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Toward Indigenous visions of nature-based solutions: an exploration into Canadian federal climate policy

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ABSTRACT

Political traction for nature-based solutions is rapidly growing as governments recognize their role in addressing the simultaneous climate and biodiversity crises. While there has been recognition of the role of Indigenous Peoples in nature-based solutions, there has also been limited academic review on their relationship. This paper explores how the Government of Canada's conceptualization of nature-based solutions either support or prevent Indigenous sustainable self-determination. Drawing on past policy frameworks, we construct a novel four-dimensional sustainable self-determination policy lens focused on: Indigenous knowledge systems; Indigenous jurisdiction over land; the full and effective participation of Indigenous Peoples; and Indigenous Peoples as rights-holders to review a total of nine federal climate policy, planning, and science documents. Our analysis shows that while there is growing recognition of Indigenous rights, inclusion of Indigenous knowledge, and commitments to include the participation of Indigenous Peoples in the implementation of certain climate activities, there is a clear unwillingness to recognize Indigenous jurisdiction and Indigenous understandings of land as systems of reciprocal relations. Reframing nature-based solutions in the context of Canadian and international climate policy is essential not only to advance the self-determination of Indigenous Peoples, but also to create the ceremonial ground for Indigenous visions of nature-based solutions in order to address these joint crises.

Key policy insights



- Despite a growing recognition of the role of nature-based solutions in climate policy, there is limited discussion of how current framings support or prevent Indigenous self-determination.
- Without such consideration, and the appropriate protection and recognition of Indigenous rights and jurisdiction, nature-based solutions risk perpetuating a form of climate colonialism that facilitates further violence and land dispossession against Indigenous Peoples.
- Framings of nature-based solutions could benefit from Indigenous ontologies to reframe discussions on the reciprocal connection between humans and nature, advancing a relational framework of nature-based solutions.
- A novel sustainable self-determination policy lens may assist Parties consider how, and in what capacity, they are considering the rights of Indigenous Peoples, as required by the Paris Agreement and the United Nations Declaration on the Rights of Indigenous Peoples.

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1. Introduction

Political traction for nature-based solutions (NbS), also known as nature-based climate solutions, is rapidly growing (Chausson et al., 2020; Griscom et al., 2019; Seddon et al., 2021). Recent reports by the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES, 2019), the Intergovernmental Panel on Climate Change (IPCC, 2019), and the Global Commission on Adaptation (GCAP, 2019) recognize the key role that NbS – solutions that work with nature to address societal challenges – play in addressing the simultaneous climate and biodiversity crises. Twin crises that, if not appropriately dealt with, are projected to cause a cascade of impacts, including thawing permafrost, the extinction of over one million species, rising sea levels, and increasingly severe weather (Bush & Lemmen, 2019; IPCC, 2019). In response, and to mitigate the most severe impacts from both crises simultaneously, proponents of NbS are highlighting their potential to deliver benefits for biodiversity, people, and the climate (Seddon, Chausson, et al., 2020).

For Indigenous Peoples, delivering ‘life-enhancing’ climate solutions is not new, but is rather a re-articulation of the multi-dimensional, interconnected, and interrelated approach they’ve been taking for centuries (Wildcat, 2009; McGregor, 2019). This approach, and the unique role of Indigenous Peoples in advancing climate and biodiversity solutions, has been increasingly acknowledged by governments, academics, and non-governmental organizations around the world. For instance, the IPCC Working Group 1 Report (2021) highlighted the role that Indigenous knowledge systems play in adaptation and mitigation, and the IPBES Global Assessment (2019) confirmed that nature is declining less rapidly in lands and forests stewarded by Indigenous Peoples. Indigenous Peoples, and their representative organizations, are also creating their own space in international discussions. At the 2021 World Summit of the International Union for the Conservation of Nature (IUCN), an outcome document, *Global Indigenous Agenda for the Governance of Indigenous Lands, Territories, Waters, Coastal Seas and Natural Resources*, was released by Indigenous Peoples to highlight key priorities. At the top of the list was recognition and respect for Indigenous rights, implementation of Indigenous solutions to the biodiversity and climate crises, and strengthening of Indigenous decision-making.¹

The connection between Indigenous governance and NbS is becoming more common in policy contexts (Indigenous Climate Action, 2021; Reed et al., 2021; Townsend et al., 2020). For example, Seddon et al. (2021) include this Indigenous governance connection in their identification of four principles to ensure that NbS benefit society: (i) NbS are not a substitute for the rapid phase out of fossil fuels; (ii) they involve ecosystems wider than just forests such as those on land and in the sea; (iii) they are implemented with the full engagement and consent of Indigenous Peoples; and (iv) they are designed to tangibly benefit biodiversity. Despite the inclusion of Indigenous Peoples in these principles, they are not generally well represented within the literature and within development of NbS solutions, leading to a number of open questions. Notably, Townsend et al. (2020) highlight ‘... how NbS are developed, on whose territories, and with what outcomes matter deeply to the success of climate change policy as well as to the rights of Indigenous Peoples’ (p. 3). Raising these how and what questions are particularly relevant as NbS is increasingly represented in international and domestic climate policy, particularly those countries with Indigenous Peoples. One such example is in Aotearoa New Zealand’s Biodiversity Strategy, *Te Mana o te Taiao* (2020), which sets a strategic direction for the protection, restoration, and sustainable use of biodiversity, with specific emphasis on Indigenous (Māori) biodiversity.

When represented in the literature, a deep ontological disjuncture between ‘conventional’ conceptions of NbS and those of Indigenous Peoples emerges. Indigenous Peoples are guided by a system of reciprocal relations and obligations taught by living in relation to one another and the natural world in non-dominating and non-exploitative ways (Coulthard, 2014). This connection extends to more than just physical territory, represented by the interconnected concepts of land, water, air, governance, spirituality, social structures, and law itself (Royal Commission on Aboriginal Peoples, 1996). During the Nature-Based Climate Solutions conference hosted in Ottawa, Canada (2020), members of the Indigenous Caucus delivered a statement which thoughtfully articulated this gap: ‘... the current framing of [nature-based] solutions continue to conceptualize humans as separate from nature, commodify nature in terms of balance sheets and offsets, and views the land and water as void of Indigenous Peoples and open for development. Clearly, we need a complete rethink.’²

There has been no systematic review of NbS, in particular natural climate solutions, from the perspective of Indigenous Peoples. This paper begins this process by focusing on Canada, a country with a complicated and constitutional relationship with Indigenous Peoples (see section 35 of the Constitution Act). Since the 2015 campaign and subsequent election of Justin Trudeau, the federal Government recommitted to climate action, announcing new plans to achieve net-zero emissions by 2050, and to a renewed 'nation-to-nation' relationship with Indigenous Peoples (First Nations, Inuit, and Métis).

While these commitments are welcome, an ongoing legacy of failure persists both for the climate and for Indigenous Peoples. On climate, Canada has not met a single climate target in the last thirty years (MacNeil, 2019), continues to rank in the top ten global greenhouse gas emitters over the last century (Bhavnani et al., 2019), and is projected to produce more oil and gas in 2050 than 2019 (Carter & Dordi, 2021). On Indigenous Peoples, the historical and ongoing impacts of colonization, land dispossession, and assimilationist policies are felt daily, highlighted most recently by the unearthing of thousands of unmarked graves at former Indian Residential 'schools'³. Given this simultaneous promise, and deep frustration, Canada offers an illustrative case to explore the intersection between NbS and Indigenous Peoples.

On the topic of NbS, the Government's most recent climate plan, *A Healthy Environment and A Healthy Economy*, relies heavily on them, believing they '... can make a significant and cost-effective contribution to the global emission reductions needed by 2030 to hold warming to well below 2°C' (p. 52). To understand how this conceptualization can either support or prevent Indigenous sustainable self-determination, we construct a novel four-dimensional sustainable self-determination policy analysis framework based on Reed, Brunet & Natcher (2020) and Reed et al. (2021). The analytical framework is focused on: (i) Indigenous knowledge systems; (ii) Indigenous jurisdiction over land; (iii) the full and effective participation of Indigenous Peoples; and (iv) Indigenous Peoples as rights-holders.⁴ Using this framework, we review a total of nine federal climate policy, planning, and science documents to answer two questions: (i) how NbS emerged in Canadian climate policy; and (ii) how does the conceptualization of NbS either support or prevent Indigenous sustainable self-determination. These questions have not been discussed in the climate change literature in Canada or elsewhere and may provide insights for other jurisdictions, especially those with Indigenous Peoples, as well as for the principles of Seddon et al. (2021). We begin with a discussion of the emergence of NbS internationally, exploring some of the criticism in the literature. This is followed by our methods, results, discussion, and conclusion.

2. Case description

2.1. Background on nature-based solutions

Nature-based solutions are not new; indeed, Indigenous Peoples have been practising NbS since time immemorial. The recent history of the emergence of NbS in policy and academic arenas, however, is out of scope of this paper: a comprehensive review of the term and its recent scientific basis can be found in Seddon et al. (2021).⁵ Nonetheless, the recent traction can be partly attributed to the United Nations Framework Convention on Climate Change (UNFCCC) and the momentous Paris Agreement, as Parties acknowledged '... the importance of the conservation and enhancement, as appropriate, of sinks and reservoirs of the greenhouse gases' (2015: p. 2) as well as note '... the importance of ensuring the integrity of all ecosystems, including oceans, and the protection of biodiversity, recognized by some cultures as Mother Earth ...' (2015: p. 2). This has helped to heighten growing uptake by governments, multi-lateral institutions, and private organizations alike. Despite this growth, there has been some conceptual discrepancies leading to the development of a Global Standard for Nature-Based Solutions by the IUCN (Cohen-Shacham et al., 2019; IUCN, 2020). The Global Standard includes a series of eight best practices to ensure rigour in the design, assessment, and scaling-up of NbS, while at the same time avoiding unanticipated negative outcomes for Indigenous Peoples and local communities (Cohen-Shacham et al., 2019).

NbS is an umbrella term for efforts that include ecosystem-based adaptation (EbA), ecosystem-based disaster risk reduction, natural infrastructure, green and blue infrastructure, and forest and landscape restoration (Cohen-Shacham et al., 2019; Seddon, Daniels, et al., 2020). In broad terms, according to the IUCN, these are

'... actions to protect, sustainably manage and restore natural or modified ecosystems, that address societal challenges (e.g. climate change, food and water security or natural disasters) effectively and adaptively, simultaneously providing human well-being and biodiversity benefits' (Cohen-Shacham et al., 2016). Though not a new concept, recent academic, political, and corporate interest has grown exponentially in recent years confirmed by systematic reviews conducted by Hanson et al. (2020) and Chausson et al. (2020). In Hanson et al. (2020), a review of peer-reviewed articles and reviews in Web of Science and Scopus showed strong growth in peer-reviewed articles on NbS, increasing from 112 articles in May 2018 to 648 papers in August 2020.

A growing body of literature examines both the challenges and opportunities of NbS (Chausson et al., 2020). At the top of the list of challenges is the fear that NbS are being used to distract from the continuation of business-as-usual consumption of fossil fuels. There is, however, clear recognition that the potential for NbS to provide around 30 percent of the cost-effective climate mitigation needed through to 2030 to achieve the targets of the Paris Agreement can only be reached if there is rapid decarbonization at unprecedented rates (Griscom et al., 2019; Seddon, Daniels, et al., 2020). Other concerns include: the paradigm of growth driven by unsustainable patterns of consumption and production (Kabisch et al., 2016; Seddon, Chausson, et al., 2020); the over-emphasis on tree planting as a 'silver bullet' solution (Seymour, 2020); the need to ensure the full engagement of Indigenous Peoples in the co-design and co-implementation of NbS (Seddon et al., 2021; Townsend et al., 2020); and the tendency to create an artificial dichotomy between people and nature by focusing exclusively on nature's benefits to society (Welden et al., 2021). Clearly, there are benefits for prioritizing solutions grounded in nature, however, current ontological orientations may be contradictory to the transformative action necessary to address the multiple crises facing the planet.

2.2. Climate policy in Canada

Before the last seven years, Canada was considered an international laggard of international progress on both climate change and Indigenous issues. On climate change, the then Harper Government was the only one in the world to withdraw from the Kyoto Protocol after ratification, capping off a decade of muzzling scientists, disrupting progress at the UNFCCC, and criminalizing Indigenous land defence (Spiegel, 2021; Harb & Henne, 2019; MacNeil, 2019). During this time, a dynamic network of non-governmental organizations, sub-national governments, and Indigenous Peoples emerged to advance climate action at various levels (MacNeil, 2019). On Indigenous issues, Canada, Aotearoa New Zealand, Australia, and the United States (also known as CANZUS) were the only countries to vote against the adoption of the United Nations Declaration on the Rights of Indigenous Peoples (UN Declaration) in 2007, largely due to their opposition to land rights, self-determination, and the minimum standard of free, prior, and informed consent (FPIC) (Lightfoot, 2016). Recognizing this, Prime Minister Trudeau, first on the campaign trail and then early in his tenure, made new commitments to act decisively on both Indigenous and climate related issues, largely guided by a commitment to the implementation of the UN Declaration and the Truth and Reconciliation Commission's Calls-to-Action.⁶ As the years progressed, a chasm emerged between this progressive rhetoric and action on the ground, illustrated by the federal purchase of the Trans-Mountain Expansion (TMX) Project⁷ and the ongoing violence against Indigenous land defenders across the country (Gobby et al., 2021).

Canadian climate policy thus offers a unique window into the policy arena in which NbS and Indigenous Peoples interact. Understanding these interactions may provide particular guidance for other CANZUS countries as they wrestle with the process of reconciliation (or more aptly, decolonization) and decarbonization. To explore this policy arena, we begin with an overview of key climate policies prepared by the Canadian federal Government.

2.2.1. Overview of the pan-canadian framework

Following the Paris Agreement, in 2016, the First Ministers (leaders from provinces, territories, and the federal government) released the Vancouver Declaration on Clean Growth and Climate Change, launching a process to prepare a pan-Canadian approach to climate change. This led to the release of the Pan-Canadian Framework at a First Ministers Meeting in December 2016 to help meet Canada's emissions reduction target of a 30 percent reduction in GHG emissions below 2005 levels by 2030 – a target left over from the Harper Government. It

included all provinces and territories with the exception of Manitoba and Saskatchewan. In parallel, the government established a monitoring and reporting framework, summarized in the annual release of a Synthesis Report, having released them in 2017, 2018, and 2019. In addition, the government launched a number of discrete policy processes, covering adaptation and resilience, sustainable finance, climate science, just transition for coal-affected communities, and mitigation opportunities for transportation and buildings. A short description of these policy processes can be found in [Table 1](#).

2.2.2. Overview of a healthy environment

The 'strengthened climate plan' builds on the Pan-Canadian Framework to scale up climate efforts to meet and exceed Canada's 2030 GHG-reduction target. The plan focuses on five pillars: (i) energy efficiency in homes and buildings through a heavy emphasis on retrofitting existing homes, municipal and community buildings, and long-term infrastructure planning; (ii) cleaner transport, including zero emission cars and trucks, and supporting clean energy and the electricity sector; (iii) an increased carbon price rising \$15 per year, starting in 2023, and culminating at \$170 per tonne in 2030; (iv) industrial support, including decarbonization with large-scale emitters and a low-carbon and zero-emission fuels fund; and (v) NbS, such as tree planting and better management,

Table 1. Description of policy processes and their objectives, launched by the Pan-Canadian Framework on Clean Growth and Climate Change.

	Overview
Expert Panel on Climate Adaptation and Resilience Results	The Expert Panel, comprised of academics, representatives of Indigenous organizations, industry, and environmental NGOs, was mandated to propose indicators to measure progress on adaptation, as related to the five priority areas within the Pan-Canadian Framework: human health and well-being; supporting particularly vulnerable regions; climate-related hazards; infrastructure; and translating science and Indigenous knowledge into action. Following eight months of intense work, the Expert Panel produced a report, <i>Measuring Progress on Adaptation and Climate Resilience: Recommendations to the Government of Canada</i> , proposing a suite of 54 indicators across the five priority areas. Members identified a further sub-set of indicators, 19 in total, that could start future discussion and work on measuring progress on adaptation and climate resilience. The full report can be found here: http://publications.gc.ca/collections/collection_2018/eccc/En4-329-2018-eng.pdf
Advisory Council on Climate Action	The Advisory Council, composed of co-chairs Tamara Vrooman and Steven Guilbeault, was created to support the government in identifying opportunities to reduce emissions in the transportation and building sectors, sectors that account for more than a third of Canadian emissions. The final report contained eight recommendations for the Government of Canada to act, and can be found here: https://www.canada.ca/content/dam/eccc/documents/pdf/climate-change/advisory-council-climate-action/acca-final-report.pdf
Expert Panel on Sustainable Finance	The Expert Panel, comprised of four financial experts, was mandated to explore global trends in sustainable finance, most notably climate-related risk disclosure, explore opportunities for sustainable finance in Canada, and propose recommendations for the government of Canada to advance the uptake of sustainable finance within its areas of jurisdiction. The report, <i>Mobilizing Finance for Sustainable Growth</i> , identified a suite of recommendations (15 in total) to shift climate change opportunity and risk management into the mainstream, business-as-usual approach to business. The recommendations leverage Canada's financial status to accelerate market activities, behaviours, and structures to support the transition to a climate-smart economy. The full report can be found here: http://publications.gc.ca/collections/collection_2019/eccc/En4-350-2-2019-eng.pdf
Climate Science 2050: Advancing Science and Knowledge on Climate Change	Climate Science 2050 was a national synthesis to understand the breadth of climate change science and knowledge needs that exist in Canada. The process was led by a federal department, Environment and Climate Change Canada, convening discussions with partners and stakeholders including through surveys and a national workshop held in Ottawa in February 2019. The report identified four outcomes, as well as a fifth area of work: earth system climate science; healthy and resilient Canadians, communities, and built environments; a carbon-neutral society; resilient terrestrial and aquatic ecosystems; and sustainable natural resources. In addition to these sections, the report began by recognizing the importance of Indigenous spaces in climate change science, emphasizing the mobilization of Indigenous leadership and participation. The full report, and the description of this section, can be found here: http://publications.gc.ca/collections/collection_2020/eccc/En4-414-2020-eng.pdf

conservation, and restoration of natural spaces. In combination with the measures introduced by the Pan-Canadian Framework, the government projects that this plan will achieve reductions within the range of 32–40 percent below 2005 levels. While this article was being finalized, the government announced a new 2030 target: 40–45 percent below 2005 levels.

3. Materials and methods

Our approach is based upon an Indigenous Research Paradigm (IRP) with the aim to refocus the evaluative lens on ‘... the innumerable ways in which white sovereignty circumscribes and mitigates the exercise of Indigenous sovereignty’ (Nicoll, 2004, p. 19). Doing this enables the research to deconstruct the dominant assumptions underlying colonial systems of climate solutions by ‘being in’ Indigenous sovereignty (Neville & Coulthard, 2019) and contribute to advance Indigenous climate futures in policy and practice (Whyte, 2018). To do this, we use the concept of sustainable self-determination to assess how the federal government’s conceptualization of NbS supports or prevents Indigenous sustainable self-determination, building on a community-based monitoring study in the Oil Sands region of Alberta (Reed, Brunet, et al., 2020) and a conceptual analysis of the Pan-Canadian Framework and Québec Zéro émission Nette (ZéN) Roadmap (Reed et al., 2021).

Sustainable self-determination advances an individual and community-driven process that ensures Indigenous livelihoods, knowledge systems, governance, relationships to land and the natural world, as well as ceremonial life that can be practiced today and into the future, facilitating their transmission to future generations (Corntassel, 2008). It emerged from four criticisms of the Indigenous rights discourse, namely: (i) the separation of land and natural resources from Indigenous assertions of self-determination; (ii) the restrictions to the participation of Indigenous Peoples in decolonization efforts; (iii) the reduction of Indigenous Nationhood to minority populations or stakeholders; and (iv) the disregard of Indigenous Peoples cultural responsibilities and relationships (Corntassel, 2008). Put another way, this identifies four important themes of analysis for any policy application of the sustainable self-determination lens: (i) Indigenous knowledge systems; (ii) Indigenous jurisdiction over land; (iii) the full and effective participation of Indigenous Peoples; and (iv) Indigenous Peoples as rights-holders. These four themes will be used to operationalize a move away from a focus on the nation state and towards the cultural, social, and political mobilization of Indigenous Peoples, building on the momentum from the UN Declaration (Corntassel, 2012). This sort of policy analysis is considered a form of research that involves interrogating existing policies to understand them, explain their strengths and weaknesses, and propose *new* policies (Geva-May & Pal, 1999). Extending this one step further, we draw on the concept of Intersectionality-Based Policy Analysis (Hankivsky et al., 2014) to pay attention to the *complex contexts and root causes* of the social problems that the policies aim to address (Wiebe, 2019). In this way, we interrogate the discursive politics that accompany the concept of NbS (Mikulewicz, 2020; Schmidt, 2011).

3.1. Methods

We conducted a review of Canadian federal climate policy documents due to the unique, fiduciary relationship the Crown (i.e. Government of Canada) has with Indigenous Peoples. Using the adoption of the Paris Agreement, as well as the election of Justin Trudeau as Prime Minister in late 2015 as a starting point, we manually surveyed all publicly available federal climate policy documents. This process began with the Pan-Canadian Framework, released in 2016, followed by the yearly synthesis reports (communicated in 2017, 2018, and 2019 – the 2020 version having been replaced with the new climate plan), four expert policy processes launched by the Pan-Canadian Framework (described in Table 1), and the most recent plan launched in 2020. In total, this resulted in nine documents that were reviewed for both quantitative (described in Table 2) and qualitative content. In particular, we reviewed each document to consider how they incorporated the four themes identified above: (i) Indigenous knowledge systems; (ii) Indigenous jurisdiction over land; (iii) the full and effective participation of Indigenous Peoples; and (iv) Indigenous Peoples as rights-holders. In doing this, we focus on the policy content of climate policy documents, paying attention to how power and privilege are constructed as a result of socio-economic-political status, race, or education (Hankivsky et al., 2014), while also referring to the policy process of preparing these documents (Vogel & Henstra, 2015). A more detailed exploration of the

Table 2. Terms used for coding analysis.

	Coding terms
Nature-based climate solutions	<i>Nature-based solutions;</i> <i>Nature-based climate solutions;</i> <i>Natural climate solutions</i>
Indigenous Peoples	<i>Indigenous;</i> <i>First Nations;</i> <i>Métis;</i> <i>Inuit</i>
Indigenous jurisdiction	<i>Indigenous jurisdiction;</i> <i>Indigenous governments or Nations;</i> <i>Treaty, modern land claims, and self-governing First Nations;</i> <i>Inuit land-claim organizations; Métis settlements</i>
Full and effective participation of Indigenous Peoples	<i>Engage or engagement with ...</i> <i>Partner or partnership with ...</i> <i>Collaborate or collaboration with ...</i> <i>Working with ...</i> <i>Will be involved / involvement ...</i> <i>Take into account ...</i> <i>Advance</i>
Indigenous knowledge systems	<i>Indigenous knowledge systems;</i> <i>Traditional knowledge;</i> <i>Indigenous knowledge</i>
Indigenous Peoples as rights-holders	<i>Rights and title holders;</i> <i>Rights (constitutionally protected, Treaty, and title);</i> <i>Respect rights;</i> <i>Recognition of rights, respect, cooperation, and partnership;</i> <i>UN Declaration on the Rights of Indigenous Peoples</i>

policy process leading to the creation of the Pan-Canadian Framework, including the limitations for Indigenous participation, can be found in the Indigenous Climate Action report, *Decolonizing Climate Policy in Canada* (2021). Table 2 explains the specific phrases used to code for the four dimensions of sustainable self-determination.

Beginning with these four themes of sustainable self-determination as initial codes, we used NVivo 12, a qualitative data analysis software, to store texts and organize our systematic review. The documents were read in their entirety line-by-line by one author (GR) to identify how and where the themes were characterized in the text, taking care to consider how Indigenous identity and socio-economic status is characterized within individual climate policy documents (Hankivksy & Cormier, 2011). These themes were analyzed, discussed, and modified amongst the research team in an iterative fashion, or more aptly, *Gaataa'aabing*, introduced by elder Doreen Trudeau-Peltier from Wiikwemkoong, to '... [be] looking or searching in a circular fashion' (Bennett et al., 2019, p. 4). Grounded in Anishinaabek values, practices, and ceremony, the *Gaataa'aabing* method is a qualitative method, first used to inform a culturally-grounded photovoice project, that involves looking at all the possibilities and resources during research. This led to the emergence of a second research question: How did NbS emerge in Canadian climate policy? To do this, we re-read the policy documents looking for references and commitments to NbS using a combination of count data (tracking the number of references to 'natur*', 'nature-based', and 'natural climate solutions') and qualitative content analysis. Based on this, we determined that additional documents were required to understand the concept's emergence, adding two new policy documents to the analysis: the Global Commission on Adaptation's report (2019), *Adapt Now: A Global Call for Leadership on Climate Resilience* (2019) and the Liberal Party of Canada (2019)'s Election Platform, *Forward: A Real Plan for the Middle Class*.

This policy analysis was combined with participant observation to corroborate research findings, identifying possible points of convergence, complementarity, and divergence. Indeed, direct observation, participation, and engagement in the establishment of several policy documents also served to enrich our findings. In particular, three co-authors (GR, CS, TS) who directly participated in the design, negotiation, and implementation of the Pan-Canadian Framework, from 2016 to the present, work to advance Indigenous rights, knowledge, and governance as a representative of a National Indigenous Organization (NIO). Another co-author (DM) participated in the 'Circle of Experts', supporting one NIO in this process.

4. Results and discussion

Following the iterative process described in the methods, we sought responses to two research questions: (i) how nature-based solutions emerged in Canadian climate policy; and (ii) how does the conceptualization of nature-based climate solutions either support or prevent Indigenous sustainable self-determination. We respond to each in turn.

4.1. Emergence of nature-based solutions in Canadian climate policy

In 2015, the newly-elected Trudeau Government introduced a collaborative process working with provinces and territories to complete a new pan-Canadian climate plan beginning with the Vancouver Declaration on Clean Growth and Climate Change. This declaration led to the creation of four federal-provincial-territorial working groups: specific mitigation opportunities; adaptation and climate resilience; carbon pricing mechanism; and clean technology, innovation, and jobs. Each working group produced a final report which led to the creation of the Pan-Canadian Framework (ICA, 2021). The Pan-Canadian Framework had no direct reference to NbS, rather the text referenced the benefits of forests, wetlands, and agricultural lands in playing ‘... an important natural role in a low-carbon economy by absorbing and storing atmospheric carbon’ (p. 22). References to natural gas ($n = 15$), natural infrastructure ($n = 2$) and natural resources ($n = 4$) occupied the majority of space. While not directly relevant to our analysis on NbS, the presence of natural gas in the Pan-Canadian Framework is illustrative of Canada’s belief in its potential as a ‘transition’ fuel for Asian markets (Tindall et al., 2020), as well as the perception that it is more environmental-friendly than other fossil fuels (Hazboun & Boudet, 2021). This pattern continued in the first and second Synthesis Report of the Pan-Canadian Framework, the Expert Panel on Climate Adaptation and Resilience Results (EPCARR), the Advisory Council on Climate Action, and the Expert Panel on Sustainable Finance, with zero references to NbS (see Figure 1 for more detail). This substantive absence begs an important question: *When did Canadian climate policy begin discussing nature-based solutions?*

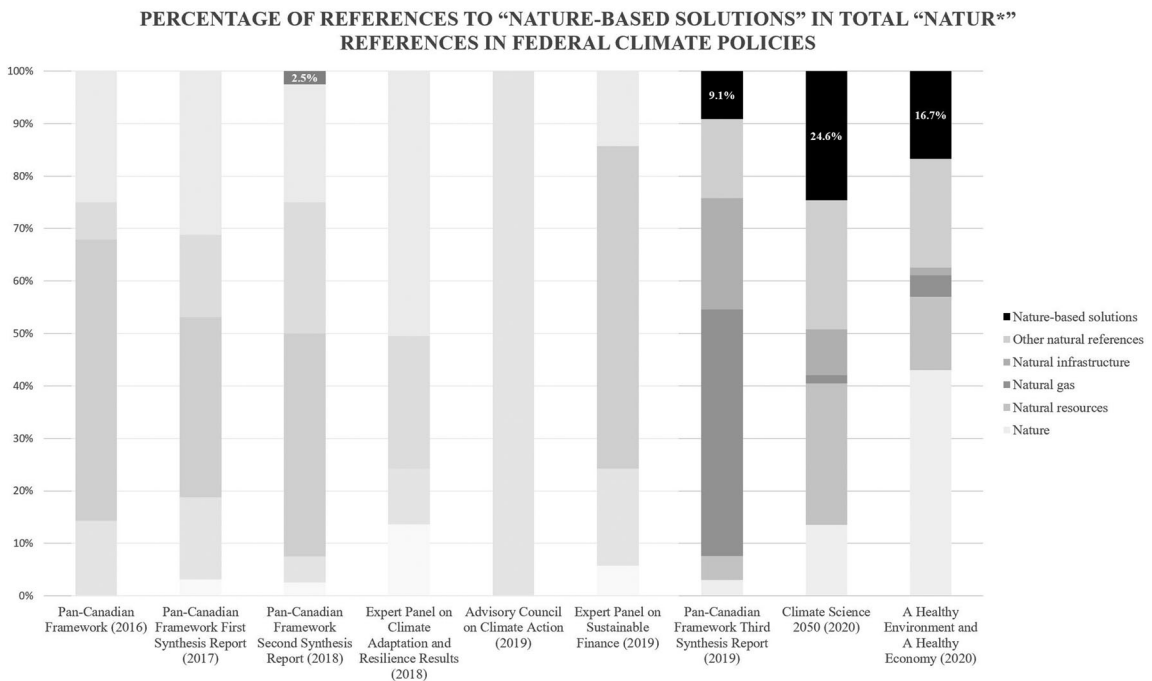


Figure 1. Percentage of references to ‘Nature-based solutions’ in total ‘Natur**’ references in federal climate policies.

Through a review of policy documents, the first substantial references to NbS were found in the Third Synthesis Report of the Pan-Canadian Framework ($n = 6$). The report, prepared in 2018, referenced Canada's role in the Global Commission on Adaptation, taking a co-leadership role with Mexico on the NbS Action Track. The Global Commission launched an international report, *Adapt Now: A Global Call for Leadership on Climate Resilience* ('Adapt Now'), with substantial reference to the benefits of NbS for both climate mitigation and adaptation, including a warning to humanity: 'Humanity faces a stark choice: We can harness NbS to mitigate climate change and to better adapt – or we can continue with business as usual and lose the essential and myriad services nature provides' (p. 31). The combination of Canada's co-leadership role, the stark language contained in *Adapt Now*, as well as efforts from environmental non-governmental organizations (Drever et al., 2021) likely contribute to the concept's inclusion in the Liberal Platform in preparation for the 2019 federal election, including a commitment to natural climate solutions and the planting of two billion trees as a cornerstone of such efforts.

The Liberal Party won the fall 2019 election, albeit in a minority government, leading to the increased consideration of nature-based climate solutions in the Speech from the Throne (both 2019 and 2020) and the mandate letters for the Ministers of Environment and Climate Change, as well as Natural Resources (Office of the Prime Minister, 2019a; Office of the Prime Minister, 2019b; Office of the Prime Minister, 2021a; Office of the Prime Minister, 2021b). This political direction influenced different policy documents, as well. In 2020, the Climate Science 2050 report was launched containing significant references to nature-based climate solutions ($n = 31$ or 24.5 percent of total natur* references in the document), calling for them to be done 'in a way that protects Indigenous rights and that is integrated with work on Indigenous protected and conserved areas' (p. 32). While the Climate Science 2050 report was largely research-based, the new climate plan, *A Healthy Environment*, built on this foundation when it was released in late 2020, referencing NbS numerous times ($n = 13$, or 16.7% of total natur* references in the document) and making clear policy statements for their benefits to holding warming under 2°C (p. 52). Unfortunately, these commitments left out the important caveats for understanding these proposed reductions: the rapid phase out of fossil fuels that must accompany NbS (see Griscom et al., 2019; Chausson et al., 2020; Seddon, Chausson, et al., 2020). At the time of writing (Sept 2021), further clarification of NbS commitments has not yet been released.

4.2. How the conceptualization of nature-based climate solutions either support or prevent sustainable self-determination

Based on this overview of NbS and its emergence in Canadian climate policy, we now shift our focus to how they considered the four themes of sustainable self-determination. Table 3 summarizes the number of references in each policy document.

4.2.1. Indigenous knowledge systems

Indigenous knowledge has been increasingly recognized by governments at the local, national, and international scale, offering unique contributions to discussions on climate and NbS (IPCC, 2019; Maldonado et al., 2013). There has been a growing inclusion and recognition of Indigenous knowledge within the identified federal climate documents, with the greatest recognition contained in EPCARR ($n = 120$) and Climate Science 2050 ($n = 23$) reports. The recent climate plan also has positive references to Indigenous knowledge, though only two in total, built around the conceptualization of Indigenous climate leadership (described below). During this time, there was a corresponding shift in the language used to describe the knowledge of Indigenous Peoples – beginning with traditional knowledge and ending with Indigenous knowledge, or in some circumstances Indigenous knowledge systems. For example, the Pan-Canadian Framework began with the exclusive reference to traditional knowledge ($n = 9$), which begins to transition in the First Synthesis (5 traditional knowledge and 3 Indigenous knowledge references), the Second Synthesis (6 traditional knowledge and 14 Indigenous knowledge references), and the Third Synthesis (6 traditional knowledge and 9 Indigenous knowledge references). By 2019, all documents exclusively use Indigenous knowledge or Indigenous knowledge systems, such as in EPCARR where 87 out of 120 references are to Indigenous knowledge systems.

Table 3. References to components of sustainable self-determination in federal policy documents.

	Indigenous Peoples	Indigenous jurisdiction	Full and effective participation of Indigenous Peoples	Indigenous Peoples as Rightsholders	Indigenous knowledge systems
Pan-Canadian Framework	80 – 59 Indigenous Peoples – 10 First Nation – 9 Inuit – 2 Métis	0	31 – 10 engagement – 1 consult – 4 partnership – 3 collaborate – 8 work with – 1 involvement – 2 take into consideration – 1 advance	6 – 4 rights of Indigenous Peoples (incl. UN Declaration) – 2 recognition of rights	9 – 9 traditional knowledge
Pan-Canadian Framework First Synthesis Report	98 – 47 Indigenous Peoples – 28 First Nation – 11 Inuit – 12 Métis	0	21 – 8 engagement – 1 consult – 3 partnership – 1 collaborate – 6 work with – 2 involvement	4 – 1 rights of Indigenous Peoples – 3 recognition of rights	8 – 5 traditional knowledge – 3 Indigenous knowledge
Pan-Canadian Framework Second Synthesis Report	129 – 39 Indigenous Peoples – 52 First Nation – 20 Inuit – 18 Métis	2 – 2 Indigenous Governments	19 – 5 engagement – 8 partnership – 2 collaborate – 4 work with	2 – 2 recognition of rights	20 – 6 traditional knowledge – 14 Indigenous knowledge
Pan-Canadian Framework Third Synthesis Report	124 – 22 Indigenous Peoples – 60 First Nation – 29 Inuit – 13 Métis	1 – 1 Indigenous Government	14* – 3 engagement – 2 partnership – 2 collaborate – 5 work with – 1 take into consideration – 1 advance	4 – 2 recognition of rights – 1 rights-bearing communities	15 – 6 traditional knowledge – 9 Indigenous knowledge

**New section on Federal Engagement and Partnership with Indigenous Peoples*

(Continued)

Table 3. Continued.

	Indigenous Peoples	Indigenous jurisdiction	Full and effective participation of Indigenous Peoples	Indigenous Peoples as Rightsholders	Indigenous knowledge systems
			<i>* Modified section on Federal Engagement with Indigenous Peoples</i>		
Expert Panel on Climate Adaptation and Resilience Results	282 – 230 Indigenous Peoples – 28 First Nation – 14 Inuit – 10 Métis	6 – 5 Indigenous Governing Bodies – 1 governance structure	15 – 2 engagement – 1 co-development – 3 collaborate – 5 work with – 1 take into consideration – 3 include	9 – 1 recognition of rights – 1 recognition of constitutionally protected rights – 3 rights-holders – 1 UN Declaration	120 – 87 Indigenous knowledge systems
Advisory Council on Climate Action	0	0	0	0	0
Expert Panel on Sustainable Finance	6 – 3 Indigenous Peoples – 1 First Nation – 1 Inuit – 1 Métis	0	3 – 1 consult – 1 partnership – 1 involvement	0	0
Climate Science 2050	113 – 42 Indigenous Peoples – 10 First Nation – 54 Inuit – 7 Métis	4 – 1 Indigenous Government – 1 Indigenous Nation – 2 Indigenous governance structures	15 – 7 partnership – 5 collaboration – 3 co-development	13 – 4 rights of Indigenous Peoples (incl. UN Declaration) – 2 Aboriginal and Treaty rights – 1 inherent rights – 1 Indigenous rights	23 – 6 Indigenous knowledge systems
A Healthy Environment and A Healthy Economy	81 – 35 Indigenous Peoples – 20 First Nation – 15 Inuit – 11 Métis	2 – 1 Indigenous Government – 1 governance	26* – 7 engagement – 2 co-development – 1 consult – 5 partnership – 7 work with – 2 take into consideration – 2 advance	4 – 1 inherent rights – 1 rights-holders – 1 recognition of rights – 1 UN Declaration	2 – 1 Indigenous knowledge systems
			<i>*New section Canada's Partnership with Indigenous Peoples</i>		

This is likely a result of the successful advocacy of Indigenous Peoples to move away from static conceptualizations of knowledge towards one that engages as a complex and dynamic system with spiritual, legal, governance, and spatial elements (Cameron et al., 2021; McGregor, 2004). A shift towards understanding Indigenous knowledge as a system that is diverse, holistic, and place-based is central to the advancement of Indigenous sustainable self-determination. Only the Climate Science 2050 report referenced the importance of Indigenous decision-making and protocols: ‘[r]esearch by and with Indigenous Peoples should also respect their protocols, policies, governance structures, and Aboriginal or treaty rights. In many cases, Indigenous Peoples of Canada have protocols and policies guiding consultation, research, or the inclusion of Indigenous Knowledge’ (p. 10).

Beyond recognition, there is limited application of knowledge frameworks, such as Ethical Space (Ermine, 2007), that support the equitable treatment and application of diverse knowledges in the context of climate policy. Both the Pan-Canadian Framework and A Healthy Environment reference efforts to recognize, to ground, or to guide decision-making, but do not go as far as referencing the unique and equally valid role that Indigenous knowledge systems play in climate solutions. For example, the Pan-Canadian Framework recognizes their importance in regard to understanding impacts and adaptation measures but makes no reference to its consideration in decision-making. Not only does this disregard the role of Indigenous Peoples in climate governance, but it also perpetuates a framing of Indigenous knowledge that can be integrated only when convenient, disregarding the power, rights, and governance imbalances raised in knowledge integration literature (Cruikshank, 2005; Nadasdy, 2007). Furthermore, this disregard for Indigenous knowledge is amplified in the context of fossil fuel development, where, for example, efforts by the Tsleil-Waututh First Nation (on the coast of British Columbia, Canada) to support intergenerational knowledge sharing between Elders and youth is imperilled by the proposed construction of the Trans-Mountain Pipeline Expansion (Spiegel et al., 2020).

The use of the concept of *braiding* knowledge systems may be more appropriate to understand the multiple ontological and epistemological foundations that enter into knowledge valuation and co-production in a process of mutual respect, kindness, and generosity (Reed, Dagli, et al., 2020). The concept of co-production, as a first step to braiding knowledge systems, is only recognized within the Climate Science 2050 report, where there is explicit recognition of ‘... both ways of knowing can be used in parallel and are of equal value and complementary’ (p. 16). The report continues to recognize the importance of Indigenous leadership, Indigenous data governance and self-determination, as well as consensual data management practices, such as the First Nations principles of OCAP® (ownership, control, access, and possession of knowledge). In a NbS context, the same report recognizes how this *braiding* approach would also benefit their growing recognition and implementation, noting how ‘... interdisciplinary research that integrates different knowledge systems to understand and minimize the barriers to implementation would be beneficial, particularly given that Indigenous Peoples have been practising NbS since time immemorial’ (p. 33).

4.2.2. Indigenous jurisdiction over land

Indigenous jurisdiction over land receives limited attention in the documents reviewed, with the majority of references being to Indigenous governments (n = 5, total) and Indigenous governing bodies (n = 5). There is a slight increase in the references to Indigenous jurisdiction (Climate Science 2050 and A Healthy Environment have 4 and 2 references, respectively), but there continue to be regular references to the ‘Nation-to-Nation, Inuit-to-Crown, and government-to-government’ relationship that was committed by the Trudeau Government in 2015. When jurisdiction was referenced, it is never referenced in the context of Indigenous jurisdiction, but rather in the context of provincial and territorial jurisdiction and a ‘... deep respect for, and recognition of, shared constitutional jurisdiction’ (A Healthy Environment, p. 64). While this speaks to the assumed authority over natural resources as between federal and provincial governments (Harrison, 2020), it also continues to perpetuate a legacy of colonization, rendering invisible Indigenous Peoples’ jurisdiction in Canada. This is not exclusive to Canada; at the international level, Ford et al. (2016) found that histories of colonialism, oppression, and racism are only found in two paragraphs out of thirty chapters of the Fifth Assessment Report on the IPCC Working Group II. Failing to acknowledge this history reveals a clear case of the politics of recognition, where governments only recognize Indigenous rights (or in the Canadian case, the ‘Nation-to-Nation’ relationship) to the extent that it does not disrupt colonial power relationships (Coulthard, 2014).

In the context of NbS, the near erasure of Indigenous jurisdiction and the separation between land, natural resources, and political recognition results in the continued threats to Indigenous lands and territories (Corn-tassel, 2008; Whyte, 2018). In sections on forestry, agriculture, and waste in the Pan-Canadian Framework, as well as the Pan-Canadian Framework's First and Second Synthesis reports (the precursor to nature-based climate solutions), there are no references to Indigenous jurisdiction, rights, participation, or knowledge systems. As NbS involve authority or decision-making over lands, waters, and territories, the approach to jurisdiction taken in the climate documents discredits, extinguishes, and circumscribes Indigenous forms of governance (Mackey, 2016; Nicoll, 2004). In this way, the true understanding of NbS requires an examination of the power relations between 'jurisdictional' holders, as well as the legacy of colonialization that manifests in – and is upheld through – the laws, policies, and jurisprudence enabling ongoing assaults on Indigenous lands and lives (Whyte, 2017). While not ironic given Canada's original opposition to the UN Declaration, it is surprising given the federal support for the growing movement of Indigenous Protected and Conserved Areas (IPCAs). IPCAs, such as the Equator-prize winning Thaidene Nëné National Park in the Northwest Territories,⁸ have been increasingly used by Indigenous Peoples to re-assert authority over land, water, resources, and territory (Moola & Roth, 2016) by giving Indigenous Peoples back the authority to determine the objectives, boundaries, and governance structures as part their right to self-determination (Indigenous Circle of Experts Report, 2018). If Indigenous exercises of authority and the history of colonization are overlooked, NbS risk perpetuating a form of climate colonialism.

4.2.3. Full and effective participation of indigenous peoples

As a result of the limited consideration of Indigenous Nations as jurisdictions, the participation of Indigenous Peoples is often downgraded to that of 'engagement' rather than shared decision-making. In Table 3, we see a consistent number of references to participation from 31 in the Pan-Canadian Framework to 26 in A Healthy Environment. Following the Synthesis Reports ($n = 21$, $n = 19$, $n = 14$, respectively), EPCARR and Climate Science 2050 had the most references to Indigenous participation ($n = 15$ for both). Interestingly, we see the introduction of a new section in the Second Synthesis Report entitled Federal Engagement and Partnership with Indigenous Peoples, which continues into the Third Synthesis Report with a slight modification, entitled Federal Engagement with Indigenous Peoples. In both these sections, the government began reporting on 'Federal Engagement with Indigenous Peoples', updating on the distinctions-based senior bilateral technical tables created following the Pan-Canadian Framework. These tables were created to have a collaborative approach for ongoing engagement with Indigenous Peoples on the implementation of the Pan-Canadian framework and on Indigenous-specific climate priorities (Second Pan-Canadian Framework Synthesis). Challenges emerge, however, when Indigenous-specific priorities originate from a different ontological and epistemological framework. For example, the First Nations Peoples Statement on Climate, released by Indigenous Peoples on the lands of Gimuy, Walubarra Yidinji and Yirraganydji (also known as Cairns, Australia), highlighted the linkages between the health of land, health of people, and climate solutions – connections rarely discussed in mainstream climate policy (Morgan-Bulled, et al., 2021).

Digging slightly deeper, there is an interesting trend in the usage of the term *engagement*, beginning with 10 references in the Pan-Canadian Framework, none in Climate Science 2050, and 7 references in A Healthy Environment. This may reflect the approach leading to the creation of the Pan-Canadian Framework directing federal-provincial-territorial working groups to *work* with Indigenous Peoples; and the Pan-Canadian Framework commits to *engage* or *collaborate* with Indigenous Peoples or *take into account* their unique circumstances. For example, governments at the federal, provincial, and territorial level will '... continue to engage and partner with Indigenous Peoples as actions are implemented and progress is tracked' (p.47). Beginning in 2020, there is a growing usage of the term *partnership*, which was highlighted in the most recent climate plan (A Healthy Environment), dedicating an entire section to *Canada's Partnership with Indigenous Peoples*. Among other statements, Canada commits to work in partnership to address their unique circumstances (p. 66). This is done largely by the concept of Indigenous Climate Leadership, which builds on eight foundational principles (p. 69-70), with a specific reference to the advancement of co-developed solutions. In other documents, there seems to be upward trend in the references to co-development, emerging first in EPCARR ($n = 1$), continuing with Climate Science 2050 ($n = 3$), and most recently in the new climate plan ($n = 2$).

While these are positive developments, no document references the role of Indigenous Peoples in decision-making, perpetuating a model of ‘consulting’ Indigenous Peoples by incorporating Indigenous knowledge into the decision-making process, thereby being ‘... let off the hook with regard to Indigenous rights’ (Littlechild, 2014, p. 37). Indigenous Peoples, however, are challenging environmental decision-making both in the courts and on-the-ground through grassroots Indigenous-led land and water defence (Cohen et al., 2021), as well as through Indigenous-led monitoring such as Indigenous Guardians (Reed, Brunet, et al., 2020). Ironically, the section on Canada’s Partnership with Indigenous Peoples is followed by a section on *Working Together Across the Federation*, with zero reference to Indigenous Peoples and their jurisdiction (a point discussed above). This speaks to Alfred and Corntassel’s (2005) belief that decolonization must simultaneously dismantle settler-colonial systems and restore Indigenous Nationhood, aligning with what others have termed an *Indigenous Doctrine of Recovery*. This doctrine repudiates the Doctrine of Discovery by advocating for the simultaneous advancement of place-based responses to ongoing colonial violence, as well as the reconnection and revitalization of Indigenous relationships with land, culture, and community (Corntassel, 2008; Corntassel, 2012).

4.2.4. Indigenous peoples as rights-holders

After significant lobbying from Indigenous Peoples around the world, the Paris Agreement recognized the importance of the rights of Indigenous Peoples in climate, stressing that Parties ‘... should, when taking action to address climate change, respect, promote, and consider their respective obligations on human rights ... including the rights of Indigenous peoples ...’ (p. 2). Indigenous Peoples leveraged this in Canada, resulting in a clear commitment to Indigenous rights in the Pan-Canadian Framework text: ‘Our governments will continue to recognize, respect and safeguard **the rights of Indigenous Peoples** as we take actions under these pillars’ (p. 3: *emphasis in original*). Commitments that have laid the foundation for a rights-based approach to Canadian climate policy align with McGregor et al.’s (2020) assertion that climate policy ‘... must consider the rights and interests of Indigenous [P]eoples as well as historical and ongoing processes of colonization’ (p. 139). These connections have also been discussed at the Turtle Lodge International Centre for Indigenous Education and Wellness found in Sagkeeng First Nation Manitoba (Cameron et al., 2019). Grounded in Anishinaabe traditional law and ceremony, the Turtle Lodge led by founder Elder Dave Courchene hosted an International Climate Summit in 2017, as part of their Onjisay Aki (‘Our Changing Earth’) Initiative.⁹ At the conference, participants identified five-areas for Indigenous-led climate action centred on connection: connection with Indigenous nationhood, spirit, traditions, the land, and each other (Cameron et al., 2021).

In the Pan-Canadian Framework, there were 6 references to Indigenous rights (and their derivatives), which happened to be the most references in all four Pan-Canadian Framework documents (the number in the First, Second, and Third Synthesis reports were 4, 2, and 4, respectively). EPCARR had the second most references (n = 9), including a reference to the constitutionally protected nature of Indigenous rights, and Climate Science 2050 had the most references with 13 in total. These references included the first and only reference in all documents to Aboriginal and Treaty rights (2 in total) and the first to inherent rights. A Healthy Environment also referenced inherent rights (n = 1). Of the total references to rights across all policy documents (n = 42), nearly a quarter (n = 11) stem from standardized language concerning the renewed relationship between Canada and Indigenous Peoples, based ‘... on the recognition of rights, respect, cooperation, and partnership.’ These references were largely found in the introduction (for example, the Pan-Canadian Framework) or call-out boxes, such as Box 2 in EPCARR.

Despite recognition of the rights of Indigenous Peoples in all the policy documents, these rights are rarely respected or safeguarded in the design or implementation of the plans. For example, the federal government failed to include Indigenous Nations in the design, implementation, and revenue generation of the carbon pricing systems resulting in the failure to design mechanisms that avoid disproportionate cost impacts (Assembly of First Nations, 2018; Bubna-Litic & Chalifour, 2012; Campney, 2021). A recent report by Indigenous Climate Action (2021) chronicles the systematic exclusion of Indigenous Nations in the decision-making process of both federal climate plans. It was for this reason that Indigenous scholars urged Indigenous Peoples to refocus away from a state-driven, narrowly constructed rights discourse towards one centred on sustainable self-determination (Cameron et al., 2019). This shift was not well-recognized in the Pan-Canadian Framework, but seems to transition as the most recent plan makes explicit commitments to self-determination (five references in

total) in climate and its broader connection to reconciliation: '[s]upporting self-determined climate action is critical to advancing Canada's reconciliation with Indigenous peoples' (p. 68). Climate Science 2050 extends this recognition to climate change research, acknowledging that it is '... holistic, place-based, and responsive, and that respects Indigenous sovereignty and ownership of data and Indigenous knowledge' (p. 7). In a NbS context, this conceptualization is essential to counter the erasure of Indigenous jurisdiction, though the full results are yet to be seen given the infancy of the commitments.

4.3. Path forward: support for indigenous sustainable self-determination in nature-based solutions

It is clear that Canada's approach to Indigenous Peoples has evolved over the last five years. This is in large part due to the constructive relationships held with First Nations, Métis, and Inuit through the senior-level bilateral tables created in the wake of the Pan-Canadian Framework, as well as Indigenous advocacy such as the AFN Chiefs-in-Assembly *Declaration of a First Nations Climate Emergency*. Indeed, this evolution was explicitly recognized in A Healthy Environment resulting in progressive commitments to Indigenous climate leadership agenda that means '... investing in the agency of Indigenous peoples and communities, supporting Indigenous-led and delivered solutions, equipping Indigenous peoples with equitable resources, and ensuring appropriate access to funding to implement self-determined climate action' (p. 69). However, our analysis shows that while there is growing recognition of Indigenous rights, inclusion of Indigenous knowledge, and commitments to include the participation of Indigenous Peoples in the implementation of certain climate activities, there is a clear unwillingness to recognise Indigenous jurisdiction, and by extension address the replication of the politics of recognition (Coulthard, 2014). Given the emphasis of sustainable self-determination on the cultural, social, and political mobilization of Indigenous Peoples, an unwillingness to engage these responsibilities may require Indigenous Peoples to act in conflict with the state, such as the Tiny House Warrior Movement in unceded Secwepemc Territory¹⁰, in order to achieve the community-based powers of sustainable self-determination. Other efforts, loosely framed under the 'Land Back' movement, have been advancing Indigenous authority and jurisdiction through reconnection, rejecting the colonial-capitalist agenda that is causing loss of biodiversity and environmental imbalance (Alfred, 2009; Cameron et al., 2019; Corntassel, 2012).

In a context of NbS, the unwillingness to discuss the land (and the reciprocal and governance relationships held by Indigenous Peoples) perpetuates the framing of climate as a techno-managerial activity that focuses exclusively on one question: 'How do humans achieve a reduction in their emissions of greenhouse gases in the coming few decades?' (Chakrabarty, 2019). This is highlighted by the selective articulation of the mitigation benefits of NbS without the requisite reference to deep decarbonization (Seddon et al., 2021). Indeed, the Canadian Energy Regulator's recent Energy Future 2020 projects a contradictory view to Canada's oil and gas development: crude oil production increases by 20 percent and in situ bitumen production grows 37 percent until 2040.¹¹ Carter and Dordi (2021) find that this projected growth in oil and gas production would exhaust nearly 16 percent of the world's remaining carbon budget. Others (Welsby et al., 2021) calculated that 83% of Canadian oil is unextractable to allow for a 50 percent probability of limiting warming to 1.5°C. Given this incongruence, the federal government should drastically change its approach to NbS and climate policy more broadly (Bush & Lemmen, 2019). Lessons from Indigenous-led approaches that simultaneously address colonialism, capitalism, and (de)carbonization are needed. Such lessons can also be applied in international settings, such as CANZUS, as many current approaches have not addressed the underlying, root causes of climate change.

This approach requires a conceptualization of NbS that supports Indigenous sustainable self-determination, grounded in an Indigenous understanding of land as a system of reciprocal relations and obligations. Borrows (2018), drawing on teachings from Elder Basil Johnston, describes this as *akinoomaagewin*, meaning that '... we learn how to live well by giving our attention to the Earth and taking direction from her' (p. 51). In a similar framing, Kimmerer (2021) describes an alternative approach to economic organization when discussing her relationship with the *Serviceberry* (*Bozakmin* in Potawatomi), a gift economy that '... arise[s] from the abundance of gifts from the Earth, which are owned by no one and therefore shared.' In both circumstances, the shift away from organizing principles of extraction (colonization) and scarcity (capitalism) towards abundance and relationality enables NbS to be concerned with healing relationships among people and the land, both at

an individual and societal level (McGregor et al., 2020). Reframing NbS, both in the context of Canadian and international climate policy, is essential to advance the sustainable self-determination of Indigenous Nations. Truly transformative climate action can only be attained when based on a reciprocal, interdependent, and learning relationship with Mother Earth (Tully, 2018).

5. Conclusion

In this article, we analyzed multiple Canadian climate policy, planning, and science documents to determine their consideration of Indigenous sustainable self-determination. Our review found that despite aspirational language, current policies and policy processes in Canada fail to support Indigenous sustainable self-determination. It provides lessons for Canada and for other countries as they consider the intersection of Indigenous Peoples and the implementation of NbS. First, Indigenous knowledge systems offer an alternative and transformative conceptualization of NbS, one that centres land and prioritizes rebalancing reciprocal relationships with the land, water, and more-than-human beings. Second, climate policy's use of NbS will only be transformative if it recognizes Indigenous Peoples as Nations with an inherent right to self-determination. Implementing the minimum standards of the UN Declaration on the Rights of Indigenous Peoples, drawing example from the Canadian legislation Bill C-15: *An Act respecting the United Nations Declaration on the Rights of Indigenous Peoples*, may be an opportunity to review past climate policy decisions and investigate how NbS upholds these minimum standards. Third, NbS cannot be considered outside of the broader Indigenous-settler government relations, recognizing the ongoing legacy of colonization, land dispossession, and environmental harm. Failure to do this may result in NbS propagating a form of climate colonialism instead of opening up institutional space for Indigenous-led decision-making to design, evaluate, and implement NbS. Examples such as IPCAs and Indigenous guardians offer great potential to simultaneously advance decolonization and decarbonization.

We stress that additional research and leadership for Indigenous-led nature-based climate solutions must come directly from rights- and title-holders on the ground in all jurisdictions. Our analysis seeks to create the space for Indigenous-led solutions to enter the discourse on nature-based climate solutions as one of many approaches to restore balance to the land (Simpson, 2017; McGregor, 2018). In a Canadian context, given their relative infancy, we see great opportunity to apply the four principles of sustainable self-determination to shift course towards the development of true *nature*-based solutions. At an international level, as an increasing number of academics, international organizations, and non-governmental institutions advocate for the uptake of NbS, discussions must not lose sight of the crisis they are attempting to solve, nor the primacy of Indigenous Peoples in leading true NbS.

Notes

1. The full *Global Indigenous Agenda* can be found here: https://portals.iucn.org/union/sites/union/files/doc/global_indigenous_agenda_english.pdf
2. The Indigenous Caucus was made up of representatives who identified as Indigenous or work for Indigenous organizations that attended this meeting. A member, Diandra Bruised Head from the Blood Tribe First Nation, read a Statement developed by the Caucus in the conference plenary. A written version of the Statement can be found here: <https://static1.squarespace.com/static/5dee67fbbfc3d2411199251b/t/5e87db456df85b022533a73a/1585961801593/Indigenous±Caucus±Statement.pdf> and the recording can be found here beginning at 00:35 and ending at 5:15: <https://www.youtube.com/watch?v=zgvKD2nLBoE>
3. For background, refer to the National Center for Truth and Reconciliation: <https://nctr.ca/>
4. For clarity, these four criteria are also found within the United Nations Declaration on the Rights of Indigenous Peoples (2007), an international human rights instrument that took nearly 30 years to negotiate. Canada expressed its support, without qualification, in 2016.
5. For more information, see Table 1 and Table 2 for detail on the political and private sector emergence of NbS.
6. The Truth and Reconciliation Commission (TRC) was established as part of a legal settlement for survivors of the Indian Residential School system. Three commissioners travelled across the country hearing stories from survivors, preparing a series of detailed reports and a set of 94 Calls-to-Action for governments, businesses, and Canadians. More information can be found here: <https://nctr.ca/about/>

7. On May 29, 2019, the Liberal Government entered into an agreement with Kinder Morgan to purchase the current Trans-Mountain Pipeline and ensure the construction and operation of the Expansion Project. While this decision received significant negative criticism by many environmentalists and Indigenous Peoples, it is worth noting that many First Nations signed agreements to derive some economic benefit from the Project's development. The Authors take no position on these decisions made by self-determining Nations.
8. For more information on Thaidene Nëné, refer to <http://www.landoftheancestors.ca/>
9. For more information on the Onjisy Aki International Climate Summit, please refer to this video: <https://www.youtube.com/watch?v=xqPKQCcjIU>
10. For more information, please see: <http://www.tinyhousewarriors.com/#about>
11. <https://www.cer-rec.gc.ca/en/data-analysis/canada-energy-future/2020/results/index.html>

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