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Remedying the environmental impacts of war: Challenges and perspectives for full reparation

Lingjie Kong[1] and Yuqing Zhao[2]*
[1]Professor of International Law, Institute for International Studies, Wuhan University, China
[2]PhD candidate, China Institute of Boundary and Ocean Studies, Wuhan University, China
*Corresponding author email: yuqing.zhao@whu.edu.cn

Abstract

While the law of State responsibility, particularly the principle of full reparation, provides general guidance for achieving full reparation, it is not quite obvious what kinds of reparation qualify as "full" and how to actualize full reparation. This article centres on the principles, approaches and methods surrounding full reparation for armed conflict-related environmental damage in the law of State responsibility. It examines how the environment is legally defined as an object of protection under international law, and discusses practical challenges in international compensation for wartime environmental damage. In doing so, it ascertains the underlying objective of full reparation, develops an approach to

assessing wartime environmental damage, and draws on experiences of international jurisprudence to quantify compensation for wartime environmental damage.

Keywords: environmental damage, armed conflict, State responsibility, full reparation, compensation.

Introduction

Multiple subsets of international law safeguard the environment during times of armed conflict, though their adequacy has been contested over the past decades. Relevant protections are proffered by international humanitarian law, international human rights law, international criminal law and international environmental law. Those bodies of primary rules of international law endeavour to prevent, mitigate and remediate harm to the environment at different phases – i.e., before, during and after an armed conflict. Even so, any military operation inevitably causes loss of life, mental and bodily harm, and damage to property and to the environment.[1] Failure to respond to the environmental challenges of war-torn societies can greatly complicate the task of peacebuilding.[2] Recently, the ongoing hostilities in Ukraine have brought the linkages between the environment and conflict to the fore, with the United Nations Environment Programme (UNEP) undertaking a preliminary and rapid review of the damage inflicted on Ukraine's environment, and the potential environmental and public health impacts, in order to inform and prepare for a comprehensive post-conflict assessment.[3]

The responsibility of States for damage caused to the environment in relation to armed conflict is well founded in the law of international responsibility. On the one hand, the responsibility of States for violations of *jus in bello* (law relating to the conduct of the war) is expressly provided for in Hague Convention IV of 1907[4] and Additional Protocol I to the Geneva

1 International Court of Justice (ICJ), *Allegations of Genocide under the Convention on the Prevention and Punishment of the Crime of Genocide (Ukraine v. Russian Federation)*, General List No. 182, Order, 16 March 2022, para. 74.

2 Ken Conca and Jennifer Wallace, "Environment and Peacebuilding in War-Torn Societies: Lessons from the UN Environment Programme's Experience with Post-conflict Assessment", *Global Governance*, Vol. 15, No. 4, 2009, p. 486.

3 UNEP, *The Environmental Impact of the Conflict in Ukraine: A Preliminary Review*, Nairobi, 2022.

4 Hague Convention (IV) Respecting the Laws and Customs of War on Land, 205 CTS 277, 18 October 1907 (entered into force 26 January 1910). Despite the absence of a specific rule addressing the protection of the environment explicitly, Hague Convention IV indirectly protects the environment during armed conflict. Several provisions of the Hague Regulations are considered relevant for the environment through their regulation of the means and methods of warfare – i.e., Article 22 and the Martens Clause contained in the preamble. In addition, the environment is indirectly protected by Article 23(g), which governs the protection of civilian objects and property, and Article 55, which sets forth the rules of usufruct for the

Conventions (AP I).[5] Under Article 3 of Hague Convention IV, "[a] belligerent party which violates the provisions of the said Regulations shall, if the case demands, be liable to pay compensation". Article 91 of AP I contains the same liability rule by providing that "[a] Party to the conflict which violates the provisions of the Conventions or of this Protocol shall, if the case demands, be liable to pay compensation". The international responsibility of States for environmental consequences of armed conflict is affirmed by the International Law Commission (ILC) in the recently adopted Draft Principles on Protection of the Environment in Relation to Armed Conflicts (ILC Draft Principles).[6] On the other hand, a State that has violated *jus ad bellum* (the law relating to the use of force) would be held responsible for all damages, including environmental damage, regardless of whether there is a violation of *jus in bello*.[7] In the meantime, with *jus in bello* continually evolving to enhance the protection of the environment, the gaps in the framework of the law of armed conflict are to be complemented by international environmental law and human rights law.[8] Thus, it follows that any belligerent State that has breached the obligations under the law of armed conflict or any other applicable rules of international law shall be held accountable for all damage it has caused, including environmental damage.

The legal principles applicable to the consequences attached to armed conflict-related environmental harm are also clear. A breach of an international engagement bringing about harm to the environment, regardless of the primary obligations breached, involves "an obligation to make reparation in an adequate form".[9] The responsible State is obliged to "wipe out all the consequences of the illegal act and re-establish the situation which would, in all probability, have existed if that act had not been committed".[10] This principle is prescribed in Article 31 of the 2001 ILC Draft Articles on the Responsibility of States for Internationally Wrongful Acts (ARSIWA) as an obligation to "make full reparation" for the damage, whether material or moral, caused by the

Occupying Power. See UNEP, *Protecting the Environment during Armed Conflict: An Inventory and Analysis of International Law*, Nairobi, 2009, pp. 14, 16, 19.

5 Protocol Additional (I) to the Geneva Conventions of 12 August 1949, and relating to the Protection of Victims of International Armed Conflicts, 1125 UNTS 3, 8 June 1977 (entered into force 7 December 1978) (AP I).

6 ILC, *Draft Principles on Protection of the Environment in Relation to Armed Conflicts, with Commentaries*, UN Doc. A/77/10, in *Yearbook of the International Law Commission*, Vol. 2, Part 2, 2022 (ILC Draft Principles), Principle 9.

7 Luan Low and David Hodgkinson, "Compensation for Wartime Environmental Damage: Challenges to International Law after the Gulf War", *Virginia Journal of International Law*, Vol. 35, No. 2, 1994, pp. 412–413.

8 See, generally, Anne Dienelt, *Armed Conflicts and the Environment: Complementing the Laws of Armed Conflict with Human Rights Law and International Environmental Law*, Springer Nature, Cham, 2022; Michael Bothe, Carl Bruch, Jordan Diamond and David Jensen, "International Law Protecting the Environment during Armed Conflict: Gaps and Opportunities", *International Review of the Red Cross*, Vol. 92, No. 879, 2010.

9 Permanent Court of International Justice (PCIJ), *Factory at Chorzów*, Jurisdiction, Judgment No. 8, 1927, Series A, No. 9, p. 21.

10 PCIJ, *Factory at Chorzów*, Merits, Claim for Indemnity, Judgment No. 13, 1928, Series A, No. 17, p. 47.

internationally wrongful act of a State.[11] Pursuant to Article 34 of the ARSIWA, the responsible State is obliged to make full reparation for the damage it has caused, which may take the form of restitution, compensation and/or satisfaction.[12] In a word, the obligation to provide "full reparation" requires the elimination of the consequences of a wrongful act as far as possible by re-establishing the situation that would have existed had the act not been committed.

While the law of State responsibility, particularly the principle of full reparation, provides general guidance for addressing reparation for armed conflict-related environmental harm, the unsettled question is how to define the specifics of such a general obligation. What are the specific requirements for the re-establishment? Does it call for restoring each and every component of the damaged environment to its pre-existing physical condition? How can we ascertain whether the adverse effects have been eliminated and the situation has been restored to the state that would have existed had the wrongdoing not been committed? In essence, what kind of reparation, and how much reparation, qualifies as "full", and how should full reparation be realized? This issue is further complicated by the impossibility of active restoration in many situations, most notably in the context of a changing environment suffering from the triple crisis of climate change, pollution and loss of biodiversity.

This article centres on the principles, approaches and methods surrounding full reparation for armed conflict-related environmental damage in the law of State responsibility. Initially, it ascertains the underlying objective of reparation by looking into the definition of the environment as an object of protection under international law. Next, it looks to develop an assessment approach in light of the continuous and cumulative nature of wartime environmental damage. Finally, it draws on international practice in awarding compensation with a view to quantifying compensation for wartime environmental damage. Note that, instead of expounding upon the specific primary rules that provide legal obligations for environmental protection in relation to armed conflict, which have been covered in great detail by various scholars, the focus of this article is on the secondary rules – that is, the law of State responsibility determining legal consequences when a State has breached a primary obligation on environmental protection in wartime situations.

The underlying objective of full reparation

The specific content of the general obligation of full reparation is refined by the aspects of the environment that are protected by law. This section of the paper examines the definition of the environment under international law for the

11 ILC, *Draft Articles on Responsibility of States for Internationally Wrongful Acts, with Commentaries*, UN Doc. A/56/10, in *Yearbook of the International Law Commission*, Vol. 2, Part 2, 2001 (ARSIWA), Art. 31. See also UNGA Res. 56/83, 12 December 2001, Annex.

12 ARSIWA, above note 11, Art. 34. See also James Crawford, *State Responsibility: The General Part*, Cambridge University Press, Oxford, 2013, p. 511.

purpose of identifying the proper objective of reparation for armed conflict-related environmental damage.

The environment as an object of protection

The meaning and scope of the "environment" has not been uniformly defined in international law. Sources of a legal definition of the environment can be found in international agreements, international jurisprudence and the views of highly respected jurists of public international law, such as the ILC.[13] In the following analysis, only treaties that explicitly and directly regulate the protection of the environment during armed conflict are introduced.

Under the international humanitarian law regime, the sources of law on the definitions of direct relevance to the protection of the environment in relation to armed conflict are limited to three major treaties: the Convention on the Prohibition of Military or Any Other Hostile Use of Environmental Modification Techniques (ENMOD Convention), Articles I and II;[14] AP I; and the Rome Statute of the International Criminal Court (Rome Statute).[15] AP I (Articles 35(3) and 55) and the Rome Statute (Article 8(2)(b)(iv)) use the term "natural environment", but neither includes a definition of this term. Prohibiting the use of the environment as a "weapon", or more accurately, as a "method" of warfare,[16] the ENMOD Convention provides significantly wider protection for the environment by requiring a much lower threshold of damage than that required by AP I.[17] However, the range of techniques covered by the ENMOD Convention appears to be restrictive,[18] and it does not address the scope of the environment as a target – i.e., the range of targets protected from "destruction, damage or injury".[19] None of the widely ratified *in bello* treaties defines the environment, and provisions on the natural environment in those treaties are framed mostly in anthropocentric terms[20] or only by reference to the term

13 Statute of the International Court of Justice, 59 Stat 1055, 33 UNTS 993, 26 June 1945 (entered into force 24 October 1945), Art. 38. See also Cymie R. Payne, "Defining the Environment: Environmental Integrity", in Carsten Stahn, Jens Iverson and Jennifer S. Easterday (eds), *Environmental Protection and Transitions from Conflict to Peace*, Oxford University Press, Oxford, 2017, p. 45.

14 Convention on the Prohibition of Military or Any Other Hostile Use of Environmental Modification Techniques, 1108 UNTS 151, 10 December 1976 (entered into force 5 October 1978) (ENMOD Convention).

15 Rome Statute of the International Criminal Court, UN Doc. A/CONF.183/9, 17 July 1998 (entered into force 1 July 2002) (Rome Statute).

16 Karen Hulme and Doug Weir, "Environmental Protection in Armed Conflict", in Malgosia Fitzmaurice *et al.* (eds), *Research Handbook on International Environmental Law*, Edward Elgar, Cheltenham, 2021, p. 401.

17 *Ibid.*, p. 402; see also UNEP, above note 4, p. 12; A. Dienelt, above note 8, pp. 60–61.

18 Yoram Dinstein, "Protection of the Environment in International Armed Conflict", *Max Planck Yearbook of United Nations Law*, Vol. 5, 2001, pp. 526–530; Karen Hulme, *War Torn Environment: Interpreting the Legal Threshold*, Martinus Nijhoff, Leiden, 2004, pp. 72–73; Julian Wyatt, "Law-Making at the Intersection of International Environmental, Humanitarian and Criminal Law: The Issue of Damage to the Environment in International Armed Conflict", *International Review of the Red Cross*, Vol. 92, No. 879, 2010, pp. 619–620.

19 C. R. Payne, above note 13, p. 53.

20 See A. Dienelt, above note 8, pp. 44–58; K. Hulme, above note 18, p. 111.

"natural environment". However, an examination of the law of armed conflict does not reveal the exact meaning and scope of this term – that is, what exactly is protected as the "natural environment".[21]

In addition to the limited protection offered by international humanitarian law, rules of international environmental law show much potential in safeguarding the environment against wartime damage. Certain environmental treaties remain applicable in times of armed conflict;[22] more generally, environmental treaties or multilateral agreements can complement and strengthen environmental protection when an armed conflict occurs.[23] Although the definitions of "environment" differ in various environmental treaties and depend on the subject matter of each treaty, a close look at the provisions of the environmental treaties indicates that environmental protection can extend to the intrinsic value of natural ecosystems.[24] For example, under the United Nations (UN) Convention on the Law of the Non-Navigational Uses of International Watercourses,[25] the term "environment" is intended to encompass the living resources of international watercourses, the flora and fauna dependent upon those watercourses, and the amenities connected with them.[26]

The work of the ILC denotes an acknowledgment of a broader concept of the environment. Typically, the 2006 Draft Principles on the Allocation of Loss in the Case of Transboundary Harm Arising out of Hazardous Activities prescribes a broad definition of the environment that "includes natural resources, both abiotic and biotic, such as air, water, soil, fauna and flora and the interaction between the same factors, and the characteristic aspects of the landscape".[27] According to the ILC, "[e]nvironment could be defined in different ways for different purposes and it is appropriate to bear in mind that there is no universally accepted definition".[28] Further, the Commission has opted to include in the definition "environmental values" and "non-service values" such as the enjoyment of nature and recreational attributes and opportunities.[29]

21 A. Dienelt, above note 8, pp. 282–287.

22 Peacetime treaties may continue in operation during armed conflict, including treaties protecting the environment. For the effects of armed conflicts on treaties, see ILC, *Report of the International Law Commission on the Work of Its Sixty-Third Session*, UN Doc. A /66/10, in *Yearbook of the International Law Commission*, Vol. 2, Part 2, 2011, pp. 106–130.

23 See, generally, A. Dienelt, above note 8; Britta Sjöstedt, *The Role of Multilateral Environmental Agreements: A Reconciliatory Approach to Environmental Protection in Armed Conflict*, Hart, Oxford, 2020.

24 Alan Boyle, "Reparation for Environmental Damage in International Law: Some Preliminary Problems", in Michael Bowman and Alan Boyle (eds), *Environmental Damage in International and Comparative Law: Problems of Definition and Valuation*, Oxford University Press, Oxford, 2002, p. 20.

25 United Nations Convention on the Law of the Non-Navigational Uses of International Watercourses, 36 ILM 700, 21 May 1997 (entered into force 17 August 2014).

26 ILC, *Report of the International Law Commission on the Work of Its Forty-Sixth Session*, UN Doc. A/49/10/ 1994, in *Yearbook of the International Law Commission*, Vol. 2, Part 2, 1994, para. 6 of the commentary to Art. 21.

27 ILC, *Draft Principles on the Allocation of Loss in the Case of Transboundary Harm Arising out of Hazardous Activities, with Commentaries*, UN Doc. A/61/10, in *Yearbook of the International Law Commission*, Vol. 2, Part 2, 2006, Principle 2(b).

28 *Ibid.*, para. 19 of the commentary to Principle 2.

29 *Ibid.*, para. 20 of the commentary to Principle 2.

The recent practice of international courts and tribunals is also encouraging in broadening the scope of the environment and allowing reparations for pure environmental damage, namely damage caused to the environment, in and of itself. In its Advisory Opinion in the *Nuclear Weapons* case, the International Court of Justice (ICJ) eloquently noted that "the environment is not an abstraction but represents the living space, the quality of life and the very health of human beings, including generations unborn".[30] Later, in the proceedings of the United Nations Compensation Commission (UNCC), despite not attempting to define the term "direct environmental damage" in UN Security Council Resolution 687, the Panel of Commissioners, in regard to environmental claims, accepted claims for a non-exhaustive list of losses or expenses in relation to environmental damage.[31] The Panel explicitly stated that "there is no justification for the contention that general international law precludes compensation for pure environmental damage".[32] In the *Iron Rhine* case decided by the Permanent Court of Arbitration, "environment" was broadly referred to as "including air, water, land, flora and fauna, natural ecosystems and sites, human health and safety, and climate".[33] In the *Certain Activities* and *Armed Activities* cases, the ICJ held that damage to the environment, in and of itself, is compensable under international law.[34]

As seen above, the traditional concern for the environment in the law on armed conflicts is framed largely in anthropocentric terms. Yet this narrow focus on immediate human needs may compromise the resilience of natural systems that supply essential environmental goods and services.[35] In light of this, we will now consider how the rules and practices for environmental protection in relation to armed conflict have developed in tandem with the growth of the broadened definition of the environment in international law.

A dynamic approach to environmental protection

It is worth noting that the ILC takes a dynamic approach to the understanding of environmental considerations in relation to armed conflict. It underlines that "environmental considerations cannot remain static over time but should develop as understanding of the environment develops".[36] The evolving concept of the

30 ICJ, *Legality of the Threat or Use of Nuclear Weapons*, Advisory Opinion, *ICJ Reports 1996* (Nuclear Weapons Advisory Opinion), para. 29.
31 UNSC Res. 687, 3 April 1991, para. 35. Created in 1991, the UNCC is mandated with processing reparation claims related to Iraq's 1990–91 invasion of Kuwait.
32 UNCC, *Report and Recommendations Made by the Panel of Commissioners Concerning the Fifth Instalment of "F4" Claims*, UN Doc. S/AC.26/2005/10, 30 June 2005, para. 58.
33 Permanent Court of Arbitration, *Award in the Arbitration regarding the Iron Rhine ("Ijzeren Rijn") Railway between the Kingdom of Belgium and the Kingdom of the Netherlands*, 24 May 2005, UNRIAA 27, para. 58.
34 ICJ, *Certain Activities Carried Out by Nicaragua in the Border Area (Costa Rica v. Nicaragua)*, Compensation, Judgment, *ICJ Reports 2018*, para. 41; ICJ, *Armed Activities on the Territory of the Congo (Democratic Republic of the Congo v. Uganda)*, Reparations, Judgment, 9 February 2022, para. 348.
35 C. R. Payne, above note 13, pp. 62–63.
36 ILC Draft Principles, above note 6, para. 7 of the commentary to Principle 14.

environment informs the notion of environmental considerations that should be taken into account in armed conflict. This dynamic approach is also instrumental in actualizing full reparation for environmental damage in the aftermath of an armed conflict.

On the one hand, a contemporary understanding of the environment conceives it as a dynamic system, rather than simply a collection of objects to be protected.[37] The interactivity of the environment should be recognized in assessing wartime environmental damage. In its comments on the ILC Draft Principles, the International Committee of the Red Cross (ICRC) stated: "What is certain is that in assessing the degree to which damage meets the threshold, current knowledge, including on the connectedness and interrelationships of different parts of the natural environment as well as on the effects of the harm caused, must be considered."[38] On this basis, the ILC stressed that current scientific knowledge of ecological processes must be taken into account when applying the "widespread, long-term and severe" damage criteria against which the environment should be protected. To be more specific, "risk of damage should not be conceptualized only in terms of harm to a specific object but should also take into account the possibility of affecting a fragile interdependent system of both living and non-living components".[39]

On the other hand, the broadened notion of the environment reflects a growing realization of the intrinsic link between human and natural systems. The distinction between the natural and man-made parts of the environment appears to be less apparent in current times.[40] As a result, the modern definitions of the environment as an object of protection do not draw a strict dividing line between the environment and human activities but encourage definitions that include components of both.[41] The interactions between human and natural systems have been studied as coupled human and natural systems, which are defined as integrated systems in which people interact with natural components.[42] Based on the complex human–nature relationship, Payne calls for a consideration of how human activities and the environment function as an interactive system. Suggestions include defining liability and causation in terms that account for interactions within the system and considering the systemic effects of remedies provided.[43]

37 C. R. Payne, above note 13, p. 62.

38 ILC, *Protection of the Environment in Relation to Armed Conflicts: Comments and Observations Received from Governments, International Organizations and Others*, UN Doc. A/CN.4/749, 17 January 2022, p. 174.

39 ILC Draft Principles, above note 6, para. 9 of the commentary to Principle 13.

40 Karen Hulme, "Natural Environment", in Elizabeth Wilmshurst and Susan Breau (eds), *Perspectives on the ICRC Study on Customary International Humanitarian Law*, Cambridge University Press, Cambridge, 2007, p. 208.

41 ILC Draft Principles, above note 6, para. 8 of the commentary to Principle 12. See also Philippe Sands and Jacqueline Peel, *Principles of International Environmental Law*, 4th ed., Cambridge University Press, Cambridge, 2018, p. 14: "The concept of the environment, however, encompasses 'both the features and the products of the natural world and those of human civilization'."

42 Jianguo Liu *et al.*, "Complexity of Coupled Human and Natural System", *Science*, Vol. 317, No. 5844, 2007, p. 1513.

43 C. R. Payne, above note 13, p. 69.

Adjusting the objective

In order to integrate the contemporary understanding of the environment, the goal of full reparation and its requirement of "re-establishing the situation that would have existed had the act not been committed" need to be specified in their application to wartime environmental damage. Despite being sparse, judicial practice concerning reparations for environmental harm can provide important insights.

It is noteworthy that re-establishing the prior situation does not simply imply restoring each and every component of the damaged environment to its pre-existing physical condition. In *Certain Activities*, Nicaragua removed approximately 9,500 cubic metres of soil from the sites in question, which were subsequently filled up and covered with vegetation. Under the fifth head of damage, Costa Rica claimed for the cost of replacement soil since the refilled sediment was of a poorer quality and was more susceptible to erosion. The Court determined that Costa Rica had not demonstrated that the difference in soil quality had an effect on erosion control, and thus that the evidence before the Court regarding the quality of the two types of soil was not sufficient to determine any loss which Costa Rica may have suffered.[44] Based on this, the Court rejected Costa Rica's claim for replacement soil.[45] Observably, here the determinative criterion for awarding the payment for restoration was not the fact that the soil that Nicaragua had removed was of a higher quality than the soil that has since replaced it. In order for the Court to identify and assess any loss that Costa Rica may have suffered, the evidence must have been sufficient to demonstrate how and to what extent the difference in quality between the two types of soil, if any, had affected erosion control. In other words, the purpose of re-establishing the pre-existing situation in this scenario is not to replace the soil with something of identical or comparable quality, but to retain the erosion control service offered by the site.

Not coincidentally, while relying on the general principles of State responsibility for guidance, particularly the principle that reparation must, as far as possible, wipe out all the consequences of the illegal act, the UNCC prioritized ecological functioning in determining the appropriate objective of remediation measures and reviewing the details of proposed remediation action.[46] The Panel of Commissioners considered that, in assessing what measures are reasonably necessary to clean or restore a damaged environment, "primary emphasis must be placed on restoring the environment to preinvasion conditions, in terms of its *overall ecological functioning* rather than on the removal of specific contaminants

44 ICJ, *Certain Activities*, above note 34, para. 74.
45 *Ibid.*, para. 87.
46 Philippe Gautier, "Environmental Damage and the United Nations Claims Commission: New Directions for Future International Environmental Cases?", in Tafsir Malick Ndiaye and Rüdiger Wolfrum (eds), *Law of the Sea, Environmental Law and Settlement of Disputes: Liber Amicorum Judge Thomas A. Mensah*, Martinus Nijhoff, Leiden, 2007, p. 207.

or restoration of the environment to a particular physical condition".[47] Even if sufficient baseline information were available, the Panel reasoned, it might not be feasible or reasonable to fully recreate pre-existing physical conditions.[48] The Panel further explained that "in some circumstances, measures to recreate pre-existing physical conditions might not produce environmental benefits and could, indeed, pose unacceptable risks of ecological harm", and as a result, "where proposed measures for the complete removal of contaminants are likely to result in more negative than positive environmental effects, such measures should not qualify as reasonable measures to clean and restore the environment".[49] The UNCC's environmental decisions focused on the protection and restoration of environmental integrity and were based on the principles of precaution, common concern, obligations to future generations, and the value of ecosystems, in addition to long-standing principles of international law.[50]

The practice of the ICJ and the UNCC has demonstrated a nuanced but critical distinction between the objectives of "returning the environment to its original state" and "maintaining the overall ecological functioning of the environment". Recalling that the proper objective of reparation for wartime environmental damage should take account of the contemporary understanding of the environment, the interactivity within the environment, and the coupling of human and natural systems, the principle of full reparation can be achieved through the objective of restoring the overall ecological functioning of the damaged environment.

Approach to assessing wartime environmental damage

As a general rule, in order to determine what reparation should be made for environmental damage, the existence and extent of such damage must be substantiated and the causal nexus between the unlawful act and the damage alleged must be established.[51] However, ascertaining the existence and assessing the extent of environmental damage in the context of armed conflict is fraught with difficulties. This section discusses issues surrounding the identification and assessment of armed conflict-related environmental damage, which include the

47 UNCC, *Report and Recommendations Made by the Panel of Commissioners Concerning the Third Instalment of "F4" Claims*, UN Doc. S/AC.26/2003/31, 18 December 2013, para. 48 (emphasis added).

48 *Ibid.*

49 UNCC, *Report and Recommendations Made by the Panel of Commissioners Concerning Part One of the Fourth Instalment of "F4" Claims*, UN Doc. S/AC.26/2004/16, 9 December 2004, para. 50; UNCC, *Report and Recommendations Made by the Panel of Commissioners Concerning Part Two of the Fourth Instalment of "F4" Claims*, UN Doc. S/AC.26/2004/17, 9 December 2004, para. 41.

50 Cymie R. Payne, "Legal Liability for Environmental Damage: The United Nations Compensation Commission and the 1990–1991 Gulf War", in Carl Bruch, Carroll Muffett and Sandra Nichols (eds), *Governance, Natural Resources, and Post-Conflict Peacebuilding*, Earthscan, Abingdon, 2016, p. 736.

51 ICJ, *Ahmadou Sadio Diallo (Republic of Guinea v. Democratic Republic of the Congo)*, Compensation, Judgment, *ICJ Reports 2012* (I), para. 14; ICJ, *Certain Activities*, above note 34, para. 72; ICJ, *Armed Activities*, above note 34, para. 145.

temporal scale for reparation, limited baseline information, and establishment of the causal nexus.

The temporal scale for reparation

The question of temporal scale for reparation arises from the continuous and cumulative nature of wartime environmental damage. In her *Preliminary Report on the Protection of the Environment in Relation to Armed Conflicts*, Special Rapporteur Marie G. Jacobsson observed that the effect on the environment of an armed conflict may remain long after the conflict and has the potential to prevent an effective rebuilding of the society, to destroy pristine areas or to disrupt important ecosystems.[52] The ICRC also drew attention to the fact that damage to the environment due to armed conflicts may have long-term consequences that continue after the end of hostilities.[53] As an illustration, in Kuwait and Saudi Arabia, the adverse effects of the oil well fires during the 1990–91 Gulf War were revealed more than ten years later in the form of desert covered with inches of oily residue that eventually hardened into a pavement-like substance, and lakes of oil that trapped livestock, birds and other wildlife.[54] Another prominent illustration is the "zone rouge", an exclusion area of France where World War I had a long-lasting impact on the environment; being completely destroyed by the Battle of Verdun, it is still deemed unfit for human habitation more than a century after the end of the hostilities. On the one hand, these examples shed an additional perspective on the importance of both the principle of precautions from the law of armed conflict[55] and the precautionary approach from international environmental law.[56] On the other, the long-term environmental impact of armed conflicts may take many years to unveil itself, and it will be far too late to wait until then to make reparation. Therefore, the appropriate remedy for such situations necessitates provisions for keeping reparations open-ended where the full extent or long-term impacts of environmental damage may not be immediately apparent, with an

52 Marie G. Jacobsson, *Preliminary Report on the Protection of the Environment in Relation to Armed Conflicts*, UN Doc. A/CN.4/674, 2014, p. 208; see also ILC, *Report of the International Law Commission on the Work of Its Sixty-Third Session*, UN Doc. A/66/10, in *Yearbook of the International Law Commission*, Vol. 2, Part 2, 2011, Annex E, "Protection of the Environment in Relation to Armed Conflicts", p. 351.

53 ICRC, *Strengthening Legal Protection for Victims of Armed Conflicts*, Geneva, 2011, p. 18.

54 Cymie R. Payne, "Environmental Claims in Context: Overview of the Institution", in Cymie R. Payne and Peter H. Sand (eds), *Gulf War Reparations and the UN Compensation Commission: Environmental Liability*, Oxford University Press, Oxford, 2011, p. 6.

55 Rule 44 of the ICRC Customary Law Study provides: "Methods and means of warfare must be employed with due regard to the protection and preservation of the natural environment. In the conduct of military operations, all feasible precautions must be taken to avoid, and in any event to minimize, incidental damage to the environment. Lack of scientific certainty as to the effects on the environment of certain military operations does not absolve a party to the conflict from taking such precautions." Jean-Marie Henckaerts and Louise Doswald-Beck (eds), *Customary International Humanitarian Law*, Vol. 1: *Rules*, Cambridge University Press, Cambridge, 2005 (ICRC Customary Law Study), Rule 44, available at: https://ihl-databases.icrc.org/en/customary-ihl/rules. See also ILC Draft Principles, above note 6, Principle 14 and para. 8 of the commentary.

56 P. Sands and J. Peel, above note 41, pp. 229–240.

option to revisit the remediation process and implement additional measures if long-term effects emerge over time or are discovered.

An effective way to identify and assess long-term risks to the environment in relation to armed conflict so as to inform necessary future actions is to monitor the consequences during conflict and in its aftermath.[57] In this regard, the ICRC suggests establishing possible mechanisms and procedures for addressing the immediate and long-term consequences of environmental damage.[58] One of the unique features of the work of the UNCC is the implementation of comprehensive monitoring and assessment projects to ascertain the level of damage. As expressed by the Panel of Commissioners, even if the results generated show that no damage has been caused or that damage has occurred but remediation or restoration efforts are not possible or advisable in the circumstances, a monitoring and assessment activity could be of benefit. Also, such an activity could help to alleviate concerns regarding potential risks or damage and avoid unnecessary and wasteful measures to deal with non-existent or negligible risks.[59]

The UNCC Governing Council decided that "appropriate priority should be given to the processing of [the monitoring and assessment] claims" related to the Iraqi invasion of Kuwait.[60] Such claims were grouped into the first instalment of environmental claims to be reviewed by the Panel of Commissioners, separately from the resolution of the related claims for environmental damage. But the monitoring and assessment programmes did not start until June 2001, ten years after Iraq's invasion and occupation of Kuwait. By this time claims had already been submitted for the third, fourth and fifth instalments. Accordingly, the Panel received and considered post-submission amendments when results from monitoring and assessment projects became available, changing the extent and nature of the damage and increasing the costs of proposed remediation substantially in some cases, while reducing it in others.[61]

Limited baseline information

Addressing immediate and long-term consequences of environmental damage from armed conflicts raises novel questions about reparation.[62] Reliable information on the condition of the environment is hard to obtain due to mass destruction – to be specific, armed conflicts will lead to disruptions in environmental monitoring,

57 Peter H. Sand, "Compensation for Environmental Damage from the 1991 Gulf War", *Environmental Policy and Law*, Vol. 35, No. 6, 2005, p. 246.

58 ICRC, above note 53, p. 18.

59 UNCC, *Report and Recommendations Made by the Panel of Commissioners Concerning the First Instalment of "F4" Claims*, UN Doc. S/AC.26/2001/16, 22 June 2001, para. 32.

60 *Ibid.*, para. 17.

61 UNCC, above note 47, para. 32. See also Larraine Wilde, "Scientific and Technical Advice: The Perspective of Iraq's Experts", in C. R. Payne and P. H. Sand (eds), above note 54, p. 97; Peter H. Sand, "Environmental Principles Applied", in C. R. Payne and P. H. Sand (eds), above note 54, p. 179.

62 Carsten Stahn, Jens Iverson and Jennifer S. Easterday, "Protection of the Environment and Jus Post Bellum: Some Preliminary Reflections", in C. Stahn, J. Iverson and J. S. Easterday (eds), above note 13, p. 5.

data collection and information-sharing.[63] In many instances, monitoring facilities and equipment are destroyed and ongoing tensions hamper data collection by rendering areas inaccessible.[64] The complexity of the ecological processes adds to the difficulties in evidence-gathering, insomuch as the assessment of environmental impact often requires a lengthy and expensive process of discovery of damage undertaken by experts.[65] To illustrate this, in the proceedings of the UNCC, a majority of the environmental claims were rejected not due to inadmissibility but for insufficient evidence,[66] such as being inadequate in establishing baseline levels, in determining the proportion of damage attributable to Iraq's invasion and occupation of Kuwait or assessing the importance of other factors, in quantifying such damage, etc.

In situations of armed conflict, making reparation is complicated by a lack of baseline information for comparison between pre- and post-war conditions. The absence of accurate baseline data precludes the determination of the precise origin and extent of the environmental consequences of armed conflicts. In this connection, the UNCC Panel of Commissioners stated that baseline information on the state of the environment prior to the Iraq conflict may be inadequate, which makes it difficult in many cases to distinguish between damage attributable to the conflict and damage that may be due either to unrelated factors or only partly attributable to the conflict.[67] As an example, the Panel decided that Syria did not provide sufficient evidence to demonstrate damage to its groundwater resources from pollutants resulting from the oil well fires in Kuwait because "the scarcity of pre-invasion data makes it difficult to assess the full significance of the post-invasion data".[68]

On the one hand, though baseline data is vital for the precise characterization of pre-invasion conditions, the inadequacy of documented baseline information does not necessarily rule out reparation. On one occasion, the UNCC Panel of Commissioners developed an estimate of the amount of damage to or depletion of rangelands, taking account of the limited baseline information about the conditions of the rangeland areas prior to Iraq's invasion and occupation.[69] On the other hand, baseline conditions can be established by reference to publicly available data and external resources. In its response to the Gulf War reparation claims, Iraq's advisory team used data from several studies undertaken in the countries concerned by reputable universities and technical institutes as well as the work of foreign consultants which provided valuable information for establishing baseline oil pollution levels.[70] Also, in the *Certain*

63 K. Conca and J. Wallace, above note 2, p. 493.
64 *Ibid.*
65 The difficulties encountered in the *Trail Smelter* and *Gabčíkovo-Nagymaros Project* cases are illustrative of this. See Hanqin Xue, *Transboundary Damage in International Law*, Cambridge University Press, Cambridge, 2003, pp. 179–182.
66 P. Gautier, above note 46, p. 209.
67 UNCC, above note 59, para. 34.
68 UNCC, *Part One of the Fourth Instalment*, above note 49, paras 333–336.
69 UNCC, above note 32, para. 178.
70 L. Wilde, above note 61, p. 103.

Activities case, the ICJ awarded compensation for environmental damage without clear evidence on reliable baseline data being presented.[71] Suggestions have been put forward to seek assistance from scientific experts who are able to palliate the unavailability or insufficiency of data on baseline conditions by using data from reference sites or by means of simulation models.[72]

Establishment of the causal nexus

Establishment of the causal nexus is another challenge facing the assessment of wartime environmental claims. The law of State responsibility requires establishing a link of causality between a culpable act and the damage suffered. The causal link must be "sufficiently direct and certain", and the damage must be neither too remote nor too speculative.[73] Realistically, environmental harm may be detected far away from the place where the action was committed, and such physical distance will cast doubt on the causal link between the injury suffered and the wrongful act.[74] In particular, damage to the environment due to armed conflicts may be extensive, spreading far beyond the actual combat zone.[75] In addition, environmental harm is the result of cumulative effects, but providing evidence of causation is often hindered by the multiple and often indirect links between violent conflict and environmental degradation; this problem can be further compounded by the aforementioned absence of baseline data about pre-conflict conditions.[76]

Given that the causation between environmental damage and wrongful acts during the conflict is not always clear and straightforward, a strict interpretation of the rules on evidence places a heavy burden on the claimant, particularly with respect to damages resulting from concurrent causes.[77] In this regard, the solution for attaining full reparation is to develop specific causality standards applicable to wartime environmental damage.

As set out by the UNCC, in the case of Iraq's invasion and occupation of Kuwait, regard must be paid to the contribution of any pre-existing or subsequent causes where such causes can be identified, "not in determining the restoration objective to be achieved by remediation, but in determining the proportion of the costs of remediation that can reasonably be attributed to [the invasion]".[78] The Panel of Commissioners made it plain that Iraq is not exonerated from liability for loss or damage simply because other factors might

71 ICJ, *Certain Activities*, above note 34, para. 76. See also *ibid.*, Declaration of Judge Gevorgian, para. 6.
72 Kévine Kindji and Michael Faure, "Assessing Reparation of Environmental Damage by the ICJ: A Lost Opportunity?", *Questions of International Law*, Vol. 57, 2019, p. 14.
73 ICJ, *Diallo*, above note 51, paras 14, 49.
74 Alexandre Kiss and Dinah Shelton, *Guide to International Environmental Law*, Martinus Nijhoff, Leiden, 2007, p. 20.
75 ICRC, above note 53, p. 18.
76 C. R. Payne, above note 50, p. 734. See also, A. Kiss and D. Shelton, above note 74, p. 263: "separating out the causation has been a difficult matter, particularly in the absence of baseline information".
77 P. Gautier, above note 46, p. 209.
78 UNCC, above note 47, para. 47.

have contributed to the loss or damage. Evidence present in relation to each head of loss or damage is the basis for ascertaining the existence of a direct causal nexus.[79]

In a similar vein, the ICJ elaborated later in the *Armed Activities* case that the question of causation raises certain difficulties in the situation of a long-standing and large-scale armed conflict, as the causal nexus between the internationally wrongful act and the alleged injury may be "insufficiently direct and certain to call for reparation".[80] It may be the case that damage is attributable to several concurrent causes, including the acts or omissions of the responsible State; or that several internationally wrongful acts of the same nature, but attributable to different actors, may result in a single injury or several distinct injuries. The Court had to consider these questions as they arose, in light of the facts of the case and the evidence available.[81] The Court then made a distinction between the actions and omissions that took place in the area that was under the occupation and effective control of Uganda and those that occurred in other areas not necessarily under Uganda's effective control. As regards the latter, the Court took account of the fact that some of the damage occurred as a result of a combination of actions and omissions attributable to other States and to rebel groups. Nevertheless, the fact that the damage was the result of concurrent causes was not sufficient to exempt Uganda from any obligation to make reparation.[82]

In specifying the legal test for causation, the ICJ highlighted that "the causal nexus required may vary depending on the primary rule violated and the nature and extent of the injury".[83] It appears difficult to draw definite conclusions about how the standard of proof regarding the causal nexus correlates with the primary rule violated and the nature and extent of the injury, yet it is undeniable that the existence of concurrent causes does not exempt the responsible actor from the obligation to make reparation for wartime environmental damage. In cases where the causal link is insufficiently direct and certain, the extent of injury attributable to the responsible actor can be assessed in light of the specific factual circumstances and the evidence produced. At the very least, in a situation of occupation, consideration must be given to whether the actor exercised effective control over the territory where the damage occurred.

In addition, the ICJ recognized that pursuant to the rules of attribution, in certain situations a single actor may be required to make full reparation for the damage while in other situations the responsibility should be apportioned among multiple actors.[84] This is consistent with the position taken by the UNCC, which held that due account of the contribution from other factors should be taken in order to determine what proportion of the damage is attributable to the

79 UNCC, *Report and Recommendations Made by the Panel of Commissioners Concerning the Second Instalment of "F4" Claims*, UN Doc. S/AC.26/2002/26, 3 October 2002, para. 25.
80 ICJ, *Armed Activities*, above note 34, para. 94.
81 *Ibid.*
82 *Ibid.*, paras 95–97.
83 ICJ, *Armed Activities*, above note 34, para. 93.
84 *Ibid.*, para. 98.

responsible actor.[85] In other words, the level of compensation paid by each actor should be proportionate to the amount of damage contributed by that actor. Note that divergence occurred when evidence did not reflect the proportion of each contribution. The ICJ took into account available evidence in arriving at a global sum awarded for all damage,[86] while the UNCC was of the view that when the proportion of Iraq's participation in the damage could not be accurately proven, it recommended no compensation.[87]

Compensation and valuation of wartime environmental damage

In environmental adjudication, compensation is a common form of remedy as it seeks to replace the loss sustained.[88] However, a calculation of monetary compensation for pure environmental harm makes the standard of full reparation extremely difficult, if not impossible, to realize. This section clarifies the complexity of quantifying wartime environmental damage and explores how relevant rules can be informed by jurisprudence of international compensation.

Valuation of environmental damage

Valuing environmental losses is a challenging exercise because, on the one hand, restitution is often impossible to achieve, and on the other, the valuation of environmental damage requires special techniques.[89] Notwithstanding its primacy as a form of reparation, restitution is frequently unavailable or inadequate in relation to environmental damage due in large part to the irreversible nature of such damage.[90] In the *Gabčíkovo-Nagymaros Project* case, the ICJ noted "the often irreversible character of damage to the environment" and "the limitations inherent in the very mechanism of reparation of this type of damage".[91] This is particularly evident in the context of armed conflict. It is often the case that armed conflict causes massive and widespread environmental harm, and restitution is often costly and sometimes impossible in the case of irreversible harm. For general reparations, the ARSIWA describes compensation as "perhaps the most commonly sought in international practice",[92] while it is also preferred by claimants for environmental harm due to sovereignty concerns. In addition, despite having a non-economic value requiring restoration to the state prior to

85 UNCC, *Part One of the Fourth Instalment*, above note 49, para. 40.
86 ICJ, *Armed Activities*, above note 34, paras 221, 253.
87 UNCC, *Part One of the Fourth Instalment*, above note 49, para. 40.
88 UNEP, *Environmental Rule of Law: First Global Report*, Nairobi, 2019, p. 217.
89 Marja Lehto, *Second Report on Protection of the Environment in Relation to Armed Conflicts*, UN Doc. A/CN.4/728, 27 March 2019, para. 134; Cymie R. Payne, "Developments in the Law of Environmental Reparations: A Case Study of the UN Compensation Commission", in C. Stahn, J. Iverson and J. S. Easterday (eds), above note 13, p. 353.
90 ARSIWA, above note 11, para. 3 of the commentary to Art. 36.
91 ICJ, *Gabčíkovo-Nagymaros Project (Hungary/Slovakia)*, Judgment, *ICJ Reports 1997*, para. 140.
92 ARSIWA, above note 11, para. 2 of the commentary to Art. 36.

the damage occurring, pure environmental damage may be incapable of being calculated in market terms. As a result, compensation raises the problem of assessing the quantum of environmental damage – i.e., whether it should be based on the costs of reinstatement measures, on an abstract quantification computed using a theoretical model, or on some other basis.[93]

The legal precedents for international environmental compensation are generally limited, indicating that the rules of international law relating to the valuation of environmental damage remain underdeveloped.[94] In addition to the ICJ and the UNCC, a substantial jurisprudence on awarding compensation has been developed in the practices of various international courts, tribunals, institutions and mechanisms, including the International Tribunal for the Law of the Sea, the International Oil Pollution Compensation (IOPC) regime, the Iran–United States Claims Tribunals, the European Court of Human Rights, the Inter-American Court of Human Rights, and the International Centre for Settlement of Investment Disputes tribunals under the Convention on the Settlement of Investment Disputes between States and Nationals of other States.[95] Notwithstanding that significant body of precedents, the questions of assessment and valuation of environmental damage were under-addressed until recently. Moreover, war reparations are usually settled by agreement between the belligerents,[96] and these agreements do not necessarily conform to the standard of full reparation. In consequence, the customary rules on compensation for environmental losses are less settled, whether in the context of armed conflict or in times of peace.

Loss of ecosystem services

The inherent difficulties in quantifying environmental damage lie in the growing focus on the value of ecosystem services. Developed at an early stage of modern environmental science and law, the law of war did not adequately appreciate the extent and type of harm suffered by the environment during armed conflict.[97] With increased emphasis placed on the concept of "ecosystem services" as well as their intrinsic value, there is now general recognition that conflicts often, directly or indirectly, affect human health and livelihoods as well as ecosystem services,[98] and that durable peace cannot be achieved if the natural resources sustaining

93 P. Sands and J. Peel, above note 41, pp. 749–750.

94 By contrast, extensive practice in this area exists at the national and regional levels. See e.g. Edward H. P. Brans, *Liability for Damage to Public Natural Resources: Standing, Damage and Damage Assessment*, Kluwer Law International, The Hague, 2001; Jason Rudall, *Compensation for Environmental Damage under International Law*, Routledge, Oxon, 2020.

95 ARSIWA, above note 11, para. 6 of the commentary to Art. 36.

96 Dinah Shelton, *Remedies in International Human Rights Law*, 3rd ed., Oxford University Press, Oxford, 2015, p. 180.

97 Cymie R. Payne, "Environmental Integrity in Post-Conflict Regimes", in Carsten Stahn, Jennifer S. Easterday and Jens Iverson (eds), *Jus Post Bellum: Mapping the Normative Foundations*, Oxford University Press, Oxford, 2014, p. 503.

98 DAC Network on Environment and Development Cooperation, *Strategic Environment Assessment and Post-Conflict Development*, Organisation for Economic Co-operation and Development, November 2010, p. 4.

livelihoods and ecosystem services are damaged degraded, or destroyed.[99] This view was endorsed by the ICJ in the *Certain Activities* case. The Court stated that "damage to the environment, and the consequent impairment or loss of the ability of the environment to provide goods and services, is compensable under international law", and that "such compensation may include indemnification for the impairment or loss of environmental goods and services in the period prior to recovery and payment for the restoration of the damaged environment".[100] These groundbreaking holdings were reinforced in the *Armed Activities* case.[101]

While efforts to quantify environmental value in financial terms are nearly always imperfect,[102] it is now evident that under international law the valuation of environmental damage should include compensation for losses in ecosystem services so that the injured State can be made whole. Although no generally applicable valuation technique is prescribed or prohibited by international law,[103] international judicial institutions have been attempting to quantify the losses to be compensated for damaged ecosystem services, as the practices of the UNCC and the ICJ suggest. The UNCC Panel of Commissioners recommended compensation for a wide variety of environmental damage, while noting the inherent difficulties in attempting to place a monetary value on damaged natural resources, particularly resources that are not traded in the market.[104] Notably, in several cases concerning the loss of ecological services, the Panel accepted the claimant's use of methods such as habitat equivalency analysis (HEA) and rejected some other methods such as travel costs surveys for the purpose of determining the nature and extent of compensatory remediation.[105] In the *Certain Activities* case, the proffered methods of both parties were deemed relevant but neither was chosen by the Court; instead, a somewhat opaque method referred to as an "overall valuation approach" was adopted.[106] These different approaches to valuation were developed in conformity with the general principles and rules applicable to the determination of compensation, with a view to achieving the goal of full reparation. It should be mentioned that one potential risk involved with addressing reparations only as monetary compensation is the failure to implement environmental recovery measures following the transfer of

99 Ursign Hofmann and Pascal Rapillard, "Post-Conflict Mine Action: Environment and Law", in C. Stahn, J. Iverson and J. S. Easterday (eds), above note 13, p. 397.

100 ICJ, *Certain Activities*, above note 34, para. 42.

101 ICJ, *Armed Activities*, above note 34, para. 348. However, the claim for environmental damage resulting from deforestation was dismissed on the ground that the Democratic Republic of the Congo did not provide any basis for assessing damage to the environment, in particular to biodiversity, through deforestation, and the Court was thus unable to determine the extent of injury, even on an approximate basis. *Ibid.*, para. 350.

102 As economists have emphasized, "[m]any ecosystem services are public goods or the product of common assets that cannot (or should not) be privatized. … Their value in monetary units is an estimate of their benefits to society expressed in units that communicate with a broad audience." Robert Costanza *et al.*, "Changes in the Global Value of Ecosystem Services", *Global Environmental Change*, Vol. 26, 2014, p. 157.

103 UNCC, above note 32, para. 80; ICJ, *Certain Activities*, above note 34, para. 52.

104 UNCC, above note 32, para. 81.

105 P. Sands and J. Peel, above note 41, p. 758.

106 ICJ, *Certain Activities*, above note 34, paras 78–83.

funds. The risk is even higher if economic techniques, rather than the actual cost of remediation and restoration, are used to value ecosystem services.

The valuation approaches employed by both the UNCC and the ICJ seem to offer only limited guidance for assessing wartime environmental damage. For instance, the UNCC Panel's application of HEA in a number of claims demonstrates a valuation procedure for ecosystem services that can be employed in future proceedings to protect and restore ecological services that are not traded in the market;[107] however, it is noted that HEA is used most effectively in oil spill cases, particularly those limited in spatial extent, but long-term environmental harm which spans multiple decades can be very difficult to evaluate using HEA.[108] In its overall valuation in the *Certain Activities* case, the ICJ was keen to adopt an approach that accounted for the correlation between the most significant damage to the area and other harms, the specific characteristics of the area, and the capacity of the damaged area for natural regeneration.[109] These considerations appear to offer a useful starting point in choosing the methods used to quantify wartime environmental damage, but the absence of an explanation as to when such a method (or any other alternatives) can be an effective tool for estimating losses in ecological services or how such a method should be conducted makes it not easily replicable for subsequent environmental cases. Hence, while there is no one-size-fits-all approach to the valuation of environmental damage, it is meaningful to form certain quantitative guidelines for how to compute the losses that are recoverable in order to ensure consistency in choosing the methods of calculating the amount of compensation.

Environment-related damage to public health

As a further complication, the valuation of damages to public health that are the result of armed conflict poses unique challenges. The environment affects the right of living: the fundamental importance of the right to a safe, clean, healthy and sustainable environment has been recognized at the international level,[110] and large-scale environmental damage exerts influence on a huge but uncertain number of populations during and after an armed conflict. Reference can be made to the *Environmental Guidelines* published by the Office of the UN High Commissioner for Refugees (UNHCR), which note that "the state of the environment … will have a direct bearing on the welfare and well-being of people living in that vicinity, whether refugees, returnees or local communities".[111]

Full reparation for wartime environmental damage cannot lose sight of the health and quality of life of the population. Ultimately, the relationship between reparation for the environment and for the well-being of humankind is not

107 C. R. Payne, above note 50, pp. 737–738.
108 William H. Desvousges, Nicholas Gard, Holly J. Michael and Anne D. Chance, "Habitat and Resource Equivalency Analysis: A Critical Assessment", *Ecological Economics*, Vol. 143, 2018, pp. 83–84.
109 ICJ, *Certain Activities*, above note 34, paras 79–82.
110 UNGA Res. 76/300, 28 July 2022.
111 UNHCR, *UNHCR Environmental Guidelines*, Geneva, 2005, p. 5.

incompatible but symbiotic.[112] Underpinning the law of armed conflict, as well as international environmental law and human rights law, the two incentives often go hand in hand.[113] In the UNCC proceedings, several claimant governments submitted substantive compensation claims for public health damage associated with the environmental damage caused by Iraq. The scope of the claims covers, for example, fatalities or increased mortality in the country as a result of exposure to air pollution during the invasion and occupation,[114] costs of medical treatment of an increased number of diseases attributed to exposure to air pollutants,[115] and treatment costs and loss of well-being associated with post-traumatic stress disorder and other psychiatric illnesses.[116] The Panel of Commissioners concluded that public health damage is compensable in principle, and that the test to be applied is whether the expense or loss for which compensation is claimed has actually occurred and can reasonably be demonstrated to be a direct result of Iraq's invasion and occupation of Kuwait.[117] However, in the majority of the health-related cases, the Panel found that the evidence submitted did not provide a sufficient basis for determining the extent to which the effects of the oil well fires might have contributed to the damage, or in other words, whether or what proportion of the damage, if any, can reasonably be attributed to the effects of the oil well fires or to Iraq's invasion and occupation. In the end, less than 0.1% of the amount claimed for substantive public health damages was granted.[118]

The frequent failure of claimant governments to meet evidentiary standards for compensation highlights the necessity of equitable considerations. Referring to the approach adopted in the *Diallo*[119] and *Trail Smelter*[120] cases, the ICJ underlined that "the absence of adequate evidence as to the extent of material damage will not, in all situations, preclude an award of compensation for that damage".[121] Rather,

> [t]he Court may, on an exceptional basis, award compensation in the form of a global sum, within the range of possibilities indicated by the evidence and taking account of equitable considerations. Such an approach may be called for where the evidence leaves no doubt that an internationally wrongful act has caused a substantiated injury, but does not allow a precise evaluation of the extent or scale of such injury.[122]

112 Merryl Lawry-White, "Victims of Environmental Harm during Conflict: The Potential for 'Justice'", in C. Stahn, J. Iverson and J. S. Easterday (eds), above note 13, p. 376.
113 A. Dienelt, above note 8, pp. 260–264.
114 See e.g. UNCC, above note 32, paras 519–522, 710–713.
115 See e.g. *ibid.*, paras 274–277, 687–692.
116 See e.g. *ibid.*, paras 282–285, 503–505, 701–704.
117 *Ibid.*, para. 68.
118 Peter H. Sand and James K. Hammitt, "Public Health Claims", in C. R. Payne and P. H. Sand (eds), above note 54, p. 215.
119 ICJ, *Diallo*, above note 51, paras 21, 24, 33.
120 Permanent Court of Arbitration, *Trail Smelter Case (United States, Canada)*, 16 April 1938 and 11 March 1941, UNRIAA 3, p. 1920.
121 ICJ, *Certain Activities*, above note 34, para. 35.
122 ICJ, *Armed Activities*, above note 34, para. 106.

Given the uncertainties of health-related effects relating to environmental damage in the context of armed conflict, the amounts of compensation can be assessed on an equitable basis which is commensurate with the scale of the relevant damage. In the meantime, special care should be taken to ensure that compensation determined on the basis of equitable considerations excludes the possibility of being "punitive or exemplary".[123]

Concluding observations

The general principles governing the legal consequences of an internationally wrongful act, in particular the principle of full reparation, provide overarching guidance for dealing with reparation for environmental damage. However, little has been said as to how exactly this goal of full reparation for environmental damage can be accomplished, especially with regard to environmental damage in the aftermath of armed conflict.

Taking the evolution of the legal concept of the environment as a starting point, it is unsurprising to see that a contemporary understanding of the environment has become more encompassing. A dynamic approach toward the understanding of environmental protection would be instrumental in providing redress for wartime environmental damage as it respects the interactivity of the environment, on the one hand, and coupled human–nature systems, on the other. A subtle but crucial distinction exists between the objectives of "returning the environment to its original state" and "maintaining the overall ecological functioning of the environment". Restoring the overall ecological functioning of the damaged environment is an underlying objective for the purpose of making full reparation for wartime environmental damage.

Prior to deciding on reparation, the existence and extent of such damage must be substantiated and the causal nexus between the unlawful act and the damage alleged must be established. A temporal approach that considers the continuous and cumulative nature of wartime environmental damage can help to ease the problems in determining the existence and assessing the extent of environmental damage in the context of armed conflict. Long-term effects of environmental damage caused by armed conflict may be identified through constant monitoring and assessment activities.

A major cause of failed environmental claims is lack of sufficient baseline information and evidence of causality to determine the extent of damage attributable to the alleged illegal acts. The unavailability or insufficiency of baseline information does not necessarily rule out reparation, however, as it can be palliated by the use of data from reference sites or by means of simulation models. In light of the difficulties in establishing a link of causality between the wrongful act and the damage suffered, more specific criteria of causation should be developed for environmental damage resulting from armed conflict. The rules

123 ICJ, *Certain Activities*, above note 34, para. 31; *ibid.*, Declaration of Judge Gevorgian, para. 9.

that can be extracted from international jurisprudence include the following: pre-existing or subsequent causes should be taken into account in determining the extent of injury that can be attributed to the wrongful act; the existence of concurrent causes does not relieve the responsible actor from the obligation to make reparation; and in situations of occupation, regard should be paid to whether the actor exercises effective control over the territory where the damage occurs.

Fully restoring the environment to its pre-existing physical conditions in the aftermath of armed conflict is often infeasible or burdensome, and in such cases compensation would be the appropriate form of reparation. Valuation of environmental damage in relation to armed conflict raises a number of practical challenges, however. The monetization of environmental damage requires special techniques, especially for losses of ecosystem services. International law neither prescribes nor prohibits specific valuation techniques, but guidelines or relevant legal instruments on the valuation of environmental damage are needed for the consistency and integration of international protection of the environment. Finally, environmental harm affects the populations concerned, and thus full reparation for wartime environmental damage cannot lose sight of public health damage. Given the frequent failure of claimant governments to meet the standard of proof, such category of damages may be valued on an equitable basis.

These are some preliminary observations that can be made as the protection of the environment in relation to armed conflict continues to evolve. In 2009, UNEP suggested establishing a permanent UN body, either under the General Assembly or under the Security Council, to take charge of evaluating and possibly compensating for environmental damage during armed conflicts.[124] While it still looks premature to have such a body be established, it is never too early to protect our environment, whether in times of armed conflict or in times of peace.

124 UNEP, above note 4, p. 6.