

Indigenous Peoples are critical to the success of nature-based solutions to climate change

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Nature-based solutions (NbS) to climate change mitigation—such as ecosystem protection or conservation, improved forest management practices, as well as afforestation—can significantly reduce global net emissions (Griscom et al. 2017; Seddon 2019). This is particularly the case when NbS are paired with emissions reductions and clean energy solutions (Anderson et al. 2019; Griscom et al. 2019; IPCC 2019). NbS could provide 30%–40% of the CO₂ mitigation required by 2030 to help ensure warming is capped at under 2 °C (Seddon 2019). While holding great potential for effective climate change policy, some NbS measures such as protected areas and forest plantations can negatively impact Indigenous Peoples globally through displacement, livelihood restrictions, and ensuing cultural impacts (e.g., Osborne 2015; Vanclay 2017) and thus must be designed and implemented with Indigenous participation and consent if they are to be successful. These impacts intensify the disadvantages already faced by Indigenous communities, including human rights violations, discrimination, and poverty (Chatty and Colchester 2002; Dowie 2009; United Nations 2009). Indigenous Peoples are also more vulnerable to the impacts of climate change including food insecurity; displacement as a result of catastrophic flooding, drought, and fires; and threats to critical infrastructure (Havemann 2009; Ford 2012; Williams 2012; Lynn et al. 2013).

Given the twin vulnerability of Indigenous Peoples to both the impacts and potential solutions to climate change, we contend that questions about 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. This is of particular relevance in Canada, which has extensive carbon sinks (Kurz et al. 2013; Price et al. 2013) and is home to over 630 distinct First Nations communities, as well as Métis and Inuit (Government of Canada 2017). Many of the high carbon density forests and peatlands that are prioritized for NbS globally are found within the traditional territories of Indigenous Nations across the country, such as Canada's expansive Boreal Forest biome (Carlson et al. 2010; Wells 2020). Canada, like other settler colonial states, is layered with multiple territorial claims, jurisdiction (state and recognized and asserted Indigenous title), and systems of governance (state and Indigenous hereditary and elected) (Borrows 1999, 2015). This complexity—and the conflicts inherent to it—complicates environmental governance and can hinder state–Indigenous collaborative efforts in conservation and climate change mitigation (e.g., Van Schie and Haider 2015; Willow 2016). Despite the devastating impacts of colonialism (TRC 2015), most Indigenous Peoples in Canada have long histories of sustainable co-existence with their territories (Stephenson et al. 2014; Turner 2014).



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Their participation and leadership is necessary for the transformative and cross-sectorial systemic change required to deal with the climate crisis (IPCC 2018; Díaz et al. 2019).

Land use, changes in land use, and climate change are profoundly linked (Griscom et al. 2017; Seddon 2019). The Intergovernmental Panel on Climate Change recently identified the opportunity to reduce net carbon emissions and advance biodiversity conservation, while recognizing the importance of Indigenous rights (IPCC 2019). In response, Indigenous Peoples and local communities from 42 countries stated that “finally, the world’s top scientists recognize what we have always known ... that strengthening our rights is a critical solution to the climate crisis” (Rights and Resources Initiative 2019). Indigenous Peoples are already stewarding nearly one-fifth of the total carbon sequestered by tropical and subtropical forests (218 gigatons) and Indigenous territories encompass 40% of protected areas globally (Rights and Resources Initiative 2019). Globally, Indigenous territories are important as habitat for biodiversity (Gorenflo et al. 2012; Garnett et al. 2018; Schuster et al. 2019) and are key to mitigating the effects of climate change as critical carbon sinks (Walker et al. 2014; Carlson et al. 2015). Given the overlap of Indigenous territories and carbon sinks in Canada, it is unlikely that NbS could be widely implemented without upholding Indigenous rights to lands and resources and respecting Indigenous governance and knowledge systems in climate change policy.

In May 2019, we hosted a workshop at the University of Guelph with Indigenous leaders, environmental nongovernment organizations, and scholars, representing the first meeting dedicated to Indigenous Peoples and NbS in Canada (Townsend and Craig 2020). Participants discussed the potential alignment of Indigenous Protected and Conserved Areas and NbS in climate change policy, along with other types of environmental stewardship and governance such as carbon offsets. While Canada is poised to transform protected areas, planning, establishment, and management through Indigenous-led conservation (Artelle et al. 2019; Zurba et al. 2019), the inclusion of Indigenous Peoples in the development of NbS and climate change policy is currently lacking. Participants indicated that many Indigenous Nations in Canada are interested in advancing NbS in their traditional territories driven by the potential social, ecological, and economic co-benefits, including the protection of culturally significant species, economic opportunities, and cultural revitalization. As one participant in the NbS workshop stated, “to be completely grounded in who you are matters, and the work we are doing around conservation economies, carbon credits, and protecting who we are—are all connected.” Many NbS projects led by Indigenous Peoples already exist or are in development in Canada. These include Coastal First Nations’ carbon offsets derived from conservation and improved forest management in the Great Bear Rainforest (British Columbia), Poplar River First Nation’s pursuit of a provincial carbon sharing agreement along with ecosystem carbon accounting (Manitoba), and Wahkohtowin Development GP Inc.’s involvement in forest management planning with First Nations to develop a climate action strategy (Ontario).

While Indigenous engagement in NbS is promising, a number of obstacles remain that participants emphasized in the workshop and deserve attention in the development of NbS and climate change policy in Canada. First, many Indigenous Nations lack technical knowledge and financial capacity to effectively participate in voluntary and regulated carbon markets, such as the development of carbon offsets. Secondly, ongoing political uncertainty in climate change policy is a barrier for Indigenous participation in NbS. For example, First Nations in Ontario no longer have the ability to sell carbon offsets in the regulated carbon market after the incoming provincial government cancelled the provincial cap and trade program in 2018. Thirdly, although the principle of “additionality” is central to the validation of carbon offset projects, ecosystems that are stewarded by Indigenous Peoples often do not qualify as they do not present an “additional” net reduction in carbon emissions. This can limit Indigenous participation in carbon offsets that are generated through the ongoing stewardship of traditional territories. Fourthly, Indigenous carbon rights are not legally recognized

in Canada, which limits Indigenous autonomy over carbon generated, or sequestered and stored, in their territories. Finally, NbS policy and projects that are advanced without the partnership or consent of Indigenous Nations can generate significant opposition from communities who consider such actions as “carbon colonialism” and a threat to inherent land rights. For example, some Indigenous groups have been critical of Ontario’s *Far North Act* that was enacted to protect the province’s vast intact peatlands, wetlands, and forests as a “vital carbon sink” (Government of Ontario 2008, para 1) because of inadequate consultation and concerns that it undermines Treaty and Aboriginal rights (Gardner et al. 2012; Smith 2015).

Although the barriers to Indigenous participation in NbS and climate change policy in Canada are significant, our workshop as well as other forums (e.g., CBD 2020) suggest these challenges are not insurmountable if governments ensure that Indigenous Peoples are equal partners in policy development. The recent resurgence of Indigenous-led conservation in Canada offers considerable insights for how NbS and climate change policy should be developed. In 2018, the Indigenous Circle of Experts delivered a landmark report with 28 recommendations predominantly outlining how Crown and Indigenous governments can work together to meet domestic and international targets for expanded protection of lands and waters (ICE 2018). As with protected areas and other spatially explicit policy outcomes, NbS such as avoided land conversion, reforestation, and afforestation typically intersect with the traditional territories of Indigenous Peoples. Participants in the NbS workshop emphasized that to reduce conflict and facilitate the free, prior and informed consent of affected Indigenous Nations NbS must protect Indigenous land and resource rights including carbon assets. Recognizing and upholding the rights of Indigenous Peoples, incorporating Indigenous knowledge of fire and other ecosystem processes impacting carbon sinks, and investing in the capacity of Indigenous Peoples to develop their own NbS on their territories are all vitally important. Together, these actions could actualize the climate mitigation potential of improved land stewardship as a solution to climate change in partnership with Indigenous Peoples.

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Author contributions

JT, FM, and MKC conceived and designed the study. JT and MKC performed the experiments/collected the data. JT and MKC analyzed and interpreted the data. JT, FM, and MKC contributed resources. JT, FM, and MKC drafted or revised the manuscript.

Competing interests

The authors have declared that no competing interests exist.

Data availability statement

All relevant data are within the paper.

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