

Article

“We Don’t Drink the Water Here”: The Reproduction of Undrinkable Water for First Nations in Canada

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Abstract: First Nation communities in Canada are disproportionately plagued by undrinkable water and insufficient household sanitation. In addition, water resource management in First Nation communities has long been a technocratic and scientific mission controlled by state-led authorities. There has been limited engagement of First Nations in decision-making around water management and water governance. As such, problems associated with access to drinkable water and household sanitation are commonly positioned as hydrological or environmental problems (flood or drought) to be fixed by technical and engineering solutions. This apolitical reading has been criticized for not addressing the root cause of the First Nation water problem, but instead, of reproducing it. In this paper, an approach using political ecology will tease out key factors contributing to the current water problem in many First Nation communities. Using case study research set in source water protection planning, this paper explains how persistent colonial practices of the state continue to reproduce undrinkable water and insufficient household sanitation. Solutions to this ‘water problem’ require greater attention to First Nations water governance capacity and structures.

Keywords: first nations; Canada; political ecology; colonization; water politics

1. Introduction

“We are not the country we thought we were”—Gord Downie [1]

Whether you have drinkable household water in Canada depends largely on who you are. If you are First Nation living ‘on reserve’, you have a significantly greater chance of having undrinkable water [2]. In 2011, a nation-wide survey of water and wastewater conditions classified 30% of First Nation water systems as high risk for contamination [3]. More recently, in 2016, 134 water systems in 85 First Nation communities across Canada were reported to be under a boil water advisory [4]. Approximately one in eight First Nation communities is under a boil water advisory issued by the public health regulator at any one time. Nationally, boil water advisories are 2.5 times more frequent for First Nation communities than for non-First Nation communities [5,6]. From a human health perspective, the number of water-borne infections in First Nations communities is an alarming 26 times higher than the Canadian national average [5,7].

While these statistics are frequently reported in popular media, much less attention is given to the causes of these contamination events. Tracing the origin of these events requires some reflection on the impacts of colonization on Indigenous people in what became Canada. It is here where we depart from a First Nation ‘water problem’ discourse and instead engage in a critical examination of causal factors, tied to political and institutional arrangements [8–12]. We acknowledge the efforts of national organizations, such as the Assembly of First Nations, regional First Nation non-governmental organizations and Tribal Councils that collectively work to improve water quality in communities.

Similarly, we acknowledge the dedication and often heroic efforts of First Nation water treatment plant operators who maintain drinking water services despite poor raw water quality, infrastructure challenges, and often inadequate federal funding [13].

Indigenous peoples have lived on Turtle Island (North America) for thousands of years, from time immemorial [14]. To this we suggest that the cause of the current ‘water problem’ is rooted in settler-colonial expansion over the past one hundred and fifty years [15–18]. In other words, the current water problem faced by many First Nations in Canada would not exist without the conditions that caused the water problem. We frame our argument not as a ‘water problem’ but rather, as a ‘political problem’ attached to historical injustices.

Colonialism in Canada, and its support institutions, including state laws restricting Indigenous people’s movement over the land, limitations on cultural and social practices, introduction of residential schools, as well as the ‘Indian Reservation’ system of forced settlement, to name a few, have recently been described as ‘cultural genocide’ [19]. Patrick Wolfe described the relationship between genocide and settler colonialism as one rooted in a logic of elimination, where invasion seeks “dissolution of native societies” through relocation and dispossession, while simultaneously “erect[ing] a new colonial society on the expropriated land base” [19]. Put differently by Wolfe, “elimination is an organization principal of settler-colonial society rather than a one-off (and super-seded) occurrence” [19] (p. 388).

Vestiges of colonialism, stemming from the *Indian Act*, remain in place today and include an array of government controls and institutional mechanisms. Territoriality drives settler colonialism, which must be recognized as a structure instead of characterized as an event. Institutions and laws perpetuate settler colonialism, reproducing the social relations and inequalities that are at the root of many ‘water problems’. The purpose of our paper is to frame Indigenous water issues in terms of ‘the political’, where disagreements over fundamental values and interpretation drive deliberation over joint action in the environment. In order to do so, we recognize the calls for recognition of Indigenous self-determination, consent, and nation-to-nation dialogue evident within academia, and national First Nations organizations, such as the Assembly of First Nations [20–23], as well as in global discourses around human rights [24–30].

Prior research on Indigenous participation in water governance and management on the prairies emphasizes improvements in the development, implementation, and evaluation of watershed plans and planning [31–33]. As part of the socio-political aspects of water, contestation and reflexivity in public debate in water governance have been given some attention, but this is exclusively focused on state-based water institutions and Western norms of deliberation [34]. Recent methodological innovations in research on Indigenous peoples’ ‘water problems’ offers promise for future investigations into household water insecurity on- and off-reserves [35,36]. Household water insecurity includes both quantitative and socio-cultural aspects of water security, such that quality, quantity, reliability, and affordability are considered alongside with entitlements and human capabilities, social and cultural dynamics, as well as political institutions and processes [35]. Entitlements are “relations that legitimize ownership claims or use rights, through trade, production, labor, inheritance, or transfer,” while human capabilities encompass the “broader impacts of water insecurity on human wellbeing” [35] (p. 4). Wilson et al. [37] encourage the adoption and adaptation of the household water insecurity approach to Canadian studies of Indigenous peoples’ ‘water problems’ by ensuring that the framework “reflect[s] Indigenous water relationships more fully” [37] (p. 2).

Building on the literature briefly outlined above, we ask: what roles do political structures and institutions have in the continued exclusion of Indigenous peoples from water governance in Canada? We seek answers to this question by critically assessing the integration of Indigenous peoples into state-based water governance and planning in the Canadian Prairie.

The paper will begin by describing how a theoretical approach from political ecology may present alternative discourses to the First Nations ‘water problem’.

We then situate our research by first discussing colonial water governance, present the results from multiple case studies of First Nations source water protection plans, and link those results to

the neglected political aspects of water governance that operate to reproduce the ‘water problem’. Methodologically, we refer to the four dominant narratives presented by Robbins [38] to describe the political ecological conditions under which the ‘water problem’ has manifest.

2. Political Ecology

Political ecology is defined as “the analytic focus on factors that shape relations of power among human groups that influence relations between these and diverse aspects of their environments” [39] (p. 205). The perspective from political ecology has been employed more commonly in ‘Third World’ or research to provide insight into, and explanation for, environmental degradation resulting from uneven power relations operating between different actors [40–43]. Political ecology offers an alternative to the more popular accounts of the environmental crisis traditionally nested in inappropriate technology, overpopulation, or poor land use management [44].

Here, we turn to political ecology as a means of exploring relations of power between the federal government and First Nations in Canada. The Government of Canada has both a fiduciary responsibility and constitutional responsibility to First Nations. Included under those responsibilities is the provision of water. We seek to explore how relations of power may reproduce the ‘water problem’ experienced by many First Nations in Canada.

Methodologically, McCarthy [45] has argued for a continued presence of ‘extended fieldwork using intensive case studies and ethnographic techniques’ in First World political ecology as a means of ‘discovering the Third World within’. That is, a political ecology analysis can be applied to ‘developed’ nations, revealing that uneven development and power relations are not exclusive to the ‘Global South’ or other developing countries. Landscape narratives, inclusion, and discourses of environmental change are used to facilitate dispossession of land and resources from Indigenous peoples in the Global North as in the South [46]. In response to this call to turn the political ecology analysis back on ourselves, we report on multiple case studies from the Canadian Prairie region. Robbins [38] identifies four dominant narratives contained within the field of political ecology (see Table 1). In this paper, we assess the applicability of these dominant narratives to the water problem in First Nations.

Table 1. Dominant narratives in political ecology. Redrawn from Robbins (2004) [19].

Narrative	What is Explained?	Relevance
1. Degradation and marginalization	Environmental change: why and how?	Land degradation, long blamed on marginal people, put in its larger political and economic context
2. Environmental conflict	Environmental access: who and why?	Environmental conflicts part of larger gendered, classed, and raced struggle
3. Conservation and control	Conservation failures and political/economic exclusion: why and how?	Usually viewed as benign, environmental conservation shown to have pernicious effects
4. Environmental identity and social movement	Social upheaval: who, where, and how?	Political and social struggles are shown to be linked to basic issues of livelihood and environmental protection

2.1. Dominant Narratives in Political Ecology

We turn to the four dominant narratives described in Robbins [38], which will be used to interpret the results of the research. Below, we briefly describe the narratives and return to them in the discussion.

The land degradation and marginalization narrative borrows from the political economy tool kit to explain land degradation in terms of exclusion, marginalization and exploitation, where one person’s (or state’s) accumulation is another person’s (state’s) degradation. Where local, traditional production systems become usurped by state intervention or regional and global market shifts, rules of resource access, and control undergo change [38]. Such conditions may lead to exploitation of the land in a quest

to produce surplus capital for outside interests. The colonization process holds closely to this model. Such exploitation, as the narrative goes, leads to local poverty and continued exploitation and land degradation. When viewed from outside, the cause of land degradation is more commonly blamed on the Indigenous (First Nation) land occupants—not on external (yet invisible) capital accumulation forces. For example, many First Nation communities in the Prairies are impacted by adjacent and upstream developments, such as agriculture or oil and gas extraction activities. These activities rarely provide material or financial benefit to the impacted communities.

The second narrative, environmental conflict, is concerned with conflicts that evolve between resource user groups that results from increasing resource pressures caused by land (or water) enclosures or appropriation by state authorities, private firms or social elites [38]. An important aspect of this narrative is that environmental conflicts may surface when local groups secure local control of collective resources at the expense of others, including those from outside the local community. For example, private managed forest tenures in parts of Canada prioritize private timber harvesting over residential homeowner rights leading to neighbourhood conflicts. Environmental conflicts are not seen to be at the core of the Indigenous water problems described in this paper, although there are First Nations in Canada who have come in to conflict with the state over resource management, including water [47–49].

The third narrative, conservation and control, argues that the struggle over local control of resources by regional, national, or global authorities erroneously characterize local production practices as unsustainable. Subsequently, these same state authorities organize to preserve the environment under the mantra of ‘conservation’. The control and management of these areas by the state, according to this narrative, removes opportunities for local production practices creating conflict over resource access leading to poverty and the possibility of environmental degradation through over-harvesting on an imposed limited land base. For example, the designation of park status over resource lands by the state to the exclusion of all other uses such as the expansion of a water reservoir may lead to conflict over future water security. While an important explanatory narrative from within political ecology, we do not see land and water conservation and control as being germane to the Indigenous water problem in Canada.

The fourth, and final, narrative from Robbins [38], environmental identity and social movement, suggests that changes in environmental management regimes and environmental conditions create opportunities for local groups to join together politically. As a result, powerful national and even global political and economic forces become themselves the target of coordinated local opposition. For example, the Canadian federal government’s purchase of Trans Mountain Pipeline brought together disparate groups in opposition to pipeline expansion and the perceived conflict of interest of government becoming both pipeline owner and federal regulator. Again, the Indigenous water problem is not well aligned with any specific environmental identity or social movement.

Based on the brief, preceding overview of the four narratives of political ecology, we position this paper in the context of the first narrative, degradation and marginalization, to best describe the political economic conditions that most closely align with the Indigenous water problem described in this paper.

In the section that follows we provide an overview of colonial water governance in Canada as context to better understand First Nation engagement in water management decision-making today.

2.2. The Politics of Colonial Water Governance in Canada

In order to understand the drivers of inequality, we ground our research on the experiences of Indigenous people’s household water insecurity, by focusing on access to water and sanitation. We begin by asserting that the institutions and processes of resource governance in Canada (forestry, water, minerals, wildlife, and land) are the mechanisms by which inequity in access to water are reproduced.

The Canadian Prairie, the geographic boundary of this research, is wholly contained within numbered Treaty agreements forged between the Indigenous land occupants represented by hereditary

leaders and European newcomer society represented by the British Crown. The purpose of the ‘Numbered’ Treaties, most signed between 1870 and 1890, was to establish peaceful, trustful relations between the British Crown, later Canada, and the Indigenous occupants, later known as First Nation people. The Treaty agreement included resource sharing and the protection of land- (and water-) based rights of First Nations, though there is disagreement between settler and Indigenous interpretations of the intent and meaning of the treaties. With Treaties came the establishment of ‘lands reserved for the Indians’, held in trust and managed by the federal government. Viewed in terms of territoriality, the Numbered Treaties were “a continuation and intensification of the re-territorialization that ensued at the end of the 19th century with the passing of the Constitution Act in 186 and the Indian Act in 1876” [18] (pp. 164–165).

Because of these Treaties as well as legislation following the establishment of the Dominion of Canada (i.e., *the Indian Act* 1876), Reserve lands and First Nations members are considered the responsibility of the federal government. This presents itself now as an attempt to bring “Indigenous political orders ... [of these areas] under the regime of settler governance” [18] (p. 164). The *Natural Resources Transfer Act* (1930) transferred administrative responsibility for lands and resources to the provinces of Canada. This transfer adds significant complexity when it comes to the Federal government fulfilling its Treaty obligations in terms of resource sharing, land rights, and water rights. In essence, provincial interests over resources, including land and water, is entrenched in the Canadian Constitution privileging provincial rights to resources over those of Indigenous peoples.

Claims of land ownership in North America are a mixture of *Terra Nullius*, and either occupancy/possession or through conversion to a ‘productive’ agricultural status [50]. In essence, the state claims that the signing of the Numbered Treaties extinguished Indigenous title to land in exchange for specific, negotiated benefits. Indigenous peoples maintain that this is an unjust and unilateral interpretation of the treaty relationship [18,51] and that Indigenous sovereignty and title persist. A narrative of cession resulted in the expansion of Dominion territory, or from the Indigenous perspective, widespread dispossession. As it claimed territory, the state established laws to allocate, distribute, and regulate land and water. Agricultural settlement has been particularly pernicious in its eliminative logic, according to Patrick Wolfe, with agricultural territoriality “ceaselessly ... eat[ing] into Indigenous territory, a primitive accumulation that turns native flora and fauna into a dwindling resource and curtails the reproduction of Indigenous modes of production” [19] (p. 395).

The concepts of property and ownership granted to the European settlers were imposed upon First Nations and the land, and these concepts introduce the notion of ‘rights’ to land and water, and rights to maximize income from ownership of land, water, or any resources with which they are associated; state regulation of ‘land as property’ is achieved through land use planning and regulations [52,53]. Such rights of ownership, and even the possibility of ownership, were foreign to Indigenous peoples, who held their relationship with the land and surrounding environs in a fundamentally different way based on communal sharing and reciprocity [54]. Indigenous social relations have become “effectively fixed and hierarchized ... within the social relations of capitalist ownership and production ... premised on dominant discourses associated with Western private property regimes and jurisdiction [sic] sovereignty” [52] (p. 98).

In Canada, provinces are delegated authority to regulate land use on private and Crown (public) lands, with further delegation of that authority given to municipal governments. The federal government retains control over, and responsibility for, reserve lands—with delegation and devolution taking place where First Nations governments have signed tri-partite agreements between the province and the federal government. Contemporary and historical practices in land and water use planning at the provincial (and municipal) level resulted in the exclusion of Indigenous voices, as reserve lands were deemed to be a ‘federal’ issue, and thus those lands are/were simply ignored as extra-jurisdictional [53].

Changes in land tenure since colonization and settlement are, as we will show, fundamental to contemporary Indigenous ‘water problems’. Although the federal and provincial governments lay claim to sovereign authority over and jurisdiction to allocate and regulate water and land, Indigenous

peoples maintain that their inherent rights to and in land were not extinguished by treaties [51,55,56]. Thus, First Nations contest the sovereign authority claimed by the state, and resist or otherwise attempt to influence the hegemonic activities of the state. They do so by litigating against the government for trespassing on Indigenous rights [57], participating in institutional processes [47,58,59], as well as educating themselves and others about treaty-based relationships [60], Indigenous rights [50,61], and Indigenous world views [62–65].

2.3. Political Ecology and Colonialism in Canada

To knit together the concepts of political ecology and colonialism in the Canadian context, we emphasize processes that dispossess and privatize lands and resources otherwise claimed by Indigenous peoples. These processes have roots in a history of patriarchal and ethnocentric narratives of Indigenous difference, implemented through government policy [66]. Diverse works draw specific attention to the link between political economies of the Canadian settler-state and contemporary Indigenous issues including law [67,68], rights [8,50,61,69–74], and participation in resource science and decision-making in traditional territories [75–78]. Historically, dispossession included relocation of communities, exclusion from newly designated private and Crown ‘property’, and non-recognition within systems of resource management and development. Contemporary primitive accumulation is achieved through non-violent dispossession and displacement, achieved through the trade of land title and rights through the depoliticized processes of land claims. Closely following dispossession is a degradation of Indigenous culture by way of incremental losses in wildlife habitat and biodiversity.

Settler-colonialism in Canada has been described as “territorially acquisitive in perpetuity” [79] to the degree that Indigenous groups will “frame their interests in proprietorial terms because their cultural objections to ... [internal] colonialism are unheard within a political context that champions property as the harbinger of social good” [46]. Adopting these notions of ‘property’ and ‘possession’ signifies a profound departure from traditional Indigenous perspectives on relations between people, and between people and the world around them [54,78]. Colonialism becomes a mechanism by which a liberal-democratic form of capitalism (including European notions of ‘property’ and relational ethics) becomes the normative framework through which people are governed and resources exploited [80]. For Indigenous scholar Glen Coulthard, the colonial relationship in Canada is not one of interdependence, where nation-states will ‘recognize’ and incorporate “sub-state national groups...into their territorial and jurisdictional boundaries” but is instead one where the master colonial/settler state “does not require recognition from the previously self-determining communities upon which its territorial, economic, and social infrastructure is constituted” [79]. The terms of recognition become an extension from within the colonial state’s framework, “structurally circumscrib[ing] the terms and content of the recognition it [is] willing to make available” through state-based processes [79] (p. 66). For example, Indigenous environmental rights are often specific, constrained, and subject to infringement by government if it is ‘in the public interest’ [81–83], an interest which is often framed broadly to mask the uneven burdens experienced by rural and remote Indigenous communities [84,85]. The outcomes of setting limits on and justifying government infringement of Indigenous rights to environmental resources appear to be resistance, resurgence, and (potentially) revolt [47–49,86–88] as well as stagnation of Indigenous economies and attempts to control cultural reproduction [81,89]. Individual indigenous rights to resources, such as fish, are not of the same class as communal rights. Individual rights typically exclude commercial access, limiting the ability of indigenous individuals to participate in resource market economies. See Brian Slattery [81] for more information on Aboriginal and Treaty rights. Indigenous water rights are claimed yet denied [8].

Within the Canadian landscape exists a diversity of treaty-based relationships between distinct communities of Indigenous peoples and the Crown. As mentioned above, we focus here on a subset of the Numbered Treaties, where the political and legal context is significantly different from the realities experienced in British Columbia, the northern territories, or even eastern Canada [90]. Settlement across the prairies is associated with drastic and dramatic changes in land use and land cover; it is

considered an agricultural region of great importance to national production. Most river systems flow north, whereas most settlement and development has occurred in the south; large scale hydro-electric development has altered waterscapes across Canada, often to the detriment of rural and Indigenous populations, as well as wildlife [84,85].

The amount of landscape disturbance and change in the southern portions of Canada exceeds that of most mid-latitude and northern portions. For most provinces, Crown lands are concentrated in the northern sections, often in association with forestry. Provinces lay claim to jurisdiction over forests as resources, although Indigenous peoples are engaged in consultations over certain aspects of forest management [91,92]. In southern portions of the province, land tenure is predominantly private ownership, excepting areas zoned as provincial reserves or conservation areas which are held in public trust. In recent years, the number of farms in this agricultural region has been decreasing, while the size of farms has been increasing. Seed and machine technology, as well as inexpensive debt and global markets supported by cheap oil, has driven much of the change evident in the landscape. Much of that change involves a homogenization of the landscapes to support highly efficient mono-culture crop production at sufficient economies of scale.

With the predominance of private land ownership in the southern treaty areas, there is less opportunity for Indigenous peoples to engage in the landscape-scale decisions that alter their local environments and traditional territories. One of the greatest land alterations on the Prairie is wetland drainage by farmers. The Prairie region is characterized by extremely flat land with poor overland drainage. This is an area of non-contributing drainage to streamflow, the Prairie pothole region, where farmers risk losing arable land to spring thaw and summer rains. As a result, unauthorized and often illegal drainage ditches channel water across the region in a cross-hatch of narrow canals. Wetland drainage is extensive and poorly regulated; where regulations exist, they may not be enforced. The province of Manitoba, for example, has a long history of drainage in its central and southern extents in the provision of significant financial, technical, and engineering support in establishing and maintaining a drainage system to support agriculture. While it did facilitate farming activities, ultimately it created significant political tension and social conflict over the rights of upstream property owners to drain water from their lands, and the rights of downstream or low-land property owners to not be inundated [93]. In the prairie region, “[f]arming practices, such as drainage and wetland removal, are changing the landscape and the ecological services that it provides” [94], reducing wildlife habitat, displacing wildlife, and changing surface water flows in terms of volume, timing, and chemistry. As more and more isolated wetland ‘potholes’ are connected to creeks and streams, downstream flooding is increasing in frequency and degree of damage [95].

Analyses of these intra- and inter-provincial conflicts over landscape and waterscape change are often couched in terms of rights-holders and property, whether the Crown is claiming control of the beds of water bodies and shorelines, or private landowners decry a right to farm and develop their lands without government interference. Only the government, however, is obliged to engage Indigenous peoples when planning a development that might affect Aboriginal and Treaty rights [96,97]. Large-scale development projects proposed by private or corporate owners often require government approval, and these would also require some level of engagement by government, though swings in popular government can and do lead to changes in the classification of projects and their subsequent requirements for engagement [98–100]. Turning again to agriculture in the prairies, the use of farm equipment to dig ditches and reshape wetlands on private property typically occurs on a small scale, but as projects distributed across a watershed, the continued connection of isolated wetlands to stream networks over time has created cumulative effects equivalent to a large-scale project. This tactic has avoided any requirement for environmental oversight, such as an environmental impact assessment and, therefore, has not taken into consideration ‘public good’.

In summary, the federal government has historically controlled resource development and land use on lands reserved for Indigenous peoples without their participation and largely without their input. Decisions related to land and water management on reserved lands are typically evaluated

strictly against administrative criteria, and even then the criteria used change over time, according to the whims of program managers [101]. Local knowledge holders, as well as Indigenous perspectives on appropriate relations with the land, have long been ignored. This has created substandard housing, poor drinking water systems and crumbling infrastructure that is too expensive for Indigenous communities to maintain representing just some of the more substantive outcomes. Broad scale landscape change has also altered Indigenous use of and access to clean water. Drainage and wetland destruction has impaired natural hydrologic processes. Not only is the water unfit to drink on many reserves, but many traditional water sources used by Indigenous peoples throughout their territories are also unsafe to drink [5,102–106].

3. Methods

3.1. Study Area

This research engaged with six First Nation communities (four of Cree culture, one Saulteaux/Ojibway, and one Blackfoot) all located in the Canadian prairie region. This region has a history of human occupation spanning thousands of years before European contact. Seasonal settlements and trap lines, buffalo hunting, ceremonies, food and medicine gathering, economic trade, and cultural practices grounded Indigenous peoples to water, land, and the spirit world in this region. The communities represent different tribal histories and regions, and thus are in different treaty relationships with the Crown; the Treaty areas are shown in Figure 1. An objective of this research was to identify local risks to drinking water sources in each community in order to apply a political ecology lens to help understand the true source of these risks.

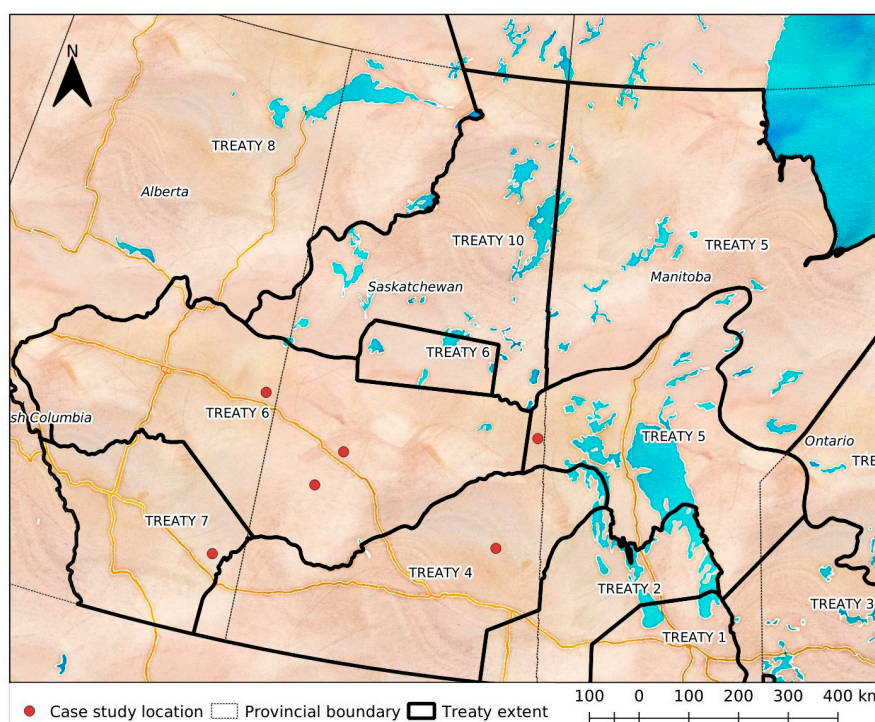


Figure 1. Approximate study locations. Sources: Global Forest Watch Canada (treaty), Natural Resources Canada (provinces).

3.2. Source Water Protection

Source water is untreated water from groundwater or surface water sources that supplies drinking water for human consumption. Source water protection (SWP) is a vital first step in the protection of water supplies, often referred to as the first step in the multi-barrier approach to safe drinking

water [107]. SWP planning offers a means of addressing land management problems in order to protect drinking water quality [108]. The SWP planning process used in the study areas adopted a five-stage planning framework (Figure 2) [109]. This planning framework represents a structured, rational planning approach for the specific purpose of supporting First Nations with drinking-water protection.

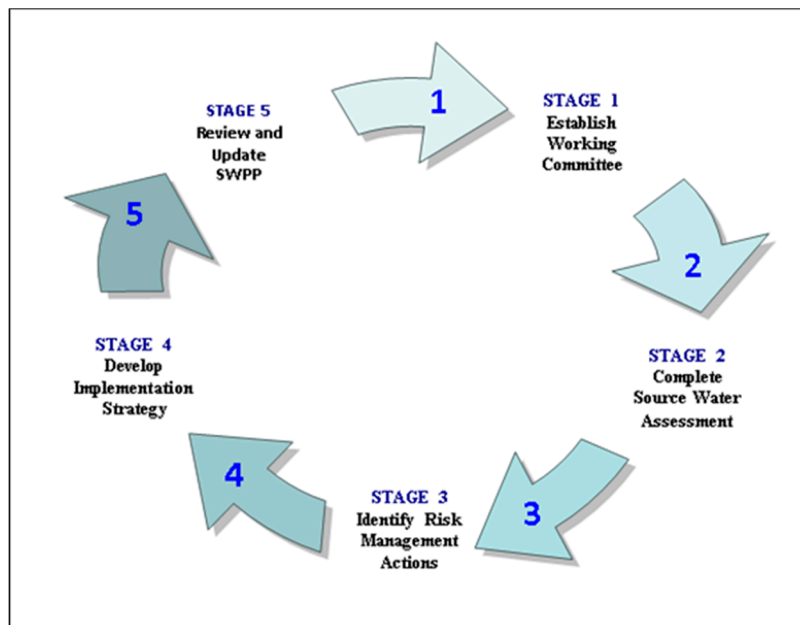


Figure 2. Source Water Protection Planning framework, redrawn from [42].

3.3. Data Collection

Each community became a partner in a source water protection planning exercise with university researchers. This engagement was voluntary and at the request of the First Nation. The lead author facilitated most meetings using the source water protection planning framework shown in Figure 2. The planning framework provided a degree of structure to the planning process, but also remained flexible to the needs and specific interests of each community. The five-stage planning process began with identification of a working committee of community members, each with knowledge of local conditions affecting water quality and quantity. Members at each working committee included a mix of community elected officials, administrators, water treatment plant operators, Elders, and other members from the First Nation.

3.4. Statement of Positionality

In a colonial context, especially one with significant marginalization of Indigenous peoples, research conducted with Indigenous communities is power-laden. Research institutions have not always engaged with Indigenous peoples ethically [110,111]. As non-Indigenous researchers, we recognize that there are uneven power relations embedded between researcher and the people and communities with which we work. Given that settler-colonialism is a process, not an event, we recognize our participation in the institutions and systems that reproduce colonial relationships.

The lead author (Baijius) is currently involved in community-based research on Indigenous engagement and water governance issues in Manitoba. The second author (Patrick) has researched and facilitated the development of numerous on-reserve source water protection plans for First Nations across Alberta and Saskatchewan over the last decade. Sharing an interest in small and remote drinking water systems, the authors have worked together on community-based water issues since 2013, and Indigenous water issues since 2015. Our intent is to advance discussions of water governance, planning, and management by linking our experience to theory. We acknowledge that it is through the

individual relationships with community members, and by way of respectful research partnerships with the communities, that our work is possible.

Although our research is community-based with Indigenous peoples, we make no claims to be the ‘voice’ of First Nation communities.

4. Results

The planning process ranked the risk level of each reported threat to source water. These risks were categorized as high, medium, or low, based on a quantitative value produced using a risk-ranking matrix that combined likelihood of an event multiplied by the consequence of the event. For the purposes of this paper, only the highest ranked risks to source water are shown (Table 2). The results indicate a pattern in the perceived highest risks from all six communities.

Table 2. High risk issues within selected prairie First Nations.

Treaty 6	Treaty 6	Treaty 7	Treaty 5	Treaty 6	Treaty 4
Landfill	Household water cisterns	Diesel spillage	Septic tank ‘Shoot outs’	Sewage lagoons	Vulnerable community well
Cisterns	Industrial drilling	Illegal dump sites	Agricultural land	Private wells	Septic tank ‘shoot-outs’
Abandoned wells	Transport hazardous goods	Livestock close to wells	Septic fields	Cisterns	Abandoned wells
Flooding	Septic ‘shoot outs’	Abandoned vehicles	Sewage lagoons	Abandoned wells	Illegal dumpsites
Septic shoot-outs		Cisterns	Cisterns	Septic shoot-outs	Cisterns

The most commonly reported risk to drinkable water was the household water cistern. The household water cistern is a form of water infrastructure widely used in many First Nation communities, consisting of a large tank, upwards of 500 imperial gallons, with the purpose of holding drinkable water for on-demand household consumption. The cisterns are typically of concrete construction and located either in the crawlspace of the home, or buried in ground and adjacent to the home (see Figure 3). The process for household water delivery to the cistern begins at the water treatment plant where a water truck is filled with potable water. The truck then drives through the community delivering water to each household cistern. This is done on a continuous basis in many communities, as most cisterns are filled on a weekly basis.



Figure 3. Cistern cap, intact but unlocked. Photo credit: R. Patrick.

The dispersed, rural settlement pattern of First Nation communities often requires multiple trucks to be in operation at any one time, and on a full-time basis. Depending on the tank capacity of a water truck, normally only four cisterns can be filled from a single truck-load of water. As a result of water

demand and limited time for truck maintenance, water truck tanks are not always disinfected resulting in potential contamination of the treated drinking water [104,106]. Additionally, many water cisterns were reported to be aging and in very poor condition. Winter freeze-thaw events causing ground heave imparts a structural toll on these concrete cisterns. Cracked and broken tanks have allowed contaminate entry in the form of organics, rodents, and snakes.

Annual cistern cleaning and maintenance will extend the lifetime of cisterns, but ultimately their replacement will be necessary, only to have the current problems repeated. The past and present system of water treatment, delivery and household storage in water cisterns merely reproduces the current water problem. In the majority of the study communities, water originating from cisterns was not consumed. The high cost of water treatment and delivery in these situations is not met with increased water security. In one community from Treaty 6, the cost of water delivery alone was over one million dollars annually. In that community, residents did not drink the cistern water due to fears of contamination based on prior skin infections and enteric illnesses.

While the federal government designed, built and funded this system of water delivery it is the responsibility of the First Nation to operate the system. These communities were never involved in decisions regarding the design of their water distribution system. Many communities would prefer a piped water distribution system, similar to municipal service structures in non-First Nation communities. Given the dispersed, large acreage settlement pattern of the case study communities, a piped distribution system would be cost prohibitive to the First Nation. While the federal government will invest millions to build improved water treatment facilities, the system that delivers and stores that same water remains costly and a source of contamination.

Risk-Ranking Results

The second most frequently reported risk to source water was the common method of household sewage disposal known as “shoot-outs”. This method of sewage disposal consists of piped sewage from a home being deposited on the land surface in a backyard area. Working committee participants voiced concern over the potential for sewage contamination of the groundwater supply originating from these “shoot-outs”. This becomes an even greater problem when considering the cumulative impact of numerous “shoot-outs” in a community. In all but one study area the source of community drinking water was from groundwater supplies. Seasonal flooding exacerbated by extreme weather events and autumn snow melt increases household and community vulnerability to sewage contamination of community groundwater supplies. Where homes are on individual wells the risk of contamination is even more acute. This method of household sewage disposal further exemplifies inadequate ‘on-reserve’ infrastructure development provided by the federal government at the time of housing approval from the federal government. A more common and preferred method of sewage disposal was piped sewage to sewage lagoons.

The third most frequently reported risk to source water supply was community landfills. All landfills were visually inspected during this research project and were found to consist of either open excavation pits or surface deposition areas (see Figure 4).

In both forms, either excavation pits or surface deposition, there was no evidence of an impermeable membrane to protect against groundwater contamination. In addition, flood water, rainwater and snow melt help to mobilize contaminants into nearby waterbodies or into groundwater supply. Climate change and extreme weather events will only exacerbate this situation. Wind-blown material presented a negative aesthetic to the community and may also increase the spread of contaminant material potentially impacting source water quality. Once a landfill site is at capacity a new location is selected and the same method of disposal is practiced. Waste reduction, recycling, and composting is not required by the federal government. Again, agencies of the federal government promoted and funded this method of solid waste disposal to be developed.



Figure 4. Landfill on First Nation in Treaty 6 territory. Photo credit: R. Patrick.

5. Discussion and Conclusions

The results from six community-based source water protection planning processes illustrate the high degree of human exposure to water contamination in First Nation communities. We view this exposure not as the product of under-capacity or dis-interest from the communities, but rather as the product of colonial structures of the state [18,19]. As ‘occupants’ of federal land, First Nations have historically been excluded from decision-making and land use planning practices of the federal state. In the absence of community control, outdated infrastructure is maintained at high costs, and inappropriate land use practices—including household water service, household sewage disposal and community landfill construction—continue despite negative health and ecological implications. Some First Nations have begun to assert their jurisdiction through the development of comprehensive community plans in the prairie region and elsewhere in Canada, and by developing land management regimes that are harmonized with federal and provincial approaches. In other words, the eliminative logic of settler-colonialism continues to restrict Indigenous governance to state frameworks [19].

Returning to our theoretical approach, we draw attention to the ‘political ecology’ of First Nation community infrastructure design. We suggest here that the exclusion of First Nations from participation in critical decision-making around household potable water delivery, household waste water disposal and solid waste landfills reproduces environmental problems, including undrinkable water in many First Nation communities. This power imbalance, constitutionally entrenched and legally enforced through the *Indian Act 1876*, continues to reproduce undrinkable water. Without addressing this colonial governance structure, no amount of money, technological wizardry, or scientific savvy will overcome these relational deficiencies. As a result, the notion of a “First Nation water problem” has become common discourse for both popular media and elected officials.

The water problem discourse masks the “political” roots of disparities in access to clean water and a safe environment [11,37].

(Re)introducing the political into water through a political ecology approach has helped to reveal power differentials operating between First Nations and state actors [21,112,113]. This political reading of the Indigenous water crisis illustrates the inability, and exclusion, of First Nations to participate democratically in securing, protecting and distributing drinkable water within their Nations and their households [114,115]. In the words of Loftus [113], by avoiding any discussion of the ‘politics’ of drinkable water access, we run the risk of environmental determinism, where poor water quality is perceived as the result of one’s birthplace or identity. This finding has currency in a relational approach to water security that emphasizes human capabilities, such that the emphasis has been on jurisdiction and techno-scientific solutions, rather than on flourishing and wellbeing [35,36]. The application of the household water insecurity approach in research on Indigenous engagement in prairie water

governance may offer significant insights, if meaningfully adapted to the community and regional context [37].

We highlight the validity of the land degradation and marginalization narrative found in Robbins [20] as a useful explanatory tool to better understand past and present political conditions responsible for the reproduction of the Indigenous water crisis in Canada today. The narrative of degradation and marginalization contains the twin conditions of ‘exclusion and injustice’ that best describe the historical context and present day impact relative to the persistent water problems faced by many First Nations in this ‘developed’ country, Canada. The exclusion of Indigenous people from land and water decision-making has led to a proliferation of ‘water problems’, where Indigenous communities and households experience issues at a higher rate than non-Indigenous households. This constitutes contemporary water injustice. Exclusion from decision-making is an on-going process that started with settlement and agriculture, and is driven by settler-colonialism’s eliminative logic [19]: occlusion of Indigenous claims to jurisdiction over traditional territory, and reduction of Indigenous voice to wards ‘represented’ by agents of the Federal government have reshaped waterscapes and landscapes across Canada. Lands and waters are degraded, Indigenous modes of production restricted, and Indigenous communities and Nations marginalized by multiple mechanisms and processes within settler-colonialism.

The application of this narrative broadens the theoretical reach of political ecology to describe the exclusion of Indigenous participation in land and water-based decision making via the instruments of colonization. While the importance of power relations in its many forms runs deep in the field of political ecology we see opportunity here to explain the First Nation water problem as a political problem and an outcome of settler-colonialism. The purposeful exclusion of a group from decision-making and the resultant environmental injustices offer an important explanatory tool from within political ecology.

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