Unsettling NbS:
A pathway towards shifting colonial power relations in nature-based solutions research and practice

by

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Abstract

This article presents a synthesis and analysis drawing from ‘NbS +’ (including NbS Justice, NBS Indigenous and NbS more-than-human literature), Indigenous governance, Indigenous planning and coexistence planning literature. The aim of this paper is to contribute to understandings of NbS and colonialism through critical reflection, as well as provide tools for action to for researchers and practitioners. In settler-colonial contexts, NbS are colonizing by default. Colonialism operates through producing and growing power asymmetries, which exist in NbS research and practice. These power asymmetries are perpetuated and accelerated by settler NbS practitioners and researchers. However, knowledge co-production that embodies ethical space principles with Indigenous partners in NbS may support power redistribution. To support settler NbS practitioners and researchers, we present a potential process to support mutually beneficial knowledge co-production consisting of three stages; pre-engagement, internal engagement and external/collective engagement.

Keywords: Nature-based solutions; NbS; Colonialism; Power; Climate change adaptation and mitigation

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1. Introduction

The IPCC's 6th assessment report states that historical and ongoing colonialism is a primary driver of vulnerability to climate change (1). Bodéwadmi (Potawatomi) scholar Kyle Whyte, writes that climate change and colonialism are interlinked (2). Because of this, climate change and colonialism must be addressed together. If responses to climate change do not address colonialism, they risk feeding into the systems that allow both to continue accelerating.

Nature-based solutions (NbS) are "actions to protect, sustainably manage, and restore natural and modified ecosystems that address societal challenges… simultaneously benefiting people and nature" (3, pxii). NbS are at the forefront of global environmental dialogue because of their ability to address the climate and biodiversity crises in tandem (4-6). There is a global surge in the uptake of NbS, and knowledge is advancing quickly. However, NbS practitioners and researchers apply them across varied issues, scales, and sectors, resulting in siloed knowledge formation, narrow applications, and analysis, and governance and financing challenges (e.g., unintended consequences, perverse incentives)(5).

For access to NbS to be equitable, NbS strategies must be adequately contextualized and place-based (7). NbS scholars cite the need for practitioners and researchers to address power asymmetries to avoid perpetuating injustice (8–12). To do this, practitioners and researchers must be able to name, reflect, and contextualize different types of power. However, there is limited guidance on how practitioners and researchers can do this, especially in settler-colonial contexts. Therefore, we are responding to these calls in the literature to expand the connection between power, NbS, and colonialism to support this work.

We write this paper as two white Canadian settler academics. Because of this, we will be drawing from the Canadian context for our analysis. This analysis is meant for settler NbS practitioners and researchers and will be especially relevant to settler colonial countries such as Australia, the United States, and Aotearoa New Zealand (13). While this analysis is also relevant to other contexts, more research should be done to consider power and colonialism in the global south/majority. We do not speak for Indigenous communities, and our understanding of this context is limited to a Western

understanding. However, we are interested in exploring how we, as practitioners and researchers, might start naming and untangling colonialism within our work.

Our paper seeks to contribute to understandings of NbS and colonialism through critical reflection and tools for action. We will introduce NbS, contextualize settler-colonial institutions, and then explain how colonialism and NbS are interlinked, identifying problems and harmful practices within NbS research and practice. We will clearly define how colonialism is reproduced through NbS through establishing and growing power asymmetries. We will then propose the pathway to the 'third space' to overcome 'autopilot colonialism,' and dismantle power asymmetries. We will provide tools for practitioners and researchers to undermine these power asymmetries and redistribute power in their research and practice. We end the paper with reflections and a call for action amongst our peers.

2. Methods

This research represents a combined literature review of seven bodies of literature. We first reviewed Indigenous governance literature to understand settler-colonial contexts and colonial systems. We then reviewed NbS literature to understand the state of current NbS literature and the dialogues that are currently taking place. We reviewed reconciliation literature, to understand the similarities and differences between reconciliation dialogue and NbS dialogue.

NbS are often implemented through planning practice. Therefore, we reviewed Indigenous planning and coexistence planning literature to understand how NbS are implemented in settler-colonial and Indigenous contexts. These bodies of literature are further developed than NbS literature and provide an overview of tensions and implementation best practices. To further contribute to our understanding of NbS implementation, we expanded our review of Indigenous planning and coexistence planning literature to Ethical Space and knowledge co-production literature to identify opportunities for NbS co-creation and implementation.

3. Nature-based Solutions

The term ‘Nature-based solutions’ was first introduced by the International Union for Conservation of Nature (IUCN) and the European Commission (7,8). According to the IUCN definition, nature-based solutions (NbS) are land and water-based initiatives designed to benefit socio-ecological systems (3). NbS is a broad term encompassing many things, including ecological restoration, area-based conservation, and natural infrastructure (6). NbS literature argues that NbS can perform many functions, including mitigating climate change through carbon sequestration, reducing the impacts of extreme weather events, and supporting human and more-than-human health and well-being (14–17).

NbS represent a physical land and water-based practice and a theoretical concept (J. Arango-Quiroga, Northeastern University, oral communication, October, 2022). As a result, NbS literature incorporates two different streams of inquiry. Firstly, NbS literature examines and improves mechanisms surrounding the land- and water-based practice or infrastructure implementation. Secondly, there is a stream of inquiry around the theoretical underpinnings of the values of NbS and a critique of the idea and concept. As such, they also represent the interface between theory to practice.

Critical NbS scholarship has begun engaging with justice, Indigenous perspectives, and more-than-human theories. NbS justice and NbS Indigenous literature argue that although NbS can provide co-benefits to humans and nature, NbS can also cause harm and perpetuate existing inequalities and systems of oppression (8,18,19). NbS Indigenous literature has argued that foregrounding Indigenous voices and knowledge systems is more just and results in more effective initiatives than those based on only Western science (4,20). Therefore, NbS practitioners and researchers must centre Indigenous voices in their research (4,20). However, NbS Indigenous literature has also highlighted a pronounced lack of research on NbS from Indigenous perspectives (21). NbS more-than-human literature critiques anthropocentric environmental justice framework elements and calls for justice for the more-than-human world (22,23). NbS Justice and NbS Indigenous literature also recommend that practitioners and researchers consider the power dynamics of systemic inequalities in

NbS initiatives (9,19,24). In line with the current dialogue, tools and frameworks are required for practitioners to implement NbS in line with current research (6).

4. Problematizing settler-colonial context: Institutions

Before beginning our analysis of colonialism, NbS, and power, it is essential to understand the institutional context in which they occur. Using Raphaël Lemkin's definition of genocide, Wolfe (25, p388) argues that "settler colonialism has both negative and positive dimensions. Negatively, it strives for the dissolution of native societies. Positively, it erects a new colonial society on the expropriated land base". Practitioners and researchers implement NbS through settler-colonial governance structures. Most research occurs within academia, and planners do the majority of implementation. This institutional context sets the stage for projects to be colonial- by-default. In settler colonial contexts such as Canada, NbS initiatives operate within settler-imposed institutions, governance, and legislative structures. In these governance structures, the "erasure of Indigenous scales of governance and autonomy has been commonplace" (26, p112). For example, the settler state does not recognize Indigenous jurisdiction (21). As a result, the Yellowhead Institute, an Indigenous-led research and education centre based at the Toronto Metropolitan University, argues that communities have a severe "lack of enforcement powers" if they do not consent to a development project (27, p21). A recent example is the Coastal GasLink/TransCanada pipeline on unceded Wet'suwet'en territory in northern British Columbia. Although hereditary chiefs of "all five clans of the Wet'suwet'en have unanimously opposed all pipeline proposals on Wet'suwet'en territory" (28, para3), the federal government is still attempting to build the pipeline. In response, members and supporters of Wet'suwet'en Nation created a checkpoint and camp to restrict access to their land. Despite this, the federal government has repeatedly attempted to gain access to continue construction through injunctions and violent raids (29).

Most NbS practitioners and researchers are Western-educated academics and planners. Mushkegowuk (Cree) scholar Michelle Daigle, and Māori scholar Linda Tuhiwai Te Rina Smith argue that academia and planning are deeply implicated in the historic and ongoing processes of colonization (30–32). Although there is a growing awareness, these authors, as well as Anishinaabe scholars Leanne Betasamosake Simpson and Deborah McGregor argue that academia remains structurally colonial through an extractive work culture, lack of cross-cultural education, siloed experience,

and the privileging of Western academic knowledge over Indigenous forms (30,32–34). For example, Indigenous knowledge systems are often incorporated into Western knowledge systems rather than stand alone as separate forms of knowledge (34). Planning, a field prominent within NbS, has been a tool for colonization and remains “one of the key policy arenas in which states seek to resettle the surety of their spatial jurisdictions” (31, p5). Yet, planning scholarship has a long way to go- as a “field of inquiry and practice has not yet sufficiently come to grips with its own complicity in the ongoing fact of dispossession in settler-colonial states” (31, p2).

5. Colonialism through NbS

Tsalagi (Cherokee) scholar Jeff Corntassel argues that colonialism is a process that continues to change in form (35). However, regardless of form, Kanien'kehá:ka (Mohawk) scholar Taiaiaike Alfred argues that colonial systems work toward the "destruction, dependency or assimilation" of Indigenous Peoples (36, p53). If we examine NbS from this lens, we can see how colonialism shapeshifts to carry out the 'destruction, dependency and assimilation' of Indigenous through NbS research and initiatives.

5.1. Destruction

Settler-colonial-defined NbS continues the destruction of Indigenous People's place-based infrastructure (or NbS) and the forced imposition of settler decisions about land (37). For example, NbS initiatives can create grounding for settler states and organizations to legitimize ongoing land theft and new land capture (19,38). This process destroys place-based cultures and communities. Vanessa Watts, an Anishinaabe and Kanien'kehá:ka (Mohawk) scholar, argues that Indigenous identities are formed through relating to and communicating with land (39). Thus, Leanne Betasamosake Simpson argues that land theft is a method to destroy Indigenous identity and place-based Indigenous knowledge systems (34). Often on stolen Indigenous land, NbS initiatives superimposed by settler organizations continue the legacy of land theft.

5.2. Dependency

NbS initiatives can increase the dependency of Indigenous communities on the settler state. Colonization and inadequate rural investments have hindered the ability of Indigenous communities to keep pace with changing infrastructure demands and development pressures, as well as new approaches to service delivery - contributing to a national infrastructure deficit greater than $150 billion (40,41). NbS can help to mitigate the deficit. However, Indigenous Nations directly "liaise with federal government departments" and often rely on federal funding (42). For this to happen, Indigenous communities must rely on federal funding, allowing the federal government to privilege projects that support the status quo (settler government hegemony).

5.3. Assimilation

NbS initiatives attempt to assimilate Indigenous Peoples into settler culture through the destruction of culture and forced dependency on the state. While this section considers NbS specifically, the issues outlined are not unique to NbS. Assimilative pressure also exists within the form and process of NbS initiatives. For example, settler-colonial values, including the ‘resource extraction’ model of development, still inform how governments interact with and implement NbS (23,43,44). Settler infrastructure has already altered ecological systems so that ceremony and reciprocal cultural responsibilities can no longer be enacted (45). Settler NbS initiatives can further this divide, called ‘environmental assimilation’ (45). Further, because settler governments dominate funding regimes, pursuing NbS strategies can force Indigenous communities to adopt systems compatible with settler bureaucracy (44). Adopting these systems can overwhelm communities with administrative duties and erode self-determination (42,44).

6. Delving deeper: Colonialism, power, and NbS

Colonialism is fundamentally about power. At its most basic level, colonialism is the process of settlers establishing and growing power asymmetries between us and Indigenous Peoples. Often, with respect to settler colonialism, power is in the form of land. Therefore, settlers commonly seek to gain and retain power by separating Indigenous Peoples from the land (25,46,47). To subvert this process, practitioners and researchers must first understand how settlers and institutions establish and grow power asymmetries through NbS. If settler practitioners and researchers do not untangle these power asymmetries, their work will, by default, continue to grow them.

Of course, power dynamics in colonialism are complex and interlocking and will vary depending on place and context. As such, this analysis is not comprehensive or diagnostic, and practitioners and researchers must do their work to ground their understanding of power dynamics. Borrowing from Takeda & Røpke (48), we will present a description of power in colonialism and NbS by examining agency, institutional, and structural power (48).

6.1. Agency power asymmetries and NbS

Agency power refers to "the capacity of agents to 'name' and 'frame' societal problems as political and policy problems, and to mobilise resources to formulate and realise the most desirable solutions" (48). Agency power asymmetries can be most closely related to the 'destruction' element of colonialism. In NbS, this presents as asymmetries in culturally appropriate research and unequal ability to access financial resources.

NbS originated in Europe and prioritizes European and Western research. As a result of this context, settler society holds significantly more agency power than Indigenous communities because they have significantly more resources to define and solve a problem in a way that serves them. Anishinaabe scholar Graeme Reed argues that most NbS research stems from a colonial and dominantly Eurocentric worldview (21). The concept of NbS originated with the IUCN and the European Commission (7,8). In 2015, the European Commission's goal was for "Europe to become a world leader both in Research and Innovation and in the growing market for nature-based solutions"

by 2020 (49, p4). As a result of this dominance, the majority of NbS research holds implicit values, including anthropocentrism, the perception of nature as a resource, the separation of humans and nature, universal conceptions of justice, and the supremacy of Western knowledge (23,24,44,50). In contrast, Reed et al. (21) noted a severe lack of Indigenous conceptualizations of NbS. In addition, due to a legacy of dispossession and extraction, settlers govern most financial resources. As a result, “many [Indigenous] Nations do not have access to their sources of revenues and rely significantly on the federal government to operate and run local programs" (42, p147).

6.2. Institutional power asymmetries and NbS

Institutional power is “the ability or official authority to decide what is best for others” (51, p1). Agents that hold institutional power include “the ability to decide who will have access to resources” as well as “the capacity to exercise control over others” (51, p1). It can be held by government or academia and operates through governance practices and access to funding regimes (48). Institutional power asymmetries most closely relate to colonialism through dependency. In NbS, institutional power asymmetries are held and accelerated through the imposition of settler legal and political systems, and restricted funding regimes, which limit accessible opportunities (48).

As a result of settler governments hoarding institutional power, and denial of Indigenous governance, Indigenous communities are often required to engage in settler institutional systems. Indigenous communities often must meet or maintain specific bureaucratic requirements set by the settler state, including additional funding applications to receive financial support from the federal government (support made necessary due to colonialism and land theft) and engage in referral processes for development consultations. Settler governments’ asymmetric institutional and agency power allows specific requirements for initiatives such as NbS, and funding opportunities may be specific-goal oriented or resource-restricted, preventing transformational change (52). The requirement for Indigenous communities to conform to settler bureaucratic processes also restricts agency power. For example, settler bureaucratic processes, such as consultation and project referrals from industry and government, restrict the capacity of many Indigenous communities even further. Janice Barry and Michelle Thompson-Fawcett, a settler and Māori scholar, respectively, argue that many Indigenous communities must operate like ‘municipalities’ to access services or

coordinate land use and development plans (53). However, their assistance and size are usually substantially smaller than settler municipalities. As a result, these processes result in Indigenous communities that are under-resourced and overburdened (54). The need for Indigenous communities to conform to settler bureaucracy becomes a route by which the settler state continues to enforce and accelerate institutional power asymmetries, eroding Indigenous self-determination (44), and reinforcing colonial structures.

6.3. Structural power asymmetries and NbS

Structural power asymmetries refer to “meaning produced through language and discursive practices, moral order produced through the naturalization of societal norms, values, and standards, and the resulting structured asymmetries of resources” (48, p179). It operates more implicitly than agency power and rests with agents in service of the status quo. How things ‘should’ be done are initiatives that correspond to the norms and values of the imposing culture. For example, structural power results from and rests within language, culture, narratives, and values that privilege certain ways of conduct over others. Structural power asymmetries can be most closely related to colonial assimilation. In contexts such as Canada, settlers hold substantially more structural power. For instance, values in line with the status quo (settler colonialism) are deemed worthy. In other words, those who hold structural power can dictate certain “acts and thoughts [as] legitimate, and others not, and [who] are enabled or constrained to mobilize resources to achieve certain outcomes in social relationships” (55, p251).

Settlers with more structural power can further restrict potential outcomes to those that fit within their worldview and invest in strengthening their worldview's legitimacy through monopolizing processes and outcomes. Those who hold more structural power favour the values and norms of their culture. Critical NbS literature has identified settler colonial values (including white supremacy, anthropocentrism, the separation of humans and nature, resource extraction, the supremacy of Western scientific knowledge systems, and the idea of a ‘universal good’ and universal conception of justice) in NbS research (21–24,44). Language embeds implicit values and beliefs. In NbS processes, using western languages to negotiate or enact solutions is a form of existing structural power asymmetry and a method to grow structural power asymmetries (31). The preference for English in research and negotiation inherently

limits the breadth of possible solutions and capacity for understanding non-Western ways of being in the world. In turn, the implicit values in NbS that support settler values and systems work to preserve and strengthen settler-colonial society.

A common pitfall in NbS research and projects is that they may attempt to mitigate systemic power asymmetries through consulting and ‘integrating’ Indigenous knowledge systems into Western science. The belief behind this is that Indigenous knowledge is more holistic and may strengthen the efficacy of NbS initiatives. However, this process is often nested within colonial structures and is rooted in the supremacy of Western knowledge systems and initiatives, further increasing power asymmetries (34,56). The belief in the supremacy of Western knowledge systems leads to the attempted integration and validation of Indigenous knowledges into scientific knowledge. This process coopts Indigenous knowledges to validate scientific knowledge and disregards other forms of knowledge that do not fit into Western thinking (34). As a result, this process strengthens the power of settler colonial research and initiatives.

7. The ‘third space’ and ‘autopilot colonialism’ through NbS research and practice

Hirini Matunga (56), a Māori planning scholar, theorizes that there may be a ‘third space’ between Indigenous and settler systems (Fig 1). In this third space, Indigenous planning can “[connect] with state-based planning, and through facilitated partnerships, collaboration and ‘institutional/statutory connectors between the two planning systems’ and collective action to indeed ‘name and change the world’” (56, p644). However, if this space is to emerge, practitioners and researchers must be aware of the dynamic of colonialism and power to ensure that the third space of dialogue does not become a space of colonization. We propose combining ‘ethical space principles’ (57) knowledge co-production principles and place-based principles can support NbS practitioners and researchers in collaborating with communities to contextualize and address colonial power asymmetries between Indigenous and settler systems (57–59).

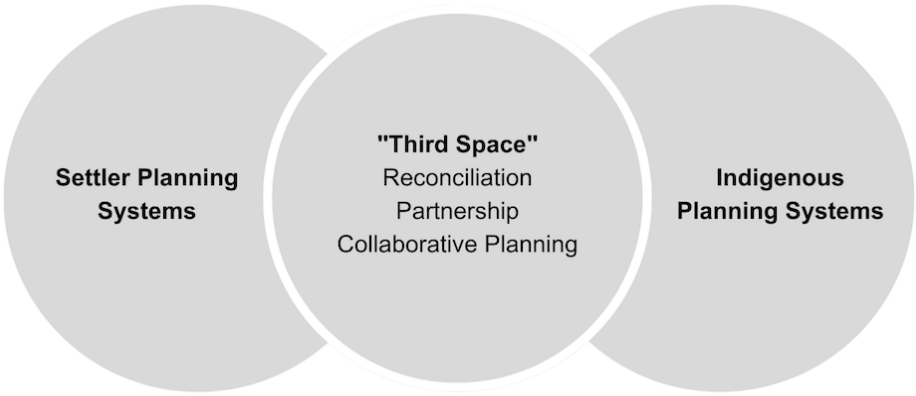

Figure 1. The ‘third space’. Figure adapted from Matunga (56)

Ethical space is a practice conceptualized by Willie Ermine, an Assistant Professor with the First Nations University of Canada from the Sturgeon Lake First Nation. Ethical space is “formed when two societies with disparate worldviews are poised to engage each other” (59, p193). The third space can also be called a space for knowledge co-production between cultures (59). Knowledge co-production is a practice and approach of “participatory research” that can facilitate transdisciplinary and transcultural collaboration in search of an answer to a question (60). As power

asymmetries must be contextualized and continually balanced, participatory co-production of knowledge is essential to facilitating conditions for the third space.

NbS initiatives may create space for knowledge co-production and collaboration between settler and Indigenous systems to create conditions for the third space to emerge. In knowledge co-production and coexistence planning literature refers to this as a ‘boundary object’ (59) or ‘contact zone’ (31). We can design NbS processes to be spaces of dialogue based on ethical space and knowledge co-production principles. For example, Nikolakis and Hotte (60) found that engagement is central to ethical space facilitation for Indigenous conservation partnerships. Their research demonstrates the importance of listening and emphasizes relationship building. Ethical space engagement is about building trust, “where truths, assumptions, and colonial hierarchies are deconstructed” (60, p9), which includes critical reflection on methodology, ontologies, and epistemologies (21). Nadeau (61) presents three key competencies required to enact ethical space; they are pre-engagement (consent), relational accountability (dynamic and continuous dialogue), and reflexivity (adaptability). These competencies are essential in the work of untangling NbS practitioners and researchers must “confront contextually varied, potentially unpredictable, or even imperceptible barriers” (59, p461). This work involves investigating “where power exists within the knowledge co-production system,” “roles,” and “mechanisms for collaboration” (59, p461).

However, due to the colonial context and existing power asymmetries in NbS, practitioners and researchers must pre-emptively balance power asymmetries to ensure that the dialogue space does not become a space of colonization. Said differently, “the notion that political decisions can be reached on the basis of deliberation between free and equal deliberative citizens ignores the reality of power and hegemony” (31, p26). As a result, shifting power is an essential and incontrovertible step toward the emergence of the third space.

To support NbS practitioners and researchers in this work, we have outlined a framework of colonialism, power, and NbS through Agency, Institutional, and Structural power descriptions above. These descriptions will aid practitioners and researchers in understanding underlying dynamics, including “where power exists within the knowledge co-production system” (59, p461). Instead of “roles,” which will change from project to project, we describe the responsibilities and positionality of settler practitioners and

researchers on ‘autopilot colonialism’ below. We will then outline a pathway to the third space.

We use ‘autopilot colonialism’ to highlight and identify that in settler-colonial contexts such as Canada, the status quo is settler-colonialism. Settlers are agents that operate and reproduce colonialism (46), including in NbS research and practice. As a result, NbS practitioners and researchers accelerate power asymmetries through NbS. Using the term autopilot colonialism demonstrates that it is no longer possible for NbS practitioners and researchers to claim neutrality. Instead, NbS must be understood as inherently political and either contributes to or detract from Indigenous sovereignty (44). Practitioners and researchers must begin the long, messy, and uncomfortable process of untangling systemic power asymmetries and unsettling themselves and their work.

7.1. Shifting power

Because of the interlinkage between colonialism, power, and NbS, shifting power is a core practice that NbS practitioners and researchers must engage in to undermine colonial systems. NbS practitioners and researchers can shift their power within and outside NbS processes. We provide some examples below in Table 1. These are not comprehensive, and practitioners and researchers must adequately contextualize and refine them. However, the examples below highlight practitioners' and researchers’ agency in changing these processes, highlight connections between problematic NbS practices and demonstrate that practitioners and researchers can shift these dynamics.

Table 1. Example actions to shift colonial power relations.

	Agency	Institutional	Structural
Committing to Indigenous-led process	X	X	X
Alternative/flexible funding models	X	X	X
Supporting language and cultural programs as part of NbS initiatives	X		X

To shift power, settler practitioners and researchers can engage in cultural safety training, reflexive practices, and understanding and communicating their positionality and biases (9,59). Doing this mitigates the risk of harm, as well as working to be aware of systemic power imbalances and structural power asymmetries that practitioners and researchers hold.

Because NbS research is primarily based on Western values, NbS practitioners and researchers can shift power by committing to mutually beneficial knowledge co-production, respecting Indigenous knowledge and practices, and citing Indigenous-led research (58,59,61,62). Also, NbS initiatives must follow equitable community-based engagement processes (26), and emphasize listening over speaking (62,63).

Because of the agency and institutional power imbalance in funding access, alternative funding models are another way to shift power. Alternative funding models could include reciprocity trusts, including financial support for Indigenous knowledge holders, and providing support for Indigenous language and cultural programs as part of NbS initiatives (20).

Finally, NbS practitioners and research can shift systemic power imbalances by only engaging in Indigenous-led initiatives and research that support long-term partnerships, flexible timelines, Free, Prior, and Informed Consent (FPIC), United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP), ownership, control, access, and possession (OCAP) principles and data sovereignty (20,21,27).

7.2. Pathway to the ‘Third Space’

To further support NbS practitioners and researchers, this paper proposes a pathway to the third space. The pathway follows the ethical space principles of engagement and includes three stages: pre-engagement, internal engagement, and external/collective engagement (see Fig 2). The pathway provides a step-by-step process that NbS practitioners and researchers can move through to support the creation of the third space. Each step is an ongoing process and consists of reciprocal and iterative processes of reflection and refinement before and between the different stages of engagement. We created this pathway from synthesizing critical NbS literature, Indigenous governance literature, and Indigenous planning and coexistence planning literature.

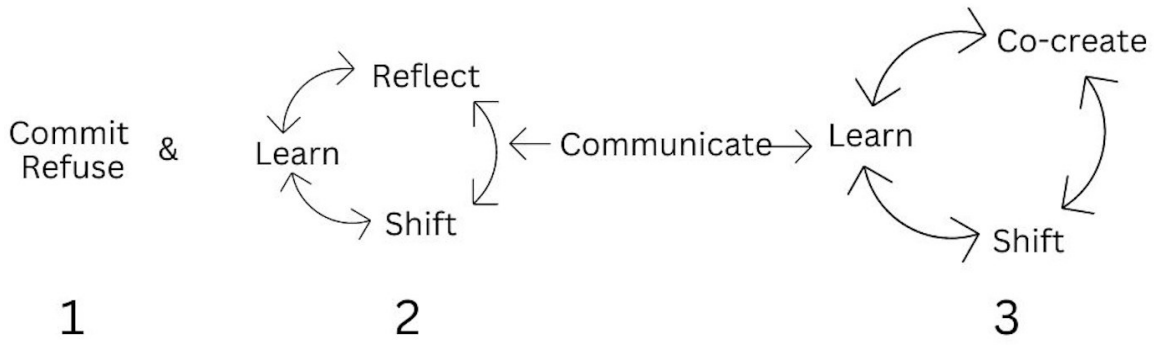

Figure 2. Pathway toward the third space for settler NbS practitioners and researchers.

The first stage, ‘pre-engagement,’ is when practitioners and researchers commit to working with an Indigenous-led process that respects Indigenous jurisdiction and upholds principles such as FPIC, UNDRIP, and OCAP (19,21,27). In this stage, researchers also commit to building long-term relationships and projects with flexible timelines (44). Refusal may be part of this first stage, where solutions that do not recognize Indigenous Peoples as rights holders or violate the rights of Indigenous Peoples must not be supported (19). Commitment and refusal, in this case, are also heavily dependent on funding. Practitioners and researchers must consider if their funding body is amenable to the principles outlined above, indicating the importance of the work.

The second process is ‘internal engagement.’ Beginning engagement consists of three actions that continue indefinitely. These actions are learning, reflecting, and shifting. This stage includes actions to learn about collaborating partners, reflect on the answers, determine how researchers and practitioners can shift power in NbS processes, and carry out these actions.

The third stage is ‘external/collective engagement’ and consists of four actions: communicate, reflect, shift, and co-create. This stage is when practitioners and researchers communicate relevant information from their internal reflections, engage with the larger group, and all participants reflect on the process. This stage also includes co-creating the following steps and ways to continue to shift power in the process. This process continues indefinitely, both during and after NbS processes have finished.

Table 2. Guiding questions for NbS practitioners and researchers undertaking the pathway to the third space.

Stage	Action	Guiding questions
Pre-engagement	Commit and Refuse	Is this process Indigenous-led?(19) Does this process respect Indigenous jurisdiction? (44) Does this process uphold UNDRIP, FPIC, and OCAP principles? (44) Does this NbS initiative uphold Indigenous sustainable self-determination? (21) How would the community like their capacity to be built? How can this process assist? (44) Is there a plan of action for a long-term relationship between the researcher/practitioner and the community? Does my funding allow for flexible, long-term research and timelines? What sort of timelines am I beholden to within my work? (e.g. graduation dates etc.) How might I make these flexible? Do I have a backup plan for if my partnership falls through?
Internal Engagement	Begin initial learning about the community.	What is the preferred mode of communication for the community? (64) What is the history and governance structure of the community? (44) What is the community's "prior engagement with other researchers and organizations", and research guidelines? (44, p23) What are the main issues that the community is dealing with right now? What are the community's values? Does this NbS initiative support this? What issues are important in the community that this project cannot solve?
	Reflect on internal motivations and positionality	What is your positionality? Why do you want to partner with this community?
	Reflect on the proposed project	What is your capacity? What resources do you have access to? (44) Will/Does this project build capacity within the community? How much? (44)
	Reflect on the proposed NbS process	Is this process in line with the community's specific research agreements? (44) Is this process inclusive at all stages? Is community engagement accessible and equitable? Where can I pre-emptively shift power?

Stage	Action	Guiding questions
	Reflect on the ongoing NbS process	Am I listening more than I am speaking? (63,65) Where can I shift power? Am I continuing to have open channels of communication with the community? What are the barriers that keep coming up? What are the opportunities? Where does systemic change need to happen? What would I do differently next time?
Group/collective engagement	Reflect on the proposed or ongoing NbS process	Where else can I shift power? Are there channels of communication regarding the "use of Indigenous knowledge systems, community data, and resources" (44, p25) as well as "timelines, capacity requirements, funding needs, and funding sources" (44, p25)? Is this process inclusive at all stages? Is community engagement accessible? (44) Any more questions that the group would like to reflect on?

Table 2 provides guiding questions for NbS practitioners and researchers during all process steps in the pathway to the third space (Fig 1). The table has three columns: Stage (stage of engagement), Action (actions to undertake for each stage of engagement), and Guiding Questions (questions to facilitate the actions).

8. Discussion

This paper represents an example of pre-engagement. As we prepared to do a research project in partnership with an Indigenous community that would support the first author's master's thesis, but due to extenuating circumstances, we had to cease our partnership temporarily. However, although we could not continue our partnership, we continued with the pre-engagement work and literature review for the same project.

When starting the research, we thought combining NbS and reconciliation would contribute to a positive and transformative solution. The dominant narrative in NbS argues that NbS are promising, support win-win outcomes, and "are critical to addressing global challenges, especially climate change" (7, p275). Reconciliation between Indigenous Peoples and settler peoples is also at the forefront of Canadian dialogue. As NbS can address social issues (18), we thought it was logical that NbS could support reconciliation. Therefore, our original question, co-developed with our collaborators, was, 'How might nature-based solutions support reconciliation efforts?'.

However, as we started reviewing various bodies of literature, we came to better understand the issues surrounding both NbS and reconciliation. We started probing deeper into our preconceived ideas and interrogating our roles as researchers. This prompted an overhaul in the research question to expand our understanding of what we were researching. approached the research more critically to understand 'How are NbS and colonialism interlinked? How might settler practitioners and researchers better support transformative NbS?'. Because of support from our funders and the ability to shift and continue research, we were able to spend time getting to a deeper space of engagement, reflection, and understanding of what NbS are, what our biases are, and our roles as researchers. As a result, our extended pre-engagement morphed into a deeper understanding of what pre-engagement means, contributing to the development of the pathway to the third space. We were exceedingly lucky in that our funders were flexible and interested in the evolution of our project. This research will continue and a new project is being co-developed with the same Indigenous community.

NbS may support transformational change. However, it is also true that they may perpetuate the status quo and systems of oppression (7,18,19). As Melanidis (66, p113) so aptly phrased, "whether or not we use the phrase "nature-based solutions" matters

less than who we are listening to, and who is making the decisions". We have outlined above how settler NbS practitioners and researchers can either shift power or engage in autopilot colonialism and perpetuate power asymmetries in their work. Settler NbS practitioners and researchers hold relative power in NbS processes. Because of this, they can shift their power from within and outside of NbS processes by engaging with existing histories and power dynamics to contribute to transformative change.

This work requires NbS practitioners and researchers to engage in 'inner and outer work.' On an individual or internal-engagement level, Taiaiake Alfred argues that this work requires settler practitioners and researchers to consider that they are in an "unjust position in relation to the land and Indigenous Peoples" (67: 00:31:50). Porter (68) writes that coexistence planning involves "a requirement to risk [yourself], the things [you] know and hold dear, and hold the space" (68, p653). To do this, NbS practitioners and researchers must consider what power they hold and why. They must be able to ask what future they are working toward, whose interests they are serving, and whose 'futurity' they are rescuing (69). Colonialism is self-perpetuating, and interrogating existing power asymmetries may be difficult for those steeped in colonial ideologies. For example, the colonial belief in a universal truth validates and moralizes these power asymmetries, making them self-perpetuate. For some, then, more than others, this process requires deep learning, self-reflection, and commitment. Internal work and systems change must be intersectional and needs to occur on an iterative and ongoing basis.

Outer work is a form of external/collective engagement and will involve transforming colonial power asymmetries inside and outside the NbS process. Outside of NbS processes, this may involve advocating for equity, diversity, and inclusion in academic, government, or corporate institutions. This process will require that practitioners and researchers identify and work to overcome barriers to this work. For example, at an institutional scale, work requirements may impede NbS practitioners and researchers from having the time and space to engage in activities to pursue change. Many researchers and practitioners experience substantial institutional barriers from academia regarding funding flexibility. In this case, practitioners and researchers must find funders willing to support transformative work. Some practitioners and researchers may have more relative power than others, and those that do must push for a more supportive work culture and resources. Of course, this is a long-term process, and NbS

practitioners and researchers cannot make this shift alone. However, if they choose to pursue transformative solutions, it is imperative that their work also involves pushing the boundaries of colonial-imposed systems and deconstructing them when possible.

All NbS must be place-based and dependent on context. The solutions will vary and may emerge if given the opportunity within the third space. This paper is a starting point, but practitioners and researchers must do their own work to situate and create the third space within their respective contexts. Transplanting solutions from other locations without engaging in local collaboration restricts the transformative ability of NbS initiatives and increases the likelihood that they will perpetuate autopilot colonialism. In other words, “to think that there is any single pathway or role for settlers may be a colonial idea in itself” (70, p155).

As stated earlier in the paper, we wrote this paper from a white settlers’ point of view, and we recognize the inherent limitations of this framing and knowledge. The examination and analysis of literature and power asymmetries are primarily from academic literature. Because of this, the framework presented cannot be comprehensive or prescriptive. This paper's process and goal is to create a space where definitions can be continuously negotiated in a space that is aware of, and acting to rebalance, power asymmetries. Setting up conditions for the third space to emerge presents an opportunity for Indigenous and settler systems to negotiate definitions of power and justice. The process, actions taken, and knowledge must be continuously negotiated because “justice is plural and an ideal that is continuously redefined” (24, p381). There will not be a one-size-fits-all solution to shift power relations within NbS initiatives. Initiatives must engage in mutually beneficial collaboration to move this work forward.

9. Reflection

This paper argues for the importance of supporting and uplifting Indigenous scholars. However, Tsimshian (Kitselas/Kitsumkalum) and Nuu-chah-nulth (Ahousaht) scholar Dr. Clifford Atleo Jr. noted that our paper neglected to include the name and heritage in the text of a significant portion of the Indigenous academics that we cited. Since Atleo's comment, we have revised the paper to note the contributions of Indigenous authors specifically. We identified the first and second authors of each paper and identified each authors' heritage through how they positioned themselves in their papers, or through Google searches. If the authors heritage has not been called out in this paper, we were unable to find information on their heritage online, or they have self-identified as settlers or non-Indigenous.

Reviewers pushed us to consider more explicitly how our identities limit the research presented in this paper. This paper was formulated through a literature review of academic sources, all in English. As a result, inherent power asymmetries are embedded in the framing of this research. Our capacity to untangle power asymmetries is constrained by our abilities to understand them. However, this belief comes from an inherently constrained understanding, which unveils a particular epistemology and theory of change. Structural power asymmetries inherently embed, and are embedded within, these assumptions. Although a more fulsome exploration of these concepts is beyond this paper's scope, acknowledging them implants humility in the research. It creates openness and curiosity. For example, maybe, unraveling power asymmetries comes not from understanding, but from another practice, or in another form that we are incapable of understanding. Regardless, we commit to being humble in this work, and future research.

10. Conclusion

NbS exist within the structure of colonialism, and NbS practitioners and researchers perpetuate colonialism through power asymmetries. However, they can refuse to participate and actively dismantle these systems by analyzing and redistributing their relative power to Indigenous partners. If practitioners and researchers do this, a theoretical ‘third space’ of dialogue may emerge between Indigenous and settler planning systems that can continue to work to balance power asymmetries and subvert systems of colonial domination.

This process is both a moral imperative and practical consideration. NbS initiatives that support colonialism are ineffective because climate change and colonialism are interlinked (2). If NbS initiatives implicitly support colonial values, they feed into systems that allow climate change to continue and accelerate (19).

To forge a pathway to the third space, we propose that NbS practitioners and researchers follow a three-step process: pre-engagement, internal engagement, and external/collective engagement. Pre-engagement must include a commitment to building long-term relationships and flexible project timelines. To shift power, Internal engagement must involve NbS practitioners and researchers engaging in internal reflection and actions. External/collective engagement must include NbS practitioners and researchers co-creating a path forward with Indigenous partners, including reflection and further action to shift power and refine the process.

We provide grounding for practitioners and researchers by providing both a theoretical underpinning and actionable steps that they can expand on as this dialogue develops This exploration draws on Canadian examples to consider the dynamics of colonialism in NbS research. There is no one-size-fits-all approach, and NbS practitioners and researchers must be able to situate power asymmetries in their specific contexts. We hope that our analysis of colonialism and power supports practitioners and researchers in conceptualizing power asymmetries more concretely. We also hope our work provides practitioners and researchers with additional frameworks and tools to mobilize this dialogue in their respective contexts.

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