

<cn>5. <ct>The ecosystem approach and the precautionary principle

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<a>Abstract

<abstract>The ecosystem approach can be considered the landmark regulatory strategy of the Convention on Biological Diversity and other biodiversity-related conventions. But legal scholarship is surprisingly thin with regard to the status and implications of the ecosystem approach. This article discusses the evolution of the ecosystem approach under the Convention on Biological Diversity, and analyses its interrelated components, including its interplay with the precautionary principle and its role in ensuring mutual supportiveness among biodiversity-related conventions, as well as with international human rights law. The article concludes by identifying overarching legal questions for future research.

<a>Key words

<keywords>ecosystem approach, precautionary approach/principle, adaptive management, benefit-sharing, human rights, climate change, mutual supportiveness

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The ecosystem approach can be considered the landmark regulatory strategy of the Convention on Biological Diversity (CBD) and other biodiversity-related conventions. While it has had a growing influence in the further development of

international biodiversity law, as well as in other areas of international law, legal scholarship is surprisingly thin with regard to the status and implications of the ecosystem approach. This article discusses the evolution of the ecosystem approach as a landmark regulatory feature of the CBD and breaks it down into its interrelated components. To that end, the article also explores the interplay between the ecosystem approach and the precautionary principle, and the role of the former in ensuring mutual supportiveness among biodiversity-related conventions, as well as with international human rights law. The article concludes by highlighting overarching legal research questions concerning the ecosystem approach that await clarification.

< a > 5.1 The development of the ecosystem approach under the Convention on Biological Diversity

As the ecosystem approach as such does not find a treaty basis in the text of the CBD, it has been the consensus-based normative activity of the CBD Conference of the Parties (COP) that has gradually developed this multifaceted concept into a fully fledged system of soft-law principles and guidelines, that capitalise on previous legal developments in international environmental law¹ but also push its boundaries forward significantly.²

The treaty basis for this development can rather be found in the legal concept of ‘ecosystem’ that was introduced and defined as an object of international regulation by the CBD with a view to focusing on the dynamic interconnectedness of the variability of life on earth³ and the need to actively manage, not just preserve, natural system functions for the long term.⁴ This notion should be distinguished from that of ‘habitat’⁵ as ecosystems transcend any particular spatial scale.⁶ It has rightly been observed, however, that while ‘the scientific construct of “ecosystem” has profoundly influenced the development of domestic and international “nature” protection

¹ Such as the concept of sustainable forest management: CBD Decision VII/11 (2004) para 7.

² For instance, while the ecosystem approach as elaborated under the CBD built upon the earlier concept of wise use of wetlands of international importance, the Ramsar Convention explicitly linked its concept of wise use to the CBD ecosystem approach in 2005: Finlayson and others (2011) 191.

³ CBD Article 2 defines ecosystem as ‘a dynamic complex of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit’.

⁴ CBD Decision V/6 (2000), Annex, Principle 8.

⁵ CBD Article 2 defines habitat as ‘the place or type of site where an organism or population naturally occurs’.

⁶ CBD Decision V/6, Annex, para 3.

programmes', its legal status in international law remains 'marginal' and 'uncertain' because ecosystems as such are generally not recognised as discrete objects of protection by international treaties.⁷

In effect, it could rather be argued that translating the scientific notion of ecosystem into a legal one has had a law-making effect.⁸ It has provided the basis for the normative development of the ecosystem approach, which was recognised by CBD parties as early as 1995 as the 'primary framework for action' in the elaboration and implementation of thematic and cross-cutting work programmes under the Convention.⁹ The idea of ecosystem management finds its origin in the 1990s in North America, where it emerged as an alternative to sectoral approaches to nature conservation, and as a way to integrate equity in those efforts.¹⁰ But CBD parties soon recognised the need to elaborate and find consensus on an international notion of ecosystem approach,¹¹ which was then enshrined in two decisions adopted respectively in 2000 and 2004,¹² whereby the CBD COP spelt out a composite strategy. Its interlinked elements will be analysed in turn below.

<h2>5.2 Unpacking the ecosystem approach

First of all, the ecosystem approach concerns *integration*: it is aimed at integrating the management of land, water and living resources, and balancing the three objectives of the Convention – conservation, sustainable use, and access and benefit-sharing.¹³ In that connection, the ecosystem approach fundamentally challenges the long-embedded sectoral and fragmented approach to environmental law making and implementation at national and international levels.¹⁴ Along similar lines, the ecosystem approach also aims to integrate different legal and management strategies, such as area- and species-based conservation, and combine them with other

⁷ Tarlock (2007) 574.

⁸ Boyle and Chinkin (2007) 260.

⁹ CBD Decision II/8 (1995) para 1.

¹⁰ Finlayson and others (2011) 187. For a discussion of the history of the concept of ecosystem, see Tarlock (2007) 577–79.

¹¹ CBD Decision IV/1 B (1998) whereby CBD parties acknowledged the need for a 'workable description and further elaboration of the ecosystem approach' and gave the mandate to develop guidance in that regard.

¹² CBD Decisions V/6 and VII/11 (2004).

¹³ CBD Decision V/6, Annex, para 1 and Principle 5.

¹⁴ Finlayson and others (2011) 196; Platjouw (2013) 158.

methodologies depending on local, national, regional or global conditions,¹⁵ through adaptive management (discussed below). The ecosystem approach also aims to integrate modern science and the traditional knowledge of indigenous peoples and local communities in adaptive management.¹⁶

While balancing the different objectives of the CBD, the ecosystem approach prioritises *conservation*¹⁷ with a view to ensuring ecosystem functioning and resilience. It conditions sustainable use to the taking into account of the limits of ecosystem functioning¹⁸ and promotes connectivity.¹⁹ This is far from straightforward, however. This difficulty is arguably the result of the ‘diverging and sometimes irreconcilable ideological projects’ behind the ecosystem approach, namely anthropocentrism and ‘its imbrication with capitalism,’ on the one hand, and eco-centrism and its ‘counter-hegemonic narratives’ premised on the intrinsic value of nature, on the other.²⁰ It has, however, been counter-argued that anthropocentrism may not inherently be an obstacle to environmentally sustainable development, as long as human concerns are pursued within ecological limits.²¹ In effect, while from a normative perspective other CBD guidelines have confirmed that sustainable use needs to be implemented in the framework of the ecosystem approach,²² in reality prioritising conservation depends on establishing genuine cooperation among different stakeholders and negotiating trade-offs between human and environmental needs in a fair manner.²³

Another key dimension of the ecosystem approach is, thus, its emphasis on *equity*, recognising that human beings, and their cultural diversity are an integral component of many ecosystems.²⁴ From this perspective, the ecosystem approach entails a decentralised, social process. It underscores the need to understand and factor in societal choices, rights and interests of indigenous peoples and local communities, and intrinsic as well as tangible and intangible values attached to biodiversity,

¹⁵ CBD Decision V/6, Annex, para 5.

¹⁶ CBD Decision V/6, Annex, Principle 11.

¹⁷ Although note critical remarks by Pardy (2003) 675.

¹⁸ CBD Decision V/6, Annex, Principles 5–6.

¹⁹ CBD Decision V/6, Annex, Principle 1. See generally Alberton (2013).

²⁰ Lucia (2015) 93–96.

²¹ Brunnée and Toope (1994) 46–47 and 70.

²² CBD Decision VII/12 (2004), Annex II.

²³ Finlayson and others (2011) 192. On the latter point, see generally Dickson and Edwards (2004).

²⁴ CBD Decision V/6 para 2.

ultimately leading to a balance between local interests and the wider public interest.²⁵ It also points to the challenge of ensuring appropriate representation of community interests in the decision-making process.²⁶ This is expected to enhance the responsibility, ownership, accountability and participation of different stakeholders in achieving the objectives of the Convention, and in facilitating the use of local knowledge. From a normative perspective, the ecosystem approach should thus be understood as a consensus-building process, which requires good-faith efforts and a considerable investment of time and resources.²⁷

From that perspective, a key element of the ecosystem approach is *benefit-sharing*,²⁸ which operates as a reward for the integration of the traditional knowledge of indigenous and local communities in planning and management, or more generally for ecosystem stewardship efforts,²⁹ such as the maintenance or restoration of ecosystem management functions.³⁰ This is based on the understanding that where local actors who control land use do not receive benefits from maintaining natural ecosystems and processes, they are likely to initiate unsustainable practices for short-term gains³¹ and possibly break the law.³² An extensive notion of benefit-sharing (which goes beyond the narrower notion related to access to genetic resources and associated traditional knowledge,³³ discussed elsewhere in this volume³⁴) has thus emerged from the ecosystem approach, which has greatly influenced other areas of work of the Convention.³⁵ It implies that the State is expected to couple procedural guarantees for community participation in decision making and management planning with substantive measures for the legal recognition of communities' sustainable practices, the provision of guidance and support to improve the environmental sustainability of community practices, and the proactive identification of

²⁵ CBD Decision V/6, Annex, Principle 1.

²⁶ CBD Decision VII/11, Annex I, para 2.5.

²⁷ CBD Decision VII/11, Annex I, para 14.

²⁸ Morgera (2014a); Morgera and Tsionmani (2010) 160.

²⁹ On the flexible and multi-dimensional concept of stewardship in environmental law, see generally Barritt (2014).

³⁰ CBD Decision V/6 para 9.

³¹ CBD Decision VII/11, Annex I, annotations to rationale to Principle 4.

³² CBD Decision V/6, Annex B, Principle 8; and CBD Decision VII/11, Annex I, rationale to Principle 4.

³³ CBD Decision VII/11, Annex I, annotations to rationale to Principle 10, where reference is made to 'the equitable sharing of benefits derived from the use of *biodiversity*' (emphasis added).

³⁴ See chapters 17-18 and 20 in this volume.

³⁵ For instance, the CBD work programme on protected areas (CBD Decision VII/27 (2004) Annex; see chapter 8 in this volume); or CBD work programme on forest biodiversity (CBD Decision VI/22 (2002); see chapter 14 in this volume).

opportunities for better/alternative livelihoods in these endeavours, with a view to facilitating understanding of, and compliance with, the law.³⁶ Benefit-sharing thus aims to address the equity concerns for those that devote their efforts to, and bear the risks of, the conservation and sustainable use of biodiversity, and for the larger community that benefits from conservation and sustainable use but does not pay the costs associated with them. Empirical research, however, has revealed that benefit-sharing may in practice be a ‘disingenuous win-win rhetoric’.³⁷ Legal reflection seems highly necessary with regard to how to prevent, address and remedy the injustices that may be brought about in the name of benefit-sharing.³⁸

< b > 5.2.1 Ecosystem approach and ecosystem services

In further elaborating on the ecosystem approach, the CBD COP noted the relevance of the conceptual approach of the Millennium Ecosystem Assessment.³⁹ This⁴⁰ was a global scientific process that facilitated intergovernmental endorsement of the term ‘ecosystem services’ as the benefits people obtain from ecosystems, namely: food, water, timber, energy and fibre (‘provisioning services’); ‘regulating services’, which affect climate, floods, diseases, wastes, and water quality; ‘cultural services’, which provide recreational, aesthetic and spiritual benefits; and ‘supporting services’ such as soil formation, photosynthesis and nutrient cycling. While the economic valuation of ecosystem benefits was already considered essential for more effective biodiversity conservation in early normative developments under the CBD,⁴¹ the Millennium Ecosystem Assessment increased attention on the contribution of biodiversity to human well-being and to development.⁴²

In particular, the Millennium Ecosystem Assessment led to further reflection on the need for appropriate and explicit accounting of the multiple links between biodiversity and human development, particularly through recourse to economics, to prevent other development objectives that conflict with biodiversity protection from

³⁶ This is a synthesis of a series of CBD Decisions analysed by Morgera and Tsioumani (2010) 160–65.

³⁷ Martin and others (2014) 84–88.

³⁸ Morgera (2014a).

³⁹ CBD Decision VII/11 para 6 and Annex I.

⁴⁰ The Millennium Ecosystem Assessment, Ecosystems and Human Well-Being, Synthesis (2005), <www.maweb.org/en/index.aspx> accessed 7 April 2015. For a discussion of legal implications, see generally Morgera (2006).

⁴¹ eg, CBD Decision III/18 (1996).

⁴² Morgera and Tsioumani (2011) 11–12.

continuing to take priority.⁴³ On the one hand, therefore, it conveyed that applying economic thinking⁴⁴ to the use of biodiversity could help clarify why poverty reduction depends on maintaining the flow of benefits from ecosystems and why successful environmental protection needs to be grounded in sound economics.⁴⁵ On the other hand, it encouraged a greater use of economic and market-based instruments in the management of ecosystem services, where enabling conditions exist.⁴⁶ In effect, the ecosystem approach already recognised the need to understand and manage ecosystems in an economic context, with a view to reducing market distortions that may affect biodiversity negatively, aligning incentives for conservation and sustainable use, and internalising costs.⁴⁷

But reference to ecosystem services raises divisive questions about the moral and cultural acceptability and the effectiveness of the pricing and marketing of ecosystem services, about inherent pressures towards their privatisation, and more generally about the appropriate balance between ecosystem stewardship and ownership.⁴⁸ The proponents of ecosystem services, however, openly acknowledge the limitations of *monetary valuation* particularly when biodiversity values are generally recognised and accepted socially and culturally,⁴⁹ and have rather emphasised valuation in a broad sense in order to clearly address the drawbacks and limitations of economics as 'a means to achieving human well-being'.⁵⁰ Accordingly, the international discourse on ecosystem services has also served to underscore the need for rights-based strategies to prevent biodiversity loss and its negative impacts on the vulnerable.⁵¹ In addition to *vulnerability*, it drew attention to the (largely unaccounted) *merit* of

⁴³ Sukhdev and others (2014) and other materials available at <www.teebweb.org/> accessed 7 April 2015.

⁴⁴ Note increased efforts to advance the use of economic valuation to mainstreaming environmental protection more effectively into development planning have been undertaken also in the areas of climate change and desertification: Stern (2007); and 'Economics of Land Degradation' initiative, <<http://eld-initiative.org/>> accessed 7 April 2015.

⁴⁵ Sukhdev and others (2014) 6.

⁴⁶ UNEP High-Level Brainstorming Workshop on Creating Pro-Poor Markets for Ecosystem Services: 10–12 October 2005, London, UK. The whole paragraph builds upon Morgera and Tsioumani (2011) 9–12.

⁴⁷ CBD Decision V/6, Annex, Principle 4.

⁴⁸ See generally Reid and Nsoh (2014).

⁴⁹ Sukhdev and others (2014) 11–12.

⁵⁰ Ibid, 9.

⁵¹ For instance, CBD Decision X/4 (2010), paras 5(d) and (f), pointing to: enhancing the benefits of biodiversity to contribute to local livelihoods; empowering indigenous and local communities; and ensuring their participation in decision-making processes to protect and encourage their customary sustainable use of biological resources.

ecosystem service providers in contributing to global human well-being.⁵² As a result, the ecosystem approach embodies a balancing of economic and non-economic understandings of the relationship between humans and the environment, as well as inherent tensions in that regard, which are reflected also in the concept of benefit-sharing as the sharing of not only economic, but also socio-cultural and environmental benefits arising from biodiversity conservation and sustainable use.⁵³ The resolution of these tensions partly depends on further appreciation of the natural capital⁵⁴ and partly on the scientific basis available for decision making, to which we now turn.

< b > 5.2.2 Adaptive management and the precautionary principle

As our knowledge of ecosystem functioning is incomplete, the ecosystem approach is tightly linked to precaution: it is predicated on the application of appropriate scientific methodologies and on the adoption of adaptive management to deal with the complex and dynamic nature of ecosystems.⁵⁵ It also calls for a cautious approach in respecting the limits of ecosystem functioning.⁵⁶

The precautionary principle⁵⁷ is the response of international environmental law to scientific uncertainty. As aptly discussed by Burns, a precautionary approach entails taking into account the vulnerability of the environment, the limitations of science, the availability of alternatives, and the need for long-term, holistic environmental considerations, thus operating as a safeguard against asymmetric information and imperfect monitoring.⁵⁸ Against this background, the precautionary principle may entail three types of conducts, in the face of scientific uncertainty: uncertainty does not justify inaction, uncertainty justifies action, and reversal of the burden of proof.⁵⁹ As opposed to the ecosystem approach, the precautionary principle has been addressed extensively by scholars⁶⁰ and international tribunals.⁶¹ The International

⁵² Sikor and others (2014) 4.

⁵³ This paragraph builds upon Morgera (2014a) 7–8.

⁵⁴ See chapter 6 in this volume.

⁵⁵ CBD Decision V/6, Annex, paras 2 and 4.

⁵⁶ CBD Decision V/6, Annex, Principle 6.

⁵⁷ Rio Declaration on Environment and Development (12 August 1992) UN Doc A/CN.151/26, vol 1, Annex I, Principle 15. See generally Cooney and Dickson (2005).

⁵⁸ Burns (2007).

⁵⁹ Wiener (2007) 597.

⁶⁰ eg: Freestone and Hey (1996); Harding and Fisher (1999); Trouwborst (2002); Fisher and others(2006); Trouwborst (2006); and Zander (2010).

⁶¹ Foster (2011).

Court of Justice applied it as a general principle of international law,⁶² while the International Tribunal on the Law of the Sea pointed to a ‘trend towards making [precaution] part of customary international law’.⁶³

With specific regard to international biodiversity law, the precautionary principle is encapsulated in the preamble of the CBD⁶⁴ and has played a significant role in the development of the Convention, notably in the area of biosafety.⁶⁵ It has also motivated the adoption of key decisions related to new and emerging threats to biodiversity, such as soft-law moratoria on genetic use restriction technologies,⁶⁶ genetically modified trees,⁶⁷ ocean fertilisation,⁶⁸ and geo-engineering.⁶⁹

Beyond these specific instances, however, the precautionary approach applies systematically to international biodiversity law through adaptive management.⁷⁰ As a ‘new legal paradigm’,⁷¹ adaptive management is premised on an ongoing learning process: responding to changing circumstances and new knowledge, as well as generating new knowledge and reducing uncertainties, thereby allowing management to anticipate and cater for change.⁷²

Few legal scholars have reflected on the interaction between the ecosystem approach and the precautionary principle in light of adaptive management. Trouwborst emphasised that both embody responses to the failure of reactive and fragmented approaches to environmental protection, and mandate similar implementing measures that should be tailor made and readily adaptable.⁷³ Trouwborst, however, calls for taking into account the ecosystem approach in the application of the precautionary principle, when the latter addresses broader

⁶² International Court of Justice, *Case concerning Pulp Mills on the River Uruguay (Argentina v Uruguay)* Judgment (20 April 2010) para 164.

⁶³ International Tribunal for the Law of the Sea, *Responsibilities and Obligations of States Sponsoring Persons and Entities with Respect to Activities in the Area (Request for Advisory Opinion submitted to the Seabed Disputes Chamber)* Advisory Opinion (1 February 2011) para 135.

⁶⁴ The CBD preamble reads: ‘Aware of the general lack of information and knowledge regarding biological diversity and of the urgent need to develop scientific, technical and institutional capacities to provide the basic understanding upon which to plan and implement appropriate measures.’

⁶⁵ See chapter 16 in this volume.

⁶⁶ CBD Decision V/5 (2000) para 23.

⁶⁷ CBD Decision IX/5 (2008) para 1(s).

⁶⁸ CBD Decision IX/16 C (2008) para 4.

⁶⁹ CBD Decision X/33 (2010) para 8(w).

⁷⁰ CBD Decision VII/11, Annex I, Principle 6, Implementation Guideline 6.2.

⁷¹ Tarlock (2007) 581.

⁷² CBD Decision VII/11, Annex I, Annotations to the Rationale of Principle 9.

⁷³ Trouwborst (2009) 36.

environmental issues than ecosystem integrity.⁷⁴ Tarlock, in effect, argued that adaptive management ‘corrects the bias [of the precautionary principle] towards no action in the face of uncertainty and the opposite bias for immediate fixes unconnected to long-term monitoring, assessment and adjustment to changes conditions and information’.⁷⁵ Brunnée and Toope, in turn, cautioned against injecting cost-effectiveness, as part of the precautionary principle, into the ecosystem approach, arguing that cost-effectiveness could serve as a ‘normative backdoor for business as usual’.⁷⁶

< a > 5.3 Ecosystem approach and mutual supportiveness

The ecosystem approach has provided a conceptual and normative basis for the CBD COP to address questions arising in other international environmental agreements, thereby serving to ensure mutual supportiveness among them,⁷⁷ as well as with international human rights law.⁷⁸

The case of the CBD COP normative activity on climate change⁷⁹ provides an exemplary illustration in this regard.⁸⁰ For instance, CBD Parties committed to designing and implementing climate change mitigation activities by ensuring opportunities for the active participation of indigenous and local communities in accordance with the Akwé: Kon Voluntary Guidelines on environmental and socio-cultural impact assessment.⁸¹ In addition, the CBD COP recommended assessing the impacts of climate change on the biodiversity-based livelihoods of indigenous and local communities, with a view to identifying adaptation priorities.⁸² These and other related normative developments under the Convention have arguably garnered intergovernmental support for a human rights-based approach to climate change, by

⁷⁴ Ibid, 33–34.

⁷⁵ Tarlock (2007) 581–582.

⁷⁶ Brunnée and Toope (1994) 69.

⁷⁷ See generally Pavoni (2010).

⁷⁸ Morgera (2014b).

⁷⁹ See chapter 25 in this volume.

⁸⁰ CBD Decision VII/15 (2004) para 8.

⁸¹ Akwé: Kon Voluntary Guidelines for the Conduct of Cultural, Environmental and Social Impact Assessment regarding Developments Proposed to Take Place on, or which are Likely to Impact on, Sacred Sites and on Lands and Waters Traditionally Occupied or Used by Indigenous and Local Communities, CBD Decision VII/16C (2004) Annex.

⁸² CBD Decision X/33 (2010) para 8(b).

systematically factoring in the role and interests of indigenous and local communities.⁸³

A more thorough assessment of the role of the ecosystem approach to mutual supportiveness is yet to be carried out. Related questions have been addressed in the areas of international watercourses⁸⁴ and oceans law.⁸⁵ But the degree to which the CBD has influenced other international regimes in this regard remains to be fully evaluated in light of the assertion made in other fora that no single universally agreed definition of ecosystem approach exists.⁸⁶

< a > 5.4 Conclusions

The ecosystem approach, as developed under the CBD, is a composite strategy that fundamentally challenges traditional regulatory approaches. It has emerged from an evolving interpretation of the CBD, and has then contributed to it, as well as to other international biodiversity conventions. It has also allowed for a mutual supportive consideration of other areas of international law, such as climate change and human rights, under the Convention.

When compared to the rich scholarly reflection on the precautionary principle, however, the scarcity of legal literature on the ecosystem approach is glaring. Three overarching areas for future legal research can be singled out. First, from a theoretical perspective, should the ecosystem approach be included among the principles of international environmental law? The catalogue of these principles is classically based on the 1992 Rio Declaration,⁸⁷ which does not refer to the ecosystem approach as such, but includes several, now widely shared,⁸⁸ principles that are connected to the ecosystem approach, such as precaution, sustainable development and inter-generational equity.⁸⁹ Second, from a pragmatic perspective, considering inherent tensions between economics and ecology captured by the notion of ecosystem

⁸³ This argument is fully explored in Morgera (2013).

⁸⁴ eg McIntyre (2004); McIntyre (2014); and Rieu-Clarke and Spray (2013).

⁸⁵ Parsons (2005); Fabra and Gascon (2008); Wang (2004); and Diz (2013).

⁸⁶ Report of the work of the UN Open-ended Informal Consultative Process on Oceans and the Law of the Sea at its Seventh Meeting (17 July 2006) UN Doc A/61/156, para 42.

⁸⁷ eg, Sands and Peel (2012) 187–237. This may explain why the major textbooks devote very little attention to the ecosystem approach: Birnie and others (2009) do not index ‘ecosystem approach’; Beyerlin and Marauhn (2011) indexed a section on habitat protection as ‘ecosystem approach’; and Gillespie (2012) devotes a couple of pages to it (483–84).

⁸⁸ See generally Viñuales (2015).

⁸⁹ Brunnée and Toope (1997).

services,⁹⁰ what legal guarantees are necessary for the ecosystem approach to realise equity in addressing interconnected, multi-scalar environmental challenges? Third, from a normative perspective, is the ecosystem approach transforming international environmental law into ‘international ecosystem law’ as posited by Brunnée and Toope?⁹¹ In other words, has the ecosystem approach helped shift the focus of international environmental law away from the sovereign interests of States, towards short- and long-term ecosystem integrity needs?

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⁹⁰ See generally Sikor (2014).

⁹¹ Brunnée and Toope (1994).

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