CRIMES AGAINST FUTURE INUIT GENERATIONS: HEAVY METALS AND PERSISTENT ORGANIC POLLUTANTS (POPS)

KONSTANTIA KOUTOUKI*

I INTRODUCTION

In the preamble of the 2001 *Stockholm Convention on Persistent Organic Pollutants*[1] we find the following acknowledgement: '…that the Arctic ecosystems and Indigenous communities are particularly at risk because of the biomagnification of persistent organic pollutants and that contamination of their traditional foods is a public health issue'. The vulnerability of the Indigenous populations of the Arctic to persistent organic pollutants ('POPs') was an impetus behind the *Stockholm Convention*[2] and although the relationship between POPs and the health of Indigenous peoples, especially children and the unborn, has been known for a very long time,[3] there has been little in terms of legislation and public policy initiatives to diminish toxic chemicals in the food and natural

* Professor of Law at the Université de Montréal, Lead Counsel for Natural Resources with the Centre for International Sustainable Development Law at McGill University and Executive Director of Nomomente Institute

1 *Stockholm Convention on Persistent Organic Pollutant*s, opened for signature 23 May 2001, 2256 UNTS 119 (entered into force 17 May 2004) ('*Stockholm Convention*').

2 *Statement by Mr Klaus Töpfer, Executive Director, United Nations Environment Programme at the Opening of the Intergovernmental Negotiating Committee on Persistent Organic Pollutants, Montreal* (29 June 1998) https://wayback.archive.org/web/20170316145532/http://www.pops.int/documents/press/prel_spch/edspch.htm; 'Northern Aboriginal organizations have been fully engaged in the negotiation processes that have led to this POPs agreement through the creation of a coalition of four northern Aboriginal organizations': Canadian Arctic Indigenous Peoples Against POPs, Persistent Organic Pollutants in the Arctic (2001) <http://www.ec.gc.ca/media_archive/press/2001/010509-3_b_e.htm>.

3 Jay Van Oostdam et al, 'Human Health Implications of Environmental Contaminants in Arctic Canada: A Review' (1999) 230(1–3) *Science of the Total Environment* 1; Jay Van Oostdam et al, 'Human Health Implications of Environmental Contaminants in Arctic Canada: A Review' [2005] (351–2) *Science of the Total Environment* 165; Shawn G Donaldson et al, 'Environmental Contaminants and Human Health in the Canadian Arctic' (2010) 408(22) *Science of the Total Environment* 5165; Northern Contaminants Program, 'Persistent Organic Pollutants in Canada's North' (Canadian Arctic Contaminants Assessment Report No 3, 2013); Arctic Monitoring and Assessment Programme, 'AMAP Assessment 2015: Human Health in the Arctic' (Report, 2015) vii, 165 ff; Jennifer Gibson et al, 'Levels and Trends of Contaminants in Humans of the Arctic' [2016] (75) *International Journal of Circumpolar Health* <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC5156859/>; Hayley Hung et al, 'Temporal Trends of Persistent Organic Pollutants (POPs) in Arctic Air: 20 Years of Monitoring Under the Arctic Monitoring and Assessment Programme (AMAP)' [2016] (217) *Environmental Pollution* 52.

environment of the Inuit. In addition to POPs, the children and adults of the Arctic communities are also disproportionately exposed to heavy metal contamination due to the presence of mercury, lead and cadmium, among others.[4] In 2013, the *Minamata Convention on Mercury*[5] was adopted, under the auspices of the United Nations Environment Programme ('UNEP') and building on the 1998 *to the 1979 Convention on Long-Range Transboundary Air Pollution on Heavy Metals*.[6] Given the long-term effects on the Inuit of these substances,[7] it begs the question whether this situation is in fact a crime against future generations of the Inuit.

Actions causing environmental harm have largely escaped the jurisdiction of penal law. This is especially true in international criminal law. However, this is changing, in part due to the progress made in the area of green criminology, or crimes against the environment.[8] In fact, in September 2016, the International Criminal Court ('ICC') announced that it will now consider environmental destruction dimensions of the cases it hears. In a statement, the Court said:

> The impact of the crimes may be assessed in light of, *inter alia*, the increased vulnerability of victims, the terror subsequently instilled, or the social, economic and environmental damage inflicted on the affected communities. In this context, the Office will give particular consideration to prosecuting Rome Statute crimes that are committed by means of, or that result in, *inter alia*, the destruction of the

4 Helge M Markusson, 'The Spread of Toxic Mercury Contamination is Affecting the Arctic' *ScienceNordic* (online), 14 January 2016 <http://sciencenordic.com/spread-toxic-mercury-contamination-affecting-arctic>; 'Inuit continue to have the highest levels of almost all persistent organic pollutants (POPs) and metals among the ethnic groups studied. A greater proportion of people in the East exceed Health Canada's guidelines for PCBs and mercury': Donaldson et al, 'Environmental Contaminants and Human Health in the Canadian Arctic' (2010) 408(22) *Science of the Total Environment* 5165; 'This work showed that most Inuit Health Survey participants were below blood contaminant guidelines set by Health Canada but that metal and POP body burdens commonly exceed exposures observed in the general population of Canada': Brian D Laird, Alexey B Goncharov and Hing Man Chan, 'Body Burden of Metals and Persistent Organic Pollutants among Inuit in the Canadian Arctic' [2013] (59) *Environment International* 33; Jane L Kirk et al, 'Mercury in Arctic Marine Ecosystems: Sources, Pathways and Exposure' [2012] (119) *Environmental Research* 64, 80–2; Northern Contaminants Program, 'Mercury in Canada's North' (Canadian Arctic Contaminants Assessment Report No 2, 2012).

5 *Minamata Convention on Mercury*, opened for signature 10 October 2013, 55 ILM 586 (entered into force 16 August 2017).

6 *Amendments to the Text of and Annexes other than III and VII to the 1998 Protocol on Heavy Metals*, opened for signature 13 December 2012 (not yet in force). See also http://www.unece.org/fileadmin/DAM/env/lrtap/full%20text/1998.Heavy.Metals.e.pdf

7 Pál Weihe et al, 'Health Effects Associated with Measured Levels of Contaminants in the Arctic' [2016] (75) *International Journal of Circumpolar Health* <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC5156856/>.

8 See also Rob White and Diane Heckenberg, *Green Criminology: An Introduction to the Study of Environmental Harm* (Routledge, 2014); Hannah Graham and Rob White, *Innovative Justice* (Routledge, 2015) ch 4; Nigel South, Avi Brisman and Piers Beirne, 'A Guide to a Green Criminology' in Nigel South and Avi Brisman (eds), *Routledge International Handbook of Green Criminology* (Routledge, 2013); Michael J Lynch, 'The Greening of Criminology: A Perspective for the 1990s' (1990) 2 *The Critical Criminologist* 3; Michael J Lynch and Paul B Stretesky, 'Clarifying the Analysis of Environmental Justice: Further Thoughts on the Critical Analysis of Environmental Justice Issues' (1999) 9 *The Critical Criminologist* 3.

> environment, the illegal exploitation of natural resources or the illegal dispossession of land.[9]

The notion of criminalising environmental degradation is not a novel one. Several years ago, international lawyer Polly Higgins made a proposal to the United Nations insisting that ecocide[10] be considered an international crime against peace, together with genocide, crimes against humanity, war crimes and crimes of aggression, and be tried by the ICC. She defines ecocide as 'the extensive destruction, damage to or loss of ecosystem(s) of a given territory, whether by human agency or by other causes, to such an extent that peaceful enjoyment by the inhabitants of that territory has been severely diminished'.[11] However, the ICC's announcement did not go quite this far; it will simply examine the environmental aspects of the existing crimes against peace rather than add a fifth crime.[12] Nonetheless this is a significant advance. To add to the momentum, a Guatemalan appellate court upheld, for the first time, a charge of ecocide

> against Spanish African palm oil corporation, Empresa Reforestadora de Palma de Petén SA – otherwise known as REPSA – denying a recent appeal that sought to overturn it. The company has been accused of criminally negligent activity resulting in massive die-offs of fish and other wildlife in and around the La Pasión River, disrupting the lives of tens of thousands of Guatemalans living in the region.[13]

Also, in *Union Carbide Corporation v Union of India*,[14] the Supreme Court of India held that unborn children at the time of the Bhopal disaster who can trace their congenital defects to the gas leak are eligible for compensation.[15]

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9 Office of the Prosecutor of the International Criminal Court, 'Case Selection and Prioritisation' (Policy Paper, 15 September 2016) <https://www.icc-cpi.int/itemsDocuments/20160915_OTP-Policy_Case-Selection_Eng.pdf>.

10 For earlier efforts on the legal application of the notion of ecocide, see Patrick Hossay, *Unsustainable: A Primer for Global Environmental and Social Justice* (Zed Books, 2006); Mark Allan Gray, 'The International Crime of Ecocide' (1996) 26 *California Western International Law Journal* 215; Anja Gauger et al, 'Ecocide is the Missing 5th Crime Against Peace' (Report, Human Rights Consortium, July 2012); Polly Higgins, Damien Short and Nigel South, 'Protecting the Planet: a Proposal for a Law of Ecocide' (2013) 59(3) *Crime, Law and Social Change* 251; Deniz Tekayak, 'From 'Polluter Pays' to 'Polluter Does not Pollute' (2016) 71 *Geoforum* 62.

11 Femke Wijdekop, 'The Duty to Care for Our Common Home', *New Internationalist* (online), 1 May 2016, <https://newint.org/features/2016/05/01/make-ecocide-a-crime/>. For a review of existing ecocide laws see Eradicating Ecocide, *Existing Ecocide Laws* (2014) <http://eradicatingecocide.com/the-law/existing-ecocide-laws/>.

12 Office of the Prosecutor of the International Criminal Court, above n 9; Adam Taylor, 'Is Environmental Destruction a Crime against Humanity? The ICC May Be About to Find Out', *The Washington Post* (online), 16 September 2016 <https://www.washingtonpost.com/news/worldviews/wp/2016/09/16/is-environmental-destruction-a-crime-against-humanity-the-icc-may-be-about-to-find-out/?utm_term=.05918977a9aa>.

13 Courtney Parker, 'Justice in Guatemala: Guatemalan Court Upholds Revolutionary Ruling on Ecocide' *Intercontinental Cry* (online), 1 January 2016 <https://intercontinentalcry.org/justice-in-guatemala-guatemalan-court-upholds-revolutionary-ruling-on-ecocide/>; Alana Marsili, 'A New Court in Guatemala Tackles Ecocide', *Frontlines* (online), November/December 2015 <https://www.usaid.gov/news-information/frontlines/resilience-2015/new-court-guatemala-tackles-ecocide>.

14 *Union Carbicide Corporation v Union of India* AIR 1992 SC 248 (Supreme Court of India) ('the Bhopal case').

15 Ibid.

Although green criminology scholars and advocates of ecocide are making great strides in demonstrating the need for criminal sanctions of environmental disasters, there is another type of environmental harm that is pushing the limits of international criminal law in the area of environment and human rights violations. Crimes against future generations, or intergenerational justice, is a concept that aims to hold perpetrators accountable for harm that will be inflicted upon future generations based on the perpetrator's actions today.[16] The World Future Council ('WFC') has been a major driving force behind the push to recognise such a crime. Professor Sébastien Jodoin has contributed significantly to the creation of a definition for crimes against future generations.[17] For our purposes the most relevant parts of the definition are:

> 1. Crimes against future generations means any of the following acts within any sphere of human activity, such as political, military, economic, cultural, or scientific activities, when committed with knowledge of the substantial likelihood of their severe consequences on the long-term health, safety, or means of survival of any identifiable group or collectivity:
>
> (c) Deliberately depriving members of any identifiable group or collectivity of objects indispensable to their survival, including by impeding access to water and food sources, destroying water and food sources, or contaminating water and food sources by harmful organisms or pollution;
>
> (h) Causing widespread, long-term and severe damage to the natural environment, including by destroying an entire species or ecosystem;
>
> (i) Unlawfully polluting air, water or soil by releasing substances or organisms that seriously endanger the health, safety or means of survival of members of any identifiable group or collectivity;
>
> and to a certain degree:
>
> (f) Preventing members of any identifiable group or collectivity from enjoying their culture, professing and practicing their religion, using their language, preserving their cultural practices and traditions, and maintaining their basic social and cultural institutions.

This definition of the new crime lends itself well to Indigenous peoples' issues for several reasons. First and foremost, there is a focus on an 'identifiable group or collectivity'. Therefore, it is easy for Indigenous communities to qualify as identifiable groups as well as take into consideration the notion of collective

16 Janna Thompson, *Intergenerational Justice: Rights and Responsibilities in an Intergenerational Polity* (Routledge, 2009); Bianca Jagger, 'Crimes against Present and Future Generations' (2014) 57(1) *Challenge* 41; Emilie Gaillard, 'Crimes against Future Generations' (2015) 2(2) *E-Pública Rev Eletrónica Direito Público*, 40; Axel Gosseries and Lukas H Meyer, *Intergenerational Justice* (Oxford University Press, 2009).

17 World Future Council, *Definition of Crimes Against Future Generations* (2016) <https://www.worldfuturecouncil.org/file/2016/01/WFC_The_Definition_of_Crimes_against_Future_Generations.pdf>; Sébastien Jodoin, 'Crimes against Future Generations: Implementing Intergenerational Justice through International Criminal Law' (2010) 5(1) *Intergenerational Justice Rev*iew 10; Sébastien Jodoin and Yolanda Saito, 'Crimes Against Future Generations: Harnessing the Potential of Individual Criminal Accountability for Global Sustainability' (2017) 7(2) *McGill International Journal of Sustainable Development Law & Policy* 115.

rights, a view that is central to a large proportion of international instruments protecting Indigenous rights.[18]

It also refers to the contamination of water and food sources, which is a critical concern for Indigenous communities.[19] This is especially true for the consumption of traditional foods by children and expectant or nursing women.[20] Using mothers' hair, plasma, and milk, as well as children's cord blood, studies have shown levels consistent with cognitive deficits'.[21]

Furthermore, there is a specific mention of the necessity to protect the capacity of the identifiable group or collectivity for 'preserving their cultural practices and traditions, and maintaining their basic social and cultural

18 See especially *Universal Declaration of Human Rights*, GA Res 217A (III), UN GAOR, 3rd sess, 183rd plen mtg, UN Doc A/810 (10 December 1948) arts 1–2; *Convention on the Prevention and Punishment of the Crime of Genocide*, opened for signature 9 December 1948, 78 UNTS 277 (entered into force 12 January 1951) art 2; *International Covenant on Civil and Political Rights,* opened for signature 16 December 1966, 999 UNTS 171 (entered into force 23 March 1976) art 27 and the provisions for collective rights; International Covenant on Economic, Social and Cultural Rights, opened for signature 16 December 1966, 993 UNTS 3 (entered into force 3 January 1976); Convention on the Elimination of All Forms of Racial Discrimination, opened for signature 21 December 1965, 660 UNTS 195 (entered into force 4 January 1969) art 1; International Labor Organization ('ILO') *Convention (No 169) concerning Indigenous and Tribal Peoples in Independent Countries*, opened for signature 27 June 1989, 1650 UNTS 383 (entered into force 5 September 1991): although initially paternalistic towards Indigenous peoples it is now considered an important treaty for these groups; *Convention on the Rights of the Child*, opened for signature 20 November 1989, 1577 UNTS 3 (entered into force 2 September 1990) arts 2, 17, 29, 30; *Declaration on the Rights of Persons Belonging to National or Ethnic, Religious and Linguistic Minorities*, UN Doc A/Res/47/135 (18 December 1992) arts 1–4; *Rio Declaration on Environment and Development*, UN Doc A/CONF.151/26 (vol I) Principle 22; United Nations Department of Economic and Social Affairs, Division for Sustainable Development, *Agenda 21* (1992) ch 26.4 <https://sustainabledevelopment.un.org/content/documents/Agenda21.pdf>; *Vienna Declaration and Programme of Action*, UN Doc A/CONF.157/24 (12 July 1993) vol I [20], vol II [28]–[32]; *Report of the International Conference on Population and Development*, UN Doc A/CONF.171/13/Rev.1 (18 October 1994, adopted 13 September 1994) [6.24], [6.27]; *Durban Declaration and Programme of Action* (31 January 2002) United Nations World Conference against Racism, Racial Discrimination, Xenophobia and Related Intolerance <http://www.un.org/WCAR/durban.pdf>; Inter-American Commission on Human Rights, *Proposed American Declaration on the Rights of Indigenous Peoples* (26 February 1997) <http://pdba.georgetown.edu/IndigenousPeoples/OASdraft.html>; 'Indigenous Peoples' (Operational Directive No 4.20, World Bank, 1991) <https://www.ifc.org/wps/wcm/connect/835cc50048855270ab94fb6a6515bb18/OD420_IndigenousPeoples.pdf>.

19 See also Donaldson et al, above n 4; Elizabeth Hoover et al, 'Social Science Collaboration with Environmental Health' (2015) 123 *Environmental Health Perspectives* 1100; James Kang-Hyon Jung and Kelly Skinner, 'Foodborne and Waterborne Illness among Canadian Indigenous Populations: A Scoping Review' (2017) 43(1) *Canada Communicable Disease Report* 7; Government of Canada, *Northern Contaminants Program* (14 December 2016) <http://www.science.gc.ca/eic/site/063.nsf/eng/h_7A463DBA.html>; Government of Canada, Aboriginal Affairs and Northern Development, 'Contaminants in Canada's North: Summary For Policy Makers' (2014).

20 Meredith S Curren et al, 'Comparing Plasma Concentrations of Persistent Organic Pollutants and Metals in Primiparous Women from Northern and Southern Canada' [2014] (479–80) *Science of the Total Environment* 306; Manhai Long et al, 'Food Intake and Serum Persistent Organic Pollutants in the Greenlandic Pregnant Women: The ACCEPT Sub-Study' (2015) 529 *Science of the Total Environment* 198; Krista Nickerson, 'Environmental Contaminants in Breast Milk' (2006) 51(1) *Journal of Midwifery Womens Health* 26.

21 Gina Muckle et al, 'Determinants of Polychlorinated Biphenyls and Methylmercury Exposure in Inuit Women of Childbearing Age' (2001) 109(9) *Environmental Health Perspectives* 957–63; Mary C Sheehan et al, 'Global Methylmercury Exposure from Seafood Consumption and Risk of Developmental Neurotoxicity: A Systematic Review' (2014) 92(4) *Bulletin of the World Health Organization* 254.

institutions'. This is vital to the preservation and prosperity of Indigenous peoples. For example, environmental degradation often leads to the loss or diminution of traditional Indigenous medicinal plants. However, the ritualistic nature of administrating the medicinal plant can be just as important as the medicine itself. In fact, Battiste and Henderson argue that:

> no separation of science, art, religion, philosophy, or aesthetics exists in [I]ndigenous thought; such categories do not exist. Thus, Eurocentric researchers may know the name of a herbal cure and understand how it is used, but without the ceremony and ritual songs, chants, prayers, and relationships, they cannot achieve the same effect.[22]

A particular plant, therefore, can be a prerequisite for a significant part of a community's spiritual and cultural life.

Hence, the WFC proposal is to a certain extent inclusive of the unique legal landscape in which environmental issues and indigenous rights coexist. However, many attempts at criminalising environmental degradation, including that of Higgins, the WFC and the announcement made by the ICC, tend to focus on environmental *disasters*. That is, environmental destruction that is contained in time and space with a relatively easily discernable geographic setting. Environmental disasters such as Chernobyl,[23] Bhopal,[24] the Aral Sea,[25] Seveso Dioxin Cloud,[26] and Minamata Disease,[27] to name a few, illustrate clearly this type of environmental contamination.[28] Horrific consequences are felt far into the future and for multiple generations after the fact but the cause is easily identifiable. However, there is another type of environmental contamination that is much more nuanced, global in nature, and toxic, particularly to future

22 Marie Ann Battiste and James Youngblood Henderson, *Protecting Indigenous Knowledge and Heritage* (Purich Publishing, 2000) 43. See also UN Permanent Forum on Indigenous Issues, *State of the World's Indigenous Peoples* (14 January 2010) 52–3 <http://www.un.org/esa/socdev/unpfii/documents/SOWIP/en/SOWIP_web.pdf>; Chidi Oguamanam, *International Law and Indigenous Knowledge: Intellectual Property, Plant Biodiversity, and Traditional Medicine* (University of Toronto Press, 2006); University of Ottowa, 'Aboriginal Medicine and Healing Practices' (8 July 2009) <https://web.archive.org/web/20170511155437/https://www.med.uottawa.ca/sim/data/Aboriginal_Medicine_e.htm>.

23 Gilbert Cruz, 'Top 10 Environmental Disasters – And the Earth Cried: Chernobyl', *TIME* (online), 3 May 2010 <http://content.time.com/time/specials/packages/article/0,28804,1986457_1986501_1986443,00.html>.

24 Gilbert Cruz, 'Top 10 Environmental Disasters – And the Earth Cried: Bhopal', *TIME* (online), 3 May 2010 <http://content.time.com/time/specials/packages/article/0,28804,1986457_1986501_1986445,00.html>.

25 Gilbert Cruz, 'Top 10 Environmental Disasters – And the Earth Cried: The Aral Sea', *TIME* (online), 3 May 2010 <http://content.time.com/time/specials/packages/article/0,28804,1986457_1986501_1986451,00.html>.

26 Gilbert Cruz, 'Top 10 Environmental Disasters – And the Earth Cried: Seveso Dioxin Cloud', *TIME* (online), 3 May 2010 <http://content.time.com/time/specials/packages/article/0,28804,1986457_1986501_1986449,00.html>.

27 Gilbert Cruz, 'Top 10 Environmental Disasters – And the Earth Cried: Minamata Disease', *TIME* (online), 3 May 2010 <http://content.time.com/time/specials/packages/article/0,28804,1986457_1986501_1986450,00.html>.

28 For an explanation of chronic environmental harm, see Rob Nixon, *Slow Violence and the Environmentalism of the Poor* (Harvard University Press, 2013).

generations, but is incredibly difficult to identify and categorise. According to McClenaghan et al:

> There is increasing evidence of health effects from various pollutants occurring at very low levels of exposure. In some areas there are clear lines of evidence linking environmental pollutants and adverse health in children … In many other areas, for literally thousands of substances, the evidence is less clear. There is a great deal of uncertainty and controversy but the stakes are very high. The number of children who may suffer from asthma, certain neurological effects or possibly effects on the immune and/or endocrine system is potentially very large … In particular, poor children and aboriginal children are generally more often at greater risk of environmentally related health problems.[29]

This paper argues that this type of low-level, chronic contamination has disastrous implications for present and future generations in general, but most critically for the children and future generations of Indigenous communities such as the Inuit. Unfortunately, as we will see, this type of environmental degradation is particularly tricky for international criminal law. Crimes against future generations, as it is presently formulated, does not overcome the inherent obstacles in criminal law concerning low-level chronic, environmental contamination. The WFC proposal does include '[u]nlawfully polluting air, water or soil by releasing substances or organisms that seriously endanger the health, safety or means of survival of members of any identifiable group or collectivity.' The problem here is the word 'unlawful', as a clear majority of this low-level pollution contaminating the planet and presenting a particularly menacing threat to the health and welfare of Indigenous community members, present and future, is not currently unlawful.[30]

Currently, corporate entities that pollute lawfully are not in any way reprimanded for the harm caused, and even when it is done unlawfully they are mainly given fines by the judicial system. It has become clear that this form of deterrence is not adequate as it is not protecting present generations, much less future ones. It is argued here that crimes against future generations needs to include judicial consequences, that cannot be easily internalised by a corporation.

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29 Theresa McClenaghan et al, 'Environmental Standard Setting and Children's Health in Canada: Injecting Precaution into Risk Assessment' (2003) 12 *Journal of Environmental Law and Practice* 245, 247.

30 See generally Nikos Passas, 'Lawful but Awful: Legal Corporate Crimes' (2005) 34 *Journal of Socio-Economics* 771; Sigurd S Dibyng, 'Environmental Harm: Social Causes and Shifting Legislative Dynamics' in Guri Larsen, Rune Ellefsen and Ragnhild Sollund (eds), *Eco-global Crimes: Contemporary Problems and Future Challenges*, (Ashgate Publishing Ltd, 2012) 44–9; Nikos Passas and Neva R Goodwin, *It's Legal but It Ain't Right: Harmful Social Consequences of Legal Industries* (University of Michigan Press, 2010); Robert Agnew, 'The Ordinary Acts That Contribute to Ecocide' in Nigel South and Avi Brisman (eds) *Routledge International Handbook of Green Criminology* (Routledge, 2013); 'These ordinary acts have several characteristics: they are widely and regularly performed by individuals as part of their routine activities; they are generally viewed as acceptable, even desirable; and they collectively have a substantial impact on environmental problems': Matthew Hall, 'The Roles and Use of Law in Green Criminology' (2014) 3(2) *International Journal for Crime, Justice and Social Democracy* 96, 97–8.

A The Internalisation of Fines in Corporate Strategies

Traditionally, fines have been used as means of deterrence and punishment for corporate crime, as well as for civil case compensation to victims.[31] Although fines given to criminal defendants may serve utilitarian goals,[32] some scholars observe that fines are limited in their applicability to corporations as an efficient deterrence measure.[33] This means that fines are not an effective way to protect future generations as these costs are generally built into corporate business strategies. Indeed, it is commonly thought that corporations make rational decisions using various means to predict outcomes such as profits and fines.[34] The corporate response to fines and damages awards is to treat them as 'routine' business expenses[35] that can be put to a cost–benefit analysis to decide whether reducing or eliminating POPs and heavy metals is cost-effective. Hence, the 'pay to pollute' cycle results in corporations considering even punitive fines as fixed costs.[36]

Economists usually consider that an actor who intends to commit a crime will be deterred only if the expected gain is less than the 'expected punishment cost' of a prohibited act.[37] Professor John Coffee explains that, 'if the expected gain were $1 million and the risk of apprehension were 25%, the penalty would have to be raised to $4 million in order to make the expected punishment cost equal the expected gain'.[38] Where individuals are concerned, legal sanctions may play less of a deterrent role than the consequences faced internally from the corporation. Coffee lists as possible internal sanctions: demotion, dismissal, lost opportunities such as non-promotion, and rejection from an anticipated fringe benefit, among others. These internal sanctions are far less severe than a felony conviction, but the probability of their application is far higher.[39] In other words, 'the profits generated by environmental crimes are very high, while prosecutions in this area are rare and sanctions are mild'.[40] Capping punitive damages at fixed limits helps companies in assessing these fines as fixed costs of doing business, resulting in 'the ability of wrongdoers to budget around deterrence measures'.[41]

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31 Christopher Kennedy, 'Criminal Sentences for Corporations: Alternative Fining Mechanisms' (1985) 73 *California Law Review* 443, 443.

32 David Uhlmann, 'The Pendulum Swings: Reconsidering Corporate Criminal Prosecution' (2016) 49 *UC Davis Law Review* 1251.

33 Darlene Wong, 'Stigma: A More Efficient Alternative to Fines in Deterring Corporate Misconduct' (2000) 3(1) *California Criminal Law Review* 3.

34 Michael Jefferson, 'Corporate Criminal Liability: The Problem of Sanctions' (2001) 65 *Journal of Criminal Law* 235, 238.

35 Wong, above n 33.

36 Ibid.

37 John Coffee, 'No Soul to Damn: No Body to Kick: An Unscandalized Inquiry into the Problem of Corporate Punishment' (1981) 79 *Michigan Law Review* 389. See also Gary S Becker, 'Crime and Punishment: An Economic Approach' (1968) 76(2) *Journal of Political Economy* 169.

38 Coffee, above n 37, 389.

39 Ibid 410.

40 Mathilde Golla, 'Très Profitables et Impunis, les Crimes Environnementaux se Multiplient' *Le Figaro* (online), 19 September 2015 <http://www.lefigaro.fr/sciences/2015/09/18/01008-20150918ARTFIG00308-tres-profitables-et-impunis-les-crimes-environnementaux-se-multiplient.php>.

41 Wong, above n 33.

Brandon Garrett, from the University of Virginia Law, explains that, while fines for corporations across all industries have risen, companies are only 'disgorging their profits' and hence 'that's not much of a penalty, to just give up your profits. It seems like something of a worthwhile risk if you don't always get caught'.[42] In fact, some jurisdictions consider penalties to be a cost of doing business by allowing companies to deduct the civil punitive damages from their corporate business and gross income taxes. In the United States, in nearly every state and federal jurisdiction where companies have been ordered to pay punitive damages, companies are able to claim these amounts as tax deductions.[43]

This point is illustrated by the Exxon Valdez oil spill. Twenty years after the spill, Exxon received punitive damages of over $1 billion in a settlement with the federal government, in which it accepted civil rather than criminal responsibility. Exxon was able to avoid a substantial portion of their cleanup costs and losses through tax reductions valued at hundreds of millions of dollars.[44] A more recent example is the 2010 Deepwater Horizon rig explosion where at least 80 per cent of the more than $42 billion that BP has paid out would qualify for a tax deduction – which has saved an estimated $10–14 billion for the company.[45] Critics highlight that, in the end, taxpayers are subsidising corporate misconduct, which, again undermines the whole point of punitive damages.[46]

In the end, it is not the company which bears the cost of the fine but shareholders, through a loss of dividends; employees, whose wages or jobs may be impacted; and consumers, for whom prices may rise.[47] The corporation not only goes unpunished, but powerless actors or even the intended beneficiary of the law, often the consumer, wind up bearing the cost.[48] According to Biron, 'they know it is unlikely they will be caught; if caught, they are unlikely to be charged; and if charged, they can work the system to avoid penalties'.[49]

This is definitely true with civil fines, however criminal sanctions, even fines, tend to be perceived differently by corporate entities. Although we argue that, ideally, criminal sanctions concerning crimes against future generations should go beyond fines, simply being found guilty of a criminal act has consequences for corporations and their directors.

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42 Danielle Kurtzleben, 'Too Big to Jail: Why the Government is Quick to Fine but Slow to Prosecute Big Corporations', *Vox* (online), 13 July 2015 <https://www.vox.com/2014/11/16/7223367/corporate-prosecution-wall-street>.

43 Michael Booth, 'NJ Bill Would Disallow Tax Deduction for Punitive Damages' *New Jersey Law Journal* (online), 24 June 2015 <https://www.law.com/njlawjournal/almID/1202730439304>. See also Colin Read, *BP and the Macondo Spill: The Complete Story* (Springer, 2011).

44 Read, above n 43.

45 Patricia Cohen, 'When Company Is Fined, Taxpayers Often Share Bill', *The New York Times* (online), 3 February 2015 <https://www.nytimes.com/2015/02/04/business/when-a-company-is-fined-taxpayers-often-share-the-punishment.html>.

46 Ibid.

47 Jefferson, above n 34.

48 Coffee, above n 37, 402.

49 Carey L Biron, 'Why Corporations Breaking Environmental Laws Are Getting a Free Pass', *Occupy.com* (online), 22 August 2014 <http://www.occupy.com/article/why-corporations-breaking-environmental-laws-are-getting-free-pass>.

The use of criminal law to sanction environmental misconduct is increasing both in domestic and international law. In the United States, the Environmental Protection Agency has increased the number of prosecutions consistently in the past two decades.[50] According to Westbrook, the United States Department of Justice has stepped up its prosecution of individuals in environmental criminal cases, with individuals now consisting of over half of the prosecutions since the 1990s. This marks a clear departure from imposing civil fines on companies only.[51]

This evolution in the prosecution of environmental damage has had a definite impact. In fact, even powerful corporations are paying attention. Block and Feinburg write that

> in our profession, we aim to keep a client from being indicted in the first place. This aim becomes an imperative when defending a corporation. An indictment in an environmental criminal case means public embarrassment and reputational damage. In addition to steep monetary penalties and years of probation, it may mean plummeting share price and suspension or termination of government contracts.[52]

Europe has been experimenting with criminal law to prevent environmental degradation since the 1998 Council of Europe *Convention on the Protection of Environment through Criminal Law*.[53] In 2008 the *Directive on the Protection of the Environment through the Criminal Law*[54] continued down the same path. European Union members are obligated to

> treat as criminal offences certain activities that breach EU environmental legislation. These offences include the illegal shipment of waste, trade in endangered species or in ozone-depleting substances, and the significant deterioration of wildlife habitats forming part of the Natura 2000 network of protected sites. Furthermore, significant damage to the environment caused by unlawful emissions to the air, water or soil, the unlawful operation of dangerous activities (including manufacture or handling of nuclear materials) or the unlawful treatment of waste will also be considered criminal offences. Member States will have to subject these offences to effective, dissuasive and proportionate criminal penalties. They will also have to ensure that companies can be held liable for offences carried out by individuals but from which they benefit.[55]

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50 United States Environmental Protection Agency, *Numbers at a Glance for Fiscal Year 2016*, Enforcement Annual Results <https://www.epa.gov/enforcement/enforcement-annual-results-numbers-glance-fiscal-year-2016>. Some major cases for 2016: United States Environmental Protection Agency, *Concluded Cases Map for Fiscal Year 2016*, Enforcement Annual Results <https://www.epa.gov/enforcement/enforcement-annual-results-concluded-cases-map-fiscal-year-2016>.

51 Amy Deen Westbrook, 'Enthusiastic Enforcement, Informal Legislation: The Unruly Expansion of the Foreign Corrupt Practices Act' (2011) 45 *Georgia Law Review* 489, 567.

52 Joseph G Block and David L Feinberg, 'Look Before You Leap: DPAs, NPAs, and the Environmental Criminal Case' (2010) *ALI-ABA Business Law Course Materials Journal* 7.

53 Convention on the Protection of Environment through Criminal Law, opened for signature 4 November 1998, ETS No 172 (not yet in force).

54 *Directive 2008/99/EC of the European Parliament and the Council of 19 November 2008 on the Protection of the Environment through Criminal Law* [2008] OJ L 328/28.

55 European Commission, *Directive on the Protection of the Environment through Criminal Law* (8 June 2016) Environmental Crime <http://ec.europa.eu/environment/legal/crime/legis_en.htm>.

Even unlikely States such as China are engaged in the creation of environmental crimes.[56] At the international level, efforts continue to create an international environmental criminal law framework. However, according to Cho, the environmental conventions recognising penal measures are not sources of law containing concrete measures of enforcement.[57]

There are also penal sanctions for environmental destruction during armed conflict. According to the *Rome Statute of the International Criminal Court*, an attack that leads to excessive environmental damage as compared to the military objectives anticipated is prohibited.[58] Hence, the notion that environmental misconduct should be punished as a crime is well recognised as a desirable and feasible endeavour.[59] However, crimes against future generations operates beyond the parameters of present-day international environmental criminal law, envisioning the possibility of not only holding the accused liable for immediately felt consequences but also those that may manifest themselves in the future.

Therefore, in a case such as Bhopal, where identifying those responsible (Union Carbide) is relatively simple in terms of legal procedure, it is less so with chronic pollution. According to Scott:

> One of the most intractable problems facing modern environmental law is the issue of chronic pollution. By 'chronic,' I refer to the continuous or continuously recurring exposures to low doses of pollutants and contaminants that characterize the experience of living in the industrialized world … Epidemiological studies now routinely forward claims of irreversible developmental effects at low levels of exposure to certain key chemicals.[60]

This is very unjust for Inuit communities since they are not even participants in industrialised economic activities producing this pollution. They are the victims of pollution produced elsewhere.

II POPS AND INUIT FUTURE GENERATIONS

Given the capacity of polluters to internalise judicial fines it is understandable why the WFC and others are calling for criminal penalties beyond fines to deter behaviour that puts in jeopardy the health and well-being of future generations. Actions compromising the health, safety or even personal potential of future generations burden these generations with incalculable

56 See Michael G Faure and Hao Zhang, 'Environmental Criminal Law in China: A Critical Analysis' (2011) 41 *Environmental Law Reporter* 10024, 10028.

57 Byung-Sun Cho, 'Emergence of an International Environmental Criminal Law?' (2001) 19 *UCLA Journal of Environmental Law & Policy* 11, 18.

58 *Rome Statute of the International Criminal Court*, opened for signature 17 July 1998, 2187 UNTS 90 (entered into force 1 July 2002) art 8(1)(b)(iv) ('*Rome Statute*'). See also Douglas Lackey, 'Postwar Environmental Damage: A Study in Jus Post Bellum' in Larry May and Zachary Hoskins (eds), *International Criminal Law and Philosophy* (Cambridge University Press, 2010) 141.

59 See also Andrew H Costinett et al, 'Environmental Crimes' (2010) 47 *American Criminal Law Review* 441.

60 Nadine D Scott, 'Confronting Chronic, Pollution: A Socio-Legal Analysis of Risk and Precaution' (2008) 46 *Osgoode Hall Law Journal* 293, 294.

injuries. We know this to be true since we are currently witnessing the toll taken on human health and safety by the actions of past generations.[61] When we specifically consider future generations of Inuit communities, the impacts of a compromised natural environment become even more apparent[62] since low-level, chronic environmental contamination is notoriously difficulty to contain in terms of geographic parameters[63] and toxicity is nearly impossible to prove with scientific certainty. In fact, the ambiguous nature of scientific verification of harm due to environmental causes,[64] and its impact on assessing liability or intent to do harm, may be further than international criminal law is prepared to stretch its theoretical foundations.[65] According to McClenaghan et al:

> Although risk assessment is routinely described as an objective, fact-based scientific activity, it is not, and probably never will be. Risk assessment methods are fairly reliable in predicting acute effects from high dose exposures but fall far short in the most important area of environmental concern: chronic, effects from long-term, low dose exposure. As for assessing the real-world situation of exposure to, and the interactive effects of multiple chemicals in the environment, it fails miserably. There is a basic lack of data, of analytical methods, and ongoing challenges in a highly complex field. Moreover, the presentation of results and their incorporation into policy decisions, the risk management extension of the

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61 According to David Christiani from the Harvard School of Public Health: 'credible estimates from the World Health Organization and the International Agency for Research on Cancer suggest that the fraction of cancers currently attributable to toxic environmental exposures is between 7% and 19% –this is hardly trivial': David C Christiani, 'Combating Environmental Causes of Cancer' (2011) 364 *New England Journal of Medicine* 2268. Also, according to *The Lancet*:

> Infants and children … are the groups most susceptible to environmental pollutants because they weigh less, develop faster than adults, retain active toxic chemicals for longer, and their developing brains are more vulnerable to exposure to chemicals. More than 300 industrial chemicals have been found in umbilical-cord-blood. Thus, babies are said to be born pre-polluted.

Editorial, 'Preventable Cancer in the USA' (2011) 375 *The Lancet* 1655.

62 According to Webster:

> With northern research programmes and numerous human-effect observations well-established in the Faroes, Greenland, and Canada, attention has turned in recent years to Russia, the largest Arctic nation. A 5-year AMAP study funded by the Global Environmental Facility recently surveyed human and environmental exposure to hexachlorobenzene (HCB), hexachlorocyclohexane (HCH), dioxins, DDT, PCBs, oxychlordane, toxaphene, mirex, mercury, cadmium, lead, and brominated flame retardants across the entire Russian Arctic.

Paul Webster, 'Health in the Arctic Circle' (2005) 365 *The Lancet* 9461 (emphasis added). 'The authors reported higher concentrations of heavy metals and persistent organic pollutants in Inuit mothers from Inuvik compared with Dene/Metis and non-aboriginal women': Donaldson et al, above n 4; 'The Adult Inuit Health Survey reported *several-fold higher contaminant levels in Canadian Inuit compared with the general Canadian population*': Laird, Goncharov and Chan, above n 4. See also Pál Weihe et al, above n 7; Gibson et al, above n 3.

63 Lisa D Kraemer, James E Berner and Christopher M Furgal, 'The Potential Impact of Climate on Human Exposure to Contaminants in the Arctic' (2005) 64 *International Journal of Circumpolar Health* 498; Ken Sexton et al, 'The Importance of Spatial Effects for Environmental Health Policy and Research' (2002) 8(1) *Human and Ecological Risk Assessment: An International Journal* 109.

64 Theresa McClenaghan, above n 29, 246. See also Olwenn V Martin and Jane A Plant, 'The Scientific Appraisal of Hazardous Substances in the Environment' (2012) in Jane A Plant, Nick Voulvoulis and K Vala Ragnarsdottir (eds), *Pollutants, Human Health and the Environment: A Risk Based Approach* (John Wiley & Sons, 2012) 19–23.

65 See also Andrew Atkins, 'A Complicated Environment: The Problem with Extending Victims' Rights to Victims of Environmental Crimes' (2010) 67 *Washington and Lee Law Review* 1623; Kathleen F Brickey, *Environmental Crime: Law, Policy, Prosecution* (Wolters Kluwer Law & Business, 2008).

> exercise, is equally subject to the value judgements and guesswork that are central to the 'science' of risk assessment.[66]

The debate about who to blame for ongoing, low-dose, chronic pollution does little to alleviate the devastation felt by children in Indigenous communities. Dr Scott discusses one of the most flagrant examples, that of the Aamjiwnaang First Nation reserve in South-Western Ontario. At this reserve, the ratio between male and female births is very much skewed towards females. This is one of many impacts reported by residents, suspected to be caused by chronic exposure to endocrine-disrupting chemicals.[67] In the Inuit context the situation is more complex, as many of the contaminants influencing the health of present and future generations in the Arctic have never been used in this area but have been brought there by prevailing winds and sea currents from any number of sources outside the Arctic.[68]

Children are much more susceptible to environmental contaminants than adults.[69] Proven or suspected detrimental links between various chemicals and the

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66 McClenaghan, above n 29.

67 Dayna Scott, 'Confronting Chronic Pollution: A Socio-Legal Analysis of Risk and Precaution' (2008) 46 *Osgoode Hall Law Journal* 293, 297; Constanze A Mackenzie, Ada Lockridge and Margaret Keith, 'Declining Sex Ratio in a First Nation Community' (2005) 113 *Environmental Health Perspectives* 1295; Diana Cryderman et al, 'An Ecological and Human Biomonitoring Investigation of Mercury Contamination at the Aamjiwnaang First Nation' (2016) 13(4) *EcoHealth* 784. See also J Ram Pillarisetti, 'Skewed Sex Ratio, Environmental Toxins and Human Wellbeing: The Need for Policies' (2016) 73 *International Journal of Environmental Studies* 697, 697–9.

68 According to United States Environmental Protection Agency:

> Some POPs have been used or released in Alaska and other northern regions by military sites, smelters, pulp and paper mills, power stations, mines, and other sources. Others have rarely or never been used locally … Due to global wind patterns, Alaska can receive POPs from both east Asia and northern Europe. POPs can also travel in rivers from southeast and central Asia into the Pacific Ocean, where water currents flow into the Arctic Ocean.

United States Environmental Protection Agency, *International Cooperation* <http://www.epa.gov/international/toxics/pop.html#alaska>. See also Jianmin Ma, Hayley Hung and Robie W Macdonald, 'The Influence of Global Climate Change on the Environmental Fate of Persistent Organic Pollutants: A Review with Emphasis on the Northern Hemisphere and the Arctic as a Receptor' (2016) 146 *Global and Planetary Change* 89; Muhammad Aqeel Ashraf, 'Persistent Organic Pollutants (POPs): A Global Issue, A Global Challenge' (2017) 24 *Environmental Science and Pollution Research* 4223.

69 Union of Ontario Indians Anishinabek Health Secretariat, 'Through the Eyes of a Child – First Nations Children's Environmental Health' (Report, 2009) 12:

> Compared to adults, children consume larger quantities of food and water per unit of body weight. They also breathe faster than most adults and their lungs have a comparatively smaller (and still developing) internal surface area. These differences expose them to larger quantities of any contaminants contained in air, food or water…Absorption of contaminants also varies. For example, a child's body will absorb approximately 50-90% of ingested lead while adults only absorb about 10% of ingested lead. An infant's skin is more permeable and will absorb more contaminants than an adult.

See generally Graham W Chance, 'Environmental Contaminants and Children's Health: Cause for Concern, Time for Action' (2001) 6 *Paediatrics & Child Health* 731; Rebecca Kokish, 'Children's Environmental Health – International Actions and Implications' (2003) 14 *Colorado Journal of International Environmental Law and Policy* 143; Alesia Ferguson, Rosalind Penney and Helena Solo-Gabriele, 'A Review of the Field on Children's Exposure to Environmental Contaminants: A Risk Assessment Approach' (2017) 14(3) *International Journal of Environmental Research and Public Health* 265.

health of children continue to accumulate.[70] In Indigenous communities this is especially alarming given their demographics. The fact is that, in Canada, about half of First Nations and Inuit people are aged 25 years or younger'.[71] In Australia, 60 per cent of the Indigenous population is under 25 years of age.[72] The sheer size of the youth population in many Indigenous communities has substantial implications for the future of these communities. For example, the population under 14 years of age in Canada as a whole is 17 per cent, compared to 33 per cent in Nunavut.[73] Physical, mental, cognitive, behavioural, and other damaging impacts of environmental contamination will shape the future of Inuit people more so than in populations where the demographics are more evenly distributed across various age groups. According to Defur et al:

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70 Lynne R Goldman and Sudha Koduru, 'Chemicals in the Environment and Developmental Toxicity to Children: A Public Health and Policy Perspective' (2000) 108(3) *Environmental Health Perspectives* 443; Philippe Grandjean et al, 'The Faroes Statement: Human Health Effects of Developmental Exposure to Chemicals in Our Environment' (2007) 102 *Basic & Clinical Pharmacology & Toxicology* 73; Lubna E Elabbas et al, 'In Utero and Lactational Exposure to a Mixture of Environmental Contaminants Detected in Canadian Arctic Human Populations Alters Retinoid Levels in Rat Offspring with Low Margins of Exposure' (2014) 77 *Journal of Toxicology and Environmental Health, Part A* 5, 223; Philippe Grandjean and Philip J Landrigan, 'Neurobehavioral Effects of Developmental Toxicity' (2014) *The Lancet Neurology* 13, 330; Marc-André Verner et al, 'Prenatal and Early-Life Polychlorinated Biphenyl (PCB) Levels and Behavior in Inuit Preschoolers' (2015) 78 *Environ International* 90; Jennifer Abbasi, 'Call to Action on Neurotoxin Exposure in Pregnant Women and Children' (2016) 316(14) *JAMA* 1436; Youssef Oulhote et al, 'Children's White Blood Cell Counts in Relation to Developmental Exposures to Methylmercury and Persistent Organic Pollutants' (2017) 68 *Reproductive Toxicology* 207; Joseph M Braun, 'Early-Life Exposure to EDCs: Role in Childhood Obesity and Neurodevelopment' (2017) 13(3) *Nature Reviews Endocrinology* 161.

71 Ontario Trillium Foundation, *Aboriginal Communities in Profile: Ontario* (Report, 2010) <http://www.ontla.on.ca/library/repository/mon/24008/304195.pdf>. See also Statistics Canada, *Aboriginal Peoples in Canada: First Nations People, Métis and Inuit* (Report, 2011) 15:

> In 2011, there were more than 254,515 Aboriginal youth aged 15 to 24, representing 18.2% of the total Aboriginal population, and 5.9% of all youth in Canada. Non-Aboriginal youth numbered just under 4.1 million, and accounted for 12.9% of the non-Aboriginal population. Inuit were the youngest of the three Aboriginal groups, with a median age of 23.

72 Indigenous Peoples' Organisations of Australia Human Rights Network, *Report of Consultations on the 5th Session of the Permanent Forum on Indigenous Issues* (28 April 2006) <http://www.humanrights.gov.au/sites/default/files/content/social_justice/international_docs/word/ipo_report_5thsession_27_28april2006.doc>. See also Australian Bureau of Statistics, *Estimates of Aboriginal and Torres Strait Islander Australians, June 2011* (30 August 2011) <http://www.abs.gov.au/ausstats/abs@.nsf/mf/3238.0.55.001>:

> The Aboriginal and Torres Strait Islander population at 30 June 2011 had a younger age structure than the non-Indigenous population, with larger proportions of young people and smaller proportions of older people. The median age of the Aboriginal and Torres Strait Islander population at 30 June 2011 was 21.8 years, compared to 37.6 years for the non-Indigenous population.

73 Statistics Canada, *Age and Sex, Percentage Distribution for Both Sexes, for Canada, Provinces and Territories* (6 October 2010) <http://www12.statcan.ca/census-recensement/2006/dp-pd/hlt/97-551/pages/page.cfm?Lang=E&Geo=PR&Code=01&Table=1&Data=Dist&Sex=1&StartRec=1&Sort=2&Display=Page>. See also Statistics Canada, above n 71:

> The 2011 NHS showed that there were 392,105 Aboriginal children aged 14 and under in Canada. They represented over one-quarter (28.0%) of the total Aboriginal population, and 7.0% of all children in Canada. In comparison, there were 5.2 million non-Aboriginal children aged 14 and under in Canada, representing 16.5% of the non-Aboriginal population … Almost four in ten Inuit were children aged 14 and under in both Nunavik and Nunavut. Children accounted for 27.8% of Inuit in the Inuvialuit region and 24.7% in Nunatsiavut. Children represented 29.9% of Inuit living outside of Inuit Nunangat.

> Once an emerging contaminant is introduced to an environment, it can move through an ecosystem through bioaccumulation, the accumulation of a contaminant in the tissues of a living organism, or biomagnification, the process by which the concentration of a contaminant increases as it moves up the food chain. A study conducted in 2011 focused on persistent organic pollutants ('POPs') in the Arctic. Through the use of a bioaccumulation model, concentrations of PCBs and DDTs were found to be 10–1000 times higher at the top than at the base of the food web. This finding suggests the biomagnification of these pollutants in Arctic animals.[74]

Research in Nunavik has linked prenatal exposure to polychlorinated biphenyl ('PCB'), a contaminant listed as a POP in the *Stockholm Convention*, with a higher risk of acute infection during the first six months of life.[75] Furthermore, research has found that children in the highest 25 per cent of exposure to PCB had a higher incidence rate of *otitis media*, a common childhood disease.[76]

Infants and children are more vulnerable to POPs because they are still developing, and because they have lower levels of detoxifying enzymes and a reduced number of fat cells to store the POPs.[77] When POPs are stored in fat it is difficult to know if they cause harm, but we know that problems occur when the fat cells are burned for energy.[78] Without fat cells POPs can easily enter the blood stream. A lack of detoxifying enzymes causes POPs to remain in the system, leading to damage of the nervous, immune, endocrine and reproductive systems. Exposure can occur from the mother's breast milk or from transfer to the foetus via the placenta.[79]

A study conducted in the Nunavik region concluded that a higher concentration of PCB in infants' cord plasma was associated with lower weight and height at birth.[80] These results are consistent with other studies conducted in other regions,[81] such as the Faroe Islands, where PCB concentration is two to

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74 Peter L Defur, Laura E Williams and Sarah D Sanford, 'Emerging Contaminants in Virginia' (2016) 40 *William & Mary Environmental Law and Policy Review* 519, 527.

75 See Éric Dewailly et al, 'Susceptibility to Infections and Immune Status in Inuit Infants Exposed to Organochlorines' (2000) 108(3) *Environmental Health Perspectives* 205; Frédéric Dallaire et al, 'Acute Infections and Environmental Exposure to Organochlorines in Inuit Infants from Nunavik' (2004) 112 *Environmental Health Perspectives* 1359; Frédéric Dallaire et al, 'Effect of Prenatal Exposure to Polychlorinated Biphenyls on Incidence of Acute Respiratory Infections in Preschool Inuit Children' (2006) 114 *Environmental Health Perspectives* 1301; Charlotta Rylander, Jon Ø Odland and Torkjel M Sandanger, 'Climate Change and Environmental Impacts on Maternal and Newborn Health with Focus on Arctic Populations' (2011) 4 *Global Health Action* 4, 4–6, 8; Weihe et al, above n 7.

76 Ibid.

77 Terri Damstra, 'Potential Effects of Certain Persistent Organic Pollutants and Endocrine Disrupting Chemicals on the Health of Children' (2002) 40(4) *Clinical Toxicology* 457, 458.

78 Anna Godduhn and Lawrence K Duffy, 'Multi-Generation Health Risks of Persistent Organic Pollutants in the Far North: Use of the Precautionary Approach in the Stockholm Convention' (2003) 6 *Environmental Science & Policy* 341, 348.

79 Esther Vizcaino et al, 'Transport of Persistent Organic Pollutants across the Human Placenta' (2014) 65 *Environment International* 107.

80 Ibid 202; Weihe et al, above n 7; Renée Dallaire et al, 'Exposure to Organochlorines and Mercury through Fish and Marine Mammal Consumption: Associations with Growth and Duration of Gestation among Inuit Newborns' (2013) 54 *Environment International* 85; Rylander, above n 75.

81 'Findings from a Russian Arctic cohort add evidence that higher levels of maternal blood PCBs might be associated with more frequent occurrences of low birth weight, premature births, stillbirths and menstrual

three times higher among infants, and Southern Quebec, where concentration is two to three times lower.[82] PCB concentration also results in negative neurobehavioural impacts.[83] Scientists have found that PCB exposure at a young age has also been linked to issues with reflexes, muscle tone and activity levels.[84] Most studies on neurobehavioural effects concern prenatal exposure and conclude that that embryos and foetuses are particularly at risk. Other issues include lower IQ[85] and hyperactivity[86] in children fed breast milk with high concentrations of PCBs. PCBs and dioxins suppress the antibody and cellular immune responses, and are linked to infertility and reproductive disorders during adulthood,[87] reduced sperm mobility,[88] and an increased menstrual cycle length.[89]

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irregularities': Arctic Monitoring and Assessment Programme, *Persistent Toxic Substances, Food Security and Indigenous Peoples of the Russian North: Final Report* (Report, 2004).

82 'The median cord serum PCB-153 concentration in the Faroese population was 3.4 times higher than the overall median of 140 ng/L.': Eva Govarts et al, 'Birth Weight and Prenatal Exposure to Polychlorinated Biphenyls (PCBs) and Dichlorodiphenyldichloroethylene (DDE): A Meta-analysis within 12 European Birth Cohorts' (2012) 120(2) *Environmental Health Perspectives* 162.

83 Joanna Jurewicz, Kinga Polańska and Wojciech Hanke, 'Chemical Exposure Early in Life and the Neurodevelopment of Children – An Overview of Current Epidemiological Evidence' (2013) 20(3) *Annals of Agricultural Environmental Medicine* 465; Olivier Boucher et al, 'Domain-specific Effects of Prenatal Exposure to PCBs, Mercury, and Lead on Infant Cognition: Results from the Environmental Contaminants and Child Development Study in Nunavik' (2014) 122 *Environmental Health Perspectives* 310.

84 Joseph L Jacobson, Sandra W Jacobson and Harold E B Humphrey, 'Effects of Exposure to PCBs and Related Compounds on Growth and Activity in Children' (1990) 12(4) *Neurotoxicology and Teratology* 319.

85 David O Carpenter, 'Polychlorinated Biphenyls (PCBs): Routes of Exposure and Effects on Human Health' (2006) 21(1) *Reviews on Environmental Health* 11.

86 Ibid 12; Paul W Stewart et al, 'The Relationship between Prenatal PCB Exposure and Intelligence (IQ) in 9-Year-Old Children' (2008) 116 *Environmental Health Perspectives* 1416; Sharon K Sagiv, Sally W Thurston and David C Bellinger, 'Prenatal Organochlorine Exposure and Behaviors Associated with Attention Deficit Hyperactivity Disorder in School-Aged Children' (2010) 171 *American Journal of Epidemiology* 593; Maddalena Mallozzi et al, 'The Effect of Maternal Exposure to Endocrine Disrupting Chemicals on Fetal and Neonatal Development: A Review on the Major Concerns' (2016) 108(3) *Birth Defects Research Part C: Embryo Today* 224, 228–30. Also: 'Potential neurobehavioural effects associated with MeHg exposure have been found in the Faroe Islands in the domains of verbal function, visuomotor integration and attention': Tina Kold Jensen et al, 'Effects of Breast Feeding on Neuropsychological Development in a Community with Methylmercury Exposure from Seafood' (2005) 15 *Journal of Exposure Analysis and Environmental Epidemiology* 423; 'Prenatal exposure to MeHg was associated with greater attention problems and with a substantially increased risk of teacher-reported symptoms consistent with ADHD (but PCB, prenatal Pb, and postnatal Hg exposures were not significantly associated with any of these behavioral)': Olivier Boucher et al, 'Prenatal Methylmercury, Postnatal Lead Exposure, and Evidence of Attention Deficit/Hyperactivity Disorder among Inuit Children in Arctic Québec' (2012) 120 *Environmental Health Perspectives* 1456.

87 Mallozzi, above n 86, 229–30.

88 Anne Vested et al, 'Persistent Organic Pollutants and Male Reproductive Health' (2014) 16(1) *Asian Journal of Andrology* 71; Melissa J Perry et al, 'Sperm Aneuploidy in Faroese Men with Lifetime Exposure to Dichloro Diphenyl Dichloroethylene (DDE) and Polychlorinated Biphenyl (PCB) Pollutants' (2016) 124 *Environmental Health Perspectives* 951; Weihe, above n 7, 4–5.

89 Germaine M Buck Louis et al, 'Persistent Organochlorine Pollutants and Menstrual Cycle Characteristics' (2011) 85 *Chemosphere* 1742.

III FUTURE GENERATIONS AND INUIT CULTURE

Aside from the devastating health consequences, POPs and heavy metals interfere to a large degree with the transmission of Inuit culture. At first glance, the link between POP contaminants, heavy metals and Inuit culture may not be obvious but Inuit culture is very closely tied to the land, ice, flora and fauna of the Arctic. Historically, the Inuit obtained their food from traditional activities such as hunting, fishing and foraging. Much of their culture is linked to these activities. Interestingly, studies have found that the mortality rate from coronary heart disease in Inuit populations is much lower compared to other Arctic populations. This is due to the nutritional profile of country food (traditional Inuit food), which contains high levels of omega-3 fatty acids and selenium.[90] However, coronary heart disease is also linked to exposure to POPs.[91] Therefore, Inuit traditional food may in fact counterbalance to a degree the negative effects of the ingested pollutants.[92] Public policies encouraging a move away from country food may do more damage than good for the Inuit, since store-bought food is linked to coronary heart disease without any protective factor. Therefore, traditional Inuit foods that are a major source of contaminants linked to heart disease are able to negate the elevated risk due to their nutritional content. In fact:

> A 70-year-old Inuit in Greenland has coronary arteries as elastic as those of a 20-year-old Dane eating Western foods, says Dr. Gert Mulvad of the Primary Health Care Clinic in Nuuk, Greenland's capital. Some Arctic clinics do not even keep heart medications like nitroglycerin in stock.[93]

The younger generations, however, avoid these foods, partly due to external influences, but also because they are aware of the high levels of POPs and heavy metals the animals contain.[94] Not only are they being deprived of the nutrition

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90 Damstra, above n 77, 208; John H Burgess, *Doctor to the North: Thirty Years Treating Heart Disease among the Inuit* (McGill-Queen's University Press, 2008); Philip C Calder, 'New Evidence that Omega-3 Fatty Acids Have a Role in Primary Prevention of Coronary Heart Disease' (2017) 1 *Journal of Public Health and Emergency* 2.

91 David O Carpenter, *Effects of Persistent and Bioactive Organic Pollutants on Human Health* (Wiley, 2013) ch 5; Stefan A Ljunggren et al, 'Persistent Organic Pollutants Distribution in Lipoprotein Fractions in Relation to Cardiovascular Disease and Cancer' (2014) 65 *Environment International* 93; Jordan T Perkins et al, 'Polychlorinated Biphenyls and Links to Cardiovascular Disease' (2016) 23 *Environmental Science and Pollution Research* 2160.

92 'Although the body burdens of PCBs and dioxin-like compounds are close to those which induced adverse health effects in laboratory animals, dietary benefits from the sea-food based diet still outweigh the hypothetical health risks.': Pierre Ayotte et al, 'PCBs and Dioxin-like Compounds in Plasma of Adult Inuit Living in Nunavik (Arctic Quebec)' (1997) 34(5–7) *Chemosphere* 1467. About the 'Arctic dilemma', see Bente Deutch et al, 'Traditional and Modern Greenlandic Food – Dietary Composition, Nutrients and Contaminants' (2007) 384 *Science of the Total Environment* 1; Eva M Krümmel, 'The Circumpolar Inuit Health Summit: A Summary' (2009) 68 *International Journal of Circumpolar Health* 509; Peter Bjerregaard and Gert Mulvad, 'The Best of Two Worlds: How the Greenland Board of Nutrition Has Handled Conflicting Evidence about Diet and Health' (2012) 71 *International Journal of Circumpolar Health*.

93 Marla Cone, 'Dozens of Words for Snow, None for Pollution' (January/February 2005) <http://www.motherjones.com/environment/2005/01/dozens-words-snow-none-pollution>.

94 Carole Blanchet, 'Nutrition and Food Consumption among the Inuit of Nunavik' (Report, Nunavik Regional Board of Health and Social Services, 2008) 143.

these foods offer, such as protection from cardiovascular disease and a myriad other health benefits, but in avoiding eating animals, they also lose the opportunity to become bearers of the traditional knowledge associated with hunting, fishing, trapping, preparing the food and using various parts of the animals for other purposes.[95]

In addition to traditional knowledge related to the catching and use of animals, traditional knowledge related to plants is also in jeopardy. Contamination of plants used in traditional diet and/or medicine has led to the avoidance of those as well. Hence, medicinal plants that traditionally healed people may in fact be making them ill.[96] Being able to identify and use medicinal plants properly is a vital part of Inuit culture and it is being threatened, not only by POPs, but also by climate change which coincidently aggravates the POP problem.[97] Climate change, like POPs, is impacting Indigenous culture by altering the relationships Indigenous peoples have with nature.[98]

It is also important to reflect, especially in the context of Indigenous communities, on the value of plants and animals as 'regulators of climate and the environment; aesthetic inspirations for art and literature; elements of religious ceremonies and other *ethical and moral* dimensions'.[99] In Indigenous worldviews, generally speaking, separating humanity from the natural world is artificial. The present world incorporates both the living and the spiritual realms, and reverence for nature must be maintained since everything necessary for survival is gotten from nature.[100] According to Anne Barron, the subtlety of this

95 See also Sarah R Hamilton, 'Toxic Contamination of the Arctic: Thinking Globally and Acting Locally to Protect Arctic Ecosystems and People' (2004) 15 *Colorado Journal of International Environmental Law and Policy* 71; Frank Sowa, '*Kalaalimernit*: The Greenlandic Taste for Local Foods in a Globalised World' (2015) 51 *Polar Record* 290; Carie Hoover et al, 'The Importance of Hunting for Future Inuit Food Security' (2016) 7(4) *Solutions* 40.

96 Union of Ontario Indians Anishinabek Health Secretariat, above n 69, 31:

> When traditional medicines such as yarrow and sumac are used, the chemicals are ingested, absorbed, or inhaled. It is not clear how many of these chemicals enter the human system through these avenues but similar exposures through the food chain have demonstrated the health effects of low-dose consumption of pesticides.

97 See, eg, Eric McLamb, 'Climate Change Intensifies Impact of POPs: UNEP Study', *Ecology* (online), 5 January 2011 <http://ecology.com/ecology-today/2011/01/05/climate-change-intensifies-impact-of-pops-un-study/>:

> Climate change increases the planet's vulnerability to persistent organic pollutants (POPs), a United Nations research team recently concluded in a major study … The study was conducted by climate and chemical experts from 12 countries, and is the first systematic and authoritative review of the impact of climate change on the release of POPs into the environment, their long-range transport and environmental fate, and human and environmental exposure.

98 Konstantia Koutouki and Natasha Lyons, 'Canadian Inuit Speak to Climate Change' (2009) 27 *Wisconsin International Law Journal* 516; Chris Furgal and Louis Rochette, 'Qanuippitaa? How Are We?: Perception of Contaminants, Participation in Hunting and Fishing Activities, and Potential Impacts of Climate Change' (Report, Regional Board of Health and Social Services, 2007).

99 Konstantia Koutouki, 'A Legal Placebo: The Role of International Patent Law in the Protection of Indigenous Traditional Knowledge of Medicinal Plants' (2010) 26(1) *Canadian Intellectual Property Review*, 31.

100 United Nations Department of Economic and Social Affairs, *State of the World's Indigenous Peoples*, vol 9 (United Nations Publications, 2009).

worldview can be all-encompassing, even when contemplating a concept such as the law:

> For all Australian Aboriginal peoples, the Law is a dimension of what is referred to in English as The Dreaming, the origin of all things and the very ground of being itself. The Dreaming is 'an ontologically prior set of events', a mythical past that conditions and participates in every aspect of the present, in which the ancestors of everything that now exists performed the actions that created the world. Geographical features, animate species, the norms that organize human relations and the order of the world itself owe their existence to the events of the Dreaming: an outcrop of rock may mark the spot at which an ancestor 'went into the ground,' or a track, the line of its movement across the landscape.[101]

Therefore, the environmental contamination of the natural world can be assessed not only for its for its consequences to the physical health of present and future Indigenous youth but also for harm caused to their spiritual and cultural life as well.

It would seem critical, given the extensive harm associated with both chronic and spontaneous environmental contamination, that criminal sanctions be possible against the perpetrators, especially because of the moral culpability dimension of the harm caused. But how to do this when the release of these toxic chemicals into the natural world is currently perfectly legal, though regulated, and the emission of contaminants occurs in one part of the world but the harm in another?

International environmental law policymakers need to step up and find a way to protect future generations. Although the work of the WFC and the recent announcement of the ICC are positive steps forward, they do not deal with the legal, chronic, low-level contamination wreaking havoc with the health and culture of Inuit children, as well as Inuit future generations. When we consider that many of these toxic substances are released into ecosystems simply to grow food, half of which we throw away, and disposable consumer products of questionable social value such as the 120 billion pieces of disposable plastic cutlery used in India every year,[102] the harm suffered by the Inuit and their future generations is definitely morally culpable and should be criminally so as well.

Given the impact ecological misconduct can have for future generations, deterrence should be a priority. However, as we saw earlier, the current civil and criminal justice systems are not necessarily equipped to assess and award damages that reflect the true extent of harm in ecological contamination cases. According to Romero, in the *Exxon Valdez* case[103] the award of $507 million 'would do little to deter a corporation like Exxon from repeating its reckless management … Exxon's profit exceeded $40 billion in 2007, and … made on average $507.5 million every 4½ days in 2007'.[104]

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101 Anne Barron, 'Authority, Property and Aboriginal Art' in Lionel Bently et al (eds), *Perspectives on Intellectual Property* (Sweet & Maxwell, 1998) 47.

102 Mica Kelmachter, 'India's Edible Cutlery Points the Way For A Zero-Waste Future', *Forbes* (online), 30 March 2016 <http://www.forbes.com/sites/micakelmachter/2016/03/30/indias-edible-cutlery-paves-the-way-for-asia-to-dream-of-zero-waste/>.

103 *Exxon Shipping Co v Baker* 554 US 471 (2008).

104 Leo M Romero, 'Punishment for Ecological Disasters: Punitive Damages and/or Criminal Sanctions' (2009) 7 *University of St Thomas Law Journal* 154, 165.

IV CONCLUSION

The health and security of Indigenous children is a vitally important issue that needs to be addressed in an effective manner. Given the still fragile state of many Indigenous communities and the overwhelmingly young populations found in these communities, environmental contamination that jeopardises Indigenous youth puts entire nations at risk. While the creation of a new legal regime in the form of crimes against future generations would go far in demonstrating the significance and moral culpability of environmental contamination, chronic low-level pollution is notoriously difficult to integrate into such a legal framework. Special consideration of this type of environmental contamination is necessary since, unlike large-scale environmental disasters, it lacks geographic locality, and easily discernable contamination impact. The disastrous effects it can have on Indigenous youth and future Indigenous generations can already be witnessed in most Indigenous communities. However, identifying which of the numerous health issues are directly related to which of the thousands of compounds or combination thereof is very elusive. As Hefendehl explains, little consensus exists in the international arena concerning environmental law in general and environmental criminal law in particular.[105]

For Indigenous communities, time is of the essence. Even with an increased birthrate many communities are on the brink of disappearing.[106] Environmental health and security issues that jeopardise Indigenous children's lifespans, capacity to function, general health, and ability to learn, practice and develop their culture, threaten the survival of many of the world's Indigenous peoples. Ironically, the theoretical foundation, although not often mentioned in academic circles, for crimes against future generations is the Indigenous philosophy of 'seven generations'. Basically, before we act we must consider the impact of those actions on the next seven generations; not doing so is morally objectionable. According to EagleWoman:

> When Europeans arrived in these lands, they viewed the abundance and fertility of the lands with an eye to immediate consumption. They did not see that these lands were stewarded as a resource for the current generations and as a storehouse of abundance for the next seven generations. As the United States consumes the resources of these lands, it is stealing the prosperity that is the intended inheritance of future generations of Indigenous peoples here, the prosperity that our ancestors planned for the generations now alive to enjoy. In Tribalist Economics, future

105 Roland Hefendehl, 'Addressing White Collar Crime on A Domestic Level: Any Lessons Learned for International Criminal Law?' (2010) 8 *Journal of International Criminal Justice* 769, 779.

106 United Nations, above n 100; Carolyn Stephens, 'Disappearing, Displaced, and Undervalued: A Call to Action for Indigenous Health Worldwide' (2006) 367 *The Lancet* 9527, 2019; 'Increases in longevity and decreases in mortality are not equal for all population groups or regions. In particular, mortality rates in high-percentage Aboriginal areas are elevated for a range of diseases and injuries': Paul A Peters, 'An Age- and Cause-Decomposition of Differences in Life Expectancy between Residents of Inuit Nunangat and Residents of the Rest of Canada, 1989 to 2008' (Report, Statistics Canada, 2013); 'Compared with the population of Canada overall, Inuit face challenges in terms of physical and mental health and well-being. Evidence of this health gap includes shorter life expectancy and higher infant mortality rates': Susan Wallace, 'Inuit Health: Selected Findings from the 2012 Aboriginal Peoples Survey' (Report, Statistics Canada, 2014) 6; Statistics Canada, 'Aboriginal Statistics at a Glance (2nd Edition)' (Report, 2015) 11.

> generations are planned for; their inheritance is the stewarded resources passed on from their ancestors and then they, in turn, pass on stewarded resources to the next generations.[107]

107 See also Angelique EagleWoman and Wambdi A Wastewin, 'Cultural and Economic Self-Determination for Tribal Peoples in the United States Supported by the UN Declaration on the Rights of Indigenous Peoples' (2010) 28 *Pace Environmental Law Rev*iew 357.