The International Indigenous Policy Journal

Volume 3 | Issue 1 Article 3

3-8-2012

Square Peg, Round Hole: First Nations Drinking Water Infrastructure and Federal Policies, Programs, and Processes

Jason McCullough
University of Guelph, mcculloj@uoguelph.ca

Khosrow Farahbakhsh
University of Guelph, khosrowf@uoguelph.ca

Square Peg, Round Hole: First Nations Drinking Water Infrastructure and Federal Policies, Programs, and Processes

Abstract
Despite nearly a decade of targeted federal government efforts to provide potable water to First Nations communities in Canada, drinking water advisories and piped-water infrastructure gaps still persist. An in-depth understanding of technical practitioners' perspectives and experiences with federal policies, programs, and processes (PPP) may provide unique insight into the challenges behind the issues. To meet this objective, we interviewed 16 First Nations technical staff within the geopolitical boundary of the province of Ontario. Results emphasize the role played by federal government-centric principles that shape policy, and the inflexible nature of the program execution format. This study provides a foundation for understanding the policy translation process and indicates action areas to create supportive policy for First Nations drinking water service provision.

Keywords
drinking water, infrastructure, policy, First Nations, Ontario, Aboriginal Affairs and Northern Development Canada

Acknowledgments
The authors wish to thank the following organizations for their assistance: the Aboriginal Water and Wastewater Association of Ontario, the Ontario First Nations Technical Services Corporation, and the Assembly of First Nations. The authors also gratefully acknowledge the First Nations technical practitioners who participated in the study, as well as Dr. Kim Anderson for her guidance and the journal reviewers for their comments. Project funding was generously provided by the Canadian Water Network. Researcher financial support was generously provided by the Natural Sciences and Engineering Research Council of Canada, and Engineers Canada. Please direct email correspondence to Jason McCullough (University of Guelph) at mcculloj@uoguelph.ca

Square Peg, Round Hole: First Nations Drinking Water Infrastructure and Federal Policies, Programs, and Processes

The *Report of the Royal Commission on Aboriginal Peoples* (1996) reported, "25 percent of the water systems and 20 percent of the sanitation systems [in First Nations communities] are substandard. They either pose a danger to health and safety or they are in need of repairs to meet basic government standards" (p. 179). This concern over access to safe, consistent drinking water in First Nations communities in Canada has since been reiterated by government and non-government agencies, First Nations organizations, and the media (Canadian Broadcasting Corporation [CBC], 2006; Chiefs of Ontario, 2001; Office of the Auditor General of Canada [OAGC], 2005). In the 2000s, the Government of Canada responded to drinking water concerns by creating a sequence of funding strategies over and above the baseline operating budget for First Nations services: the First Nations Water Management Strategy in 2003, the First Nations Water and Wastewater Action Plan in 2008, and, to a certain extent, Canada's Economic Action Plan in 2009 (Indian and Northern Affairs Canada [INAC], 2009a; INAC - Audit and Assurance Services Branch [INAC-AASB], 2009).

Despite nearly a decade of targeted federal efforts, however, field results indicate that federal strategies have not met the expected improvements (OAGC, 2005, 2011). Health Canada (2009) reported that for the period of 2003 to 2007, an average of 123 drinking water advisories (DWAs) were in effect every year in First Nations communities[1]. This concern was compounded by an annual increase in DWAs issued over the same period[2]. Similarly, the *National Assessment of First Nations Water and Wastewater Systems*, commissioned by Indian and Northern Affairs Canada[3] (2011), reported that 1,880 homes still remained without in-house piped water in 2009 compared to 5,300 such homes in 2001 (INAC, 2003). First Nations citizens and politicians have expressed frustration with the current drinking water situation (CBC, 2005; Chiefs of Ontario, 2001; Safe Drinking Water Foundation-Advanced Aboriginal Water Treatment Team [SDWF-AAWTT], 2009), which culminated most recently in a proposal to approach the United Nations to investigate potential human rights violations for homes that lack in-house piped water (Rabson, 2011).

Academic literature on First Nations drinking water issues remains a sparsely populated field. Most data tend to be found in the 'grey' literature produced by government agencies or First Nations organizations. Past areas of study include regulatory framework gaps (Swain, Louttit, & Hrudey, 2006); organizational capacity challenges (Chiefs of Ontario, 2001; Institute on Governance [IOG], 2006; Smith, Guest, Svrcek, & Farahbakhsh, 2006); infrastructure gaps and challenges (OAGC, 2005; Ontario Ministry of the Attorney General, 2002); and control, authority, and devolution demands (Chiefs of Ontario, 2001). Yet, other than 10 uncoded community infrastructure profiles presented in the Chiefs of Ontario (2001) and the Polaris Institute (2008) publications, there is little in-depth research and analysis on the behaviour and nuances of federal policies, programs, and processes (PPPs) that govern drinking water service provision, including the planning, design, construction, and operation of drinking water systems, in First Nations communities.

---

[1] A snapshot from May 31, 2011 indicates that 1-in-6 First Nations communities (n = 111) were under DWA (Health Canada, 2011). Median DWA duration is 39 days (Health Canada, 2009).

[2] The report notes that analysis of the upward trend is complicated by a concurrent increase in water monitoring, testing, and reporting.

[3] The federal ministry responsible for First Nations affairs has had many names including: Department of Indian Affairs and Northern Development (DIAND), Indian and Northern Affairs Canada (INAC) and, most recently, Aboriginal Affairs and Northern Development Canada (AANDC).

The First Nations technical context in Canada is jurisdictionally complex and is burdened by a colonial history. We approached this complexity through a grounded theory methodology with a focus on the 'client' perspective[4]. This focus on the client is purposeful. The voices of First Nations organizations and peoples tend to be found at the margins of the academic mainstream (Indigenous Peoples' Health Research Centre [IPHRC], 2004; McGregor, 2008), particularly so in the technical realm. Our attempt to define this voice not only provides insight into the technical and policy challenges affecting drinking water service provision, but it also provides a much needed opening for a relatively untapped source of knowledge – the staff that fulfill technical duties for First Nations communities and organizations.

An in-depth understanding of the 'Ontario experience' through the eyes of drinking water system operators, circuit rider trainers, tribal council technical advisors, and other technical practitioners may provide a richer understanding of the complex PPPs at work in Ontario, as well as shed light on what may be occurring in other provinces and territories in Canada.

Policies, Programs, and Processes: An Overview

Policies

The First Nations – Government of Canada political relationship is one of the oldest areas of Canadian government policy. The political relationship has evolved over time in response to three policy paradigm periods: the military protectionist paradigm period (first contact – 1812), the assimilationist paradigm period (1812 – 1990s), and the 'new' paradigm period (1990s – present) (Howlett, 1994). Howlett (1994) defined the new paradigm as one of mutual recognition, peaceful co-existence, and First Nations self-government. These principles became clearly established in the Canadian policy landscape through the 1996 *Report of the Royal Commission on Aboriginal Peoples* recommendations (Tanner, 2001).

Throughout the 1990s, new paradigm policy initiatives of self-government, natural resource co-management, and program service devolution took centre stage in the First Nations – Government of Canada political relationship. Outcomes, however, indicate that the new paradigm principles have "yet to be institutionalized in a meaningful sense" (Howlett, 1994, p. 641). In one case, Innu Nation members experienced concerns regarding their community's capacity to administer the institutional burden of self-government (Tanner, 2001). In another case, Kluane First Nation members perceived that the Dall sheep co-management process provided only token decision-making authority (Nadasdy, 2003). A final case stems from a policy review of natural resource management devolution to First Nations in the Yukon Territory, which found that the process was in fact one of deconcentration, not devolution[5] (Natcher & Davis, 2007). This dichotomy between autonomy-building initiatives and assimilationist outcomes was anticipated by Weaver (1990). She argued that the 1990s would be a transition period in which both old and new paradigms would co-exist, producing a "continuing tension between them, as the old ways of thinking gradually give way to the new" (p. 10).

[4] First Nations define their relationship with the Government of Canada as nation-to-nation. This structure is most evident in the case of land claims and self-government agreements (Malloy, 2001). In terms of drinking water service provision, however, First Nations tend to be recipients, and thus clients, of the federally authored, administered, and 'owned' PPP.

[5] Deconcentration represents a transfer of administrative responsibility to smaller, geographically dispersed government units of the same central government. In this case, it refers to an imposition of Western institutions and ideologies on First Nations governments.

In terms of drinking water service provision, federal policy was first articulated through a 1977 memorandum to Cabinet that proposed providing First Nations communities with physical infrastructure equal to that of their non-First Nations neighbours (Swain et al., 2006). In 1984, First Nations policy in Canada gained broad legislative muscle through the Supreme Court's decision to recognize the federal government's fiduciary responsibility towards First Nations (Morse, 1989), with drinking water service provision ostensibly falling within this responsibility (Chiefs of Ontario, 2001; SDWF-AAWTT, 2009). Service provision devolution began in the early 1990s with day-to-day management and operation responsibilities being transferred to individual First Nations (Chiefs of Ontario, 2001; Swain et al., 2006). Policy initiatives built momentum through the 1990s and 2000s by way of a series of federal funding strategies: the Drinking Water Safety Program for Native People in 1990 (Moore, 1999), the Gathering Strength water and sewer initiative in 1998 (OAGC, 2005), the First Nations Water Management Strategy in 2003, the First Nations Water and Wastewater Action Plan in 2008, and elements of Canada's Economic Action Plan in 2009 (INAC, 2009a; INAC-AASB, 2009).

As with other new paradigm initiatives, drinking water service provision devolution has had mixed outcomes. First Nations find themselves: (i) working within a patchwork of policies, programs, and funding conditions (Chiefs of Ontario, 2001; Swain et al., 2006); (ii) burdened by the complexity of multiple stakeholders and jurisdictional players (Swain et al., 2006); (iii) overwhelmed by the governance and managerial responsibilities (IOG, 2006); (iv) challenged by technical duties (IOG, 2006; Smith et al., 2006); (v) lacking a support system (Chiefs of Ontario, 2001; IOG, 1999); (vi) lacking regulation (IOG, 2006; Swain et al., 2006); and (vii) ultimately lacking the financial resources to respond (Chiefs of Ontario, 2001; IOG, 1999; Swain et al., 2006).

The marginal success of drinking water service devolution (OAGC, 2005) is evident in a report authored by the Safe Drinking Water Foundation - Advanced Aboriginal Water Treatment Team (2009) advocacy group. The report recommends that "[r]esponsibility and liability for providing safe drinking water should be passed back to INAC until such time as communities have water treatment plants that can, at a minimum, consistently meet all 56 health parameters of the *Guidelines for Canadian Drinking Water Quality*" (p. 3).

Programs

The jurisdictional and operational framework that governs First Nations drinking water programs is distinct from its non-First Nation counterparts (Swain et al., 2006). The framework is rooted in the *Indian Act* and is manifested as shown in Table 1. The table shows key jurisdictional players and stakeholders, as well as their associated roles in drinking water program implementation. INAC and First Nations band councils are the dominant players within this framework; these entities are responsible for the funding and execution of drinking water service provision.

Service provision is dominated by three phases and their associated funding programs (*in parentheses*): system construction (*Major Capital*), minor system repairs and upgrades (*Minor Capital*), and system operation and maintenance (*O&M*). INAC serves as the funding agent with funding being provided through annual base funding in the form of INAC's Capital Facilities and Maintenance Program, as well as 'one-time' targeted funding strategies (e.g. First Nations Water Management Strategy) (INAC-AASB, 2009). All funding amounts are based on funding formulas and level of service standards defined by INAC (Department of Indian Affairs and North Development: Corporate Services - Departmental Audit and Evaluation Branch [DIAND: CSDAEB], 1997; INAC-AASB, 2009). The Capital Facilities and Maintenance Program is not exclusive to the needs of drinking water service

Table 1

Actors and Roles in First Nations Drinking Water Service Provision

Form	Organization	Role
Jurisdictional authority	Band council & band administration	Project delivery[a]
	INAC	Funding[a]
		Process quality control[a]
	Health Canada	Water monitoring quality control[a]
Service institution	Tribal councils & Ontario First Nations Technical Services Corporation	Project management support[b]
		Technical advice to affiliated First Nations[b]
	Circuit Rider Training Program	On-site training[e]
Contractor	Safe Water Operations Program service providers	Long-term operations oversight[c; d]
		On-site training[d]

[a] INAC, 2004; [b] INAC, 2009b; [c] INAC, 2008a; [d] Northern Waterworks Incorporated, 2010; [e] Ontario First Nations Technical Services Corporation, 2010.

provision. Rather, it provides funding for a range of public works, including wastewater systems, roads and bridges, community buildings, schools and power service (INAC-AASB, 2009).

Processes

Major Capital funding is disbursed to a First Nation through the Major Capital Works process. This process is shaped by the Treasury Board's policy for federally funded projects, specifically the *Project Approval Policy* (Treasury Board of Canada Secretariat, 2011). The Major Capital Works process consists of the standard sequence of engineering design and construction stages with an overlay of technical and financial review processes. The significant milestones in the review process are the Preliminary Project Approval submission (PPA) and the Effective Project Approval submission (EPA). These are 'go/no-go' INAC reviews that release funding for the subsequent design and construction stages. Figure 1 provides a visual representation of the Major Capital Works process adapted from DIAND: CSDAEB (1997) and Taylor and Hill (2010).

Figure 1 distinguishes the two parallel process streams according to action agent. The First Nation's project team includes band council representatives, a project manager (often part of band administration), tribal council technical advisors, consultants, contractors, an INAC Capital Management Officer, and an INAC Technical Advisor. The federal ministries involved include INAC, Health Canada, Environment Canada, and Human Resources and Skills Development Canada (Taylor & Hill, 2010). INAC is the lead action agent representing the Government of Canada.

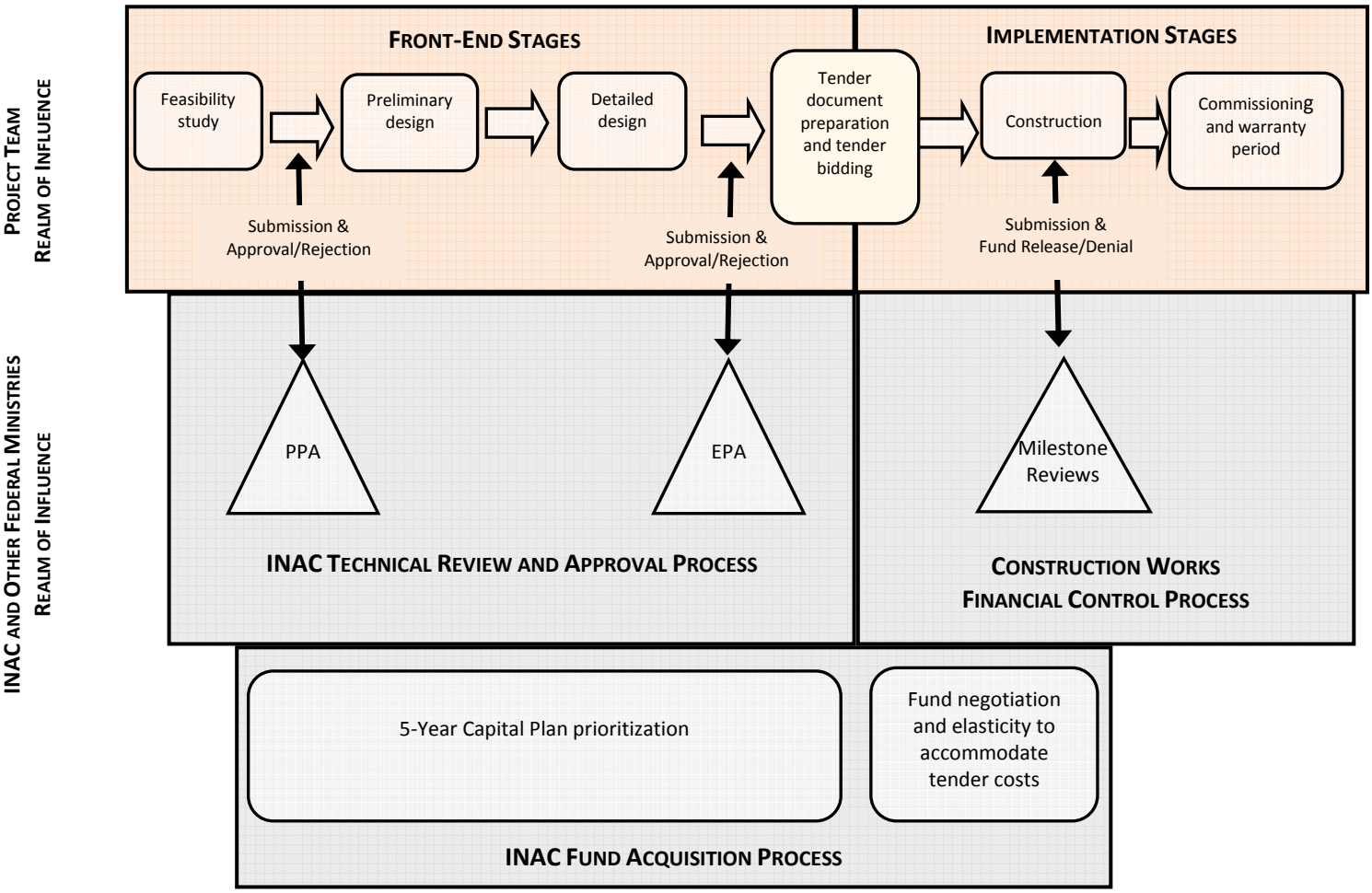

Figure 1. Major Capital Works process.

Minor Capital and Operation and Maintenance (O&M) funding is disbursed to a First Nation through funding arrangements and provided in 'block' funding format. These funds are typically transferred to First Nations on an annual basis and, therefore, are not represented in Figure 1. Block funding provides local discretion over fund usage, provided that funding agreement requirements are met. In terms of O&M, INAC provides 80% of a formula-calculated O&M budget (INAC, 1998).

The Case Study: The 'Ontario Experience'

Ontario is home to the largest First Nations population within a single province or territory in Canada. Twenty-three percent of the First Nations population lives in Ontario, with approximately 80,500 people living in a First Nations community[6] (DIAND, 2005). This population is distributed among 127 First Nations communities, 34 of which are remote (INAC, 2008b). Relative to non-First Nations

[6] An additional 81,200 First Nations citizens live outside of a First Nations community but within the province of Ontario (DIAND, 2005).

communities, First Nations communities tend to have smaller populations, be more rural, and be less accessible (INAC, 2011a).

Communities in Ontario are typically categorized according to geographic location (northern or southern) and road accessibility (accessible or remote). Generally speaking, northern Ontario has a colder climate, a bedrock geology defined by the Canadian Shield, and a low population density. In contrast, southern Ontario has a milder and shorter winter, sedimentary rock geology, and a high population density (Baldwin, Desloges, & Band, 2000; Natural Resources Canada, 2007). All remote communities are located in northern Ontario (INAC, 2008b).

Methods

From September to November of 2009, we conducted 13 face-to-face interviews with 16 First Nations technical practitioners from the province of Ontario. Three interviews consisted of two practitioners from the same organization being interviewed at the same time. The face-to-face interview process involved 6,000 kilometres of travel throughout Ontario. Recruitment included the snowball process and purposeful sampling[7] at a First Nations technical tradeshow.

For our study, we defined a 'First Nations technical practitioner' as a staff member of a First Nations organization that has the professional responsibility for:

- Operating or managing drinking water systems *(operators or public works managers)*;
- Training or assisting drinking water system operators *(trainers or operator association staff)*;
- Administering or advising the implementation of drinking water system projects *(tribal council technical department staff or consulting engineers of First Nation-owned engineering firms)*; or
- Analysing drinking water system policies (*policy analysts)*.

By nature of their professional occupation, technical practitioners have varying experiences with PPP. Project team members have direct experience in PPP execution, while operators and trainers have direct experience with PPP outcomes. Policy analysts, on the other hand, have exposure to the statistics, reports, and government publications on PPP impetus and outcomes.

Practitioner voice was diverse with professional experiences representing accessible and remote communities, small and large community populations, weak and strong economic conditions, and rural and suburban community development formats. Practitioner positions ranged from field-level to policy-level staff. Five practitioners were women and 11 practitioners voluntarily self-identified as being First Nations.

Data collection and analysis followed grounded theory methodology from Creswell (2007) and was supplemented where necessary by Marvasti (2004). Briefly, this consisted of: (i) a semi-structured, pretested interview protocol document; (ii) a holistic and exploratory approach to data collection and analysis; (iii) verbatim transcriptions of audio-recorded interviews; (iv) transcription open coding using QSR International's NVivo 8 software; (v) preliminary coding validation through a participant

[7] Purposeful sampling was carried out through brochure distribution from a tradeshow booth and subsequent voluntary recruitment. Tradeshow delegates were almost exclusively First Nation technical practitioners from within Ontario, with the majority stemming from the First Nations operator community and First Nations technical advisory community.

feedback process; (vi) axial coding data analysis; and (vii) selective coding for meaning making. Post-analysis validation was completed through a triangulation exercise consisting of a document review of eight uncoded First Nations infrastructure case studies and media interviews.
The University of Guelph Research Ethics Board approved the study. Verbal informed consent was provided by each study participant. All efforts were made to ensure confidentiality, as well as accommodate Indigenous-authored research ethics and best practices (see for example Erasmus and Ensign (1991); IPHRC (2004); National Aboriginal Health Organization [NAHO], (2007); & Smith (1999).

Results

Data analysis identified a dual central phenomenon that defines drinking water service provision PPP. This dual central phenomenon consists of a PPP paradigm and a PPP execution format.

PPP Paradigm

The first component of the central phenomenon reflects the governing principles, collectively called the PPP paradigm, that drive and control the PPP. First Nations technical practitioners' experiences with the PPP 'in action' demonstrate a persistence of three principles: financial accountability, macro- and micro-control, and frugality. The following sections discuss each principle and provide a supporting table of interview-based, coded data.

Financial accountability principle. Financial accountability structures how INAC can respond to and interacts with First Nations clients, and provides limits to INAC's use of judgement and subjectivity. The overwhelming need for INAC to be accountable to external agents restricts its ability to respond to technical challenges. One participant noted:

> (…) think outside the box INAC! That's one of the things I like to tell them at meetings is 'think outside the box'. They don't know how to. They can't. And their only way to defend themselves (…) is to go back to their procedures and guidelines, right? And ensure that they are being followed. (…) And that in itself in essence is the problem, right? Because stepping outside that box and trying to do something creative or better or more functional or whatever (…) is...is virtually impossible. (P7)

A greater understanding of 'the box' that INAC must work within is provided in Table 2. The coding breakdown shows how the financial accountability principle inhibits INAC's adaptability to the local context through an adherence to a standardized set of rules, guidelines, formulas, and criteria. At the same time, the financial accountability principle burdens the INAC – First Nations relationship with multiple levels of bureaucracy and external oversight. Figure 2 illustrates the direction of funding flow and accountability in First Nations drinking water service provision as presented in Table 2. The figure shows a stakeholder relationship where First Nations are at the start of the accountability chain and at the end of the funding flow chain. Accountability mechanisms within a First Nation itself were not richly discussed.

Table 2

Financial Accountability Principle Breakdown

To whom is INAC accountable?	What is financial accountability?	How is this achieved?	Which mechanism is used?
Auditor general Treasury board General public (Canada, not just Ontario)	No subjectivity	Reproducible process	Formula funding
		Consistent approach (i.e. one-size-fits-all)	Rules and guidelines
		Maximum funding level defined (i.e. standards defined for infrastructure product)	Funding criteria manuals (i.e. Level of Service Standards)
	No fund abuse	Fund only approved tasks	Technical scrutiny
			Funding criteria manuals (i.e. Level of Service Standards)
		Quality control redundancy	Multiple agency approvals
		Traceability	Reporting paper trail
		Minimize mismanagement opportunity	Out-source to private sector
			Require Professional Project Manager (*a pending policy*)

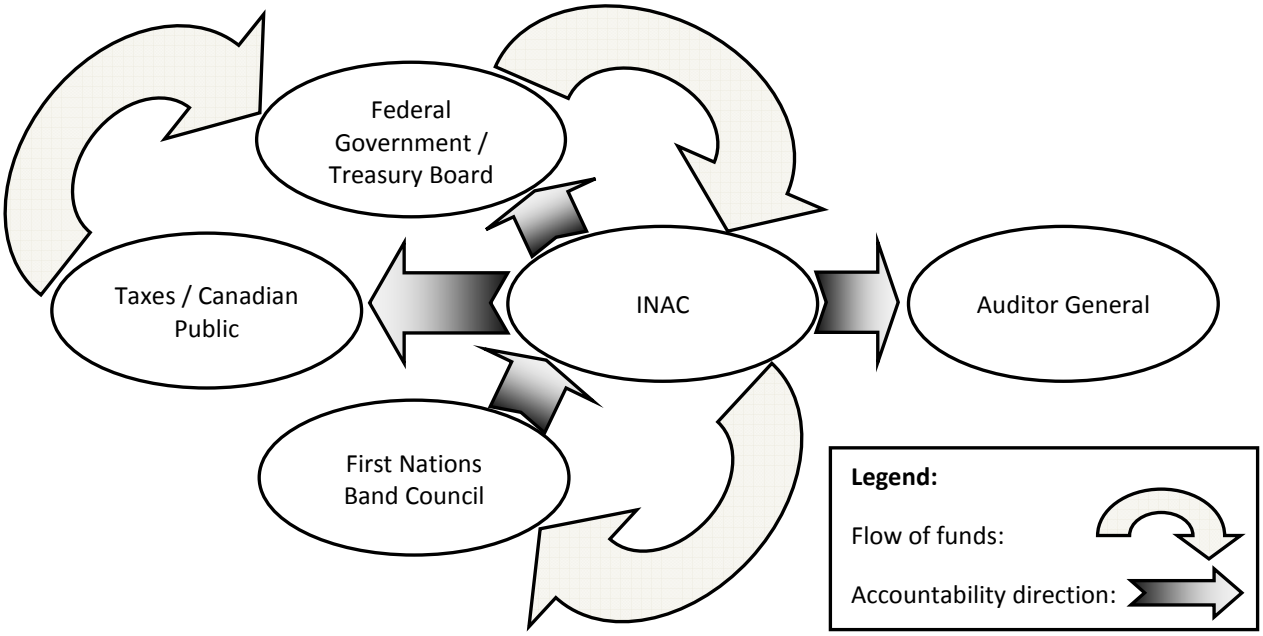

Figure 2. Funding flow and accountability relationships.

Macro- and micro-control principle. Macro- and micro-control is INAC's *modus operandi*. It defines how INAC behaves in the course of its regular programming, and how it responds to unplanned situations. One participant discussed the day-to-day impact of this external control:

> I would like to see the First Nation be able to say what their priorities are. To be able to put the resources to where they believe the priorities are. Just like any other municipality does in the province; they have that ability. First Nations don't have that ability. The government, for example, with this First Nations Infrastructure Funding [INAC special funding program] – they didn't ask us [First Nations band] what the priorities should be. They didn't ask First Nation peoples what their priorities would be. Somebody in an ivory tower set those priorities. And when I look at them? They're the exact opposite of what ours are here. (P3)

The various forms of macro- and micro-control, as discussed by practitioners, are presented in Table 3. The coding breakdown depicts INAC as a ministry with a dual role: client funder and project advancement gatekeeper. The breakdown further characterizes the INAC – First Nations relationship as a one-way relationship, where decision-making authority is maintained outside the First Nations' realm of influence.

Table 3

Macro- and Micro-Control Principle Breakdown

Whom does INAC control?	What is control?		How is this achieved?	Which mechanism is used?
First Nations bands Tribal council (indirectly) Consultants (indirectly)	Micro-level	Fund use control	Fund only approved components	Funding criteria manuals (i.e. Level of Service Standards)
				Reporting
			Fund only approved amounts	Formula funding
		Product control	Technical review	Fund release conditional on approval
		Execution control	Out-source to private sector	Professional Project Manager
				Safe Water Operations Program service providers
	Macro-level	Fund use control	Treasury Board Indian Programming budget provided directly to INAC	Approved service categories and funding priorities
				Fund release protocols (i.e. public tender, local hiring clause)
		Product control	Set design and operation standards	Funds provided to meet, but not exceed, set standards
		Process control	Open-ended implementation timeline	Funding application approval/rejection
				Project ranking placement on 5-Year Capital Plan
			Power centralization (i.e. information imbalance)	No decision-process transparency (i.e. INAC operates as a 'black-box' towards band councils)
				Minimal reporting feedback to band councils
			Compliance with process rules	Fund flow continuity (i.e. start or stop fund flow)
				Multi-stage approval process (i.e. PPA or EPA)

Frugality principle. Practitioner PPP experiences indicate how INAC consistently gravitates towards frugality in its decisions, actions, and institutional direction. Frugality is manifested through cost-savings, not necessarily value-maximization (i.e. most 'bang-for-your-buck'). As one participant noted, cost-saving may come at the expense of product quality:

> What does it mean to be cost effective? In my mind, yes, there is a term called 'cost effective', where one option is better or just as good as another option that is more expensive. In their [INAC] minds, whatever is the cheapest one. To me, that's not 'cost effective'. (P9)

Cost-savings, however, are not limited to product selection decisions. It also emerges in the form of delayed spending and low design standards. Table 4 presents the findings in greater detail.

The coding breakdown alludes to a portfolio management approach to First Nations service programs. Portfolio management refers to the centralized management of one or more portfolios in order to achieve specific organizational objectives, and where success is measured in terms of aggregate performance (Project Management Institute, 2008). This approach results in a top-down evaluation of a project's merit and an interconnectedness – and consequent vulnerability – of drinking water service provision to other service programs or portfolios (i.e. housing, health services). This approach, when pressed for funds, exhibits a 'fund stretching' phenomenon, which is characterized in the First Nations context by a penchant towards studies, piecemeal capital works approval, and bare essentials product design.

PPP Execution Format

The second half of the central phenomenon reflects PPP structure and client compatibility, characteristics collectively called the PPP execution format. Practitioners characterized the PPP format as 'one-size-fits-all' and emphasised the need for the execution format to appreciate and accommodate the diversity among First Nations communities, First Nations bands, and tribal councils. Here, we develop the premise of diversity by looking closer at three dominant themes, and by contextualizing the challenges this poses to the current PPP execution format by looking at a number of examples. The three themes investigated are capacity variations, infrastructure constructability variations, and societal diversity. Each theme is elaborated on using interview-based coded data figures or tables.

Capacity variations. In terms of drinking water infrastructure implementation and operation, capacity refers to the abilities needed to operate and maintain a water treatment plant and distribution system, and complete a Major Capital Works process. For conciseness, capacity elements are grouped into four functional categories in accordance with practitioner comments:

- Formalized capacity (e.g., education levels, engineering titles, operator certification level);
- Demonstrated capacity (e.g., credit history, project execution track record, O&M budget control);
- Support systems (e.g., administrative, technical, financial management); and
- Financial strength (e.g., internal sources of revenue, community economy).

Table 4

Frugality Principle Breakdown

Towards whom does INAC behave frugally?	What is frugality?	How is this achieved?	Which mechanism is used?
First Nations bands Tribal councils Consultants (indirectly) Contractors (indirectly)	Conform to annual budget, not annual need (i.e. infrastructure or operational)	Target abstract costs, not true costs	Formula funding
			Fixed rate for Indian Programming increase
			Lack of comprehensive operations and infrastructure needs assessment (i.e. dollar figure)
		Rigid to PPA cost estimates	Reduce consultant budget
			Reduce construction scope pre or post tender submission
		Centralize funds; allocate Indian Programming funds to service categories, not individual bands	One-pot funding structure (i.e. funding shifts impact other programs, other bands)
			One-off funding format (i.e. no continuity emphasis)
	Lower instantaneous spending	Target lower standards	Subpar design standards
			Subpar O&M standards
		Instantaneous cost evaluation, not life-cycle cost evaluation	Technical review design changes
			Reduced consultant budget
	Delay spending	High report writing requirements	Deflect to studies
		Risk management approach; act only as necessary	Band-aid repairs
			Piecemeal community infrastructure development
			No enforcement or regulations

Interview findings show two general patterns: lower capacity in northern communities, particularly in remote communities, relative to southern communities (macro-level), and random variation of capacity between individual communities, band councils, band administrations, and tribal councils, regardless of location (micro-level). Further analysis of practitioner comments indicates:

- Demonstrated capacity is not restricted to southern communities. Northern communities, including remote communities, have shown demonstrated capacity;
- Support is least available in northern communities where formalized capacity is lowest; and
- Capacity loss (i.e. retention challenges) is most acute in northern communities, particularly in remote communities.

Figure 3 illustrates the two capacity patterns and data analysis findings.

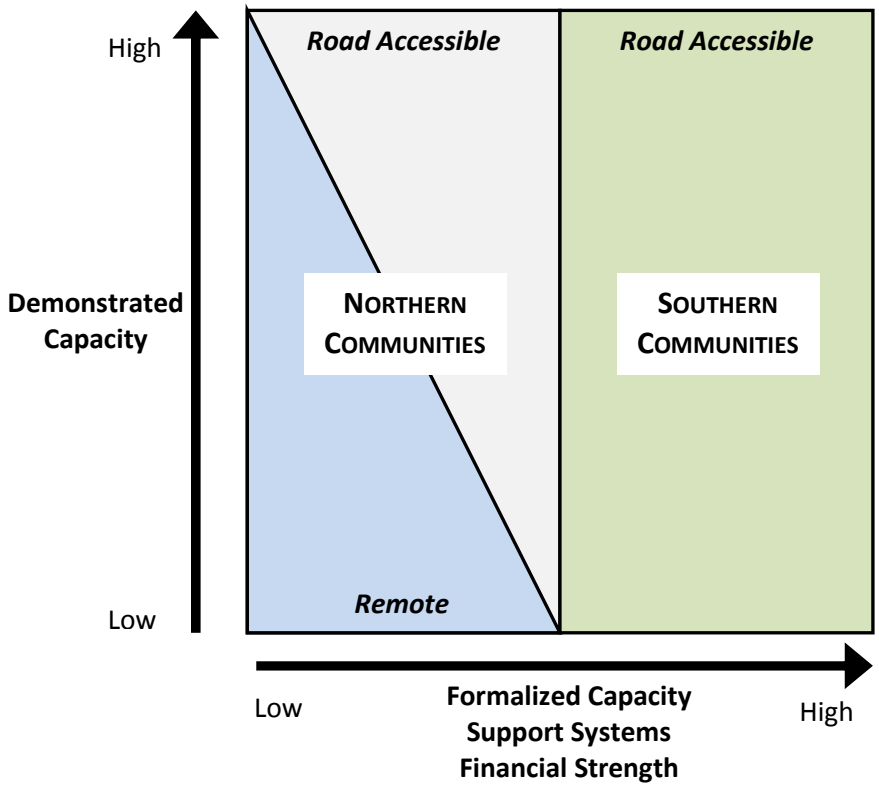

Figure 3. Patterns reflecting functional capacity categories as a function of community type.

The variation in formalized capacity, demonstrated capacity, support systems, and financial strength demonstrates heterogeneity among First Nations communities, First Nations bands and tribal councils. As one practitioner indicated, even with the same context (e.g., accessible or remote; northern or southern), heterogeneity challenges the creation of a single definition or 'snapshot' of First Nations' capacities:

> (…) one of the classic things though that I see, say 20 km on the other side of the border of our tribal council, they [operators] are sitting there with no training at all. Nothing going on. They are looking over here at my guys getting together every one or two months [for training]. (P11)

Infrastructure constructability variations. Infrastructure constructability variations highlight the logistical differences that affect construction projects in different parts of the province. In short, northern communities, particularly remote communities, have significantly more challenging construction logistics than their southern counterparts. Constructability variations noted by practitioners are described in Table 5.

Table 5

Constructability Variations

Construction Issue	Southern Communities	Northern Communities	Remote Communities
Construction season	All-year	(No data)	June – August
Equipment mobilization / Demobilization access	All-year	All-year	January – March (winter road)
Ease of access / Proximity to urban centre	High	Medium	Low
Skilled-labour pool access	High	Medium	Low
Logistical costs	Average	(No data)	High
Geotechnical conditions	(No data)	Possible bedrock	Possible bedrock

Simply put, constructability will directly affect the cost and timeline of community infrastructure projects, translating into a sluggish rate of infrastructure development. The construction limitations experienced in remote communities should not be underestimated, as indicated by the following remark:

> So the only way that they can bring in heavy material or heavy equipment is by winter road. And that winter road is typically open mid-January and closes typically mid-March. If you have a good season, you can start it earlier and extend it longer. If you have a bad season, that window gets smaller and smaller. Like, you may only have a four-week period where you haul in stuff. Sometimes the winter roads are opened up earlier but it's only to light traffic. So, they

> can bring in half-tons and cars and small trucks. (…) that's also how they get their fuel. It's all hauled in. (P8)

Societal diversity. Although First Nations are lumped together as one cultural group and consequently one federal ministry, there are significant variations in societal characteristics between First Nations themselves. Practitioners indicated that remote communities, relative to road-accessible communities, have a unique social structure in terms of leadership structure, perception and adoption of formal education, and occupational priorities. In many remote communities, traditional leadership[8] is very much involved with governance decisions, including the infrastructure development processes (e.g., project meetings, project direction decisions). This is noteworthy as both the engineering consultant and construction contractor professional charge-out structures and specialization-oriented organizational structures are not equipped to deal with direct involvement from traditional leadership. As one participant commented:

> And it's hard as well, for us from the technical [side]. Because we go in looking at more of the technical [aspects] and try to advise them on more of those aspects. Versus their cultural or other factors that may come into it, from TEK [traditional ecological knowledge] or others, that are unique and different than how we perceive things, from strictly trying to treat that water and making sure it's the safest (…) for consumption by the community. (P5)

Societal diversity not only exists in organizational structure but also in social norms and practices. In some cases, the existing social structure in remote communities does not readily accommodate the 'nine to five' work structure. The following dialogue highlights the convergence of two distinct sets of work structure norms and practices:

> P8: This fall for instance. Hunting season. One community – all the men are gone.
> P7: They are doing their traditional hunt.
> P8: For a week...You know? So who runs the water plants, the generating stations, the fuel farms and all that. There's nobody there. Everyone's gone.

Although both quotations reflect remote communities, it does not imply that non-remote First Nations communities should be grouped together as one entity. On the contrary, leadership positions on economic development and O&M user-fee systems, for example, were found to vary throughout the province with no observable trend. In the case of user-fees, some band councils and communities have accepted user-fee incorporation into their water management structure, while others view user-fees negatively as a form of taxation.

Societal diversity within the First Nations cultural grouping was not pursued to great detail. The brief discussion above merely highlights how different First Nations societies express different needs, wants, and political visions through their band councils and political bodies. At a national or provincial level, these may at times appear contradictory or divided, and thus do not speak with one voice. Unto themselves, however, these may be entirely consistent.

Policies, programs, and processes compatibility examples. INAC's policies, programs, and processes are applied in an equal and standardized manner for all First Nations clients. The compatibility of this standardized approach, however, varies between First Nations communities, First Nations bands, and tribal councils. To better understand this, three PPP examples are briefly reviewed.

[8] Many communities still operate with traditional systems of governance, which function alongside the public elections-based *Indian Act* system of Chief and Council.

Major Capital Works process. Practitioners noted that INAC's Major Capital Works process caters to low capacity bands and inhibits growth in high capacity bands. The following comment reflects the frustration experienced by a high capacity band:

> Their [INAC] process needs to be streamlined so that it takes into account the First Nations abilities, the First Nations priorities. Because right now, the way it is …they [INAC] have too much control over the funding of projects. And I guess it comes from probably having to deal with First Nations that don't have the capacity. Where they have to 'hold hands'. So they think they got to hold everybody's hands. And we're saying [PHYSICAL GESTURE OF SEPARATION], you know? 'Give me the freaking money, and we'll get the job done.' Never mind trying to tell us what to…every little thing what to do, and putting all these policies and procedures that are…really, hamper the implementation of the project. (P3)

Even so, the overwhelming nature of the process inhibits low capacity bands, as evidenced in the following quotation:

> (…) if you're a First Nation that doesn't have any technical people, and you don't have a good tribal council to work with, things take a really long time. Because the First Nation doesn't know what steps to take, doesn't know what questions to ask. And then it just prolongs the process (...). (P8)

O&M band contribution requirement. The O&M band contribution requirement (i.e. 20% of the budget) demonstrates a general incompatibility between mandate and reality. Band contribution requirement may be theoretically feasible in communities with viable economies; however, many First Nations communities face a dire economic reality that is incompatible with the principle of user-fees. This, in turn, sets the stage for two-tier service delivery as shown in the following comment on low operator salaries:

> So the rest of that money has to come from within the community itself. That's part of the reason why there's a huge parity [in operator salary]. Cause it makes it tough for a lot of communities with no...[or] with very little income generation. They have a difficult time topping up that wage. (P14)

End-of-fiscal funding opportunity. The end-of-fiscal funding opportunity presents itself yearly between early January and March 31st, and has the unique benefit of being streamlined with a fast turnaround. The driver behind this funding opportunity is the termination of the fiscal year. This deadline prompts federal ministries to utilize the remaining budget in preparation for the upcoming budget request. As funds must be expended by March 31st, bands must have 'shelf-ready' designs[9] to send out for tender and construction must be completed during winter months. As such, this opportunity favours bands with the internal funds to complete a design and those located in a geographic zone that permits construction during winter. As a result, in decreasing order, this opportunity favours: southern communities, road accessible northern communities, and, lastly, remote communities. One practitioner working with remote communities emphatically remarked on this issue:

> Interviewer: Is there anything you could see that would improve project implementation? That would make life easier for you?

[9] Shelf-ready designs are those that have already gone through the feasibility study, preliminary design, detailed design, and contract document preparation stages. These designs are ready for tender and construction.

> P5: Number one would be, for my communities, to change the fiscal. That would be number one.

Remote communities' incompatibility with the end-of-fiscal opportunity is dramatic. These communities:

- Have minimal, or no, internal funds (generalized trend);
- Face a construction shutdown in winter;
- Have a restricted contractor mobilization window governed by winter road conditions; and
- Require considerable leadtime for contractors to coordinate equipment mobilization on the winter roads.

Unfortunately, many special funding programs follow the same end-of-fiscal funding schedule window. As such, remote communities, and to some degree all northern communities, miss out on community infrastructure development opportunities. One practitioner spoke to this limitation:

> (…) the fiscal timing and everything...just does not work for remote communities. All those initiatives that come out, the stimulus funding with CEAP [Canada's Economic Action Plan], and FNIF [First Nation Infrastructure Funding], and all that stuff – it's all March 31st dependent. And it's basically stymieing us...we're becoming ineffective in being able to do anything because of the timing. (P7)

The three PPP examples provide tangible descriptions of the PPP execution format. INAC's emphasis on reproducibility and equality has resulted in a one-size-fits-all approach to program delivery, which produces PPP with incompatibilities to field conditions – a square peg, round hole phenomenon. The following quotation emphasizes the disconnect between INAC's PPP objectives and the field results:

> You can work with these policies [First Nations content or employment clause in public tenders], if things work right. But for the most part, they are difficult to work with. And a lot of times First Nations will just throw up their hands and say 'ok, that is so much work to do that, let's just tender it out'. (P10)

Discussion

The three governing principles – financial accountability, macro- and micro-control, and frugality – depict a PPP paradigm that is INAC-centric; one that places INAC's, and by association the federal government's, priorities first. This is in sharp contrast to INAC's official mandate of "[w]orking together to make Canada a better place for Aboriginal and northern people and communities" (INAC, 2011b, ¶ 1), and further still from a perceived mandate of making safe drinking water in First Nations communities a top priority. In terms of drinking water infrastructure, this disconnect is notable for two reasons. First, if INAC is not the 'champion' of First Nations infrastructure needs, then who is? And, how does this gap affect a community's physical development? Second, although federal rhetoric and funding strategies over the past decade appear to be progressive and support autonomy-building initiatives, the PPP paradigm alludes to an institution that in practice is fundamentally unchanged. Unless INAC's institutional memory and structure are dramatically changed to yield a First Nations-centric institution, federal government efforts will continue to be diluted.

The other area of concern is the PPP execution format, which is characterized as a one-size-fits-all format that stifles high capacity First Nations organizations, overwhelms low capacity organizations, and in general fails to account for the heterogeneity within First Nations. As such, rather than provide an equally beneficial operating platform, the net result is an equally unaccommodating one-size-fits-all operating platform to no one group's benefit. The take-home message is: In order to maximize PPP initiatives in Ontario, heterogeneity among First Nations must be treated as a dominant, not recessive, trait. Consequently, execution format flexibility to accommodate a diverse client base must be central to future drinking water infrastructure PPP. This is particularly critical in the context of drinking water service devolution where each First Nation band inevitably exhibits different rates of uptake and success with the devolved responsibilities.

Should the above changes not be addressed, Canada runs the risk of perpetuating the funding cycle of dismay that has been witnessed over the last decade. The government performance audit on the First Nations Water Management Strategy alludes to this possibility. The audit found "most high-risk [drinking water] systems have improved to medium-risk rather than to low-risk" (INAC, 2007, p. 92). This statement indicates that the strategy has deflected, and not resolved, the First Nations drinking water crisis. As a starting point for change, future papers will present the practitioners' visions for a future working environment, as well as a policy tool to accommodate client diversity.

PPP Findings within the Existing Body of Knowledge

PPP findings contribute to the existing body of knowledge on First Nations and Indigenous policy as follows:

- The PPP paradigm results provide another decade of data to Howlett's (1994) study of First Nations policy change, indicating a continued failure to meaningfully implement the new paradigm in drinking water service provision;
- The evident competition between new and assimilationist paradigm principles supports Weaver's (1990) prediction of a coexistence of old and new paradigms;
- The non-technical factors influencing drinking water program success, such as the lack of First Nations control and the underlying institutional paradigm, corroborate Nadasdy's (2003) findings in the natural resource co-management field;
- The PPP paradigm provides a lens for analysing federal government responses to First Nations issues, such as the 2010 *Bill S-11* for First Nations drinking water regulation (Senate of Canada, 2010); and
- The PPP experience in Canada provides a comparison for Indigenous policy reform taking place in other colonially structured countries. Australia, for example, has: (i) similarly abandoned its assimilationist policy paradigm in favour of a self-determination policy paradigm, (ii) not yet meaningfully implemented the new paradigm, (iii) not yet successfully devolved program services, and (iv) not yet accommodated the diversity in the Indigenous population (Sherwood & Edwards, 2006; Turner, 1997).

Conclusion

In this article, we discussed the principles and format that govern drinking water infrastructure policies, programs, and processes in First Nations communities, and identified areas for change that otherwise may not be immediately obvious. Though findings are based on the Ontario context, the federal nature of First Nations policy may make these relevant to other provinces and territories in

Canada. This research also opens the door for comparative research with Indigenous populations in other colonially structured countries in the policy area of community infrastructure and services.

References

Baldwin, D., Desloges, J., & Band, L. (2000). Physical geography of Ontario. In D. Euler, A. Perera, & I. D. Thompson (Eds.), *Ecology of a managed terrestrial landscape patterns and processes of forest landscapes in Ontario* (pp. 12-29). Vancouver, BC: UBC Press.

Canadian Broadcasting Corporation. (2006, February 20). *Aboriginal waters - A slow boil: Drinking and waste water on Canada's reserves*. Retrieved from http://www.cbc.ca/slowboil/

Canadian Broadcasting Corporation. (2005, October 31). *Boil water advisory tops 9 years for B.C. native community*. Retrieved from http://www.cbc.ca/canada/story/2005/10/31/kwicksutaineuk051031.html

Chiefs of Ontario. (2001). *Drinking water in Ontario First Nation communities: Present challenges and future directions for on-reserve water treatment in the Province of Ontario*. Toronto, ON: Author.

Creswell, J. W. (2007). *Qualitative inquiry and research design: Choosing among five approaches*. Thousand Oaks, CA: Sage Publications Incorporated.

Department of Indian Affairs and Northern Development. (2005). *Basic deparmental data - 2004*. Ottawa, ON: Author.

Department of Indian Affairs and Northern Development: Corporate Services, Departmental Audit and Evaluation Branch. (1997). *Audit of the capital projects and operating and maintenance funding management regimes*. Ottawa, ON: Author.

Erasmus, P., & Ensign, G. (1991). *Practical framework for community liaison work in Native communities*. Brandon, MB: Justin Publishing.

Health Canada. (2011). *Drinking water and wastewater*. Retrieved from http://www.hc-sc.gc.ca/fniah-spnia/promotion/public-publique/water-eau-eng.php#how_many

Health Canada. (2009). *Drinking water advisories in First Nations communities in Canada: A national overview 1995-2007*. Ottawa, ON: Author.

Howlett, M. (1994). Policy paradigms and policy change: Lessons from the old and new Canadian policies towards Aboriginal Peoples. *Policy Studies Journal, 22*(4), 631-649.

Indian and Northern Affairs Canada. (2011a). 2011-2012 Financial overview - March 2011. Retrieved from http://www.ainc-inac.gc.ca/ai/arp/fin/2011/fo2011dk-eng.asp

Indian and Northern Affairs Canada. (2011b). *Mandate, roles and responsibilities*. Retrieved from http://www.ainc-inac.gc.ca/ai/arp/mrr-eng.asp

Indian and Northern Affairs Canada. (2009a). *Chronology - Water*. Retrieved from http://www.ainc-inac.gc.ca/ai/mr/is/chrwtr-eng.asp

Indian and Northern Affairs Canada. (2009b). *Tribal Council funding*. Retrieved from http://www.ainc-inac.gc.ca/ap/gov/igsp/tcf/index-eng.asp

Indian and Northern Affairs Canada. (2008a). *Fact sheet: First Nations water and wastewater*. Retrieved from http://www.ainc-inac.gc.ca/ai/mr/is/fn-wtr-eng.asp

Indian and Northern Affairs Canada. (2008b). *Ontario First Nations map*. Toronto, ON: Author.

Indian and Northern Affairs Canada. (2007). *Summative evaluation of the First Nations water management strategy*. Ottawa, ON: Author.

Indian and Northern Affairs Canada. (2004). First Nations water management strategy - Water and wastewater services on First Nations reserves: Roles and responsibilities. Ottawa, ON: Author.

Indian and Northern Affairs Canada. (2003). *National assessment of water and wastewater systems in First Nations communities - Summary report.* Ottawa, ON: Author.

Indian and Northern Affairs Canada. (1998). *Corporate manual system: Volume 1 - Capital facilities and maintenance.* Ottawa, ON: Author.

Indian and Northern Affairs Canada, Audit and Assurance Services Branch. (2009). *Audit of the capital facilities and maintenance program.* Ottawa, ON: Author.

Indigenous Peoples' Health Research Centre. (2004). *The ethics of research involving Indigenous Peoples.* Regina, SK: Author.

Institute on Governance. (2006). *Building governance capacity: The case of potable water in First Nations communities.* Ottawa, ON: Author.

Institute on Governance. (1999). *Public works in small and rural municipalities.* Ottawa, ON: Author.

Malloy, J. (2001). Double identities: Aboriginal policy agencies in Ontario and British Columbia. *Canadian Journal of Political Science, 34*(1), 131-155.

Marvasti, A. B. (2004). *Qualitative research in sociology: An introduction.* London, United Kingdom: Sage Publications Incorporated.

McGregor, D. (2008). Anishnaabe-Kwe, traditional knowledge and water protection. *Canadian Women Studies, 26*(3-4), 26-30.

Moore, J. (1999). Water quality monitoring in Canadian Aboriginal communities. In J. Cotruvo, G. Craun, & N. Hearne (Eds.), *Providing safe drinking water in small systems: Technology, operations, and economics* (pp. 387-393). Boca Raton, FL: Lewis Publishers.

Morse, B. (1989). Government obligations, Aboriginal Peoples and section 91(24) of the *Constitution Act, 1867*. In D. Hawkes (Ed.), *Aboriginal Peoples and government responsibility: Exploring federal and provincial roles* (pp. 59-91). Don Mills, ON: Carleton University Press.

Nadasdy, P. (2003). Reevaluating the co-management success story. *Arctic, 56*(4), 367-380.

Natcher, D. C., & Davis, S. (2007). Rethinking devolution: Challenges for Aboriginal resource management in the Yukon Territory. *Society and Natural Resources, 20*(3), 271-279.

National Aboriginal Health Organization. (2007). *OCAP: Ownership, control, access and possession.* Ottawa, ON: Author.

Natural Resources Canada. (2007). The atlas of Canada - Population density, 1996. Retrieved from http://atlas.nrcan.gc.ca/auth/english/maps/peopleandsociety/population/population1996/density

Northern Waterworks Incorporated. (2010). First Nation water treatment facilities. Retrieved from http://www.nwi.ca/first_nation.html

Office of the Auditor General of Canada. (2011). *The 2011 status report of the Auditor General of Canada to the House of Commons - Chapter 4: Programs for First Nations on reserves.* Ottawa, ON: Author.

Office of the Auditor General of Canada. (2005). *The 2005 report of the commissioner of the environment and sustainable development to the House of Commons - Chapter 5: Drinking water in First Nations communities.* Ottawa, ON: Author.

Ontario First Nations Technical Services Corporation. (2010). *Circuit rider training program - Program overview*. Retrieved from http://www.ofntsc.org/crtp

Ontario Ministry of the Attorney General. (2002). *Part two: Report of the Walkerton inquiry*. Toronto, ON: Author.

Polaris Institute. (2008). *Boiling point! Six community profiles of the water crisis facing First Nations within Canada*. Ottawa, ON: Author.

Project Management Institute. (2008). *A guide to the project management body of knowledge*. Newton Square, PA: Author.

Rabson, M. (2011, February 16). First Nations to alert UN to water woes - Minimum standards not being met: MKO. *The Winnipeg Free Press*. Retrieved from http://www.winnipegfreepress.com/local/first-nations-to-alert-un-to-water-woes-116296654.html

Royal Commission on Aboriginal Peoples. (1996). *Report of the Royal Commission on Aboriginal Peoples. Vol.3: Gathering strength*. Ottawa, ON: Minister of Supply and Services Canada.

Safe Drinking Water Foundation - Advanced Aboriginal Water Treatment Team. (2009). *A review of the engagement sessions for the federal action plan on safe drinking water for First Nations - A position paper*. Saskatoon, SK: Safe Drinking Water Foundation.

Senate of Canada. (2010). *Bill S-11: An act respecting the safety of drinking water on first nation lands*. Ottawa, ON: Public Works and Government Services Canada.

Sherwood, J., & Edwards, T. (2006). Decolonisation: A critical step to improving Aboriginal health. *Contemporary Nurse, 22*(2), 178-190.

Smith, L. T. (1999). *Decolonizing methodologies: Research and indigenous peoples*. New York, NY: Zed Books Limited.

Smith, D., Guest, R., Svrcek, C., & Farahbakhsh, K. (2006). Public health evaluation of drinking water systems for First Nations reserves in Alberta, Canada. *Journal of Environmental Engineering and Science, 5*, S1-S17.

Swain, H., Louttit, S., & Hrudey, S. (2006). *Report of the expert panel on safe drinking water for First Nations, Volume 1*. Ottawa, ON: Department of Indian Affairs and Northern Development.

Tanner, A. (2001). The double bind of Aboriginal self-government. In C. Scott (Ed.), *Aboriginal autonomy and development in northern Quebec and Labrador* (pp. 396-414). Vancouver, BC: UBC Press.

Taylor, J., & Hill, D. (2010). *Major Capital projects: The process*. Ontario First Nations Technical Services Corporation Annual Conference. Niagara Falls, ON: Ontario First Nations Technical Services Corporation.

Treasury Board of Canada Secretariat. (2011). Project approval policy. Retrieved from http://www.tbs-sct.gc.ca/pol/doc-eng.aspx?section=text&id=12075

Turner, P. (1997). Public policy in indigenous affairs - No miraculous solutions. *Australian Journal of Public Administration, 56*(2), 3-11.

Weaver, S. M. (1990). A new paradigm in Canadian Indian policy for the 1990s. *Canadian Ethnic Studies, 22*(3), 8-18.