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The archetypal ecocide: is environmental devastation in the Alberta oil sands an international crime?

Kate Mackintosh* and Lisa Oldring**

Abstract

The Alberta oil sands operations have long been referred to as ‘ecocidal’ in view of the environmental devastation they cause. Yet the oil sands operations continue to grow, with the rewards, risks and damages provoking polarized reactions. Government and corporate industry sources highlight the oil sands as ‘an immense economic driver’ and ‘a secure source of energy for the world’. Critics, including many Indigenous peoples in the region, protest the severe environmental destruction wrought by the extractive operations as criminal acts of ‘ecocide’. In this article, we apply the contemporary proposed definition of the international crime of ecocide to the Alberta oil sands operations. While there has been a wealth of comment on this definition of the crime, there are fewer attempts to apply it to real life examples of environmental destruction. This article builds on this work, using a detailed application of the proposed definition to the oil sands operations both to highlight the ecological devastation they cause and to explore some of the definition’s nuances, revealing areas which may need more thought.

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1. Introduction

In September 2011, two CEOs were found guilty of ecocide for their role in the Alberta oil sands operations. Although the trial was held in the UK Supreme Court and led by senior barristers, the CEOs were played by actors and the trial was a mock one, designed to get the concept of ecocide debated as widely as possible.¹ Fifteen years later that conversation has moved ahead: the criminalization of the worst environmental harm has growing public support,² and four states have proposed that the crime of ecocide be added to the statute of the International Criminal Court. This would mean that individuals could be prosecuted either by a state with jurisdiction or by the Court in the Hague.³ The prohibition of ecocide in domestic law is progressing in a number of States and at the level of the European Union.⁴ Ecocide is not prohibited as a crime under Canadian legislation.

Meanwhile the oil sands operations have only grown, with the rewards, risks and damages continuing to provoke polarized reactions. Government and corporate industry sources highlight the oil sands as ‘an immense economic driver’ and ‘a secure source of energy for the world’. Critics, including many Indigenous peoples in the region, protest the severe environmental destruction wrought by the extractive operations as not only ‘ecocide’ but a ‘slow industrial genocide’ and ‘regulated murder’.⁵

¹ The brainchild of ecocide law pioneer Polly Higgins, the mock trial was organised by The Hamilton Group, <https://www.ackroydandharvey.com/carbon-13/>. See also “Test trial convicts fossil fuel bosses of ‘ecocide’”, The Guardian, 5 October 2011: <https://www.theguardian.com/environment/damian-carrington-blog/2011/sep/29/ecocide-oil-criminal-court>; “Stop the tar sands destruction – outlaw this ecocide”, Polly Higgins, The Guardian, 17 November 2011.

² Global Commons Alliance (2024)

³ See Rome Statute of the International Criminal Court, and “The ICC at a glance” <https://www.icc-cpi.int/sites/default/files/Publications/ICCAtAGlanceENG.pdf>

⁴ At EU level, offences ‘comparable to ecocide’ appear in the 2024 Environmental Crime Directive (EU) 2024/1203. The Council of Europe 2025 Convention on the Protection of the Environment through Criminal Law also includes a “particularly serious offence” which, as its Explanatory Report details, “can encompass conduct comparable to ‘ecocide’” (Explanatory Report para. 172). See also Zhang and Mackintosh (2025) and <https://www.stopecocide.earth/leading-states>.

⁵ See eg. Kusnetz (2021) ‘Indigenous groups say Big Oil’s pollution threatens their existence in Canadian forest’; Morin (2024); Huseman & Short (2012).

In this article, we follow in the footsteps of our predecessors by applying the contemporary proposed definition of ecocide to the oil sands operations.⁶ While there has been a wealth of comment on this definition of the crime⁷, there are fewer attempts to apply it to real life examples of environmental destruction. Notable exceptions include pieces by Chiarini (2024), Kozak (2024), Udell (2023), Heller (2021) and the case studies in the 2023 Promise Institute symposium.⁸ This article builds on this work, using a detailed application of the proposed definition to the Alberta oil sands operations both to highlight the ecological devastation they cause and to explore some of the definition's nuances, revealing areas which may need more thought. We adopt a teleological (or 'purposive') approach to interpreting the proposed definition of ecocide, examining the elements of the definition according to the object and purpose of the proposed international crime.

...

In September 2024, the Pacific Island States of Vanuatu, Fiji and Samoa, parties to the ICC's Rome Statute, formally proposed that the Statute be amended to include a fifth crime of ecocide.⁹ They were joined the following month by the Democratic Republic of Congo.¹⁰ The Pacific Island States propose the definition issued by the Independent Expert Panel in June 2021 (the "Pacific Island States' definition" and the "IEP", respectively),¹¹ according to which ecocide means **"unlawful or wanton acts committed with knowledge that there is a substantial likelihood of severe and either widespread or long-term damage to the environment being caused by those acts."**¹²

⁶ This article does not address the additional, significant environmental impacts stemming from the transportation and further processing of fossil fuels exported from the Alberta oil sands.

⁷ For a comprehensive overview of scholarship since the IEP Pacific Island States' definition was issued in June 2021, see <https://ecocidelaw.com/bibliography/>

⁸ See eg. Chiarini (2024); Kozak (2024); Udell (2023); Heller (2021, *Opinio Juris*); Samuels-Jones (UCLA Promise Institute Symposium 2023: 'An International Crime of Ecocide: New Perspectives'); Busse and Rogers (UCLA Promise Institute Symposium 2023: 'An International Crime of Ecocide: New Perspectives'); and Mackintosh, Swaak-Goldman, Dawson and van der Woude (UCLA Promise Institute Symposium 2023: 'An International Crime of Ecocide: New Perspectives').

⁹ See <https://www.theguardian.com/law/article/2024/sep/09/pacific-islands-ecocide-crime-icc-proposal>, and Vanuatu's Statement to the 23rd Session of the Assembly of States Parties of the ICC, 3 December 2024 https://asp.icc-cpi.int/sites/default/files/asp_docs/ASP23-GD-VUT-3-12-ENG.pdf.

¹⁰ Statement made by the Democratic Republic of Congo at the Convention on Biodiversity COP, 31 October 2024, <https://ecojurisprudence.org/initiatives/democratic-republic-of-congo-declaration-for-an-international-crime-of-ecocide/>

¹¹ See "Proposal – Independent Crime of Ecocide" signed by Ambassador Odo Tevi of Vanuatu, available at https://static1.squarespace.com/static/5ca2608ab914493c64ef1f6d/t/66e34b2fd56f13659fd7a093/1726171951982/Prposal_9thSeptember_Vanuatu_RomeStatute.pdf/

¹² The IEP definition and commentary are available at: [https://static1.squarespace.com/static/5ca2608ab914493c64ef1f6d/t/60d7479cf8e7e5461534dd07/1624721314430/SE+Foundation+Commentary+and+core+text+revised+\(1\).pdf](https://static1.squarespace.com/static/5ca2608ab914493c64ef1f6d/t/60d7479cf8e7e5461534dd07/1624721314430/SE+Foundation+Commentary+and+core+text+revised+(1).pdf)

Applying the Pacific Island States' definition's threshold of harm – “severe and either widespread or long-term damage to the environment” – to the oil sands operations leads us to take issue with critiques of this definition as anthropocentric.¹³ An anthropocentric crime (or world view) places humans at the centre: the crime is committed to the extent its effects are experienced by human beings.¹⁴ As our assessment underlines, and unlike the majority of other Rome Statute crimes, the Pacific Island States' definition explicitly does *not* require human harm to be threatened or established for ecocide to take place. But the definition goes further than this by including both human and non-human elements in its description of harm, eroding the separation between humans and the rest of nature. Harm to “any element of the environment, including grave impacts on human life” are relevant to determining ecocide.¹⁵ The environment itself is defined to include the biosphere,¹⁶ which is generally understood as “a global ecosystem composed of living organisms (biota) and the abiotic (nonliving) factors from which they derive energy and nutrients.”¹⁷ In this respect, the definition is better described as “ecocentric”, a perspective which sees humans as indivisible from the rest of nature. Indeed, the understanding that harms to human and non-human nature are interrelated, if not inseparable, provides the very rationale for proposing ecocide as an international crime.¹⁸

Our examination of whether the damage caused by the oil sands operations can be classified as “wanton” under the definition adds layers to this. The wanton test explicitly introduces consideration of the value of the environment to humans, requiring harms to be balanced against social and economic benefit. At first glance, this re-introduces the division between human and non-human nature. However, a closer look reveals a more complex equation, in which human interests feature on both sides. The more pressing questions arise over the distribution of benefits and harm, and how considerations of justice and equity are to be integrated into the test. The prohibition of adverse

¹³ See, for example, Matthew Gillett's essay in this volume, which classifies the definition as belonging to a “social utility school”, as well as Liana Georgieva Minkova, *The Fifth International Crime: Reflections on the Definition of “Ecocide”*. *Journal of Genocide Research*, Vol. 25(1), pp. 62–83 (2023).

¹⁴ “Anthropocentrism regards humans as separate from and superior to nature and holds that human life has [intrinsic value](#) while other entities (including animals, plants, mineral resources, and so on) are resources that may justifiably be exploited for the benefit of humankind.” <https://www.britannica.com/topic/anthropocentrism>

¹⁵ Pacific Island States' definition, above note 11, paragraph 2(b).

¹⁶ Pacific Island States' definition, paragraph 2(e).

¹⁷ <https://www.britannica.com/science/biosphere>

¹⁸ In her article ‘Criminalizing Ecocide’ (2024), Rebecca Hamilton interprets the definition to the contrary, as separating humans from nature. See below, Section 2.b.iv for a more detailed rebuttal of this interpretation.

distinction in international human rights law, and reference to its application in the Rome Statute Article 21(3), may provide a way to avoid the test replicating or perpetuating discriminatory outcomes.

Finally, our examination of whether acts related to the oil sands extractive operations may be “unlawful”, the alternative criterion to wanton under the definition, underlines the importance of referral to both national and international law. While the domestic regulator has issued fines relating to transgressions at the Alberta operations, Indigenous groups and individuals, along with other affected populations, have convincingly argued that these are inadequate. Allegations of corporate capture of the regulator – which is purportedly an arms-length, independent body but which operates with ‘direct industry participation’¹⁹ – further underline the weakness of relying on national law alone. At the international level, human rights law seems the most relevant body which might be transgressed and so render the activities unlawful. Issues also arise around the distinction between specific material acts (such as extraction, processing and combustion) and the corresponding environmental harm, and the threshold for unlawfulness, raising the important question of whether a pattern of illegality related to these acts would meet the test. This is especially pertinent given the compound and cumulative nature of environmental harm caused by the oil sands operations, as we discuss in section 2.

In order for a crime to be committed, one or more individuals responsible for the prohibited acts must have acted with knowledge that there was a substantial likelihood of that scale of damage being caused by those acts. Unlike the organisers of the 2011 mock ecocide trial, we are not here concerned with identifying individuals with potential liability for ecocide, whether from government, industry or the various regulatory bodies. But in view of the wealth of documentation of the deleterious effects of the oil sands operations over many years, it seems likely that many such individuals could be said to have acted with this knowledge. In particular, as the harm has already manifested, the question of risk would seem to be resolved. A similar logic suggests that the *mens rea* in the definition of wanton: reckless disregard for disproportionate damage – would also be met.

¹⁹ Canadian Energy Centre, “Change at the top: meet Rob Morgan, new CEO of the Alberta Energy Regulator; Restructured AER aims a return to its technical roots”, 20 August 2025, <https://www.canadianenergycentre.ca/change-at-the-top-meet-rob-morgan-new-ceo-of-the-alberta-energy-regulator/>

2. Overview of the Alberta oil sands

The Lower Athabasca region of Alberta encompasses most of Canada's oil sands deposits, which lie beneath vast swaths of boreal forest.²⁰ Often referred to as the 'northern lungs of the world' or the 'Amazon of the North', the boreal forest as a whole is the single-largest terrestrial carbon storehouse in the world and a significant regulator of the effects of climate change.²¹ The Northern Alberta boreal forest is nesting ground for billions of birds and waterfowl, and a critical habitat for fish and wildlife including the threatened woodland caribou and wood bison.²² It is also the traditional territory of many First Nations and Metis communities, and home to approximately 23,000 Indigenous peoples from 18 First Nations and six Metis settlements.²³ The Canadian Heritage-designated Athabasca river runs from south to north, connecting Fort McMurray, Fort MacKay, the oil sands operations, and Fort Chipewyan.²⁴ Downstream where the Peace and Athabasca rivers meet lies the Peace-Athabasca Delta, one of the world's most ecologically significant freshwater wetlands. A designated Ramsar Convention wetland and UNESCO World Heritage Site, the Delta is the "lifeblood for the local Cree, Chipewyan and Métis peoples".²⁵

The Alberta oil sands operations began in the 1960s, when the American company Sun Oil started construction of the Great Canadian Oil Sands Limited plant to the north of Fort McMurray near the mostly-Indigenous settlement of Fort McKay. Oil sands extraction operations have since grown to cover 142,200 km² of land in the Athabasca, Cold Lake and Peace River areas of Alberta, an area roughly the size of Greece or Nepal. The operations are private sector-owned and operated, a majority by corporate interests based in the United States, as well as corporations in Canada, Asia and Europe.²⁶ Most are 'royalty projects', with approval granted by the Government of Alberta in

²⁰ 'Oil sands' are composite of water, clay, sand and bitumen, which is a low-grade, thick, viscous form of crude oil. For details on the industrial oil sands extractive processes through in situ and open pit mining, see <https://pathwaysalliance.ca/who-we-are/about-the-oil-sands/>; and <https://www.oilsandsmagazine.com/technical/mining/surface-mining>.

²¹ <https://naturecanada.ca/discover-nature/canadas-different-environments/canadas-boreal-forest/>

²² https://www.parklandinstitute.ca/ten_things_to_know_about_indigenous_people_and_resource_extraction_in_alberta

²³ Ibid.

²⁴ See Regional Aquatics Monitoring Program (RAMP) (2025)

²⁵ Brackley (2024)

²⁶ See "Who Benefits? An Investigation Into Foreign Ownership in the Oil Sands", Environmental Defence, Équiterre, and Stand.earth, May 2020, <https://old.stand.earth/sites/stand/files/report-foreign-ownership-oilsands.pdf>, although the

return for royalties on crude bitumen.²⁷ The Alberta oil sands currently represent the world's third-largest proven oil reserve with over 170 billion barrels of oil, comprising 97% of Canada's proven reserves.²⁸

The industrial development of the Alberta oil sands is embedded within the history of colonialism and Canada's resource extraction economy, which continues to shape the relationship between Indigenous peoples and the federal and provincial governments in Canada.²⁹ The oil sands lie within the First Nations territories covered by Treaties 6 and 8, which were signed in 1876 and 1899 between the Canadian government and Indigenous peoples. While the history of these treaties is controversial, their validity is recognized and affirmed in section 35 of the Constitution Act of 1982. Some Indigenous communities have entered financially-lucrative agreements and partnerships with the oil sands industry, though whether these arrangements were agreed with 'free, prior and informed' consent is questionable.³⁰ Extensive concerns related to oil sands development have been expressed over many years by First Nations, Indigenous individuals and organisations, and Métis individuals and settlements.³¹

The environmental toll of the oil sands operations has deeply altered the relationship of Indigenous peoples to local ecosystems, impeding the exercise of their treaty and constitutional rights to cultural and subsistence practices including fishing, hunting, trapping and gathering. Historical records demonstrate, for instance, how the town of Fort McMurray and the Syncrude corporation collaborated in the 1970s "to evict and demolish Moccasin Flats, a Métis settlement that existed in Fort McMurray since at least the 19th century" in order to advance corporate interests and make

number of 'foreign entities' in the oil sands is shrinking: "Foreign companies are exiting the oilsands — and maybe investors too", Financial Post, 10 October 2024, <https://financialpost.com/commodities/energy/alberta-oilsands-becoming-more-canadian>.

²⁷ <https://www.alberta.ca/royalty-oil-sands>

²⁸ <https://natural-resources.canada.ca/our-natural-resources/energy-sources-distribution/fossil-fuels/crude-oil/what-are-oil-sands/18089>

²⁹ Parlee (2015)

³⁰ On the diverse and 'nuanced, dynamic, and strategic' perspectives of Indigenous groups, see Indigenous Climate Action and EcoJustice (2021). See also Birrell (2022), who argues that "(l)eaders who entered into these agreements did so knowing that the bitumen mining projects would be going forward with or without their consent, and that these developments would further disrupt the lands they depended on for their livelihoods. The choice they had was not whether the projects would proceed, but whether they could secure an economic future for their communities and the generations to come". For an industry regulator perspective, see Jaremko (2013), p 107.

³¹ See Indigenous Climate Action and EcoJustice (2021), above note 31.

space for oil company housing.³² As we examine below, oil sands operations have since further displaced Indigenous peoples, fragmented bird and wildlife habitats, contaminated water, polluted air, razed forested land, and diverted and drained waterways, with significant impacts on ecosystems and the lives, health and well-being of local populations. These impacts have led scientists to summarize the Alberta oil sands extractive region as a ‘sacrifice zone’.³³

Despite the “grave and still poorly-understood implications” of the Alberta oil sands operations, the extractive operations continue to grow, driven by short term economic incentives, corporate profit and government subsidies.³⁴ Production is expanding, with output of oil sands raw bitumen averaging 3.4 million barrels daily in 2023 and production expected to reach 3.7 million barrels per day by 2030 according to industry forecasts.³⁵ The Canadian Energy Regulator expects oil sands production to increase to 4.3 million barrels daily by 2039 before beginning to decline.³⁶ In November 2025 the federal government entered an MOU with the provincial government of Alberta which, under conditions that include advancement of a massive carbon capture and storage project, would see the construction of a new bitumen pipeline. The proposed pipeline would carry an additional million-plus barrels daily from the Alberta oil sands to coastal British Columbia for export. The MOU promotes Indigenous consultation, as well as the potential for co-ownership, but does not require the free, prior and informed consent of Indigenous peoples.³⁷

3. Alberta oil sands and the crime of ecocide

³² Longley (2021), Chapter 7.

³³ Westman & Joly (2019).

³⁴ McLachlan (2014). See also eg McKenzie, Beedell & Corkal, (2022); Stephenson (2024); Kwetásel’wet Wood (2025).

³⁵ Canada Energy Regulator: Provincial and Territorial Energy Profiles - Alberta, (2024); Hwang and Birn (2023)

³⁶ Williams (2021).

³⁷ Canada-Alberta Memorandum of Understanding, 27 November 2025, <https://www.pm.gc.ca/en/news/backgrounders/2025/11/27/canada-alberta-memorandum-understanding>

The Alberta oil sands operations have been referred to as ecocide by affected Indigenous communities,³⁸ in scholarly works³⁹ and in media articles.⁴⁰ In the following sections we consider whether the destruction created by the oil sands could meet the definition of ecocide proposed as an amendment to the Statute of the ICC by the Pacific Island States in September 2024. We consider primarily whether the pollution from the oil sands satisfies this definition, but the damage caused by the extraction and processing of the bitumen is compounded by the greenhouse gases emitted by its combustion. To properly assess whether the harm reaches the threshold of ecocide, therefore, the greenhouse gas effect on climate disruption must be taken into account. This is also considered below.

a. Severe and widespread or long-term damage to the environment

The Pacific Island States' definition of ecocide considers the "environment" to include "the earth, its biosphere, cryosphere, lithosphere, hydrosphere and atmosphere, as well as outer space". The harm caused by the Alberta oil sands operations clearly impacts the "environment", as it involves soil, water and air pollution, including significant greenhouse gas emissions⁴¹; immense water consumption, with impacts on river systems, lakes and groundwater; and razing of forest, vegetation and wetlands. Reference to the "biosphere" along with further detail around protected elements of

³⁸ See for eg "We are the land. So when you're destroying that land, when you're committing ecocide, you're committing genocide." Mike Mercredi, member of the Athabasca Chipewyan First Nation, as quoted in <https://www.nbcnews.com/news/world/indigenous-groups-say-big-oils-pollution-threatens-existence-canadian-rcna5946>. See also Morin (2024)

³⁹ Crook & Short (2014).

⁴⁰ Higgins (2011); Kusnetz, Surma & Talmazan (2021); Spinks (2011).

⁴¹ The consideration of greenhouse gases as pollution, rather than in a separate category of environmental harm, is increasing common, especially since the 21 May 2024 Advisory Opinion on Climate Change and International Law from the International Tribunal on the Law of the Sea which concluded that "anthropogenic GHG emissions into the atmosphere constitute pollution of the marine environment" (para 179), https://www.itlos.org/fileadmin/itlos/documents/cases/31/Advisory_Opinion/C31_Adv_Op_21.05.2024_orig.pdf

the environment in the definitions of the terms severe, widespread and long-term indicate that living creatures, including humans, are also envisaged.⁴²

Assessing the extent of environmental harm caused by Alberta's oil sands operations is complicated by the lack of accurate, comprehensive, integrated and publicly-accessible data, as well as complexities related to the attribution of harm.⁴³ The last decade has seen improvements in terms of "governance, expanded geographical scope, and inclusion of Indigenous communities" in environmental monitoring of the oil sands, however significant issues remain.⁴⁴ Research suggests that details of the harm to ecosystems remain obscured and cumulative impacts have not been assessed, while the lived experiences, knowledge and perspectives of Indigenous peoples in the region have been marginalized or ignored altogether.⁴⁵

Indigenous peoples have, for many years, decried the caustic changes to land, air and water quality caused by the oil sands operations, with some reporting air pollution "so bad they cannot open their windows because it hurts their lungs to breathe" and that they can "feel the toxicity that enters their lungs: a pungent stench that irritates the eyes, throat and nose".⁴⁶ Access to land-based traditional activities has been impeded by land and habitat fragmentation, while toxins affecting traditional food sources have further altered Indigenous hunting and fishing practices.⁴⁷ Elevated rates of cancer and other serious illnesses have been recorded in the Indigenous communities along the Athabasca river, as have higher than usual incidents of rare cancers, and consumption of traditionally-caught fish and meats has been linked to high rates of cancer.⁴⁸ Anxiety related to this reality is further driving a shift away from traditional food sources, with culturally-significant compound impacts for Indigenous communities considering, for example, that "fish are not only a source of food but are seen as kin and a symbol of cultural survival and resistance to colonialism".⁴⁹

⁴² See for eg, Encyclopedia Britannica, above note 15, and NASA: "The Biosphere includes all life on Earth including life living on the Earth's Geosphere and in Hydrosphere, including humans and all organic matter that has not yet decomposed." <https://mydasdata.larc.nasa.gov/basic-page/about-biosphere#:~:text=What%20is%20the%20Biosphere%3F,that%20has%20not%20yet%20decomposed>

⁴³ "A Decade of Research and Monitoring in the Oil Sands Region of Alberta, Canada: Special Issue", Integrated Environmental Assessment and Management, Volume 18, Issue 2, 1 March 2022.

⁴⁴ Dubé, Dunlop et al (2022).

⁴⁵ Baker and Westman (2018); Brunet, Jardine, et al (2020); Heydon J (2018); Keepers of the Water (2024).

⁴⁶ Taylor (2024); Canadian Parks and Wilderness Society/Environmental Defence (2022), p 28.

⁴⁷ Brunet, Jardine et al. (2020), p 1320; McLachlan (2014).

⁴⁸ McLachlan (2014); NRDC (2014); Lewis (2014).

⁴⁹ Brunet, Jardine et al. (2020), p 1320. See also Edwards (2014).

In the following sections we highlight areas of damage to assess the extent to which the harm could meet the threshold of ‘severe and either widespread or long-term damage to the environment’. In keeping with the Pacific Island States’ definition, we consider harm to various protected elements of the environment to encompass living creatures, including humans.

i. Severe

The Alberta oil sands are referred to as “the world’s most destructive oil operation” causing “destruction so vast and deep it challenges the existence of land and people”.⁵⁰ The following paragraphs identify examples of severe damage to elements of the environment through destruction of forests and wetlands; pollution of water, soil and air, including through emission of greenhouse gases,⁵¹ and excessive use of water resources. We consider whether these harms could be described as **“very serious adverse changes, disruption or harm to any element of the environment, including grave impacts on human life or natural, cultural or economic resources”**, in the terms of the definition.

We note the introduction of the anthropocentric reference to “natural, cultural or economic resources” (emphasis added) here. This draws attention to the human impact of the environmental destruction. However, as harm to non-human elements are included irrespective of their value to humans – as “any element of the environment” – the overall effect is one of ecocentrism.⁵²

Deforestation and wetlands destruction

A growing body of research suggests that the deforestation and mining of wetlands related to oil sands extraction operations in Alberta is causing very serious adverse ecological changes, disruption or harm.⁵³ Surface mining processes involve the razing of swaths of trees, as well as the

⁵⁰ Leahy (2019); Kusnetz (2021).

⁵¹ See ITLOS Advisory Opinion, above note 36.

⁵² See above, Introduction

⁵³ Petersen and Sizer (2014); Roberts, Bayne et al. (2022).

removal of peat moss, vegetation and soil up to a depth of 75 meters.⁵⁴ Wetlands in the area to be mined are drained and rivers are diverted, causing the disruption of wildlife habitat and loss of biodiversity, with far-reaching effects across the ecosystem. Whilst in situ mining is less intensive in terms of deforestation, it too causes significant land fragmentation, and consequently, wildlife habitat and landscape disintegration.⁵⁵

The boreal forest and wetlands are vital elements of the environment, supporting a wide range of wildlife species and providing a source of livelihood, culture and spiritual life essential for Indigenous peoples in the region. The forest is also a major carbon sink which is vital to the health of the atmosphere and, consequently, the global population.⁵⁶ The regional peatlands are equally integral to the ecosystem, serving “as a water conservation mechanism that supports the surrounding region including adjacent uplands, downstream watersheds, and maintains overall landscape integrity.”⁵⁷ The deforestation and disruption of peatlands caused by oil sands mining also results in the loss of important carbon storage resources, contributing further to climate change.⁵⁸

The ecological impacts of habitat destruction and fragmentation are addressed in studies that trace adverse changes in the way wildlife interact and identify threats to the survival of various species.⁵⁹ Indigenous communities and scientists have raised alarm over the steep decline in boreal woodland caribou, already listed as threatened under Canada’s Species at Risk Act, as well as the significant impacts of oil sands activity on white-tailed deer, black bears, coyotes, lynxes, fishers, birds and waterfowl.⁶⁰ Woodland caribou require large pieces of intact and connected boreal forest for their survival, including old mature forests and lush wetlands.⁶¹ While important efforts have been made towards caribou protection and recovery, including through Indigenous-led initiatives, the

⁵⁴ <https://open.alberta.ca/dataset/d5a7fec7-6e37-431c-9f33-eb98510c65e4/resource/eb20740d-d1bc-4e60-b441-99f6c84998d8/download/2016-oil-sands-discovery-centre-osdc-facts-about-albertas-oil-sands-and-its-industry.pdf>; <https://www.alberta.ca/oil-sands-101>

⁵⁵ Ibid. One study suggests that as compared with surface mining, in situ mining ‘could actually have greater cumulative effects as the distributed infrastructure it requires leads to major fragmentation of the landscape’. Way, Flanagan and Thibault (2017), page 9. See also Dubé, Dunlop et al (2022).

⁵⁶ UNECE (2023); Montgomery and Larson (2022).

⁵⁷ Volik, Petrone and Price (2024).

⁵⁸ Turetsky, Wieder et al (2002).

⁵⁹ McLachlan (2014); Fisher and Ladle (2022).

⁶⁰ Ibid.

⁶¹ Petersen and Sizer (2014); Dyer (2001).

population of this threatened species continues to decline.⁶² This has further acute impact on Indigenous peoples, as reflected in this statement by Chief Janvier of the Chipewyan Prairie Dene First Nation: “The extinction of caribou would mean the extinction of our people. The caribou is our sacred animal; it is a measure of our way of life. When the caribou are dying, the land is dying.”⁶³

Another major study commissioned by the Athabasca Chipewyan and Mikisew Cree First Nations describes the presence of muskrats as an indication of healthy wetlands, before explaining the impact of the precipitous decline in muskrat population attributable primarily to oil sands operations as:

great enough that few community members even eat muskrat anymore, although they were a mainstay of the local diet in the near past (...). This species was important enough to both Cree and Dene cultures in the region that it arguably amounted to a “cultural keystone” species (...). Hundreds of thousands of muskrats thrived throughout the delta, and it played a valuable role because of its dependability in trapping and thus economic return and as a key source of food, to say nothing of its value for clothing and ceremony. Indeed, some thought that the decline in muskrat populations was severe enough that the resulting loss of livelihood was in part responsible for pushing people off the land into town, which in turn helped prompt a diet-transition away from country foods to ones that are store-bought.⁶⁴

These examples spotlight some of the serious adverse impacts of deforestation and fragmentation, as well as disruption to wetlands, on elements of the environment including forest, peatlands and wildlife. These impacts have contributed to the fragmented access to traditional lands, and cultural and economic resources of Indigenous communities in the region. Impacts on hunting, fishing and gathering practices have deprived Indigenous peoples of culturally-significant food sources, impacting the maintenance, transmission and renewal of Indigenous practices and relationships to the land.⁶⁵ The effects are not only severe, but also long-term.

Wastewater and air pollution

62 UNESCO (2022); Environment Canada, Recovery Strategy for the Woodland Caribou, Boreal population in Canada (2012).

63 As cited in Droitsch and Terra Simieritsch (2010) , p4

64 McLachlan (2014) p 36, footnotes omitted.

65 McLachlan (2014); Westman and Joly (2019).

Serious concerns have been raised, for decades, over environmental harm caused by the toxic wastewater from surface mining which is collected in immense tailing “ponds”, or open-air wastewater reservoirs. The creation of these reservoirs requires the construction of massive earthen dams to hold the tailings, a byproduct of the separation of bitumen from clay, sand and silt, using high volumes of heated water mixed with chemicals.⁶⁶ Government reports dating back as far as 1973 highlight the toxic tailings as a serious problem “with alarming implications for local ecologies and health” and identify the inability of industry to effectively deal with the tailings as “the most imminent environmental constraint to [...] future expansion”.⁶⁷ One 2015 study noted that wastewater tailings had become “a particularly intractable environmental problem” because “there are currently no technologies available to extract bitumen without tailings; tailings ponds cannot be restored to a predisturbance state; tailings ponds already comprise approximately 60 km² in the oil sands region; and both the number of ponds and their areas continue to expand as production levels increase”.⁶⁸

Wastewater tailings are known to contain chemical toxins including naphthenic acids, cyanide, phenols, arsenic, cadmium, chromium, copper, lead and zinc.⁶⁹ The Commission for Environmental Cooperation, reviewing publicly-available studies in 2020, confirmed that there was “strong scientifically valid evidence” that the waste ponds were leaching contaminants into the groundwater.⁷⁰ Data from oil sands companies themselves show toxins detected at monitoring wells extremely close to surface waters, with documented cases of contaminated tailings substances “reaching or projected to reach surface waters in Jackpine Creek (from Shell), Beaver Creek (from Syncrude), McLean Creek (from Suncor) and the Athabasca River (from Suncor)”.⁷¹ Tailings ponds have resulted in the contamination of rivers, air and boreal forest vegetation, with subsequent exposure to toxins for fish, wildlife and downstream predominantly-Indigenous communities.⁷²

⁶⁶ <https://www.aer.ca/understanding-resource-development/resource-development-topics/tailings>

⁶⁷ Intercontinental Engineering of Alberta Ltd. (1973) ; McNeill. & Lothian (2017), p. 2.

⁶⁸ Nelson, Krogman et al (2015) p 346.

⁶⁹ Kelly, Short et al (2009).

⁷⁰ Commission for Environmental Cooperation (2020), page 60.

⁷¹ Ibid, page 80-81.

⁷² Kelly, Short et al. (2009); Environmental Defence et al. (2023) ; and Canadian Parks and Wilderness Society/Environmental Defence (2022) pp 10 and 27.

Leakage of tailings fluid from Imperial Oil's Kearl oil sands mine onto the territories of nearby Indigenous communities was discovered in May 2022 by company workers which, according to internal company documents, had been ongoing at least since 2020.⁷³ Although the company reported the discovery of the initial underground leak in May 2022 to the Alberta Energy Regulator (AER), this information was not shared with affected Indigenous communities for nine months.⁷⁴ In a separate incident, in February 2023, 5.3 million litres of wastewater spilled from the same Imperial Oil tailings area, leaking into boreal wetlands and tributaries where water drains to drinking water sources.⁷⁵ The severity of harm caused by these massive leakages and spills is yet to be fully assessed, and the underground leak reportedly is ongoing to date. A recent assessment of the monitoring and management of tailings concluded, further, that "the reported number of spills and total spill volumes are underestimates of the true rates" and "the true magnitude of the ecological impacts of tailings spills may never be known".⁷⁶

As the adverse impacts on the downstream environment and food chain are well-documented, these incidents "exemplif(y) the dangers the toxic tailings pose to communities and entire ecosystems".⁷⁷ Tailings toxins have serious adverse health impacts for fish and wildlife, including by increasing hormone levels, disrupting reproductive systems and causing growth of tumours,⁷⁸ and are responsible for the large number of migratory birds and waterfowl that die each year.⁷⁹ High profile toxic wastewater incidents include the death of at least 1,666 ducks on a tailings site operated by Syncrude in 2008; 550 ducks that died or had to be euthanized after landing on tailings ponds operated by Syncrude, Suncor Energy and Shell Canada in 2010; the death of thirty-one great blue herons, a protected migratory species, in 2015; and the death of several hundred California gulls from exposure to contaminated wastewater on an island in one tailings lake.⁸⁰ The full extent of harm to birdlife is unknown, since most bird deaths go undetected and unreported.⁸¹

⁷³ https://www1.aer.ca/compliancedashboard/enforcement/202302-02_Imperial%20Oil%20Resources%20Limited_Kearl_Order.pdf

⁷⁴ <https://www.aer.ca/about-aer/media-centre/announcements/announcement-february-07-2023>

⁷⁵ Ibid.

⁷⁶ Timoney (2025).

⁷⁷ Environmental Defence et al. (2023).

⁷⁸ Bolden, Rochester et al. (2017); Brunet, Jardine et al (2020) p 1320.

⁷⁹ McLachlan (2014); Timoney and Lee (2014).

⁸⁰ CPAWS (2024) 'Wildlife keep being harmed from tailings ponds'; Brooymans (2010).

⁸¹ CPAWS (2024) 'Wildlife keep being harmed from tailings ponds'. See also C. C. St. Clair (2014), page 85.

Unlike surface mining, in situ mining does not contribute to tailings ponds; instead wastewater is injected into deep aquifers on site. Although this process has attracted relatively little attention in terms of potential environmental harm, recent research has revealed US government documents which suggest that the risk of harm to the environment and human health related to such practices has been known for decades.⁸² In 2022 a series of earthquakes rocked parts of Alberta near the town of Peace River, including one that reached a 5.6 magnitude - the largest ever recorded in the province's history.⁸³ The quakes occurred near a deep disposal well that was used to inject more than one million cubic metres of wastewater down to a depth of roughly two kilometers. Seismologists confirmed that the earthquakes were caused by the industrial wastewater disposal activity by oilsands company Obsidian Energy.⁸⁴ While no injuries were reported in this instance, due to the remoteness of the epicenter, the seismologists' study notes that quakes of this magnitude are known to be harmful and even deadly.⁸⁵

Oil sands mining and related processes also emit air-polluting anthropogenic carbon dioxide, methane, nitrous oxide, and halogenated compounds. These 'volatile organic compounds' can have serious human health impacts and contribute to the formation of acid rain, smog, and soil acidification, among other environmentally harmful effects.⁸⁶ They appear to be massively under-reported by the industry.⁸⁷ A study published in 2024 found that air pollution from the Athabasca oil sands exceeded industry-reported emissions across the studied facilities by rates between 1,900% to over 6,300%, and detected compounds released during the oil sands process that had not been reported at all.⁸⁸ These gases also have significant greenhouse effects.

Greenhouse gas emissions

⁸² Nobel J., "The Oil Industry's Latest Disaster: Trillions of Gallons of Buried Toxic Wastewater", DeSmog, 12 February 2026, <https://www.desmog.com/2026/02/12/the-oil-industrys-latest-disaster-trillions-of-gallons-of-buried-toxic-wastewater/>

⁸³ Stanford University (2023)

⁸⁴ Schultz, Woo, et al. (2023); Rosen (2015).

⁸⁵ Schultz, Woo, et al. (2023), p 1.

⁸⁶ Oil Sands Environmental Impacts / Canada Commons (2024); Kelly et al. (2009).

⁸⁷ McNeill. & Lothian (2017), p 3.

⁸⁸ Wren, McLinden et al (2023).

The oil sands industry is Canada's largest and fastest-growing source of greenhouse gas emissions: while the country's total emissions fell by 8.5% between 2005 and 2023, emissions from the oil sands are "in a league of their own", increasing by 143% in the same period.⁸⁹ Emissions are projected to climb further even with technological advances that reduce their intensity, as oil sands production continues to increase.⁹⁰

Oil sands companies meanwhile have invested heavily in further expanding production, while relying on the chimera of carbon capture and storage technology to meet decarbonization targets.⁹¹ Even if these proposals to capture, compress, transport and inject carbon dioxide underground were to be realised, they would risk further "non-negligible, novel, and irreversible adverse" environmental impacts.⁹² These include the leakage of toxic carbon dioxide; threats to drinking water from acidification in underground aquifers; massive usage of freshwater; increased emissions of air and water pollutants, and earthquakes.⁹³ Similar concerns recently halted a carbon capture project in Queensland, Australia after an environmental assessment found that carbon storage would "likely cause an irreversible or long-term change in water quality" if carbon pollution were to migrate

⁸⁹ Beer (2025)

⁹⁰ Campbell (2023); Saxifrage (2023); Nuccitelli (2024); Bakx (2024)

⁹¹ The Pathways Alliance, a coalition launched by six companies in 2021 to 'advanc[e] environmental innovation and projects', proposes a CCS network and pipeline which, when operational, would 'transport captured CO₂ from multiple oil sands facilities to a hub in the Cold Lake area of Alberta for permanent underground storage.'

<https://pathwaysalliance.ca/foundational-project/carbon-capture-and-storage-ccs/> See also Pembina Institute, 'Waiting to Launch: Mid-Year Review', September 2024, <https://www.pembina.org/media-release/oilsands-companies-increasing-spending-production-not-reducing-emissions>; Institute for Energy Economics and Financial Analysis, "Financial Risks of Carbon Capture and Storage in Canada: Concerns About the Pathways Project and Public Energy Policy", December 2024, https://ieefa.org/sites/default/files/2025-01/Financial%20Risks%20of%20Carbon%20Capture%20and%20Storage%20in%20Canada_December%202024.pdf; and Naomi Oreskes, "The False Promise of Carbon Capture" in Scientific American Magazine Vol. 330 No. 3 (March 2024), p. 80, doi:10.1038/scientificamerican0324-80.

⁹² "First Nations want Impact Assessment Act review for Pathways Alliance project", The Canadian Press, 4 December 2024, https://www.thecanadianpressnews.ca/business/first-nations-want-impact-assessment-act-review-for-pathways-alliance-project/article_c4ad4f27-21df-5223-b5d7-b86e8d672f29.html;

"Alarm bells raised as Alberta's refusal to assess dangers of massive oilsands carbon capture project sparks safety concerns", Press Release, Athabasca Chipewyan First Nation, Ecojustice et al, 31 October 2024, <https://ecojustice.ca/news/alarm-bells-raised-as-albertas-refusal-to-assess-dangers-of-massive-oilsands-carbon-capture-project-sparks-safety-concerns/>

⁹³ <https://environmentaldefence.ca/2023/12/01/beware-of-two-false-solutions-to-climate-change-brought-to-you-by-big-oil/>; Alberta Energy Regulator cites oil company for causing seismic events in Peace River area", Canadian Press, 23 March 2023, <https://globalnews.ca/news/9572808/largest-alberta-earthquake-oilsands-wastewater-stanford/>

through the region's aquifer.⁹⁴ These future effects are relevant to the ecocide definition, which requires an assessment of risk of harm.

In addition to the greenhouse gas emissions produced *directly* by the oil sands operations, the damage assessment must also account for *indirect* emissions (“scope 3 emissions”) resulting from the combustion of fossil fuels extracted and sold to third parties.⁹⁵ Courts have established that scope 3 emissions fall within the responsibilities of the entity extracting and selling the fuel.⁹⁶ Emissions from the Canadian oil sands industry overall account for approximately 11% of Canada's carbon footprint, with 80% of these being scope 3 emissions.⁹⁷ Given that Canada is the fourth-largest oil producer globally and this industry accounts for 31% of its national emissions, the immense scope 3 emissions from the end use of these products are a significant factor in global climate disruption.⁹⁸

Water consumption

Finally, oil sands mining operations increasingly are under scrutiny for their intensive use of freshwater in the context of declining river flows and worsening drought conditions in the region which, in turn, are contributing to devastating wildfires.⁹⁹ Oil sands operations reportedly consumed more than 220 billion litres of water in 2023—more than 240 Olympic-sized swimming pools per day—to produce 669 million barrels of oil.¹⁰⁰ While the AER reports that 79% of this is recycled water,

⁹⁴ “Queensland outlaws carbon storage in Australia's biggest aquifer”, Reuters, 30 May 2024, <https://www.reuters.com/business/environment/queensland-outlaws-carbon-storage-australias-biggest-aquifer-2024-05-31/>

⁹⁵ Scope 3 emissions capture emissions that occur throughout a company's value chain, including those arising from investments, transportation and distribution, generated waste, employee commuting, etc. See the Greenhouse Gas Protocol, https://ghgprotocol.org/sites/default/files/2023-03/Scope3_Calculation_Guidance_0%5B1%5D.pdf, Introduction, page 6.

⁹⁶ See for example the Judgment (Advisory Opinion) of the EFTA Court of 21 May 2025 with the respect to the case *Greenpeace v Norway*, in which the Court held that scope 3 emissions count as “effects” of projects on the environment and so must be taken into account in Environmental Impact Assessments. Case E-18/24.

⁹⁷ Pembina Institute (2017) <https://www.pembina.org/blog/real-ghg-trend-oilsands>; McGaughy, Abraham et al (2025) p 1.

⁹⁸ McGaughy, Abraham et al (2025).

⁹⁹ Meghan Potkins, “There's no barriers for Mother Nature': Wildfires continue to burn out of control near oilsands plants”, Financial Post, 4 June 2025, <https://financialpost.com/commodities/energy/wildfires-burn-out-of-control-alberta-oilsands>; Ulrich (2024), “Extreme drought is forcing Wood Buffalo National Park to more aggressively tackle wildfires”, CBC News; Sauchyn, St-Jacques & Luckman (2015).

¹⁰⁰ Alberta Wilderness Association, “Oil sands companies used more water last year, despite regulator's claim of improved efficiency”, 18 December 2024, <https://albertawilderness.ca/news-release-oil-sands-companies-used-more->

the rest is drawn primarily from the Athabasca river at levels researchers suggest may not be sustainable.¹⁰¹

Indigenous peoples have raised concerns over the impact of water abstractions from the Athabasca river system, as well as oil sands industry-related pollution, on aquatic life and declining wetlands in the region.¹⁰² The report of a recent conference of Indigenous elders, knowledge-holders and other experts on regional water systems reflects these concerns, noting that “(e)xtreme industrial extraction of the Tar Sands in so-called Alberta is severely depleting, polluting and threatening freshwater downstream flows. Indigenous Peoples are left with the devastation of this in their communities and are seeing severe low water levels firsthand.”¹⁰³ Whilst provincial Alberta government data suggests that water withdrawals are “small (...) relative to instream flows”, the monitoring report published by the World Heritage Center and IUCN concludes that “even modest water withdrawals can result in downstream impacts to the [Peace-Athabasca Delta], especially during the dry season, during drought years, or when considering cumulative impacts of climate change, continued development in the Athabasca watershed, etc”.¹⁰⁴ The significant reduction in river flow already detected in the watershed near Fort McKay suggests that apprehension about the further decline of water levels is well-founded.¹⁰⁵

Summary reflections

We suggest that the examples examined here already show that oil sands mining-related deforestation and wetlands destruction, water consumption, and toxic pollution of water and air, including the release of GHGs, is resulting in “very serious adverse change, disruption or harm” to elements of the environment, meeting the criterion of severity necessary to establish ecocide. A full assessment would be a much larger undertaking than we attempt in this article, due to the scale of the oil sands operations, difficulties accessing data, and complexities in linking empirical evidence

water-last-year-despite-regulators-claim-of-improved-efficiency; Alberta Energy Regulator, Data and Performance Reports: Water Use Performance, December 2024,

<https://www.aer.ca/data-and-performance-reports/industry-performance/water-use-performance>

¹⁰¹ <https://www.aer.ca/data-and-performance-reports/industry-performance/water-use-performance/oil-sands-mining-water-use>; Sauchyn, St-Jacques and Luckman (2015).

¹⁰² UNESCO (2022) p 29.

¹⁰³ Keepers of the Water (2024) p 7.

¹⁰⁴ UNESCO (2022).

¹⁰⁵ Aryal et al. (2024).

with specific legal thresholds, particularly as these relate to cumulative impacts. However, in our view this is unlikely to result in a different conclusion in view of the severity of the well-documented environmental harm.

Our examination underlines the impossibility of separating harm to humans from harm to other elements of the environment. In addition to the serious adverse health effects we have noted, the expansion of oil sands industrial mining has “substantially eroded” the ability of Indigenous community members to participate meaningfully in traditional activities. The significant compound impacts on the lives, health and well-being of people in this region threatens rights that are fundamental to their existence.

ii. Widespread

Environmental harm is considered to be “widespread”, for purposes of the definition, if it “**extends beyond a limited geographic area, crosses state boundaries, or is suffered by an entire ecosystem or species or a large number of human beings**”. A group of environmental scientists asserted in 2024 that “the environmental impacts of oil sands industrial activity on human and ecological health are widespread and multimedia (e.g., occurring through air, water, soil, and sediment)”, affirming that the harm impacts the entire ecosystem.¹⁰⁶ In the following section, we pay attention to the geographical scope of the harm.

The land area of the Alberta oil sands operations alone is massive, covering 142,200 km², of which “more than 12.5 million hectares [...] have experienced habitat disruption due mainly to tar sands development”.¹⁰⁷ The environmental harm extends even further however, considering the wide-reaching impacts on wildlife, air, water, soil and other elements of the ecosystem. Monitoring studies have demonstrated for instance that boreal woodland caribou avoid areas within 500 meters of industrial disturbances and will not cross cleared areas as forest is fragmented, an insight that

¹⁰⁶ Sandhu, Rougeot et al (2024), p 1.

¹⁰⁷ Petersen and Sizer (2014).

illustrates the wide span of the ecological footprint of oil sands operations relative to the physical (human) footprint.¹⁰⁸

The “unprecedented” scale of wastewater tailings ponds, which expanded in area by 300% between 2000 and 2020, is another indicator of the widespread nature of the environmental harm.¹⁰⁹ There are 30 active, massive ponds across nine oil sands projects, covering 300 km² of the boreal forest. The largest tailings pond, Syncrude’s “Southwest Sand Storage”, is estimated to be just under 8km long and 30 km² in total area. More than 1.4 trillion liters (or more than 1 billion cubic meters) of tailings are stored in these ponds, enough to fill over half a million Olympic-sized swimming pools.¹¹⁰ While the volume of toxic waste fluids that has contaminated the environment is not known, contaminants from oil sands mining and related processes can affect water bodies in a 90-kilometer radius around the mining facility.

The ongoing expansion of wastewater tailings has shown no signs of abatement, even with the introduction of various policies and regulations. One study noted that “(n)ew tailings regulations were implemented in 2009, stating operators had five years to reduce their fluid tailings, but our analysis shows that the fluid tailings area still grew 40 percent from 2010 to 2015 (from 73.37 km² to 102.39 km²)”.¹¹¹ Considering the scale and severity of harm already caused by wastewater tailings, the rate at which they continue to expand is alarming.

The injection of wastewater from in situ mining also may cause harm that is widespread, since this wastewater is reportedly “capable of migrating long distances in the planetary crust [and] can induce earthquakes days, months or even years after the injection”.¹¹² Researchers highlight the uncertainties associated with the extent of harm “along with the general lack of knowledge of the exact stress and faulting conditions below ground, make such earthquakes difficult to forecast or manage”.¹¹³ The earthquakes in Peace River in 2022 caused shaking that was felt more than 600km away.

¹⁰⁸ Petersen and Sizer (2014); Dyer (2001).

¹⁰⁹ Sandhu, Rougeot et al (2024) p 1.

¹¹⁰ Ibid, p 3.

¹¹¹ Ibid, p10.

¹¹² <https://theconversation.com/earthquakes-caused-by-industrial-activities-what-are-the-risks-and-how-can-they-be-reduced-81294>

¹¹³ Ibid.

Finally, the climate harms attributable to scope 1, 2 and 3 emissions from the oil sands, as well as to the destruction of boreal forest and other carbon sinks meet every element of the definition of widespread: extending beyond a limited geographic area, crossing state boundaries and being suffered by entire ecosystems or species and a large number of human beings.

Summary reflections

The damage to the environment caused by the oil sands operations appears to easily meet the criterion of widespread in the Pacific Island States' definition of ecocide.

iii. Long term

Although the instances of severe harm we highlight appear to meet the criterion of widespread, and so the threshold of harm for ecocide, the next section nonetheless examines whether the damage caused by the oil sands meets the alternative criterion of “long-term”, in the sense that it is **“irreversible or ... cannot be redressed through natural recovery within a reasonable period of time”**.

Many of the harms surveyed here meet this definition. The extensive landscape fragmentation, persistent water, soil, and subsurface contamination, and biodiversity loss in the boreal forest and wetland areas cannot be redressed through natural recovery within a reasonable period of time.

Whether the harms can be reversed through remedial actions taken by the polluters is another consideration. Oil sands companies are required by law to “reduce land disturbance; salvage and store oil; remove equipment; clean up contamination (known as remediation); replace soil, and revegetate the area” through a process that “can take many years or even decades”.¹¹⁴ Significant concerns have been raised regarding the long-term environmental and public health impacts of

¹¹⁴ <https://www.aer.ca/regulations-and-compliance-enforcement/site-closure-requirements/reclamation>. See also Olszynski, Leach and Yewchuk (2023).

wastewater tailings reclamation, as well as the standards in place for reclamation.¹¹⁵ Mine operators are required to return the relevant land to ‘equivalent land capability’, a term criticized as “nebulous”, “poorly defined, broadly and variably interpreted”.¹¹⁶ As of 2016, only 0.1% of the area currently disturbed by oil sands mining in Alberta had been certified as reclaimed by the Alberta Government (and these areas do not contain tailings).¹¹⁷ Researchers highlight “significant data gaps” in the efficacy of wetland reclamation technologies relied on in industry plans and criticize government and industry assertions regarding successful wetland reclamation as unsubstantiated.¹¹⁸ One study forecasts that oil sands exploitation will “result in the loss of more than 480,000 ha of natural ecosystems in northeastern Alberta, of which about 186,000 ha will be wetlands” and of this, 90% will be peatlands “that cannot be restored within human time frames”.¹¹⁹

Even if it were possible to redress the harms in a reasonable timeframe, commitment of the oil sands operators and industry regulators to do so is unclear. The volume of tailings is expected to rise at least until 2037, according to some corporate plans.¹²⁰ Oil sands operators have proposed the piloting of controlled releases of “treated” wastewater from the tailings ponds directly into the Athabasca watershed because “while other options exist, the volume of water that has accumulated exceeds the ability of these alternatives to absorb all of the [waste]water”.¹²¹ The federal and provincial governments are considering regulations that would allow for this practice.¹²² Meanwhile, the provincial liabilities system, established to ensure remediation and reclamation, allows oil sands companies to use their assets against their environmental liabilities (rather than requiring ‘hard’ security). This system is criticized as seriously flawed, since it is reliant on “a series of unrealistic assumptions about asset values, future oil markets and prices” as well as “the unproven technology of remediation and reclamation of oil sands mines”.¹²³ Experts argue the regime is “not fit for purpose” since, ultimately, corporate bankruptcy can “entirely defeat the environmental obligations of corporations”.¹²⁴

¹¹⁵ See Rougeot (2024); Sandhu, Rougeot et al. (2024); and Olszynski, Leach, and Yewchuk (2023).

¹¹⁶ Olszynski and Dubé (2022), page 3.

¹¹⁷ Canadian Parks and Wilderness Society/Environmental Defence (2022) p 5.

¹¹⁸ Timoney (2015).

¹¹⁹ Ibid.

¹²⁰ Canadian Parks and Wilderness Society/Environmental Defence (2022).

¹²¹ Gratton (2023). See also Sandhu, Rougeot et al. (2024).

¹²² <https://www.cbc.ca/news/business/bakx-oilsands-tailings-release-mining-effluent-regulations-1.6271537>

¹²³ Olszynski, Leach, and Yewchuk, above note 108, page 28.

¹²⁴ Ibid, page 27.

As noted above, the implications of this destruction for living beings in the area are inadequately documented. Indigenous community members and researchers have pointed to the lack of investment in understanding and addressing local concerns regarding long-term human health impacts, making it harder to rely on these harms to satisfy the long-term criterion. In the words of one study, “(i)mportant health concerns, including high rates of cancer, which call for further research, are instead soft-pedalled and obscured”.¹²⁵ In 2024 the federal government announced funding for a ten-year Indigenous-led Fort Chipewyan Health Study, which will seek to establish a health baseline, understand the causes leading to the pattern of high rates of cancer in Fort Chipewyan, and explore the implications on Indigenous community members' health.¹²⁶

Summary reflections

Many of the harms created by the oil sands operations meet the long-term criterion. However, the assessment is complicated by uncertainty around remediation, and the ultimate scale and duration of harm will be affected by future regulatory and industry decisions. Significant data gaps, in particular with regard to long-term health effects in Indigenous communities, pose another challenge.

The notion of “long-term” has heightened significance since for many Indigenous peoples in the region, “once the land has changed, it is no longer the same place, as it has lost its spirit and is considered to be contaminated and untrustworthy. Landscapes are repositories of stories, names, lessons, oral traditions, and ethnoecological information; these places hold knowledge in ways that cannot be replaced.”¹²⁷ Others are skeptical of the notion of reclamation which they maintain is “used as a rationalization for impacts on First Nations’ territories, to the point that some companies make promises to restore culturally important plants, and other companies make claims that in the long run their activities will improve culturally significant landscapes and cultural keystone species

¹²⁵ Baker and Westman (2019) p 147.

¹²⁶ <https://www.canada.ca/en/environment-climate-change/news/2024/08/federal-government-announces-support-for-community-led-health-study-in-athabasca-oil-sands-region.html>

¹²⁷ Baker and Westman, above note 41, p 151, source citations omitted.

habitats”.¹²⁸ These considerations are important to understanding the long-term nature of harm in the context of the oil sands.

iv. The oil sands operations create widespread, long-term and severe harm to the environment

The oil sands operations result in multiple reinforcing harms to the environment, understood in the expansive terms of the Pacific Island States’ definition to include “the earth, its biosphere, cryosphere, lithosphere, hydrosphere and atmosphere, as well as outer space”. Deforestation, soil removal and the destruction of peat moss and wetlands harm these elements of the environment, deplete carbon sinks and threaten endangered species.¹²⁹ Wildlife is also threatened by the toxic water pollution, as are local human inhabitants who lose sources of clean and safe drinking water and are exposed to contaminated food. Air pollution and toxic emissions lead to acid rain with its subsequent effects, and to increased rates of cancer in humans and animals. All of these changes disrupt traditional hunting, fishing and gathering practices of Indigenous peoples in the area, with profound impacts on the health, cultural and spiritual well-being of Indigenous communities. Greenhouse gas emissions both at the site and from combustion of the extracted bitumen contribute to dangerous anthropogenic climate change.

These effects constitute severe, widespread and long-term damage, satisfying the first prong of the definition of ecocide.

b. Unlawful or wanton acts

The Pacific Island States’ definition of the crime of ecocide requires the acts that cause a substantial risk of harm to be either unlawful, or wanton. No definition of unlawful is provided. Wanton is defined

¹²⁸ Ibid.

¹²⁹ For specific applications of ecocide definitions to wildlife harm, see Mackintosh et al. (2023) and Gillett et al. (2025).

as: “with reckless disregard for damage which would be clearly excessive in relation to the social and economic benefits anticipated”.

i. Unlawful

The definition of ecocide proposed by the Pacific Island States does not detail what is meant by unlawful. In the commentary accompanying the IEP definition, the Panel explains that this was deliberately left open, so that it might include reference to both national and international law.¹³⁰

There are a number of different ways in which the oil sands operations can be assessed as lawful or not. There have been allegations that the operations have contravened different environmental or other domestic laws and regulations; some of these allegations have been confirmed. In addition, much domestic regulation appears ceded to the industry itself, leading to allegations ranging from ineffectiveness and excessive regulatory discretion to corporate capture.¹³¹ More fundamentally, the oil sands project as a whole has been challenged as in contravention of treaties concluded between the Crown and Indigenous peoples in Canada. And on the international level, claims have been brought against Canada for violations of international human rights law, in particular by the Indigenous peoples who live in the areas exploited for the oil sands. Finally, the contributions of the oil sands operations to climate change, through scope 1, 2 and 3 emissions, can be assessed against relevant binding international law.

While more comprehensive research would be required to reach definitive conclusions, the following sections provide examples of how each approach could lead to a finding of unlawfulness.

Domestic environmental law

Domestic regulation of the oil sands operations is complex and involves federal and provincial responsibilities. At a provincial level, the Alberta Energy Regulator (AER) was established in 2013 to

¹³⁰ IEP definition, above note 11.

¹³¹ See, for example, Timoney (2025); Yewchuk, Fluker and Olszynski, (2023); Anderson (2024); Paradis (2023).

“improve Alberta’s competitive advantage by making [the] regulatory system more efficient”, while ensuring “that energy resource activities are safe, environmentally responsible, and actively managed”.¹³² As the entity responsible for regulating the oil sands, the AER has obligations under legislation including the Environmental Protection and Enhancement Act (EPEA)¹³³ which outlines provincial requirements for the management of air, water, land, and biodiversity, and supports and promotes the protection, enhancement and wise use of the environment by designating proposed activities for which an approval or registration is required.¹³⁴ However, the AER is not an independent body funded by the Alberta government; it is funded by the industry it is tasked with regulating.¹³⁵

The appointment of former oil executives to AER senior executive and board positions has added to a sense of “chronic and systematic” regulatory capture, which severely undermines the credibility, impartiality and effectiveness of environmental regulation and oversight.¹³⁶ Indigenous communities raised their frustrations about regulatory capture affecting “a range of areas, like how impact assessment is conducted, how the duty to consult is discharged, and how liabilities are managed in the energy sector” in their testimony before a parliamentary committee in 2023.¹³⁷ Similar accusations have led Indigenous and environmental organisations to call for the resignation of the President and CEO of the AER, as well as the entire AER Board, citing research that highlights the failure of the AER “to gather credible and relevant environmental data, (...) to conduct routine on-site inspections” as well as “dishonest(y) in its reporting of spill incidents with regards to oil sands tailings spills in Alberta”.¹³⁸ A recent peer-reviewed study corroborates the failures of the regulator “to gather credible and relevant environmental data, conduct routine on-site inspections, and protect ecosystems from harm” in a manner which is “inconsistent with its regulatory responsibilities”, noting these failures are hallmarks of regulatory capture.¹³⁹

¹³² <https://www.aer.ca/understanding-resource-development/enerfaqs-and-fact-sheets/enerfaqs-what-is-the-aer#what-does-the-aer-not-regulate?>

¹³³ Ibid.

¹³⁴ The AER also has responsibilities under the Oil and Gas Conservation Act, Oil Sands Conservation Act, Coal Conservation Act, Geothermal Resource Development Act, the Pipeline Act, the Water Act, the Public Lands Act and the Mines and Minerals Act.

¹³⁵ <https://www.aer.ca/providing-information/about-the-aer/who-we-are>

¹³⁶ <https://www.keepersofthewater.ca/news/treaty-8-territory-joint-statement-by-keepers-of-the-water-environmental-defence-and-alberta-wilderness-association-on-the-appointment-of-rob-morgan-as-ceo-of-the-alberta-energy-regulator>; <https://globalnews.ca/news/533718/more-than-30-groups-want-albertas-new-energy-regulator-removed/>; <https://www.desmog.com/2025/02/11/albertas-energy-regulator-is-fully-captured-by-industry-study-finds/>

¹³⁷ House of Commons, Canada (2023) Evidence Number 057

¹³⁸ Alberta Wilderness Association et al, Joint Letter (2025)

¹³⁹ Timoney (2025).

Criticism also has been levied against Environment and Climate Change Canada (ECCC), the federal government entity that bears responsibility for the administration and enforcement of a wide range of legislative protections related to the environment. These include the pollution prevention provisions of the **Fisheries Act**, which prohibit the deposit of harmful substances into water frequented by fish or a place where it may enter water frequented by fish. In 2017, Environmental Defence Canada, the Natural Resources Defence Council and a Canadian resident claimed that the ECCC was failing to enforce these provisions in the Alberta oil sands. Their submission to the Commission for Environmental Cooperation highlighted documented cases of seepage or leaks of contaminated tailings substances, noting that:

The Canadian government has neither prosecuted any company for documented surface water contamination, nor has it pursued regulation governing tailings pond leakage. It relies on the Government of Alberta to alert it to possible violations of the Fisheries Act, and Alberta in turn relies on industry self reporting. An industry-funded regional water monitoring body that Canada relies on – the Regional Aquatic Monitoring Program – has been discredited as scientifically inadequate and for failing to identify significant water pollution in the region.¹⁴⁰

The federal and provincial governments are legislatively mandated to regulate the environmental impact of oil sands operations. The alleged failure of the regulatory entities to do so effectively is indicative of unlawful behaviour. Notably, definitions of unlawful environmental destruction in the Council of Europe Convention on the Protection of the Environment through Criminal Law include conduct “carried out under the authorisation of a competent authority of a Party when the authorisation was obtained fraudulently or by corruption, extortion or coercion”.¹⁴¹

In some cases, however, regulatory measures have resulted in sanctions against oil sands companies, mainly in the form of administrative environmental protection orders (EPO) and corporate fines. High-profile incidents have led to corporate prosecutions in a few cases. Following a private prosecution initiated by a concerned individual, charges were laid against Syncrude Canada in relation to the tailings pond incident in 2008 that caused the death of over 1,600 birds.

¹⁴⁰ Commission for Environmental Cooperation (2020), page 81.

¹⁴¹ Council of Europe Convention on the Protection of the Environment through Criminal Law, 14 May 2025, Article 3(a), [https://search.coe.int/cm/#\[%22CoEIdentifier%22:\[%220900001680b5cfad%22\],%22sort%22:\[%22CoEValidationDate%20Descending%22\]\]](https://search.coe.int/cm/#[%22CoEIdentifier%22:[%220900001680b5cfad%22],%22sort%22:[%22CoEValidationDate%20Descending%22]]). See also EU Directive on the protection of the environment through criminal law, 2024/1203, 11 April 2024 Article 3.1 which contains similar language.

The company was fined an historic CDN\$3 million.¹⁴² In 2019, Syncrude Canada was fined CDN \$2.7 million for the deaths of 31 great blue herons.¹⁴³

In February 2023, the AER issued an EPO against Imperial Oil regarding the two wastewater incidents at its Kearl Lake facility (see section 3.a.i above, subsection ‘Wastewater and Air Pollution’).¹⁴⁴ The company was ordered to take immediate measures to control, mitigate and remediate the harm, as well as to communicate to any potentially affected parties. Its failure to adequately deal with the leaks led the AER to issue two enforcement decisions in August 2024, resulting in the company being fined CDN \$50,000.00.¹⁴⁵ In early March 2023, officers from ECCC issued a Fisheries Act Direction requiring Imperial Oil to take immediate action to prevent any seepage from its mine at Kearl Lake entering fish-bearing waters. In May of that year, ECCC Enforcement opened an investigation into a suspected release of prohibited substances into the waters. The investigation is ongoing.¹⁴⁶

In January 2025, the AER announced its decision to bring nine charges against Imperial Oil in relation to the wastewater overflow incident of February 2023. This prosecution, brought under provisions of the EPEA and the Public Lands Act, would allow for the imposition of higher penalties than those under the administrative procedures.¹⁴⁷

In addition to these high-profile incidents and according to media reports, at least 16 companies operating in the oil sands contravened rules requiring them to fund independent environmental monitoring.¹⁴⁸ The companies reportedly paid the financial penalties for non-compliance rather than funding the independent assessments.

142 R. v Syncrude Canada Ltd., 2010 ABPC 22; https://www.ppsc-sppc.gc.ca/eng/nws-nvs/2010/22_10_10.html; EcoJustice (2010), Ensuring that polluters pay after ducks die at tailing ponds; Fluker (2011).

¹⁴³ <https://financialpost.com/commodities/energy/syncrude-to-pay-over-2-7m-to-settle-charges-in-alberta-blue-heron-deaths>

¹⁴⁴ February 6, 2023, https://www1.aer.ca/compliancedashboard/enforcement/202302-02_Imperial%20Oil%20Resources%20Limited_Kearl_Order.pdf <https://www.aer.ca/about-aer/media-centre/announcements/announcement-february-07-2023>.

¹⁴⁵ Bob Weber, “Alberta regulator fines Imperial Oil over Kearl tailings pond leaks”, 22 August 2024, <https://www.cbc.ca/news/canada/edmonton/alberta-energy-regulator-kearl-leak-1.7302069>. See also Drew Yewchuk, “Administrative Penalties at the Alberta Energy Regulator: Regulatory Penalties for the Kearl Oilsands Leak” (4 Sept 2024), online: ABlawg, http://ablawg.ca/wp-content/uploads/2024/09/Blog_DY_Kearl_Oilsands.pdf

¹⁴⁶ <https://www.canada.ca/en/environment-climate-change/services/oil-sands-monitoring/federal-actions-kearl-oil-sands.html>

¹⁴⁷ However at the time of writing, no enforcement decisions have been taken regarding the issue of deep groundwater seepage at the Kearl mine. See Yewchuk (2025).

¹⁴⁸ de Souza (2024).

These examples are illustrative of how oil sands operations have been found in violation of domestic law, despite the lack of independent monitoring, systemic failure of environmental oversight and the corporate capture of government regulators detailed above.

Indigenous Treaty Rights

Indigenous peoples in the oil sands regions, which includes the Denesuline (Chipewyan), Woodland Cree, Métis, and others, have for years argued that the government has violated their constitutionally-enshrined treaty rights by allowing the development of the oil sands (see section 2 above), as well as their rights under international law. Numerous legal challenges have been brought, some successful.¹⁴⁹ The Athabasca Chipewyan First Nation has highlighted the cumulative and synergistic nature of the negative impacts of the oil sands operations on Indigenous treaty rights, which are compounded against existing structural inequalities including political and economic marginalization.¹⁵⁰

Treaty-protected and culturally significant subsistence activities include hunting, trapping, fishing and harvesting wild foods; gathering materials for cultural use; and engaging in land-based cultural and spiritual practices. As highlighted in one case study, these rights also include ‘ancillary rights’, which are defined as:

the right to access those factors incidental to the original right, and reasonably required for the direct exercise of the treaty and Aboriginal right. For example, given that fishing requires fish populations of reasonable health and abundance, water quantity and quality can be interpreted as an ancillary right for those who are guaranteed the right to hunt, trap, and fish under section 35 and the numbered treaties. Further, ancillary rights can include sufficient resources for traditional land use, the experience of remoteness and solitude on the land, and appropriate and safe land for traditional activities that is accessible.¹⁵¹

¹⁴⁹ See for example *Fort McKay First Nation v Prosper Petroleum Ltd*, 2020 ABCA 163. On April 1, 2025, the Athabasca Chipewyan First Nation (ACFN) filed a judicial review of Alberta Environment and Protected Areas’ decision to renew the rules for the Alberta’s Mine Financial Security Program (MFSP) without addressing critical flaws that were identified and shared with Alberta during its review of the Program from 2022 to 2024. See also Indigenous Climate Action and EcoJustice (2021); and Driotch and Simieritsch (2010); Treaty Alliance Against Tar Sands Expansion (2016).

¹⁵⁰ Athabasca Chipewyan First Nation Submission on Bill C-50 to the Parliamentary Standing Committee on Natural Resources, 1 December 2023, <https://www.ourcommons.ca/Content/Committee/441/RNNR/Brief/BR12773392/br-external/AthabascaChipewyanFirstNation-e.pdf>

¹⁵¹ Way, Flanagan and Thibault (2017) page 7.

As the research we have surveyed suggests, the ability of affected Indigenous peoples to exercise their treaty rights has been severely impacted by displacement and the dispossession of lands; pollution and contamination of land and water; loss of wildlife and decreased biodiversity; and other impacts associated with the oil sands extractive operations.¹⁵² Violation of these constitutionally-protected entitlements provides further indication of unlawfulness on the part of the state.

International Human Rights Law

The right to free, prior and informed consent, as provided under article 19 of the UN Declaration on the Rights of Indigenous Peoples (UNDRIP), is particularly relevant in the context of the Alberta oil sands.¹⁵³ In its consideration of Canada's 2017 periodic reports, the UN Committee on the Elimination of Racial Discrimination reported its deep concern that "environmentally destructive decisions for resource development which affect their lives and territories continue to be undertaken without the free, prior and informed consent of the indigenous peoples, resulting in breaches of treaty obligations and international human rights law".¹⁵⁴ Other UN treaty bodies have noted that to be adequate and effective, 'free, prior and informed consent' processes must involve independent impact assessments, as well as interactive and continuous dialogue with Indigenous peoples through 'culturally appropriate procedures'.¹⁵⁵ In the context of the Alberta oil sands, consultation on a project-by-project basis which fails to address the cumulative impacts of the extractive

¹⁵² Westman and Joly (2019). The Commissioners' report on the signing of Treaty 8 at the end of the 18th century provides insight into the Government's undertaking to respect these rights, as exemplified in the following quote from the Superintendent: "Our chief difficulty was the apprehension that the hunting and fishing privileges were to be curtailed. [...] we had to solemnly assure them that only such laws as to hunting and fishing as were in the interest of the Indians and were found necessary in order to protect the fish and fur-bearing animals would be made, and that they would be as free to hunt and fish after the treaty as they would be if they never entered into it. We assured them that the treaty would not lead to any forced interference with their mode of life" Report of Commissioners for Treaty No 8, 22 September 1899, <https://www.rcaanc-cirnac.gc.ca/eng/1100100028813/1581293624572>.

¹⁵³ United Nations Declaration on the Rights of Indigenous Peoples Act. See also *Taku River Tlingit First Nation v. British Columbia*, *Haida Nation v. British Columbia*, *Mikisew Cree First Nation v. Canada*

¹⁵⁴ CERD, Concluding Observations on the combined twenty-first to twenty-third periodic reports of Canada, CERD/C/CAN/CO/21-23, para 19 (a)

¹⁵⁵ Views adopted by the Committee under the Optional Protocol to the International Covenant on Economic, Social and Cultural Rights, concerning communications Nos. 251/2022 and 289/2022, 8 October 2024, E/CN.12/76//2551/2022, and Views adopted by the Committee under the Optional Protocol to the Convention on the Rights of the Child on a communications procedure, concerning communication No. 172/2022, 16 January 2025, CRC/C/97/D/172/2022.

developments on First Nations' treaty rights has been found to undermine the honour of the Crown, a critical component of treaty interpretation.¹⁵⁶

In 2021, UNDRIP was incorporated into Canadian law, making it legally binding on the Canadian authorities and mandating its implementation through an action plan.¹⁵⁷ (Canadian courts had found a “duty to consult and accommodate” First Nations deriving from treaty rights already in 2005.¹⁵⁸) This legislation requires respect for the rights of Indigenous peoples through “processes that are *free* from manipulation or coercion, *informed* by adequate and timely information, and occur sufficiently *prior* to a decision so that Indigenous rights and interests can be incorporated or addressed effectively as part of the decision making process - all as part of meaningfully aiming to secure the consent of affected Indigenous peoples”.¹⁵⁹ However Indigenous peoples continue to protest the authorities' failure to properly consult and seek their consent for the oil sands operations.¹⁶⁰ The AER is singled out in a recent study as “almost entirely unresponsive to Indigenous opposition” to oil sands projects in the regulatory approval process.¹⁶¹

Indigenous communities and environmental groups have called for moratoria on the expansion of oil sands mining and a halt to existing operations, pending the establishment of processes to ensure the free, prior and informed consent of affected Indigenous peoples; evidence-based assurances that industrial wastewater “is not reaching or at risk of reaching the environment”; meaningful access to compliance data; and the effective enforcement of relevant environmental legislation, among other accountability measures.¹⁶² The recent proposal by the federal government to amend the Fisheries Act to allow for treated wastewater tailings to be released into the Athabasca raises further questions related to a lack of free, prior and informed consent, as well as to the environmental and health risks for downstream communities.¹⁶³

¹⁵⁶ Fort McKay First Nation v Prosper Petroleum Ltd, 2020 ABCA 163, <https://www.canlii.org/en/ab/abca/doc/2020/2020abca163/2020abca163.pdf>; Mikisew Cree First Nation v Canada (Governor General in Council), 2018 SCC 40 at para 24, [2018] 2 SCR 765 [Mikisew 2018]

¹⁵⁷ UNDRIP Act, 2021; UNDRIP Act Action Plan 2023-2028.

¹⁵⁸ Heydon (2018) p.72.

¹⁵⁹ <https://www.justice.gc.ca/eng/declaration/about-apropos.html>

¹⁶⁰ One study concludes that “the regulatory approval process (...) does not provide meaningful opportunities for Indigenous communities to control whether or not oil and gas projects proceed on their traditional territories”. Indigenous Climate Action and EcoJustice (2021). See also Birrell (2022).

¹⁶¹ Indigenous Climate Action and EcoJustice (2021) page 8.

¹⁶² Environmental Defence, Keepers of the Water et al, (2023).

¹⁶³ As addressed by the UN Special Rapporteur on the rights to safe drinking water and sanitation in the report of his visit to Canada, A/HRC/57/48/Add.1, 9 September 2024, para 69.

Beyond the specific protections of UNDRIP, it seems likely that the nefarious effects of the oil sands operations outlined in section 2 above, would violate international human rights law provisions related to the rights to life;¹⁶⁴ physical and mental health;¹⁶⁵ private and family life;¹⁶⁶ food and water;¹⁶⁷ cultural rights;¹⁶⁸ the right to a clean, healthy and sustainable environment;¹⁶⁹ the rights of children and of future generations;¹⁷⁰ as well as the right to an effective remedy.¹⁷¹ A lack of respect for the human rights of Indigenous peoples also disregards Indigenous perspectives and knowledge of their environment as well as the vital role of Indigenous peoples in land stewardship, the importance of which is recognised under international law.¹⁷² A State must protect those within its jurisdiction against human rights abuse by third parties, such as corporations, and failure to do so will result in a violation.¹⁷³

¹⁶⁴ The UN Human Rights Committee specifies that the right to life “concerns the entitlement of individuals to be free from acts and omissions that are intended or may be expected to cause their unnatural or premature death, as well as to enjoy a life with dignity”. See General Comment no. 36, 3 September 2019, CCPR/C/GC/36, paras 3, 26 and 62.

¹⁶⁵ CESCR General comment no. 14 (2000), The right to the highest attainable standard of health (article 12 of the International Covenant on Economic, Social and Cultural Rights), E/C.12/2000/4, 11 August 2000.

¹⁶⁶ See, for example, UN Human Rights Committee, *Portillo Cáceres v Paraguay*, CCPR/C/126/D/2751/2016 (2019), regarding failure of the State to protect individuals from severe environmental contamination, in violation of the State’s international obligations to protect the rights to life and respect for private and family life and the home.

¹⁶⁷ See Report of the Special Rapporteur on the human rights to safe drinking water and sanitation on his visit to Canada, 57/48/Add.1, 9 September 2024; Report of the Special Rapporteur on the right to food on his visit to Canada, A/HRC/22/50/Add.1, 24 December 2012.

¹⁶⁸ CESCR General Comment 21: Right of everyone to take part in cultural life (art. 15, para. 1 (a), of the International Covenant on Economic, Social and Cultural Rights), E/C.12/GC/21, 21 December 2009, paras 36 and 37.

¹⁶⁹ International Court of Justice, *Obligations of States in respect of climate change*, Advisory Opinion, 23 July 2025 (“ICJ Advisory Opinion 2025”), paras. 387-393; UN General Assembly resolution 76/300, ‘The human right to a clean, healthy and sustainable environment’, July 2022, A/RES/76/300. See also Report of the Special Rapporteur on the Issue of Human Rights Obligations Relating to the Enjoyment of a Safe, Clean, Healthy and Sustainable Environment, Doc A/HRC/37/59 (2018), and *Community of La Oroya v Peru*, Inter-American Court of Human Rights, Judgment, March 2024.

¹⁷⁰ See Committee on the Rights of the Child general comment 26, CRC/C/GC/26, 22 August 2023, which recognizes the principle of intergenerational equity and the interests of future generations.

¹⁷¹ See for example *Portillo Cáceres v Paraguay*, above note 159, addressing the failure of the State to conduct an effective investigation into the effects of environmental pollution, ensure accountability of those responsible, provide reparations for victims, and adopt preventative measures.

¹⁷² For example, the Kunming-Montreal Global Biodiversity Framework highlights the role of indigenous peoples and local communities as custodians of biodiversity and as partners in its conservation, restoration and sustainable use, and declares that the Framework’s implementation must ensure that “the rights, knowledge, including traditional knowledge associated with biodiversity, innovations, worldviews, values and practices of indigenous peoples and local communities are respected, and documented and preserved with their free, prior and informed consent”.

¹⁷³ UN Human Rights Council resolution 17/4, ‘Human rights and transnational corporations and other business enterprises’, 6 July 2011, A/HRC/RES/17/4; Guiding Principles on Business and Human Rights: Implementing the United Nations “Protect, Respect and Remedy” Framework, A/HRC/17/31 (Annex), 21 March 2011. <https://documents-dds-ny.un.org/doc/RESOLUTION/GEN/G11/144/71/PDF/G1114471.pdf>. See also UN Human Rights Council, Report of the Special Rapporteur on human rights and the environment, ‘Business, planetary boundaries, and the right to a clean, healthy and sustainable environment’, A/HRC/55/43, 2 January 2024.

The Athabasca Chipewyan First Nation delineated a range of human rights violations attributable to the Alberta oil sands operations in its submission to the UN Special Rapporteur on human rights and climate change in March 2025, with concerns ranging from land and habitat destruction, to air and water pollution, to the disproportionate impacts of climate change on Indigenous peoples.¹⁷⁴ The ACFN criticized the failures of the federal and provincial governments to adequately regulate the oil sands industry, including by “setting and enforcing science-based and culturally relevant regulations to prevent air and water pollution”, as well as to manage the cumulative impacts and ensure the administration of effective reclamation processes.¹⁷⁵ ACFN members emphasized the importance of respect for the rights of Indigenous peoples in the just transition away from “a colonial structure designed to keep us dependent on fossil fuels while continuing to destroy our lands, traditional ways and livelihoods”.¹⁷⁶

International law regulating greenhouse gas emissions

In its Advisory Opinion on the obligations of States in response to climate change, the International Court of Justice made clear that international law imposes binding duties on states to protect the climate system and other parts of the environment from anthropogenic greenhouse gas emissions.¹⁷⁷ The Court made clear that these duties relate to “all actions or omissions of States which result in the climate system and other parts of the environment being adversely affected by anthropogenic greenhouse gas emissions”¹⁷⁸. It gave as examples that aligned with this interpretation “activities such as ongoing production licencing and subsidizing of fossil fuels”.¹⁷⁹ Where a state fails in its duty to protect the climate system – a duty which is delineated by a tapestry of applicable law – it commits an unlawful act.

One way in which the scope of a State’s duty to protect the climate system is determined is via commitments made under the Kyoto and Paris Agreements. According to the Court: “non-compliance with emission reduction commitments by a State may constitute an internationally

¹⁷⁴ <https://www.ohchr.org/sites/default/files/documents/issues/climatechange/cfis/cfi-fossil-fuel/subm-fossil-fuel-based-indi-peop-acfn.pdf>

¹⁷⁵ Ibid.

¹⁷⁶ Ibid, page 5.

¹⁷⁷ ICJ Advisory Opinion 2025.

¹⁷⁸ ICJ Advisory Opinion 2025, para 94.

¹⁷⁹ Ibid., para 94.

wrongful act.”¹⁸⁰ The Canadian Climate Institute considers that “Canada is not on track to achieve any of its climate goals”,¹⁸¹ and in 2024, it wrote that progress on cutting emissions in some sectors was “more than countered by rising emissions from oil and gas, particularly oil sands production.”¹⁸² Insofar as support to the oil sands is contributing to Canada’s failure to meet its emission targets, and so to protect the climate system, it appears to meet the criteria of unlawful.

Summary reflections

In conclusion, there are multiple ways in which the oil sands operations could be construed as unlawful, from violating domestic environmental regulations and Indigenous Treaty rights to contravening international human rights and environmental law. As the legal responsibilities of both emitting companies and states are increasingly elaborated by national and international courts, it seems likely that emissions from the oil sands operations will incur liability for either or both of these actors.¹⁸³ Corporate influence over domestic regulation underlines the importance of referral to both national and international law when applying this test. Some of these violations are applicable to the whole operation, and others to just one aspect, raising the question of whether unlawfulness in one area of the vast oil sands operation is sufficient to bring the whole enterprise within the definition of ecocide. It seems possible, however, that the pattern of illegality over multiple legal frameworks that we begin to unveil here would meet the unlawfulness test.

ii. Wanton

¹⁸⁰ Ibid., para 221.

¹⁸¹ Canadian Climate Institute, “Independent Assessment: 2025 Progress Report on the 2030 Emissions Reduction Plan” February 2026, p. 1. <https://climateinstitute.ca/wp-content/uploads/2026/02/Climate-Institute-440-Megatonnes-Independent-Assessment-2026-2025-Progress-Report-2030-Emissions-Reduction-Plan.pdf>

¹⁸² Canadian Climate Institute, “2024 emissions estimate shows progress stalled, Canada’s 2030 target out of reach”, 18 September 2025. <https://climateinstitute.ca/news/2024-emissions-estimate-shows-progress-stalled/?utm>

¹⁸³ In addition to proceedings at the ICJ, cases on State responsibility include *Sacchi et al v Argentina* (2019), UN Committee of the Rights of the Child, which found that states are legally responsible for the harmful effects of emissions originating in their territory on children outside their borders and *KlimaSeniorinnen v Switzerland* (2020), European Court of Human Rights, which found that inadequate regulation of GHG emissions violated the rights of the claimants to respect for private and family life. Domestic cases include *Lliuya v RWE AG* (2025) in the Higher Regional Court of Hamm, Germany, which found that major greenhouse gas emitters can in principle be found liable for the impacts of their emissions under German civil law, based on the proportion of their contributions to global emissions, and *Milieudefensie et al. v Royal Dutch Shell* (2021), Dutch District Court of The Hague.

If it cannot be established that extractive operations in the oil sands contravene any local or international laws, such acts may still amount to ecocide if they can be said to be “wanton” or “**with reckless disregard for damage which would be clearly excessive in relation to the social and economic benefits anticipated**”.

The huge role that the oil sands play in providing energy for Canada, as well as the United States, make the balancing test captured in the criterion of “wanton” particularly relevant. In its commentary to the definition, the IEP noted that this criterion:

introduces a proportionality test into the definition which reflects environmental law principles. Much national and international environmental law involves a balancing of environmental harms against social and economic benefits, which is expressed in the principle of sustainable development, and the Panel was mindful that socially beneficial acts, such as housing developments and transport links, can cause severe and either widespread or long-term damage to the environment.¹⁸⁴

This reliance on the international environmental law principle of sustainable development has been criticized by commentators who see sustainable development as an oxymoron: wishful thinking that allows capitalist destruction of the environment to continue. They further suggest that by separating social and economic interests from environmental interests it reproduces the separation of humans from the rest of the environment, a false dichotomy which supports a view of the environment as a human resource.¹⁸⁵ As Hamilton writes: “humans will have to appear, explicitly, on both sides of any balancing test that weighs the harms and benefits of environmental destruction.”¹⁸⁶ Minkova concludes more categorically that “environmental harm cannot be separated from socio-economic injustice and cost–benefit analysis merely obfuscate [sic] that reality.”¹⁸⁷

¹⁸⁴ IEP definition, above note 11.

¹⁸⁵ See for eg. Minkova (2024); and Hamilton (2024), “Criminalizing Ecocide”, https://digitalcommons.wcl.american.edu/cgi/viewcontent.cgi?article=3251&context=facsch_lawrev; <https://academic.oup.com/jicj/article/22/1/81/7698934>. This is supported by the reference to “natural, cultural or economic resources” in the definition of severe, drawn from the Committee on Disarmament’s definition in the ENMOD Convention.

¹⁸⁶ Hamilton (2024), p. 40, although she goes on at p 42 to note that “Admittedly, the outcome in terms of the (increasingly large) quantity of anticipated human benefit required before acts committed in the knowledge that they are substantially likely to cause severe and widespread/long-term damage to the environment will be spared criminalization, could eventually be the same under either test.”

¹⁸⁷ Minkova (2024) page 89.

We agree with both of these statements. However, contrary to those authors, we do not see them as incompatible with the wantonness test. It is indeed impossible to separate harm done to “the environment” from the resulting negative effects on human beings. As we have shown above, the Pacific Island States’ definition of ecocide does not do so. The “damage to the environment” that would amount to ecocide is clearly described to encompass harm to humans and other species as well as to ecosystems and other “element[s] of the environment”. An attentive reading of the wantonness test in the context of the whole definition makes clear that human interests, rather than being opposed to “nature”, do appear on both sides of the equation. Damage, as defined through the terms severe, widespread and long-term, is weighted against social and economic benefits. These benefits are uniquely human, but the damage is not. It embraces harm to all of nature, specifically including human life, health and culture.¹⁸⁸

Having reaffirmed the scope of damage to be weighed, we now turn to the question of whether it is clearly excessive in relation to the social and economic benefits it brings. This raises a number of questions about how social and economic benefits are defined and assessed, and how they are balanced against harms.

Assessing social and economic benefits

The oil sands provide employment for tens of thousands of people (the exact figure is hard to determine). This includes members of Indigenous communities.¹⁸⁹ According to the Canadian government, over 6% of provincial employment and 21% of Alberta’s annual GDP comes from the oil and gas sector. A Statistics Canada report estimated that every direct job created in the oil and gas sector “typically creates two indirect jobs in businesses that sell to oil and gas producers, and three ‘induced’ jobs in sectors where oil and gas workers spend their money”.¹⁹⁰

¹⁸⁸ The International Law Commission, in its work on the draft Principles on the Protection of the Environment in Relation to Armed Conflicts, has noted that “The environment thus represents a complex system of interconnections where the factors involved (such as humans and the natural environment) interact with each other in different ways that “do not permit them to be treated as discrete””. A/CN.4/728, 27 March 2019, para. 196.

¹⁸⁹ Parlee (2015).

¹⁹⁰ Government of Canada, “Alberta Sector Profile: Mining, Quarrying, and Oil and Gas”. Available at <https://www.jobbank.gc.ca/trend-analysis/job-market-reports/alberta/sectoral-profile-mining-oil-gas>

Around 80% of Canadian crude oil is exported, bringing considerable revenue. In 2023, exports were valued at CDN \$124 billion, or 16% of Canada's total export value.¹⁹¹ In May 2024, Statista estimated that Canada's oil sands extraction industry contributed 1.7% of total GDP.¹⁹² The United States received approximately 97% of Canada's crude oil exports in 2023, representing around two thirds of that country's total crude oil imports.¹⁹³ The vast majority of this comes from the Alberta oil sands.

When juxtaposing these economic benefits with the damage outlined in the earlier sections, critical questions of distribution and justice arise. Chief among them: who is enjoying these benefits, and are these the same communities that are experiencing the burdens of harm? Can adverse impacts experienced by one population be offset by benefits accrued to another?

The first set of concerns pertains to social distribution. To what extent are the benefits of oil sands development equitably shared across social groups differentiated by gender, ethnicity, class, age, disability, or other structural axes of marginalisation? With respect to Indigenous communities, one long-time observer of Alberta's resource economy has observed:

Benefits (revenues) tend to be captured provincially and federally, the trickle down of these benefits is perceived to be limited according to statistics on income distribution. Statistics Canada data show significant disparities between Aboriginal and non-Aboriginal peoples.¹⁹⁴

... some of the highest disparities between the well-being of non-Indigenous and Indigenous people have been found in northern Alberta.¹⁹⁵

These observations align with broader evidence suggesting that the more marginalised a group is, the less likely it is to benefit materially from extractive development. Meanwhile, environmental

¹⁹¹ <https://www.cer-rec.gc.ca/en/data-analysis/energy-markets/market-snapshots/2024/market-snapshot-almost-all-canadian-crude-oil-exports-went-to-the-united-states-in-2023.html>

¹⁹² <https://www.statista.com/statistics/1319179/canada-oil-sands-gdp-impact/#:~:text=Canada's%20oil%20sands%20extraction%20industry,1.7%20percent%20of%20total%20GDP.>

¹⁹³ Canada Energy Regulator, "Market snapshot: Almost all Canadian crude oil exports went to the United States in 2023", 21 August 2024, available at <https://www.cer-rec.gc.ca/en/data-analysis/energy-markets/market-snapshots/2024/market-snapshot-almost-all-canadian-crude-oil-exports-went-to-the-united-states-in-2023.html>; Government of Canada, "Mapping the Canada-US Energy Relationship", 13 April 2022, available at <https://connect2canada.com/2022/04/mapping-the-canada-u-s-energy-relationship-2/>

¹⁹⁴ Parlee (2015) p.427, referring to 2006 data.

¹⁹⁵ Parlee (2015) p.429.

harms tend to be disproportionately borne by those with the least political and economic power.¹⁹⁶ As detailed above, Indigenous communities have been among the most severely affected by the ecological and health consequences of oil sands operations.

This disparity raises a key ethical and legal question under the “wantonness” element of the crime of ecocide: should the benefits and harms being weighed affect the same communities? Surely harms inflicted upon one segment of society cannot legitimately be offset by benefits conferred upon another.¹⁹⁷

A second set of concerns arises in relation to geographical distribution. Over what spatial range should social and economic benefits be measured, and is this co-extensive with the area in which the harms occur? Employment is created in the local area, which is the area suffering the brunt of the pollution. But the revenue generated from the sales of the oil benefits a far wider group.¹⁹⁸ And the oil is a substantial source of energy for people and business in the United States, who are far away from the nefarious effects of the extraction. This asymmetry prompts us to ask whether social and economic benefits accruing to distant populations can be considered in evaluating whether the threshold of ‘wanton’ environmental destruction has been crossed. Put another way, can severe, widespread and/or long-term damage to the environment in one area escape the classification of ecocide if it benefits people far away from the site of the damage?

The definition of ecocide is silent on these questions. However, within the interpretive framework of the Rome Statute, guidance might be found in Article 21(3), which provides that law must be applied “consistent with internationally recognised human rights, and be without any adverse distinction founded on grounds such as gender ..., age, race, colour, language, religion or belief, political or other opinion, national, ethnic or social origin, wealth, birth or other status.”¹⁹⁹ If the crime of ecocide is introduced into the Rome Statute, this provision could inform application of the wanton

¹⁹⁶ See, for example, reports of the UN Special Rapporteur on Extreme Poverty, Philip Alston, “Climate Change and Poverty”, A/HRC/41 (2019), and of the UN Special Rapporteur on Racial Discrimination, E. Tendayi Achiume, “Ecological Crisis, Climate Justice and Racial Justice”, A/77/549 (2022).

¹⁹⁷ Liana Minkova explores this question, with reference to the work of W. Adams, in her 2024 article cited above.

¹⁹⁸ See note 23 above. In addition to Canadian corporations, businesses in the United States, Asia and Europe have stakes in the oil sands operations.

¹⁹⁹ Rome Statute, Article 21(3).

test. In particular, it might preclude the use of aggregate benefit arguments to justify severe harm disproportionately borne by socially or politically marginalized groups.

Greenhouse gas emissions and their climatic effects raise a corollary question: what are the implications when a relatively small group reaps concentrated benefits while the resulting harm is dispersed across the globe? In this case, the adverse consequences of climate disruption are suffered by many who reap no benefit at all from the industry.

A final consideration arises with respect to the baseline against which benefits are to be assessed. Should the evaluation of “social and economic benefit” be conducted relative to a counterfactual in which oil sands operations never existed, in which they have ceased, or in which they have transitioned into a renewable energy framework? The Government of Canada has announced a goal for 30% of Alberta’s electricity to be generated from renewable sources by 2030,²⁰⁰ although there appears to be little corresponding ambition to scale back oil sands production: the provincial government’s emission reduction plans focus on “support [to] emissions reductions beyond our borders.”²⁰¹ Yet a more transformative energy transition would plausibly involve replacing employment and revenue from oil sands extraction with that generated by renewable energy. Such a transition could potentially yield similar or even greater economic benefits for Alberta and Canada as a whole, while also reducing the global harms associated with fossil fuel emissions. Modelling exercises have pointed to the significant benefits of reduced oil sands extraction, which would “immediately reduce greenhouse gas emissions, air pollution and freshwater use, resulting in widespread benefits for human health, ecosystem integrity and climate change”, while creating jobs in environmental reclamation and helping restore the rights of Indigenous peoples.²⁰² In this light, claims of social and economic benefit associated with oil sands operations must be scrutinised not

²⁰⁰ <https://www.atcoenergy.com/blog/renewable-energy-in-alberta#:~:text=The%20Renewable%20Electricity%20Act%20is,from%20renewable%20sources%20by%202030,although%20it%20imposed%20a%20seven-month%20moratorium%20on%20renewable%20energy%20development%20in%20August%202023.>

²⁰¹ Government of Alberta, Emissions Reduction and Energy Development Plan, Overview, available at <https://www.alberta.ca/emissions-reduction-and-energy-development-plan>.

²⁰² Mertins-Kirkwood and Hulse (2024). See also the perspective of the Athabasca Chipewyan First Nation on the need for a just transition respectful of Indigenous rights in its Submission on Bill C-50 to the Parliamentary Standing Committee on Natural Resources, 1 December 2023, <https://www.ourcommons.ca/Content/Committee/441/RNNR/Brief/BR12773392/br-external/AthabascaChipewyanFirstNation-e.pdf>

only for how they are distributed, but also for how they compare to plausible alternative pathways that minimise harm.

Summary reflections

This analysis has not attempted to reach a final or definitive conclusion on whether the Alberta oil sands operations meet the legal threshold of “wanton” environmental destruction under the Pacific Island States’ definition of ecocide. Instead, it has used application of the test to explore the notion of “wanton” in more detail.

We disagree with the simple characterisation of the test as “anthropocentric”, finding that, when read in the context of the full definition, it does not artificially separate humans from the rest of nature. However, the exercise raises questions about how the balancing of harms and benefits should be structured and on what ethical foundations it should rest. The harms associated with oil sands operations are significant, cumulative, and borne largely by Indigenous communities. Meanwhile, many of the benefits, including energy supply and revenues, accrue to actors far removed from the sites of extraction and the communities affected. This spatial and social disjunction suggests that application of the wantonness test involves complex questions of justice and equity. It invites scrutiny not only of whether the benefits are sufficient to justify the harms, but who benefits, who suffers, and what alternatives might allow for more equitable and sustainable outcomes. In this sense, the most important insights from this analysis lie not in the specific conclusions it reaches about the Alberta oil sands, but in the interpretive possibilities it uncovers within the test itself.

4. Conclusion

When the 2011 mock trial found two CEOs guilty of ecocide for their role in the Alberta oil sands, the crime had no agreed definition. In this article, we have re-run the case with the Pacific States’ definition formally proposed for inclusion into the statute of the ICC. The exercise allows us to

examine the gravity of the devastation caused by the oil sands operations, as well as the contours of the definition itself.

While we do not claim to have conducted an exhaustive investigation, our findings offer strong preliminary support for concluding that the harm caused by the Alberta oil sands operations meets the threshold for the crime of ecocide. The damage caused by the extractive operations is unfolding in ways that are severe, widespread *and* long-term, although we highlight the challenges to assessing long-term harm without clarity on future regulatory and industry decisions. Forests are razed, wetlands drained, waterways poisoned and species threatened with devastating impacts on the life, health and cultural survival of communities, particularly Indigenous communities, in the area. These harms are compounded by significant greenhouse gas emissions that are fuelling global climate disruption.

Critically, we have shown not only that harm to humans and the broader environment are inseparable, but that the Pacific Island States' definition recognises this. By defining the environment to include the biosphere, as well as by blending harm to human and non-human elements in its parameters of damage, the Pacific Island States' definition takes an ecocentric approach.

Our examination of whether the oil sands operations are unlawful or wanton – the second threshold test in the Pacific States' definition – leads to less definitive conclusions. We uncover a myriad of ways in which the operations could be considered unlawful for state and private actors – from domestic environmental law to Indigenous Treaty rights, international human rights law and international obligations recently delineated by the International Court of Justice – but our most significant observation is that international law provides an essential guardrail, especially where, as in this case, there are credible allegations of corporate capture of the domestic regulator.

The alternative wanton test is of particular relevance to the Alberta oil sands, which are a significant source of energy, employment and income to individuals, corporations and consumers in Canada and beyond. As a preliminary point, we find, based on our earlier analysis, that the test does not separate humans from non-human nature as has been alleged. However, our application of the test reveals a disjunction between those who benefit from the operation and those who suffer, with the

damage distributed along axes of power and the local Indigenous peoples bearing the heaviest burden. In order to avoid compounding inequality, implementation of the test will have to consider not only whether the benefits outweigh the harms, but whose interests are served, whose well-being is compromised, and what other paths could offer greater equity and sustainability.

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