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RESEARCH ARTICLE

Examining Human–Nature Relationships Through the Lens of Reciprocity: Insights from Indigenous and Local Knowledge

Ethnoecological perspectives on environmental stewardship: Tenets and basis of reciprocity in Gitxsan and nłeʔkepmx (Nlaka'pamux) Territories

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Abstract

1. Local and Indigenous Peoples steward and protect a significant proportion of biologically diverse ecosystems globally. This fact is increasingly acknowledged by researchers and international organizations, offering both opportunities and challenges at the intersection of Indigenous and western knowledge production in the context of environmental management research and policy.
2. Drawing on half a century of ethnoecological research and personal experiences in Gitxsan and nłeʔkepmx Territories in the Pacific Northwest of North America, this research considers the role of reciprocity as an inherent philosophy and tenet for successful environmental stewardship.
3. Reciprocity is a legal responsibility and moral perspective that foregrounds many Indigenous worldviews. Such cultural drivers and obligations towards lands and biota appear to be unknown, marginalized or instrumentalized in mainstream and western science and policy.
4. We conclude that fundamental elements of reciprocity may not be adequately blended or braided into western environmental management frameworks. As such, alternatives to blending include acknowledging sole proprietary and self-determining rights for Indigenous Peoples to govern and steward lands outside of western infrastructures and value systems.
5. This study raises critical questions about the feasibility of reconciling reciprocity with western environmental management practices and regulations. It explores the implications for Indigenous rights and sovereignty, and climate change mitigation. By addressing these complex issues, we contribute

to ongoing discourse on the integration of Indigenous and western knowledge in environmental stewardship research, and the ethical, historical and cultural challenges that come with it.

KEYWORDS
environmental management, ethnoecology, Indigenous land stewardship, reciprocity, science and policy

1 | INTRODUCTION

In 2019, the Intergovernmental Panel on Climate Change (IPCC) recognized the crucial role that local and Indigenous communities play in stewarding ecosystems and preventing exhaustive land use globally. Two years later, the 2022 IPCC report went further, arguing that '[the] recognition of inherent rights of Indigenous Peoples, is integral to successful forest adaptation in many areas' and 'are more effective and sustainable because they are locally appropriate and lead to more legitimate, relevant and effective actions' (IPCC, 2022, pp. 21–29). Globally, Indigenous Peoples are responsible for maintaining over 30% of intact forest landscapes, despite only accounting for less than 4% of the population (Fa et al., 2020). Countless scientific research papers and reports published in the last few years have found similar trends at the intersection of Indigenous land-use or stewardship and global environmental health (Estrada et al., 2022; Kor et al., 2023; O'Bryan et al., 2021; Pratzer et al., 2023; Reyes-García et al., 2019; Schuster et al., 2019). This global-scale recognition has evolved alongside a notable surge in mainstream scientific discourse, which purports to recognize and uphold Indigenous knowledge systems and practices alongside western scientific ones (Geniusz, 2009; Munyonga, 2020; Singer et al., 2023).

For many, this trend signifies an important and positive turning point where Indigenous Peoples' knowledge and practices are informing western scientific research and innovation at a time that it is needed most (Arsenault et al., 2019; Dickson-Hoyle et al., 2021; Lamb et al., 2023; Wildcat, 2010). However, this paradigm shift, known variously as braiding/blending knowledge, has also been characterized as a blatant and veritable 'feasting' on peoples' knowledge, practices, and communities (Munyonga, 2020, p. 118). Indigenous writers and scholars have pointed out the irony and uncertainty that parallel research converging environmental sciences and local and Indigenous knowledge—questioning how systems responsible for colonization (governments, universities, extractive industries, etc.) can now convincingly incorporate and uphold the same communities that were meant to be erased only a few generations ago (Blaser et al., 2011; Geniusz, 2009; McGregor, 2018; Todd, 2015). More practically, some have questioned the commensurability of western and Indigenous knowledge systems for informing mainstream environmental stewardship policies, or whether such integration is even desirable (Broadhead & Howard, 2021; Kanngieser & Todd, 2020; Nadasdy, 2003). Critics hold that the process of knowledge integration has historically been more akin to assimilation and commodification or that the integration of Indigenous knowledge into western scientific praxes usually results in 'cherry picking'—incorporating some forms of Indigenous knowledge and representations while silencing or muting others, notably axiological groundings such as spiritual views of the land, and as we explore here, tenets of reciprocity (Broadhead & Howard, 2021; Burkhart, 2019; Reid & Sieber, 2020).

Reciprocity can be variously expressed as a social, cultural, or psychological norm that involves a mutual exchange of benefits and favours. But it is also more broadly regarded as a responsibility to living beings according to the customs, expectations and ideologies of a social group. For example, reciprocity is a fundamental principle that informs and defines local and Indigenous environmental stewardship practices globally. In many societies, similar but expressly unique patterns of reciprocity emerge as foundational environmental philosophies—whether it's mino-bimaadiziwin in Anishinaabe contexts (McGregor, 2018), ᏚᏳᎪᏛ (Du-yuk-dv) in Cherokee country (Owl, 2022), Tjukurpa for Anangu (Robin et al., 2022), hózhó in Navajo philosophies (Kahn-John & Koithan, 2015) or Gwelx Ye'enst for Gitxsan (Greening, 2017). Reciprocity is a significant element of environmental philosophies in which land, people and biota are continually dependent on one another, a relationship formulated on sustained reciprocal acts (Brewer & Johnson, 2023; Kimmerer, 2017).

Throughout the last half century, ethnoecologists,[1] alongside Indigenous researchers and collaborators, have been working to reclaim and support Indigenous environmental stewardship practices around the world, often concluding that such practices are highly sophisticated, empirically driven and exhibit successful and 'sustainable' environmental outcomes (Alcorn, 1981; Anderson, 1996; Conklin, 1954; Feit, 1973). Practically, and through the development of critical method and theory in ethnoecology, some ethnoecological practitioners have come to the realization of what many Indigenous Peoples have always known—that the necessary elements of 'good' environmental stewardship derive from the entire sphere of peoples' laws, beliefs and worldviews, including ideological foundations like reciprocity (Anderson, 1996; Clément, 1998; Molnár et al., 2023). Indigenous

[1]Ethnoecology is often used synonymously with ethnobiology. While unique in their intellectual development (e.g. Alves & de Albuquerque, 2010), we treat them interchangeably herein.

and local stewardship practices are not driven by piecemeal or isolated knowledge systems alone (e.g. 'traditional knowledge'), but by social institutions, governance structures and emotional or relational views of the land (Anderson, 1996; McGregor, 2004; Wyndham, 2009).

Despite millennia of place-based derived philosophies and land-based practices, important aspects of Indigenous environmental stewardship—often distilled or variously arranged into the four Rs: respect, relevance, responsibility and reciprocity—are still widely overlooked in western environmental science and management frameworks (Baker & Westman, 2018; Kanngieser & Todd, 2020; Molnár et al., 2023). This is not to say non-Indigenous researchers and institutions do not value and participate in reciprocating acts in their personal or professional lives. Rather, in mainstream environmental research and policy, we have observed that reciprocity is routinely overlooked, downplayed (consciously or not) or only valued *if* reciprocal acts can be extrinsically understood as contributing directly to a specific market or management issue. Reciprocity in these contexts is enacted as something functional, transactional or even consequentialist and appears to be entirely different from the moral duty of reciprocity, which in some Indigenous societies in North America is guided by relational/spiritual views of the land or what Gregory Cajete calls a 'theology of place' (Cajete, 1999). Reciprocity, then, is not another tool in the management toolbox—it is the very foundation of, and legal obligation to, the rights of all living beings and relations (see also Kanngieser & Todd, 2020).

Tensions between western and Indigenous environmental philosophies and epistemologies are not a new scholarly line of inquiry. Over 25 years ago, ethnoecologist Roy Ellen observed that 'Indigenous knowledge is currently the flavour of the month: as both economic commodity and political slogan' (Ellen, 1998, p. 87). At the time, Ellen was articulating concerns about Indigenous Peoples' knowledge from the Amazon Basin being uncritically adopted in environmental conservation movements or being exploited by bioprospectors and ethnopharmacologists. Similarly, Arun Agrawal observed that scholars and non-governmental organizations promoting the use of local and Indigenous knowledge in the sciences and development literature in the 1980s were in fact re-colonizing the lexicon of Indigenous Peoples as 'the latest and best strategy in the old fight against hunger, poverty…' but that, 'the attempt is bound to fail because different [I]ndigenous and western knowledges possess specific histories, particular burdens from the past, and distinctive patterns of change' (Agrawal, 1995, p. 413).

These concerns and debates appear to have been overlooked in current environmental scholarship and policy discourse. Agrawal's writing applies as widely now as it did a quarter-century ago, but instead of hunger, poverty and ethnomedicines, the adoption and promotion of Indigenous knowledge in environmental sciences appears to have been refashioned to reflect current global struggles (e.g. biodiversity loss, climate change). So, while the adoption and promotion of Indigenous knowledge in contemporary environmental sciences is a broadly positive trend, we continue to witness the same downplaying or compartmentalizing of stewardship values and core ideological beliefs like reciprocity. Arguably, the same issues identified in the 1980s and 1990s have not been attenuated; as Dennis and Bell point out, western scientific and regulatory discourses are still inadequate for Indigenous Peoples and communities because they ignore, '*relationships and responsibilities* to the natural world that are critical for well-being and collective continuance' (Dennis & Bell, 2020, p. 380, emphasis added).

Without overlooking the extractive and colonial nature of ethnoecology—which in some cases continues today (McAlvay et al., 2021; Posey, 1990; Shiva, 2007)—critical and pluralist approaches in ethnoecological sciences have been useful for interrogating the compatibilities and tensions that exist when attempting to 'braid' or 'blend' Indigenous and western environmental epistemologies (e.g. Armstrong & McAlvay, 2019; Joseph et al., 2022; Nieves Delgado et al., 2023; Turner, 2020b). For example, Virginia Nazarea argues that ethnoecology has the power to demonstrate '[w]estern scientific ignorance about other peoples' ways of thinking and doing… and point out its arrogance in dismissing anything that is different as being inferior' (Nazarea, 1999, pp. 3–4). As Indigenous scientists (Grenz, Zyp-Loring, LaFontaine) and ethnoecologists (Armstrong, Johnson, Turner), we review how environmental stewardship practices and responsibilities in Gitxsan and nɬeʔkepmx Territories in the Pacific Northwest of North America are nested within overlapping but unique embodiments of reciprocity (Figure 1). Considering decades of ethnoecological research, place-based knowledge and personal experiences, we explore how expressions of reciprocity are centred in Gitxsan and nɬeʔkepmx philosophies and worldviews as existential and/or legal obligations. Our objectives are to (1) consider any vital aspects of reciprocity (recognizing the complexity and diversity of reciprocal practices through space and time), while (2) assessing ethnoecological and other scholarly debates that have, over the better part of a century, dealt with current issues and failures at the intersection of Indigenous and western scientific knowledge production. Finally, (3) we argue for a level playing field, recognizing that reciprocity is the fundamental substrate upon which many Indigenous stewardship practices flourish. We discuss how and if such tenets are indeed incommensurate with western worldviews and practices, and what it means in the context of rights, title and ownership, and an aggressively changing climate.

2 | GOOSE GEN'AMA (RETURN, THANKS, GRATITUDE), RECIPROCITY IN LAX'YIP GITXSAN

> From the land we come, and to the land we return.
>
> Gwininnitxw, Yvonne Lattie

The people of 'Xsan (Gitxsan) are decentralized Indigenous polities whose collective territories span some 2000 km^2 of lands and waters in the middle and upper Skeena and Nass River watersheds in northwestern British Columbia (BC), Canada (Figure 1). The tenets and basis of reciprocity in environmental management contexts

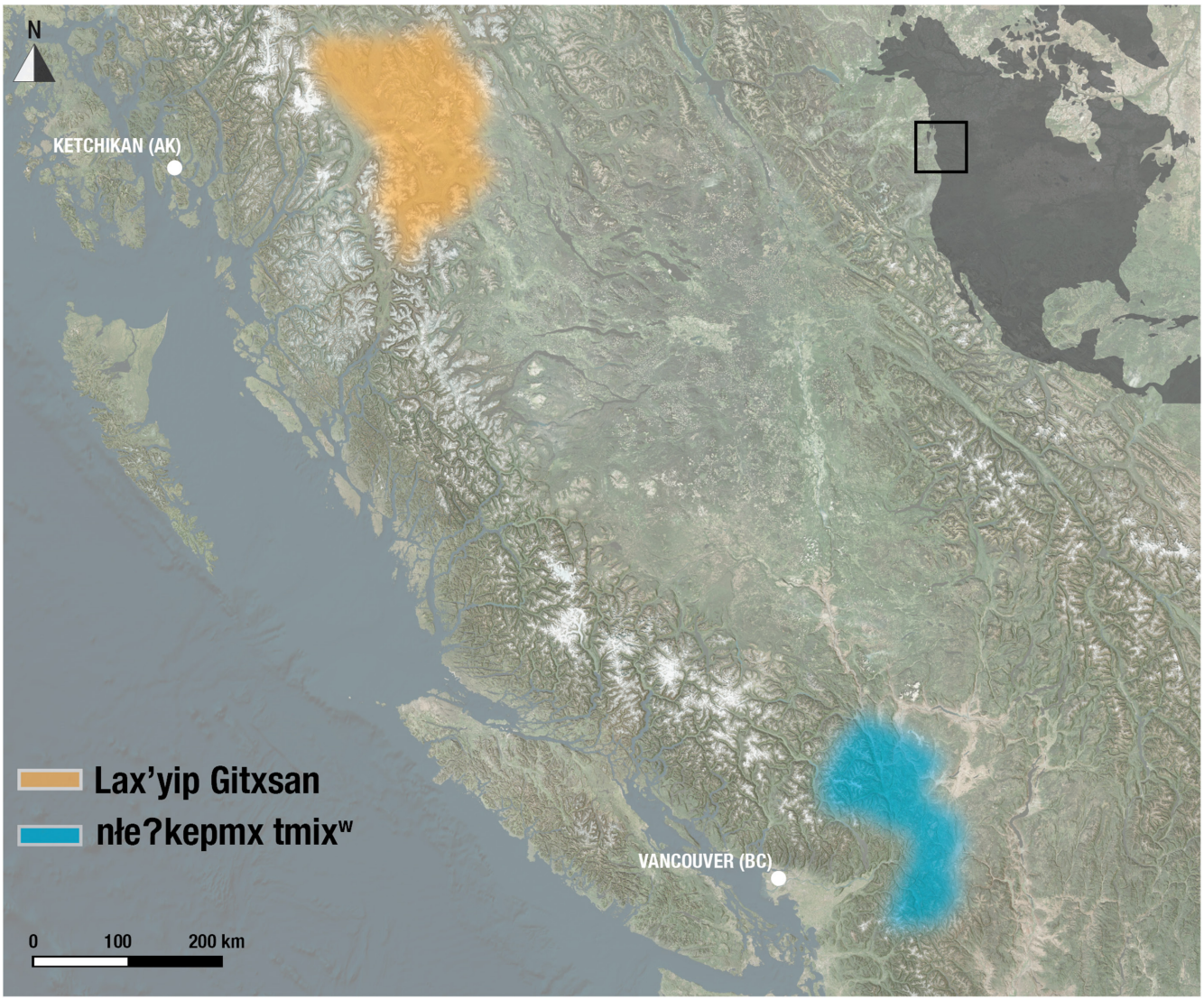

FIGURE 1 Reciprocity situated in two contexts: Lax'yip (Territories) Gitxsan (and Gitanyow) and nłeʔkepmx tmix^{w} (Nłeʔkepmx Territories) in northwestern North America.

are perhaps best articulated within Gitxsan legal governance structures based on matrilineal kinships of exogamous clans divided into House groups known as the Wilp (Huwilp, plural)—the fundamental social and political unit around which land tenure is organized. Wilp Territories, or lax'yip, are typically delineated by watersheds with boundaries drawn along drainage divides and in 1997, the Supreme Court of Canada recognized Gitxsan Huwilp title to House-owned Territories in the precedent-setting court case, Delgamuukw-Gisday Wa v. The Queen (1997). Although title was not defined, the ruling acknowledged that Gitxsan had never extinguished title to the Queen or Canadian government, and as such, the case recognized Gitxsan rights (and obligations) to manage and make decisions about Wilp-owned Territories. Each Wilp is guided by the Sigidim haanak'a or Simgigyet (Matriarchs and Chiefs), who are responsible for the health of the Territory, protecting and plicating plants, fish, animals and other biota for their use by Wilp members. Contrary to some western conservation and management ideologies, it is widely accepted that if the land is left unused, unacknowledged and uncared for, the animals, plants, birds and fish will depart, leaving humans helpless. Therefore, 'use' and 'caring for' are fundamental acts in which people build reciprocal relations with non-human beings. As Chief Gwininnitxw (Zyp-Loring's Wilp) often remarks, 'you either use it or lose it'.

Coordinating the use of lands and waters among tens of thousands of people, over thousands of years, requires an erudite system of management and coordination. Despite early settler colonial depictions of Indigenous Peoples' lacking ownership and land tenure systems in the Pacific Northwest (see Deur & Turner, 2005), Gitxsan territorial law has been characterized by 'aggressive exclusivity' while 'conferring rights of access on others, based on reciprocity' (Mills, 2008, p. 88). Wilp Chiefs and their families exercise proprietary title rights in accordance with Gitxsan laws (ayook and adaawx), which are foregrounded by a measured stewardship approach: 'access to the resources of Wilp members are safeguarded

by the Sigidim haanak'a's authority to manage their claims…it is expected that Wilp members and non-Wilp members alike will heed the word of the Sigidim haanak'a, for she has equal obligations to the animals, plants, and fish who reside on the territories…and will bear the burden of shame if the animals, plants, and fish disappear from the lax'wiiyip [lax'yip; Wilp Territory]' (Mills, 2008, p. 114). In testimonies recited by Hereditary Chiefs during the Delgamuukw court case there was a clear emphasis on the function of reciprocity to govern relationships among people, animals, plants, and the spirit world—these sets of behaviors and practices are culturally encoded into essential beliefs (reincarnation) and conferred land stewardship responsibilities. In western contexts, peoples' essential management interactions are primarily among other humans, whereas Gitxsan acknowledge the personhood of all living beings and know that 'both humans and animals, when they die, have the potential to be reincarnated. But only if the spirit is treated with the appropriate respect' (Wa & Uukw, 1992, p. 23). In contrast, people can prevent reincarnation by disrespecting plants and animals through overharvesting, careless use, being wasteful and other taboos, guaranteeing that they will not return and leading to the loss of food, medicines and spiritual well-being.

Gitxsan stewardship norms and ideals do not obscure the need to adapt to changing biophysical events and processes, nor does it suggest that people were without fault. Sometimes people failed: lessons were learned, laws were enacted and social mores evolved over thousands of years. Numerous stories, owned and shared among Huwilp, recount times when people mistreated mountain goats, overharvested fish or were callous about lands and the beings in them (Sterritt, 2016). In these accounts, assailants were met with devastating mudslides, famine and war. Respect and reciprocity (or lack of) are almost always the causal forces of devastation (e.g. disrespecting goats=famine). In 1936, Gitselasu (Ts'msyen) Chief Niss'daxook (Walter Wright) proclaimed, 'Great disasters are the landmarks of a people who are wise. They mark the ending of a time of error. They set a starting point for a better mode of life' (Wright, 1962, p. 41).

In western scientific contexts, Indigenous Peoples' oral referents ('stories') are typically regarded as frivolous or benign, stemming more from myth than reality. This perspective reflects a deep unknowing of how the adawx (stories/histories) and ayook (laws) fundamentally direct peoples' behaviours, stewardship ethos and management paradigms. The adawx and ayook outline the proper order of the universe, which consistently teaches that abuse of animals or territories upsets the moral balance. That balance needs to be restored by acts of reciprocity so as not to invite retribution, usually in the form of famine, injury or death. Pete Muldoe (Gitludaahl) explained, 'Our histories show that whenever new people came to this land, they had to follow its laws if they wished to stay. The Chiefs who were already here had the responsibility to teach the law to newcomers. They then waited to see if the land was respected. If it was not, the newcomers had to pay compensation and leave' (Wa & Uukw, 1992). Compensation in this sense is a reciprocal act, an exchange for wrongdoing and an acknowledgement of the harms done. This is still enacted today in the Feasthall, if someone arrives late, spills their soup or acts otherwise against the laws or expectations, the Wilp must be compensated.

Governance structures like the Wilp act to limit overharvesting and resource exploitation and incentivizes those able to maintain or even enhance fruit, nut, root and berry crops, fish and game—all intensively harvested 'resources' that were essential to peoples' livelihoods and health and well-being. Promoting the productivity of diverse and nutritious foodsheds requires stabilizing acts (active management) as people deal with environmental fluctuations and variability. Acts of stewardship and management are especially apparent in territorial responsibilities to keep the land productive—restricting access with consequences for trespass, but also the right to decide and direct acts like cultivation, clearing and burning. Based on interviews with Gitxsan Elders, teachers and knowledge-holders in the 1980s and 1990s, Johnson (Gottesfeld) underscored how berry patch burning is intimately tied to the system of reciprocity between corporate House groups (Huwilp). 'Traditionally burning was done by the 'father's side' (wilksi 'wiitxw) and the service was paid for with a feast (Kathleen Mathews interview). This is consistent with the ideology of balanced reciprocity between houses which informs most Git[x]san social relations…In practice, the 'father's side' uses and has access to the berry resources of the territory it would burn on behalf of spouses and children, and the men would likely be intimately familiar with the territory being managed, although not responsible for managing and regulating harvest from it' (Gottesfeld, 1994, pp. 448–451).

Western scientists and regulators interested in 'traditional knowledge' and related technologies have a habit of divorcing the social and behavioural contexts within which such knowledge and material infrastructures are nested. Consider fish weir technology, used for thousands of years across the Pacific Northwest but made illegal in Canada under the Indian Act in the late nineteenth century (Newell, 1993). Recently, weirs have been re-introduced and proclaimed as a strategy for better fisheries management and collaborative outcomes between regulators, researchers and Indigenous Nations in Canada (e.g. Atlas et al., 2020). However, the physical weir is only one aspect of traditional fisheries. Historically, and before settler colonialism, using weirs (and other technologies like stone traps, dipnets, etc.) allowed people to selectively harvest salmon, leaving some species or groups if they were too early, if numbers appeared to small, and/or avoiding female spawners (Morin et al., 2021; Newell, 1993). These and other protocols for harvesting—like the proper handling and disposal of fish necessary for renewing stocks—are at odds with some western practices (e.g. maximum sustainable yield, dead counts, catch and release angling, etc.). The recent reintroduction of weirs is important, but the success of Gitxsan fisheries was arguably less about the physical technology (the weir) and more about ideological positions like 'taking only what you need', 'returning remains to the water' and governance structures decisively constructed around Wilp autonomy and authority to organize, enforce and manage a fishery (e.g. deliberating on the number of fish needed for each household, conferring with other Huwilp up

and down rivers). A standalone weir, without the Wilp's authority to manage and steward the waters and land around it, is arguably performative and moot.

These issues—downplaying impactful socio-cultural and political features of good stewardship systems—continue to affect Gitxsan communities' today. Currently, Huwilp like Gwininnitxw are forced to continually engage in the regulatory system to hold Canada and the BC government accountable for their failing to address drastic land-use changes, resulting in the destruction of plant, animal and fish communities in their Territories. Despite the Supreme Court acknowledgement of Wilp title, provincial regulators and industry are rarely equipped (ideologically, emotionally and spiritually) to grasp and recognize Gitxsan stewardship protocols and laws based on respect and reciprocity. For decades, Gwininnitxw has worked hard to enforce Territorial laws and stewardship protocols, turning down money from resource extraction projects and filing legal suits to hold obstinate industries and regulatory agents accountable. When asked about the frameworks that guide Wilp land-use planning, Gwininnitxw (Yvonne Lattie, Figure 2) routinely points to the laws, teachings, responsibilities and inheritances described by *Gwelx Ye'enst*—the overarching philosophy encompassing the liliget (Feasthall), adawx and ayook, and which directs how to behave in Gitxsan society (see also Greening, 2017). Gwelx Ye'enst is a practical philosophy that translates literally to the passing down of tangible (lands, waters) and immaterial properties (laws, teachings) with the expectation that the 'the basket will be left full' for future generations. Hanamukw (Don Ryan) similarly describes Gwelx Ye'enst as the rights and responsibility of Chiefs to protect and steward lands for future generations, a reciprocating responsibility from one generation to the next—one that is not transactional but enacted by a deep sense of moral duty.

3 | RECIPROCITY IN NŁE?KEPMX TMIX^{W}

Nłe?kepmx (Nlaka'pamux) are a Salishan people whose homeland is geographically at the heart of the Salish language group. nłe?kepmx tmix^{w} (nłe?kepmx land) extends along the Fraser, Thompson and Nicola Rivers and surrounding lands in south-central British Columbia (Figure 1). The impacts of early colonization upon nłe?kepmx tmix^{w} cannot be overstated. European explorers, beginning with Simon Fraser in 1808, travelled through nłe?kepmx lands in the late nineteenth and early twentieth centuries. In 1858, approximately 10,000 miners headed up the Fraser River in pursuit of gold, following a rush that ballooned to over 50,000 people living along the river by 1861. This ushered in a colonial force that introduced violence, dispossessed nłe?kepmx and neighbouring Indigenous Peoples of lands and resources and resulted in the 1862 smallpox epidemic that killed an estimated 50%–75% of the local population. Colonial pressures continued after the end of the gold rush, as ranchers settled the area, further reducing nłe?kepmx families' access to their lands. Implementation of the 1876 Indian Act imposed colonial rule, forcing nłe?kepmx onto marginal reserves, enabling further theft of traditional lands and causing the erasure of people, culture, food systems, land stewardship practices and language. During this process of colonization, our (nłe?kepmx) survival was often based on downplaying or rejecting the knowledges that had sustained us since time immemorial. Opportunities for learning out on the land and multigenerational transferring of knowledge were severed, in some cases for many decades, leading to widespread, collective losses of nłe?kepmx knowledges and land-based practices. The colonial history of our (authors Grenz and LaFontaine) Nation foregrounds a better understanding of the swift and violent alteration of nłe?kepmx lifeways, which had developed for over 12,000+ years. The events of settler

FIGURE 2 (a) Author Jennifer Zyp-Loring (Gwininnitxw) examining 700 years of burning and earthwork engineering in her ancestral territory (Maxhla Didaat). (b) D'am Galaanhl Giist (Slamgeesh Lake) and Puberty Island near the ancestral village of Gitangwalk, cared for and managed by Wilp Gwininnitxw today. (c) Yvonne Lattie (Gwininnitxw) at Maxhla Didaat camp. (d) Sicintine ice fields, draining into Xsa Gin 'Taa Yin (Sicintine River), a cold-water regulator for the Skeena River and centrepiece of Maxhlaa Didaat Territory.

and extractive colonialism eroded our ability to live in reciprocity with the land; the laws of the colonizers were designed to break Indigenous land relationships.

While some ethnographic and ethnoecological work has been undertaken in the region, a tension persists today between the role settlers have played in documenting these knowledges and practices within western anthropological and scientific frameworks. Certainly, such texts are valuable and have secured, for posterity, some information that may have otherwise been lost to nłeʔkepmx. However, our knowledge systems and practices are grounded in oral transmission, participatory learning and symbolic representations—the recording of our cultural practices, philosophies and language in written formats by outsiders inevitably resulted in misunderstandings and misrepresentations of our knowledges. As Cecil King (1997, p. 125) said, 'The language anthropologists use to explain us traps us in linguistic cages because we must explain our ways through alien hypothetical constructs and theoretical frameworks'. For example, ethnobotanical accounts recorded by James Teit (Steedman, 1930; Teit, 1896, 1898) have mostly provided lists of our plants and their uses. The scope of these lists alone clearly demonstrates the strength of the relationship between nłeʔkepmx and our lands. However, these lists provide limited inferential material through which nłeʔkepmx lifeways were rooted in life-sustaining reciprocal acts with plants on those lists. Early settler perspectives, such as Teit's, inappropriately recorded information through the lens of cultural evolution—a scientific framework wholly endorsed by the most prominent scholars at the time—reducing nłeʔkepmx to 'hunter–gatherers', a label that implied no care or responsibility towards the lands, waters or other lifeforms that supported us. Throughout these and other early ethnographies, there was little to no recognition of the sophisticated land shaping and stewardship practices and protocols required to achieve the abundance of biota and resources that settlers first encountered in nłeʔkepmx tmixʷ (see also Turner, 2020a). We argue that this process—of cherry picking, mistranslating or decontextualizing knowledge and practices—may, consciously or not, continue as environmental scientists and regulators are now increasingly willing to study and appropriate our teachings.

Fortunately, nłeʔkepmx language revitalizers such as Mandy Jimmie and cultural knowledge keepers such as John Haugen and Mamie Henry have centred our own People and axiology, and thus provided evidence of living by the law of reciprocity. For example, in the spték̓ʷɬ (creation) stories they, and others, have shared how reciprocity is a clearly embedded tenet and norm—not taking more than one needs, warnings regarding the consequences of greed, and the importance of respect for our plant and animal relations. The spték̓ʷɬ, 'Wood Tick' (told by Herb Manuel), is one such example. Wood Tick had a staff he used to strike the ground, causing a deer to fall over so he could harvest them. Coyote asked Wood Tick to loan the staff to him so he could help get a deer for old Wood Tick and share it with him. Wood Tick told him, 'Don't hit the ground more than once. Just one deer per day and bring the staff back and put it away'. While Coyote expressed his agreement, when he got out on the land, he banged the staff to the ground twice. Two deer came down and nothing bad seemed to happen. He then decided to get a week's supply at once so he wouldn't have to walk up the mountain every day. Banging the staff repeatedly, deer began to fall all around him. Suddenly, the spell of the stick broke and the deer all jumped up, coming back to life. They ran by Coyote's camp and all of the old bones, meat and hides from past harvests were mended together and also left, and all his food was gone (Hanna & Henry, 1996). He was punished for his greed.

Nłeʔkepmx Elders have taken care to explain to those from outside the nłeʔkepmx culture about the importance of reciprocity, land stewardship and respect for the non-human relatives—plants, animals and even fungi—that provide for the people (Laforet & York, 1998; Turner et al., 1990; York et al., 1993), as all are spiritual beings. This is why syémit (prayer) is an important protocol that precedes food-gathering activities to ensure mindfulness and enacting respect and reciprocity in interactions with land and non-human relations to avoid actions that could bring harm (Egesdal et al., 2011, p. 25)—the consequences of which are known to bring sickness or misfortune in fishing, hunting and harvesting food. Elder Hilda Austin of Lytton (Figure 3) shared an example of such prayers while digging roots at Lake Petáni, where she addressed Rattlesnake, Bear and Grizzly at each elevation where they were likely to be encountered (Egesdal et al., 2011, p. 9). Austin describes that animals were, in fact, People—'nέx̓ʷm xeʔe tək séytknmx'—and that they would respond to the prayer if given in earnest (Egesdal et al., 2011, p. 571).

Elder Annie Zixkwu York from the town of Spuzzum (Figure 3) shared stories and experiences of being out on the land with those of previous generations, describing land stewardship techniques meant to promote plant health and production for the benefit of all relations. These included practices such as pruning of hazelnut (*Corylus cornuta*) and berry bushes, the transplanting of Pacific crabapple (*Malus fusca*) and saskatoon berry (*Amelanchier alnifolia*) varieties, and fire stewardship, which she had observed during her early childhood, some 90–100 years ago (Turner, 1999). York described the intentionality of the timing of burns, recalling her uncle saying close to the fall season that, 'It's going to rain pretty soon, time to burn [so the fire will not spread too much]'. She observed firsthand that in subsequent years, an abundance of berries such as huckleberries and blueberries (*Vaccinium* spp.) could be found in those burned areas. Elders Hilda Austin and Nora Jimmie shared similar examples, such as controlled burns meant to enhance the growth of forage plants for deer such as q̓ʷléwe (*Allium cernuum*, nodding onion) and grasses (Hilda Austin, Nora Jimmie, personal communication to N. Turner, 1984).

The impacts coinciding with the loss of reciprocity and stewardship norms could be seen within Elder Annie York's own lifetime. She observed how the colonial government's banning of the use of fire resulted in berry picking areas reverting to dense brush and trees, reducing or eliminating berry bush populations and negatively affecting berry production, size and quality. For example, on Botanie Mountain, when burning was no longer allowed, York observed that the sk'ém'ets [*Erythronium grandiflorum*, yellow glacier lily corms] were not as big or plentiful as before (Annie York, personal communication

FIGURE 3 (a) Botanie Valley, an area that was formerly tended through controlled burning. (b) Edible root vegetables harvested from Botanie Valley. (c) Hilda Austin of Lytton with *sk'ém'ets* drying; (d) Elder Annie York of the town of Spuzzum; and (e) nłeʔkepmx petroglyphs near town Spuzzum.

to N. Turner, 24 January 1991), demonstrating the consequences of a broken plant–people relationship. Elder Hilda Austin recalled similar deterioration of landscapes with the banning of controlled burning (personal communication to N. Turner, 20 October 1982). She shared that Thompson Mountain, once a prime place to harvest traditional root vegetables and berries (because the people used fire routinely to maintain open meadowlands), had grown into dense brush since the banning of this practice in the early 1900s. She also described how peoples' knowledge about how to use fire for environmental stewardship had diminished because of such land transformation and coercive policies. Austin recalled that careful observations and experience had made it possible to determine which areas should be burned at a given time, and that such fires were well controlled; if the fire burned too much, it could be stopped.

Harvesting was—and is—an essential practice driving reciprocal relationships between people and plants, as evidenced by the fact that widespread, intensive, long-term harvesting did not deplete the populations of food plants like various root species (Turner et al., 1990, p. 28). In fact, continual disturbance of the soil, selective harvesting of the roots (bulbs, corms and tubers) by size and age, and scattering of seeds and propagules, typical of root harvesting activities, enhanced their overall productivity (Turner & Kuhnlein, 1983). Plant health, quality and productivity were also enhanced through other stewardship activities such as: (1) tilling and 'weeding' of grasses or other competing herbs (done with a digging stick during harvesting) to aerate the soil, enhance moisture penetration and improve nutrient cycling; (2) transplanting (moving roots and other propagules from one location to another) to enhance plant density and distribution; (3) pruning and coppicing (cutting back branches or entire upper growth of trees or shrubs like huckleberries, saskatoon berry or hazelnut) to stimulate new, more vigorous growth and increase berry production; (4) monitoring responsibilities by certain groups or individuals to closely observe plant health and appropriate harvesting times, often over generations; and (5) ceremonial protection that observes protocols that guide the use and harvest of certain species in specific places. Further, the practice of purposeful selection of roots, bulbs or corms based on size, harvesting the larger ones and leaving the smaller ones in place or replanting them, improved future harvests, following the teachings shared by Annie York,

Mabel Joe and others to always 'leave some for next year'. Other harvesting protocols, such as those guiding mushroom picking practices, likewise demonstrated care and reciprocity. Elders York and Austin shared that after harvesting mature mushrooms, gently using a stick to uncover them, one should carefully re-cover the spot with soil and duff to protect any younger mushrooms that had not yet emerged (Turner et al., 1990).

We would be remiss not to comment on the ongoing impacts of colonialism that have resulted in an observable lack of reciprocal land-use ethics perpetuated upon nłeʔkepmx Territory today. A century of colonial fire suppression, coupled with human-caused climate change, resulted in a devastating mega wildfire in Lytton in 2021, which burned more than 83,000 ha of the territory, on the heels of another, subsequent fire in 2023. The change in both the frequency and intensity of fire is a result of a loss of reciprocity, fulfilling our responsibilities to the land (e.g. Grenz & Armstrong, 2023). While the personal stories and oral histories shared by our elders and knowledge keepers have made clear the consequences of broken reciprocal relationships with land, their warnings have largely been ignored. Current colonial policies, regulations and government control of lands, predicated on a scientific and bureaucratic ethos devoid of reciprocity, have resulted in mismanagement and disenfranchisement. As these same researchers and regulators are now eager to hear our voices, we must ensure that fundamental tenets of reciprocity cannot be overlooked or inhibited; they also cannot be reactionary; reciprocity must be reclaimed and supported as our way of being and enacted continuously—just as our elders have taught us within the nłeʔkepmx fundamental law—take care of the land and the land will take care of you (nłeʔkepmx Law, n.d.).

4 | DISCUSSION

Reciprocity is embedded in laws, ideologies and practices that underscore local and Indigenous Territorial realities globally. Like the case studies in Gitxsan and nłeʔkepmx contexts presented here, many Indigenous societies share similar but expressly unique and distinctive patterns of reciprocity as the basis for environmental stewardship practices. In Iñupiaq country (currently Alaska and northern Canada), principles of 'collaborative reciprocity' hold that humans and animals constitute each other—this is commonly portrayed in whaling practices where animals willingly give themselves to people but only if they have been afforded specific rights and respect (Sakakibara, 2018). The same is true in Sahaptin contexts on the Columbia Plateau; if hunters are arrogant, careless or disrespectful, they will have no hunting luck (Hunn, 1990). In Nuu-chah-nulth territories (Vancouver Island), the philosophy of heshook-ish tsawwalk similarly illustrates the links that unify all things physical and immaterial, and offers roadmaps to navigate these worlds with respect, reciprocity and gratitude (Atleo, 2005). Affording this kind of personhood to non-humans is more than religious animism; it is a moral and environmental philosophy put into action by concrete acts of respect and reciprocity.

While there are shared commonalities, there is also considerable variability and diversity in peoples' environmental philosophies and ontologies. Accumulated over massive spatial and temporal scales, ideologies like reciprocity emerge from, and are specifically enacted upon, the lands from which they came. Yet, researchers continue to debate the validity and credibility of pan-Indigenous stewardship philosophies and know-how as indistinct phenomena. In the 1960s and 1970s, questions about whether Indigenous and pre-colonial societies in North America were inclined to sustainably manage their environments were propped up with evidences like the prevalence of pre-colonial warfare, the extinction of megafauna or that rudimentary technologies meant that even if people wanted to deplete resources, they didn't have the capability (Chagnon, 1968; Harris, 1977). These debates have been variously revived, cresting again in the 1990s around Redford's (1991) popular characterization of the 'ecological noble s*vage'. Despite compelling and critical refutations by ethnoecologists and Indigenous writers—Alcorn (1993) argued that 'the myth of the noble state' also ought to be debunked (and see Geniusz, 2009; Gottesfeld, 1994; Nadasdy, 2005)—and that Redford himself renounced the term, calling for a more diversified and nuanced view of Indigenous stewardship practices, the same simplistic stereotypes remain commonplace in mainstream environmental management discourse and policy today (Arsenault et al., 2019; Eichler & Baumeister, 2021).

The challenge now is how to underscore place-based tenets and axiological norms like Gwelx Ye'enst or nłeʔkepmx ideologies alongside western environmental management ones. For example, multi-stakeholder recovery planning for extreme wildfires that have devasted swathes of nłeʔkepmx tmix^{w} and neighbouring St'at'imc Territories continue to downplay customary laws and environmental stewardship values (Grenz & Armstrong, 2023). Geographer Sarah Hunt Tłaliłila'ogwa has questioned whether western ontological possibilities are too constrained to make knowledge integration meaningful, writing that, 'engagement with Indigeneity involves the establishment of ontological limits around what knowledge is and is not legible…In order to be legible…knowledge must adhere to recognized forms of [western] representation' (Hunt, 2014, p. 29). Arguably, until non-Indigenous scientists, consultants and bureaucrats find 'refusing to share one's food [as] morally repugnant and negatively sanctioned' as some local and Indigenous societies do, there will always be a steep hill to climb (Hunn, 2011, p. 88). Indigenous scholars and ethnoecologists have long pointed to the functions of the 'four Rs' as the driving force behind healthy relationships, communities and ecosystems (Anderson, 1996; Ludwig & El-Hani, 2020; Nelson, 2008). But those relevant tenets are typically absent in mainstream Indigenous science research and policy or are mentioned and acknowledged only in passing (Alook et al., 2023).

Our assumption is that unscalable and immaterial tenets like reciprocity are anathema to western environmental management praxes. Indigenous scholars and ethnoecologists have shown that, under the scrutiny of academics, bureaucrats and consultants, Indigenous knowledge systems and practices tend to be reduced to purely historical, functional or technological units. For example,

in British Columbia, heritage and environmental impact assessment laws and regulations only protect cultural and environmental resources narrowly defined by western values and materialist philosophies (see Lepofsky et al., 2020). Gitxsan cultural landscapes—including traditional Wilp food harvesting locales, fish camps, trails and travel corridors and other cultural infrastructures—are only protected if they pre-date 1846 and if archaeological consultants deem associated material remains worthy of consideration. As a result, Wilp-stewarded places with considerable community-based value and broad environmental functions are continually at risk from land-use developments (e.g. Armstrong et al., 2023).

Reciprocity within Gitxsan and nłeʔkepmx contexts is not meaningfully considered in conventional regulatory or scientific praxes, which lean heavily on materialist principles and give primacy to hypothetico-deductive logic and the physical substances of resource management systems (Geniusz, 2009; Johnson & Hunn, 2010; Nelson, 2020). To be clear, these reasoning tools can be useful, but not if they unequivocally repress other epistemic frameworks. Indigenous researchers continuously adopt western scientific principles, but it is difficult to imagine mainstream environmental managers grappling with reverential and reciprocal practices like syémit (prayer), and thus, it may be an example of where braiding and blending western and Indigenous practices is a lost cause (see also Broadhead & Howard, 2021). In the context of fast capitalism—the rapid pace at which economic transactions and exchanges occur in modern capitalist politics—reciprocity is likely irreconcilable (Agger, 2004). Hyped-up aspects of private property ownership, for-profit models in health and education, and the focus on techno- and market-fixes to solve wicked problems like climate change and resource exhaustion all create moral hazards that are incommensurate with ideological norms like heshook-ish tsawwalk, Tjukurpa or Gwelx Ye'enst. We know that reciprocity is a powerful variable, lesson and solution to environmental exploitation and mismanagement, but it becomes dubious or muted in the bedlam of blending and braiding.

Reason stands then: if environmental scientists, consultants and decision-makers are sincere and committed to empowering Indigenous knowledges and practices to mitigate climate change impacts or to maintain and steward healthy ecosystems, then it must be done outside of western capitalist and scientific frameworks. Axiological imperatives like reciprocity cannot be injected into a failing system and expected to shift the paradigm—at least not at the rate at which climate change, biodiversity loss and state-sanctioned resource extraction are dramatically impacting peoples' lands and livelihoods. If reciprocity is one of the singular threads that features prominently in successful stewardship systems globally, and if mainstream management institutions are incapable of reconciling these moral imperatives, then mainstream power brokers ought to acknowledge inherent and systematic failures and move aside. In other words, reciprocity as a moral imperative or ideological norm will not and cannot be meaningfully integrated and blended into current mainstream environmental management paradigms. However, reciprocity, even if imperfectly evoked, continues to function and is apparent in some Gitxsan and nłeʔkepmx contexts. Therefore, autonomy and sovereignty over stewardship policy, practices and processes appear to be the logical solution to mainstream environmental management failures.

For example, recognizing the inability of western institutions to adequately protect and maintain healthy and functioning ecosystems across Australia, Indigenous Protected Areas (IPAs; or conserved areas, IPCAs, in Canada) have developed as land management agreements between several Indigenous communities and colonial governments. These initiatives are primarily led and managed by Indigenous communities autonomously and are maintained based on their own knowledge, governance systems and conservation priorities. IPAs account for 74 million ha, or over 46% of Australia's National Reserve System, and are formally recognized by colonial governments and internationally by the International Union for Conservation of Nature (IUCN). IPAs are notable as a mechanism for preserving and defending culture, supporting local leadership and governance and increasing community members' access to country, all while addressing local conservation issues left unattenuated by state researchers and managers. The guiding principle in one IPA, Walalkara, is Tjukurpa—a core philosophy grounded in reciprocating acts and ideologies that require the land to remain productive and healthy for the benefit of future generations (Robin et al., 2022).

Moreover, Artelle et al. (2021) provide guideposts for decolonial models of conservation and environmental management in the Great Bear Rainforest in BC, underscoring the importance of sovereignty and autonomy—that the stewardship of 'resources' is inseparable from land rights, including title and self-determination—and that all stewardship must be place-based and centred on communities. Under these principles, drawn from Haíłzaqv, Kitasoo/Xai'xais, Nuxalk and Wuikinuxv worldviews and values, and by accessioning and mobilizing highly localized knowledge (bear behaviour, habitat, population dynamics, etc.)—data that was simply non-existent in provincial managers' toolkits—local communities did a more effective job protecting and stewarding grizzly bear populations than previous western management models. Blending and braiding of western and Indigenous knowledge is important and possible, but arguably, only when sovereignty and autonomy are prior (Artelle et al., 2019).

It is worth noting that Indigenous-led conservation mandates, or IPCAs, are still relatively new undertakings for colonial governments. Consultation and consent processes for establishing IPCAs or autonomous management units are not always robust or fully respect the rights and title of Indigenous communities. Moreover, Indigenous Peoples' inherent and legal rights should not be contingent on obtaining a desired conservation or land management outcome. Indigenous-led stewardship initiatives are not an opportunity for mainstream managers to cut their own budgets, deflect accountability or wash their hands of the practices that have led to biodiversity loss and environmental degradation in the first place. The principles of distributive, restorative and recognition justice are critical for any researcher or manager working towards these ends (McGregor, 2018; Wolverton et al., 2023).

5 | CONCLUSION

Fundamental principles of reciprocity in Gitxsan and nłeʔkepmx contexts (and beyond) might not find full integration within western approaches to environmental management. Consequently, alternatives to integration involve recognizing exclusive proprietary and self-determined rights for local and Indigenous communities to govern and protect their lands, despite dominant structures and value systems. We continue to pose significant questions regarding the possibility of harmonizing Indigenized conceptions of reciprocity within western environmental management methodologies and regulations. In honouring and holding up those who have worked hard and continue to maintain deeply meaningful and intellectual philosophies—like Hanamuxw, Gwininnitxw and Annie York—in the face of ongoing environmental mismanagement, researchers, consultants and bureaucrats might reflect on their own culturally relevant understanding of reciprocity and reciprocating acts, and begin to grapple with the ethical, historical and cultural hurdles that accompany braiding and blending endeavours.

AUTHOR CONTRIBUTIONS

Study conception and design: Chelsey Geralda Armstrong; *data collection/research overview*: Chelsey Geralda Armstrong, Jennifer Grenz; *analysis and interpretation of research*: all authors; *draft manuscript preparation*: all authors; *revisions and approval of the final version of the manuscript*: all authors.

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The manuscript does not include available data.

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