is accepted that, given the current discussion between States concerning the Global Pact[178] it seems that they are far from creating a global constitutional order based on ecological integrity. Of course, the same could be said for all the proposals made in Section 4 and this should not deter a conclusion here that it would be best suited for governance in the Anthropocene. The rejection of this approach here is based on the contention that such a drastic step, while it might provide a solution, is not necessary. In other words, it is not necessary to create a constitutional order for IEL in order to ensure protection of the planetary boundaries, as discussed further below.

However, the grundnorm approach does demonstrate the usefulness of an overall goal to which all regulation efforts in IEL can work towards. With ecological integrity of the Earth-system as an objective of the Pact, this provides that a PBF created by the Pact would work towards the same objective as the other provisions of the Pact, be they general principles of IEL or otherwise. This objective is the same as that of a PBF;[179] to maintain Holocene-like conditions. In this way the PBF created in the Pact is coherent with the rest of the Pact and this is useful in the implementation of the general principles of IEL and the PBF, as they both work towards the same goal. Therefore, the PBF created in the Pact should be closely linked to the objective of the Pact, and in certain regards this will occur naturally.

4.3.3.3 The Framework Convention

Fernández and Malwé propose the adoption of a framework convention on planetary boundaries. This is designed to establish broader commitments for its parties and leaves the specific targets to subsequent protocols. The framework would "set the general purpose and principles of a new cooperation and coordination between States and institutions".[180] The authors contend that this approach would have the advantage of flexibility, "allowing norms to adapt and evolve as necessary in response to the latest scientific advances."[181] The framework convention would

[175] Supra note 35 at 205; supra note 48 at 290.
[176] Supra note 35 at 206-207.
[177] Supra note 167 at 54; See also the Paris Agreement.
[178] P Doran and others, 'Summary of the First Substantive Session of the Ad Hoc Open Ended Working Group towards a Global Pact for the Environment: 14-18 January 2019', (2019) 35(1) *Earth Negotiations Bulletin*, <http://enb.iisd.org/unep/globalpact/oewg1/> (date accessed: 5th May 2019).
[179] Supra note 167 at 49.
[180] Ibid at 54.
[181] Ibid.

have the maintenance of Holocene-like conditions as its objective, this would work in the context of the current proposal regarding the objective of the Pact. The authors note the need to identify "the necessary reforms and new standards for each existing legal regime in order to guarantee the coherence of these regimes with the aforementioned common objective."[182] The proposal then lists 11 fundamental elements that the framework should contain, including recognition of; the ecological thresholds of the planetary boundaries and the fact that humans have become a geophysical force capable of transgressing those thresholds, and the multi-scale interactions between different system and the need to manage them in an in integrated manner.[183] The recognition of humans as a force capable of transgressing those boundaries is an important recognition of a key part of the Anthropocene hypothesis and will serve to create a better epistemological framework which will inform the rest of the PBF in the treaty. Also, the recognition of interactions between systems is coherent with the proposal below to address problem-shifting.[184]

In all, the framework convention approach taken here has much to offer a PBF in the Global Pact. It establishes a goal which is similar to the proposed objective of the Pact and this brings much of the advantages offered by the key contribution of the grundnorm approach. It establishes overarching principles and requires assessments by scientific bodies, which was noted as the key contribution of Biermann's approach. It is a more detailed proposal than the previous two and thus offers greater guidance to a PBF contained in the Pact. It is an improved approach over the draft Global Pact by offering specific guidance "for effectively safeguarding the Earth system and its key processes in a systemic manner".[185]

Given its adoption of the main benefits of the other approaches, and its less drastic approach than the constitutional order established by the Grundnorm approach, this framework convention approach will be used to influence the design of the PBF in the Global Pact.

4.3.4 The PBF in the Global Pact

This section will take the preceding analysis and use it to outline what the PBF should look like in the Pact and how the Pact will create it. The Global Pact is to serve as central point of future IEL, in this regard it is ideally placed to incorporate a PBF. The framework approach outlined above serves as the most specified, coherent and realistic attempt at protecting the planetary boundaries and so it is proposed that it be incorporated in the Pact. The 11 fundamental elements of that approach should be included in the Pact, with some minor alterations given the other proposals made here in Section 4. Firstly, the recognition of multi-scale interactions between different systems[186] is adequately addressed below in Section 4.5, and this forms that element of the framework in this current proposal. Secondly, the proposed objective of the Pact forms the

[182] Ibid.
[183] Ibid at 54-55.
[184] See Section 4.5.
[185] Supra note 167 at 55.
[186] Ibid.

objective of the PBF. As noted, the two are the same and the first part of the provision creating the PBF will recognize that in order to achieve the objective of the Pact, the maintenance of the Holocene-like conditions, Parties shall regulate the human impact on the ecological thresholds of the planetary boundaries. The rest of the requirements listed by Fernández and Malwé should then be incorporated into the Pact.

The authors framework approach will, instead of acting as a standalone framework convention, be incorporated into the Global Pact as part of the overall attempt to improve the effectiveness of IEL. This will dramatically alter the conception of the Pact by greatly expanding its impact on the governance structure of IEL. The Pact may still include the general principles of IEL, and in fact this would be favorable as including both the principles and the PBF in the Pact would prepare IEL to achieve the proposed objective of the Pact with systemic coherence throughout the governance structure. This is demonstrated in the following section discussing sustainable development in the Pact. As will be discussed, the PBF created here will impact the understanding of sustainable development, framing it in the context of protection of the planetary boundaries. If both the original intention of including general principles and the PBF form the content of the Pact, this effect will be mirrored throughout the Pact.

4.3.5 Conclusion

The analysis of the three approaches revealed that the Framework Approach is the most suitable for the current proposal. It contains concrete proposals that incorporate the advantages of the other approaches and itself offers a holistic view of the management of human impacts on the Earth system. It also mixes coherently with the other proposals contained in Section 4 and even improves their effectiveness by framing the context in which they operate. In conclusion, the PBF should be incorporated into the Global Pact in the form of the framework approach outlined above, with the necessary alterations noted.

4.4 Strong Sustainability in the Pact

4.4.1 Introduction

This section will use the discussion in Section 3.3 to, firstly, decide how sustainable development can be best conceptualized in the Pact to be suitable for the Anthropocene, and secondly, how the article on sustainable development can be worded to achieve this. The discussion takes place in the context of the other proposals and particularly the objective of ecological integrity and the PBF, which contribute a planetary dimension to sustainable development and makes ‘sustainable’ meaningful. In the context of a Pact which has a PBF at its core, the idea of what is sustainable is much informed by the limits imposed by the planetary boundaries.

4.4.2 Strong Sustainability

Section 3.3 concluded that there is a need to legally change the definition of sustainable development to one that is characterized by strong sustainability; which hierarchically orders the three pillars with the natural environment coming first. Ecological integrity is also a vital concept in strong sustainability as a core concept of strong sustainability is that there is ecological sustainable development or no sustainable development at all. Strong sustainability in the Pact must be linked to the PBF created in order to provide coherence and certainty within the governance structure, and so the wording of the provision must connect the three pillars to the planetary boundaries.[187] The PBF provides an operating space for human development, and sustainable development must recognize this remaining space, otherwise economic development will transgress the planetary boundaries and the development proceeding under the auspices of sustainable development will cease to be truly sustainable.

4.4.3 The Wording of the Provision

With the required elements of the concept now outlined it is necessary to outline what way the provision on sustainable development in the Pact should be worded to include the proposed elements. It must incorporate ecological integrity and the planetary boundaries as the remaining space for development. It must also ensure a clear hierarchical ordering of the three pillars. The following example of such a wording is proposed:

'In order to achieve the protection and restoration of the biophysical conditions of the Holocene, necessary for life to flourish on Earth, including human societal development, Parties shall ensure development that meets the needs of the present without exceeding the safe operating space of the Earth's life-support system, on which the welfare of current and future generations of all life on Earth depends.'

The first thing to note from this definition is that it is has expanded greatly from the traditional definition.[188] This demonstrates the increased awareness of the impacts on the Earth system caused by human societal development. The Anthropocene concept provides this awareness in that it focuses attention on the Earth-wide impacts of humans. The proposed definition provides an objective for sustainable development, foremostly, that sustainable development is intended to achieve the protection and restoration of the biophysical conditions of the Holocene, which in this context are informed by the planetary boundaries. This, and the reference to the safe operating space of the Earth's life-support system, ensure coherence with the proposed objective and PBF.

The definition also clearly includes an eco-centric vision. It places human societal development as part of the flourishing of life on Earth and alters the traditional statement of meeting the needs of present and future generations of humans to include all life on Earth. This changes the fundamental anthropocentric approach of traditional sustainable development; that integrates

[187] See Section 3.3.3-4.
[188] Supra note 74.

environmental concerns seemingly only to ensure that future generations of humans can use it to meet their needs. The new conception clearly provides that development is constrained by the limits of the Earth-system in order to ensure that all life, including human, can flourish.

The proposal clearly provides a hierarchical ordering of the three pillars. Firstly, by the objective of sustainable development; that the purpose of sustainable development is to ensure the ecological integrity of the planet, and this is specified to ensure clarity. Secondly, the prohibition of exceeding the safe operating space of the Earth-system ensures that although economic development can proceed to a point, this is ultimately limited by the planetary boundaries.

A small but important point on the wording of the proposed definition above is the onus on Parties to 'ensure' sustainable development. This wording is intended to ensure that State Parties enforce this conception of sustainable development on actors that are not parties to the Pact but that nevertheless have an impact on the Earth system.

Finally, the definition seeks to incorporate concerns relating to developing nations, primarily the reality of resource exploitation that occurs as a country develops to a services-based economy.[189] It does this by retaining the reference to meeting the needs of the present. The safe operating space, or the space in which development may occur allows for policies aimed at the eradication of poverty, while limiting these efforts when they reach a point where they would transgress Earth-system limits. The eradication of poverty among humans is laudable but this will not be helped by transgressing the planetary boundaries, which in turn will have violent impacts on the ability of developing countries to develop.

4.4.4 Conclusion

The proposed definition of sustainable development is an attempt to provide strong sustainability in the Global Pact. Including references to ecological integrity and the PBF ensures an eco-centric approach which hierarchically orders the three pillars and, most importantly, ensures true sustainability in the context of the Earth-system. The proposal provides an objective for sustainable development which is coherent with the proposed objective of the Pact and will ensure the proper integration of ecological concerns with development policies.

4.5 Fragmentation and the Global Pact,

4.5.1 Introduction

In Section 3.4 it was shown that the differing sectoral objectives of different MEA regimes results in problem shifting and thus inefficiency in the actions undertaken to mitigate the impacts that humans are currently having on the Earth system. The fragmented governance structure is not itself an issue, as environmental problems are specific and technical in nature. However, this structure contributes to inefficiency in IEL and it was proposed that a hierarchical ordering of

[189] Supra note 10 at 152.

priorities would provide a solution. A single goal, which would give all MEA regimes a shared purpose to which their specific treaty objectives would contribute, is proposed here as the solution to problem-shifting. This proposal relies heavily on the proposed objective of the Pact, ecological integrity. This is combined with a proposal for a provision in the Global Pact that attempts to improve the global co-ordination of actions in the pursuit of the objective of the treaty. It would be impossible for a single short provision to resolve conflicts between all regime objectives, therefore, the role of the compliance mechanism in a Global Pact would be vital in resolving specific conflicts, and this forms part of the discussion below. In short, the following section proposes combining the efforts of the objective of the Pact, a provision specifically orientating different MEAs towards an overall goal, and the compliance mechanism created by the Pact, in order to resolve problem-shifting. This attempt to resolve problem-shifting is closely linked to the PBF proposed above and forms a central part of that governance structure. It ensures that a holistic approach is taken in efforts to protect the planetary boundaries and that the interconnectedness of the planetary systems is accounted for in regulation efforts.

4.5.2 The Objective

If the Global Pact is to serve as a centrality for IEL it is suitable for determining the global, cross-sectoral impact of the individual actions of MEAs. The Pact is currently in a process which is considering the need to address the gaps in IEL.[190] The Report of the Secretary General states that conflicts between regimes can be managed using conflict clauses, mutual supportiveness or the Vienna Convention on the Law of Treaties.[191] It would be much more efficient and arguably result in more effective management of conflict to include a prioritizing system in the Pact than to address the problem individually in over 900 MEAs.

The draft Pact presented by the Club des Jursites contained an overarching framework of principles but did not address problem-shifting directly and so failed to properly deal with fragmentation in IEL.[192] However, it is proposed here that the proposed objective of the Global Pact, ecological integrity, acts as a prioritizing principle for individual MEA regimes. If the Pact is to contain an overarching framework of principles which seeks to harmonize and provide a minimum level of effectiveness for the existing principles contained within the various MEAs across the planet,[193] then including the ecological integrity as the objective of the Pact, and thus this overarching framework, will encourage the interpretation of the principles, and thus the specific obligations of MEAs in terms of this overall objective. However, this is only part of the effect that the objective will have in relation to problem-shifting under the current proposal. The second part involves the provision which specifically orientates different MEAs toward this objective as an overall goal.

[190] See generally supra note 5.
[191] Ibid at [83].
[192] See Preliminary Draft of the Group of Experts - Draft global Pact for the Environment.
[193] Y Aguila and J Vinuales, 'A Global Pact for the Environment: Conceptual Foundations', in in Y Aguila and J Vinuales, A Global Pact for the Environment - Legal Foundations (Cambridge Centre for Environment, Energy and Natural Resource Governance, C-EENRG Report 2019-1).

4.5.3 The Article Resolving Fragmentation

To ensure a coherence of effort between different MEA regimes a provision should be included in the Pact which provides that; 'in order to limit the cross-sectoral impacts of human activities affecting the Earth-systems, Parties shall co-ordinate all efforts seeking to manage human impacts on the Earth-systems with reference to the objective of the Pact.' This is a specific mandate for Parties to ensure that they do not engage in problem-shifting. It also provides a mandate for the compliance mechanism of the Pact to advise Parties on their cross-sectoral impacts and it thus limits the potential for problem-shifting. The compliance mechanism will be able to provide policy guidance on what types of efforts result in problem-shifting and so will help ensure that individual MEAs work towards the objective of the treaty, as an overall prioritizing goal.

4.5.4 Systemic Integration

Related to problem-shifting and the different objectives of MEAs across the globe is the problem that the norms of IEL are not sufficiently accounted for in public international law decision-making in general.[194] In this regard, the Pact could "provide clearer direction for treaty-interpreters to achieve systemic integration in public international law, due both to its ongoing crystallisation of custom and to its status as a binding treaty."[195] In regimes not prioritizing ecological concerns, the impact on the Earth system is often forgotten, and these regimes require greater coherence with ecological concerns.[196] The Pact provides for increased institutional strength among IEL and a binding instrument, which can be enforced through adjudication, will provide greater integration of environmental issues into international law.[173] The Pact, as a binding instrument, does provide for greater integration of ecological concerns into other areas of international law, and so provides a solution to a problem associated with the fragmentation of IEL; that the customary principles previously had no centrally binding instrument to guide their use in other areas of law.

4.5.5 The Compliance Mechanism

A document which will be central to IEL, such as the Pact, has the potential to offer a global perspective on the issue of fragmentation, for example, when different MEA regimes in different sectors have conflicting objectives. The institution created by the Pact would have a central part to play in the practical application of such a role. The draft Global Pact lacks any provision which seeks to resolve such problem-shifting between planetary boundaries.[197] However, it is

[194] Supra note 5 at [71-76].
[195] M Young, 'Global Pact for the Environment; Defragging International Law', (2018) *Blog of the European Journal of International Law,* <https://www.ejiltalk.org/global-pact-for-the-environment-defragging-international-law/> (date accessed: 24th April 2019).
[196] Supra note 5 at [71-76] and [82].
[197] Supra note 192.

worthwhile critiquing the compliance mechanism created by the draft Pact to determine whether it suited to enforcing such a provision, like the one proposed above.

Article 21 provides that the Committee established shall operate in a non-adversarial and non-punitive manner, thus granting the Committee facilitative rather than punitive powers. The White Paper claims that this choice is appropriate given that the Pact will be a universal and general environmental text.[198] Given the level of doubt in the viability of the Pact at negotiations so far, this seems like a wise choice.[199] In fact, it is not necessary to force the resolution of conflicts between MEAs, and recommendations based on country reporting would likely be sufficient to ensure a heightened awareness of cross-sectoral impacts. This cuts to the root of the problem, that such impacts are not even considered at present given the tunnel-vision of MEAs. Such an approach also has the benefit of fitting into the role needed for the rest of the provisions of the treaty. If the proposed provision was included to govern the priorities of the actions of MEAs, using the objective of ecological integrity as a guide, then the facilitative approach of the compliance mechanism in the draft Pact is probably sufficient.

The proposal to incorporate the PBF in section 4.3 has an impact on the compliance mechanism envisioned for the Pact. The establishment of a framework approach, with corresponding Protocols and Conferences of Parties (COPs) will result in a much more intricate institution established by the Pact. However, the approach taken can be similar to that envisioned in the draft Pact, in that it can still take a facilitative approach based on future agreement between State Parties.

4.5.6 Conclusion

This section outlined the proposal to resolve problem-shifting in IEL using a combination of the proposed objective, a provision coordinating efforts to achieve that objective, which then in turn gives the compliance committee, the facilitative nature of which the analysis concluded is sufficient to address problem-shifting and is appropriate given the nature of the Pact, a mandate to facilitate Parties to the Pact to address problem-shifting in individual circumstances of conflicts between regime objectives. This proposal takes a holistic approach to the interconnected nature of the planetary boundaries, ensuring their protection.

[198] Supra note 161 at 43.
[199] Supra note 178.

5. Conclusion

Several broad conclusions can be drawn from the discussion in Section 3, which are specified more in the relevant sections themselves. The PBF is feasible and has a number of advantages in the Anthropocene; it provides clear guidance to the objective of regulation, it incorporates a planetary dimension, it takes an eco-centric approach at its core, and it avoids the uncertainty surrounding the transgression of planetary system limits and the resulting effects of this uncertainty on international law.

Sustainable development must undergo a transformation if it is to provide true sustainability by incorporating concepts of strong sustainability which hierarchically order the three pillars.

The fragmented structure of IEL results in problem-shifting which impacts the effectiveness of IEL. Thus, there is the need for a hierarchical ordering of priorities in order to create a coherent body of law which maximizes effectiveness of the individual actions to contribute to the overall protection of the Earth system.

Making ecological integrity an overall goal of IEL provides a solution to the problems associated with sustainable development and fragmentation, and it is a key concept for the PBF. In its place as an overall goal it would even pave the way for the introduction of the PBF. If this does not occur, it is still important to ensure that ecological integrity is integrated into sustainable development and is given a greater normative status so that it can improve the issues resulting from fragmentation and to provide for an introduction of the PBF.

Section 4 used the conclusions in Section 3 to propose a several features and alterations that should be included in the Global Pact to make it better suited to governance in the Anthropocene. Firstly, the Pact should include ecological integrity as its objective, which will aim to ensure that the Earth system(s) continue to function as they have done in the Holocene. This objective then informs and is intricately linked with the other proposed features.

The Pact should incorporate a PBF in the form of the framework approach outlined above. This approach is the best of the three analyzed and provides for the advantages of the approach discussed in Section 3.2. It thus ensures that the uncertainty surrounding the transgression of planetary system limits and the resulting effects of this uncertainty on international law are not experienced, effectively preventing a key consequence of the Anthropocene hypothesis.

The proposal in Section 4.4 concerning the altered definition of sustainable development creates an eco-centric conception of sustainable development designed to ensure true sustainability of human development in the Earth-system. The proposed wording also integrates sustainable development with the PBF and the proposed objective of the Pact

Finally, in relation to fragmentation and problem-shifting, a combination of the proposed objective and a provision coordinating efforts to achieve that objective, which then in turn gives the compliance committee a mandate to address specific instances of problem-shifting, proposes a solution to the issues raised in relation to the structural nature of IEL, thus maximizing the effectiveness of the individual actions to contribute to the overall protection of the Earth system.

In conclusion, the interlinked proposals made in Section 4 would, if incorporated into a Global Pact for the environment, provide a solid basis for IEL in the Anthropocene. It would equip IEL with the legal tools necessary to combat the potentially violent ecological characteristics of this new geological age.

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