



**WATER INFRASTRUCTURE AND
WELL-BEING: WHAT DOES THE DATA
TELL US?**

**MELANIE O'GORMAN
UNIVERSITY OF WINNIPEG, MB,
CANADA**

WATER RIGHTS AND AN ECONOMIC PERSPECTIVE

- We know there is a legal basis – also likely the case that there is an economic basis for such infrastructure.
- Economic analysis is needed to confront government and public apathy towards the issue.

→ Economic counter-argument may persuade the government to act sooner.

- Economics first comes to mind when we consider the costs of water infrastructure and indoor plumbing.
 - \$4.7 billion! (Neegan Burnside Ltd. (2011))
 - Economics can also be used to quantify the benefits of providing them.



WHAT ARE THE ECONOMIC BENEFITS OF IMPROVED WATER INFRASTRUCTURE?

- Improved health, including reduced incidence of water- and sanitation-related illness (such as respiratory tract, skin and gastrointestinal tract infections)
 - **Averted health care costs**
- Fewer absences from work - and increased labour earnings - due to illness.
- Children's attendance at and performance in school
- Environmental benefits of proper sanitation infrastructure, including reduced groundwater contamination, improved soil quality and improved health of aquatic life
- Inherent value of access to safe drinking water

HEALTH IMPACTS OF A LACK OF WATER INFRASTRUCTURE

- Are poorer quality water/wastewater systems in First Nations communities associated with poorer health?
- We investigate the relationship between access to safe water and general health conditions in First Nations communities in Canada using 3 datasets:
 - The Aboriginal Peoples Survey (2001, 2006) – off-reserve data
 - The Regional Health Survey (2008) – on reserve data
 - St. Theresa Point First Nation data (2016)



THE MODEL

$$H_i = \alpha + \beta X_i + \delta W + \varepsilon$$

- H_i represents a number of health indicators for individual i
- $W = 1$ if household consider water safe to drink, 0 otherwise
- $W = 1$ if water contaminated in a particular time during a year, 0 otherwise
- X_i includes age, sex, household's income, province, education, employment, alcohol, smoking

SAFE WATER MATTERS OFF-RESERVE

- **Safe drinking water**

- Increases the probability of having good health up to 8%
- Decreases the likelihood of suffering from a stomach problem by 4%
- Decreases the chance of being unemployed due to health problem by 3.8%

- **Contaminated water**

- Decreases the probability of having good health up to 7%
- Increases the likelihood of suffering from a stomach problem by 3%

ON RESERVE ANALYSIS

- On-reserve data – from the Regional Health Survey
- Survey administered by First Nations Information Governance Centre (FNIGC) and Regional Partners
- Information for 2002 and 2008
- Sample size of roughly 11,000

Summary Statistics for Dependent Variables

	2002	2008
Proportion in excellent, very good or good health	79.90%	77.20%
Proportion having stomach and intestinal problems	7.70%	9.90%
Proportion reporting that they feel depressed (2002) /distressed (2008)	29.90%	50.80%

IMPACT OF WATER SOURCE ON HEALTH ON RESERVE

Odds of good health – relative to having water delivered by truck (2008 data)

Including explanator y variables:	Age* and Gender*	Age*, Gender* and Defence*	Age*, Gender*, Defence* + Res. School*	Age*, Gender*, Defence* + Res. School*, Good Community Progress*
Piped	1.102	1.088	1.107	1.109
Well	0.830	0.833	0.58	0.862

IMPACT OF WATER SOURCE ON HEALTH ON RESERVE (CONTINUED)

**Odds of being told you have a stomach problem –
relative to having water delivered by truck (2008 data)**

Including explanator y variables:	Age*, Gender	Age*, Gender*, Defence*, Remote	Age*, Gender*, Defence*, Remote*, Res School*
Piped	0.688	0.816	0.807
Well	1.021	0.996	0.983

* Independent variables are statistically significant at the 1%, 5% or 10% levels.

IMPACT OF WATER INFRASTRUCTURE ON HEALTH COSTS

- Piped water associated with a roughly 20% decrease in stomach/intestinal problems relative to trucked water.
- The cost of infectious and parasitic diseases in 2008 was estimated at \$2.92 billion (Economic Burden of Illness in Canada (2014)).
→ Includes the costs of hospitalization and physician care, drug costs, mortality and morbidity costs
- Benefit of piped water on reserve could be estimated at \$583 million for 2008.

IMPACT OF SANITATION ON RESERVE

Odds of good health for those with sanitation relative to those without sanitation (2008 data)

Including explanatory variables:

Age* and Gender*

Sanitation

1.383

* Independent variable is statistically significant at the 1%, 5% or 10% level.



IMPACT OF WATER SOURCE ON MENTAL HEALTH

**Odds of distress – relative to having water delivered by truck
(2008 data)**

Including explanator y variables:	Age*, Gender*, Res. School*	Age*, Gender*, Res. School* and Defence*	Age*, Gender*, Remote + Res. School*	Age*, Gender*, Defence* + Res. School*, Good Community Progress*
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Piped

0.581

0.864

0.866

0.862

Well

0.840

0.840

0.823

0.840

*** Independent variables that are statistically significant at the 1%, 5% or 10% levels.**

IMPACT OF RUNNING WATER ON MENTAL HEALTH

Odds of distress relative to having no running water (2008 data)

Including explanatory variables:	Age*, Gender*, Defence	Age*, Gender*, Res. School*	Age*, Gender*, Defence, Small*	Age*, Gender*, Defence, Good Community Progress*
Running water	0.601	0.591	0.581	0.587

* Independent variables that are statistically significant at the 1%, 5% or 10% level

ST.THERESA POINT FIRST NATION

- St. Theresa Point is 610 kilometers Northeast of Winnipeg. The community is accessible by plane and boat in the summer and by winter road in the winter.
- Registered Population: 4187 as of March 2016
- Treaty: Adhesion to Treaty No. 5
- Band No. 298
- Area: Approx. 7,129 Acres
- Chief: David McDougall

(Source: <http://www.stpfirstnation.com>)



OUR STUDY

- To document daily implications of a lack of funding for water infrastructure. We ask:
 - What are the day-to-day impacts of inadequate infrastructure and indoor plumbing?
 - Are there health implications?
 - Is a lack of proper water infrastructure affecting schooling?
 - Are there still homes that need to be retrofitted?
 - How much are people spending on bottled water/filtration systems?
 - Are there any concerns with cisterns?
- This information may assist with acquiring increased Federal funding for infrastructure.

FOCUS GROUPS

- To obtain focus group participants' views on interventions that would improve the safety and reliability of drinking water in St. Theresa Point
- To talk generally about the impacts of a lack of running water/improper sanitation on the community.
- We held Focus Groups with:
 - Elders
 - Nursing station staff
 - Teachers
 - Council





SURVEY

- We surveyed 145 people between March 19-23, 2016
- We first went door-to-door – stopping in at peoples’ homes and having them fill out the survey/be interviewed there
- We also had a booth at the Northern Store
- Our survey consisted of:
 - Open-ended questions
 - Quantitative questions

SUMMARY STATISTICS

- 60% of sample was male
- Average family size of 6
- 90% of individuals have lived in the community their whole lives

Age range	Proportion of sample
14-20 years old	6.4%
21-30 years old	39.0%
31-40 years old	27.0%
41-50 years old	14.2%
51-60 years old	9.2%
61-70 years old	2.8%
Older than 70 years old	1.4%

SUMMARY STATISTICS CONTINUED

		Income levels (per month)	
Primary language spoken		Less than \$1500	61.9%
English	18.9%	\$1501-\$3000	20.4%
Cree	2.4%	\$3001-\$4500	15.9%
Oji-Cree	59.8%	\$4501-\$6000	0.9%
English and Oji-Cree	30.7%	\$6001-\$7500	0.0%
		\$7501-\$9000	0.0%
		Above \$9000	1.8%
“People can’t afford water - \$25 out of their children’s mouths”		Refused to answer	13.3%

ACCESS TO WATER

- 88% have a working flush toilet
- 4.8% use an outhouse
- 10.5% use a slop pail
- 87% have a working shower
- 74.2% have a septic tank

Water Source

Pipe (home connected to main water line)	52.1%
Water tank (water delivered by truck)	35.2%
No running water	12.7%

ACCESS TO WATER CONTINUED

- 30.3% get water from a neighbour's house
- 39.2% haul water from the lake or community tap
- We asked "Do you ever expect to have water but don't?"
 - 65.5% say yes



HAULING WATER

- “How much time do you spend per day hauling water?”
- Between 1 and 2 hours on average

How far do you have to go to get water?

Less than 10 metres	32.2%
10-100 metres	33.9%
101-500 metres	23.7%
501-1000 metres	6.8%
1-2 kilometres	13.6%
Over 2 kilometres	5.1%

How do you haul water?

Using my vehicle	48.1%
Using a borrowed vehicle	11.1%
Taxi	9.3%
Walking	55.6%

WHAT WOULD YOU DO WITH THE EXTRA TIME IF YOU WEREN'T HAULING WATER?

- “I would focus on my family, spending time with them”
- “I would clean my home and yard during the summer”
- “I would relax”
- “I would exercise”
- “I would look for a job”
- “I would play video games”
- “I would watch TV or visit friends”
- Most prominent response – “I would work”
- It was noted that while hauling water is hard work, it is an important cultural activity

DEFENDING AGAINST UNCLEAN WATER

- 64.8% trust their water to be clean
- 32.2% boil their water
- 68.2% purchase bottled water



How much do individuals spend on bottled water?

Less than \$10	43.3%
\$11-\$30	35.6%
\$31-\$50	13.3%
\$51-\$70	1.1%
\$71-\$90	2.2%
More than \$90	4.4%

WATER AND HEALTH

- 30% of individuals say they've missed work or school because they or a family member was sick from a waterborne illness
- 18% say they've missed school or work for another water-related reason
- 33.3% feel chlorine is bad for their health

Self-rated health status

Excellent	13.5%
Very Good	12.7%
Good	43.7%
Fair	27.0%
Poor	11.9%

WATER AND HEALTH CONTINUED

- Methicillin-resistant Staphylococcus aureus (MRSA)
- Boils
- Infections
- Diarrhea
- Impetigo
- Stomach aches

• Lice

How often is your water monitored?

Every few months 24.8%

Twice a year 5.7%

Once a year 7.6%

Less than once a year 61.9%



INSIGHT FROM FOCUS GROUPS

- Some students don't come to school because of boils – it's painful to sit down
- Children – some get sores even though they bathe daily
 - “Babies with rashes – but so many babies look like that. Then racism happens - because such issues are blamed on parents' mistreatment”
 - “People are desensitized – because it happens all the time here”

DEALING WITH WATER TANKS

- How much do you spend per year cleaning your water tank?
 - Average: \$84.57
- 89% of individuals would like their water tank cleaned more often



How often is your water tank cleaned?

More than once a year	20.0%
Once a year	58.3%
Once every 2 years	5.0%
Less than once every 2 years	16.7%

CONCERNS WITH WATER TANKS

- They get dirty and need to be cleaned more often
- Not refilled often enough
- Mice getting in them
- “Too small for our household”
- “Brown and gooey at the bottom”
- Too much maintenance is involved
- Water truck breaks down – and no mechanics
- Get stuck in roads (when muddy)

WATER QUALITY

“Before we had running water we had clean water”

- Water quality goes from one extreme to the other – not consistent
 - At times we have lots of brown water coming out
 - Other times you can just smell chlorine
- Many don't use water for drinking – only for washing

“We need a clean lake; not just the water plant”

“Our ancestors respected water”

“Water is a spirit. It is used in many ways – for the animals, plants and us. We use to heal our bodies.”



IMPACT ON SCHOOLING

“The water situation does make a difference when you’re talking about the quality of life of the students”

- Water pressure – at the school – very unpredictable.
 - It’ll shut off sometimes for an hour or so
 - School is at the end of the line
- Skating rink – can’t flood it – so it’s not functioning
- Some students go to the washroom every hour – they have diarrhea
 - But they’re still managing to come to class
- If water isn’t working, school is shut down – this happens a lot





IMPACT ON SCHOOLING (CONTINUED)

- Some students don't come to school because they haven't been able to shower or do laundry
- Eye wash stations don't work – science classes can't do experiments
- If there is a fire – and everyone is using water so water pressure is low – it would be a disaster
- “Water has always been an issue”

SHOULD THE WATER SITUATION IN ST. THERESA POINT BE PUBLICIZED FOR OTHER CANADIANS?

- 121 people answered this question

→ 90% answered “yes”

- Responses:

“I would publicize it to the government so they can find people to clean our lakes”

“We should publicize this issue to the government so we can get funding to get more main water lines”

“First Nations people live in third world conditions and our leaders need to be acknowledged and something should be done about this crisis”

“Yes and no. I don’t want the others to think that we are not doing good in this community. But I know there are peoples that want to help get better water and sewage supply”

“Yes, it should be public because we should have equal access to clean water as other citizens”

WHAT, IN YOUR VIEW, IS MOST IMPORTANT FOR IMPROVING THE WATER/SANITATION SITUATION IN YOUR COMMUNITY?

- Most prominent answer - for all to be directly connected to main water line – 38% of respondents indicated this
- 29% of individuals indicated a general desire for clean water
- 10% of individuals demanded more water trucks
- Other responses:
 - “I would like water to run in pipelines in each home for convenience like washing clothes or daily shower”
 - “Water filtration systems”
 - “Need more trained workers to work at the plant”
 - “Community education on proper water use”



WHAT, IN YOUR VIEW, IS MOST IMPORTANT FOR IMPROVING THE WATER/SANITATION SITUATION IN YOUR COMMUNITY?

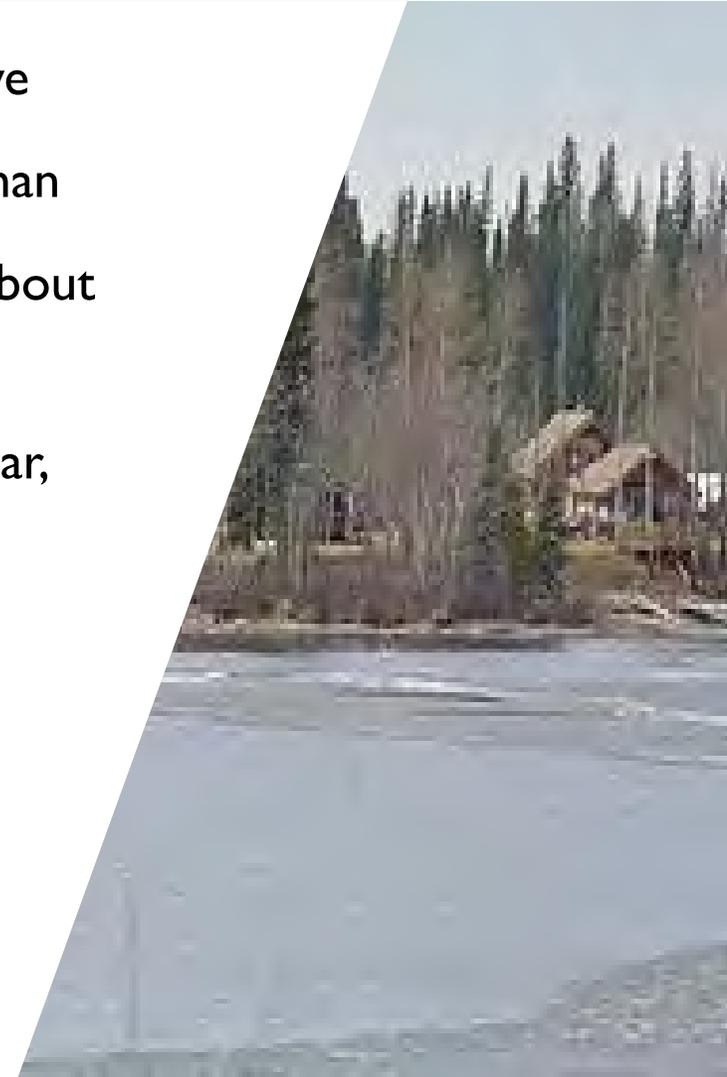
- “Clean cisterns”
- “Better water delivery”
- “Workers need to check levels of chlorine in the water we drink”
- “More water trucks - people left waiting for weeks at a time”
- “Need bigger water treatment plant and more main lines”
- “Better water pressure”
- “Better roads”
- “More septic tanks”
- “When the water is off, we call each other house to house to see if someone has good water and others help out. We shouldn't have to do that - we should be self-sufficient.”

WHAT, IN YOUR VIEW, IS MOST IMPORTANT FOR IMPROVING THE WATER/SANITATION SITUATION IN YOUR COMMUNITY?

- “Improved water pressure”
- “Water that I could trust so I don’t need to boil it”
- “More retrofitting of homes”
- “Hooked to main water line instead of worrying about saving every last drop of water”
- “More frequent testing of water”
- **“If everyone got water from the main line – how would things change?”**

NEW PROJECT: 'FROM RESEARCH TO ACTION'

- 'Research to Action' on Issue of Inadequate Drinking Water Services on Reserve
- Karen Busby, Leona Star, Katherine Starzyk, Helen Fallding and Melanie O'Gorman
- In this paper we discuss how these results suggest a way forward for bringing about real change in the water/sanitation situation in First Nations communities.
- We conclude that while key reforms for bringing about this change are now clear, advocacy and/or legal action on the issue must occur in order to pressure the Federal government to act.



NEW PROJECT: 'FROM RESEARCH TO ACTION'

Importance of First Nation-led advocacy

a) AMC's 'water is a human right' postcard campaign (2011)
as a model campaign -

http://www.emptyglassforwater.ca/nyk/wp-content/uploads/2010/11/Water_Is_A_Human_Right_Postcard.pdf

b) Clean Running Water Campaign by MKO – December 2010

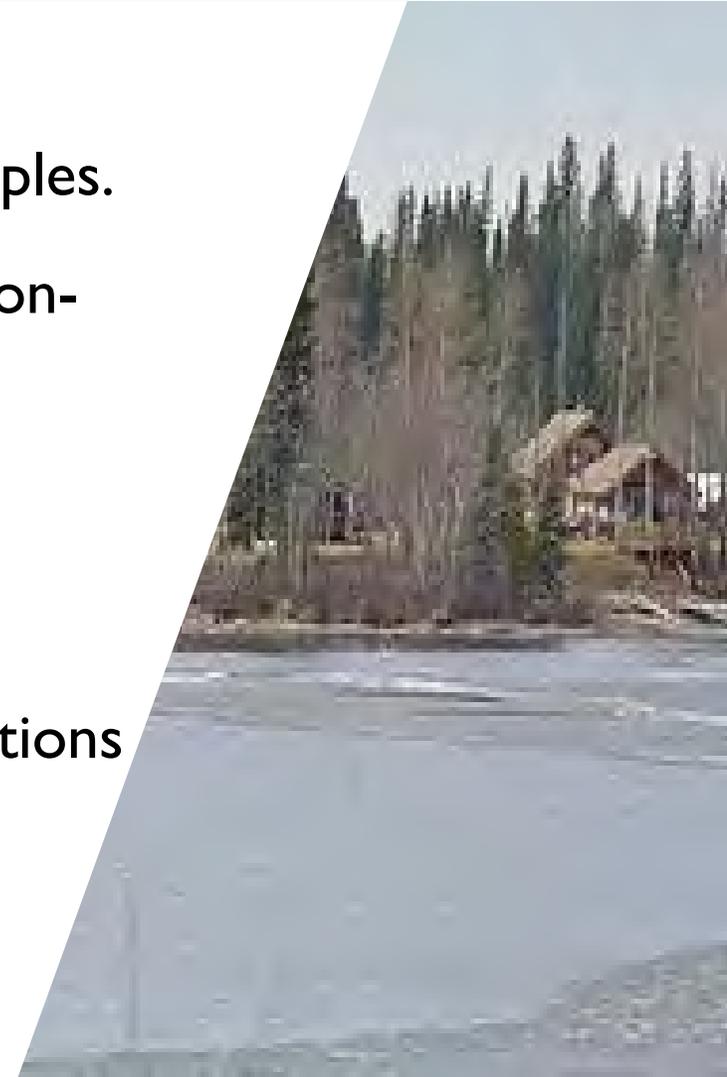
c) AFN (with Council of Canadians) – open letter to politicians in last election regarding right to water

However many of these campaigns have failed to galvanize public support.



WHERE'S THE OUTRAGE?

- Insights from interviews with experts in the area of advocacy on this issue
- Broadly there is public indifference to the rights of Indigenous peoples.
- Measures to correct injustices often viewed as taking away from non-Indigenous peoples – issues are presented as zero-sum games.
- Often individuals say: “Well that’s just the way things are”.
- Divide and conquer strategy of government.
- Government has used its control over the ‘purse strings’ (First Nations funding) as a bargaining chip.



WHAT CAN BE DONE?

- Posters and letters – very ephemeral
 - Very easy to sign.
 - Government knows this
- Need many letters to your MP.
- Political leaderships in First Nations sometimes are not always the best spokespersons.
- Better to have community members who can talk about impacts – especially children.



WHAT CAN BE DONE? (CONTINUED)

- Connect the issue to all Canadians – ‘bring it home’
 - Walkerton – garnered attention to Southern water regulation
 - If all Canadians cared then politicians would act
- Any success that has occurred involving a First Nation and the Federal government has come at the end of a fight – not a negotiation. For example, the James Bay and Northern Quebec Agreement came at the end of a fight.
- Political will is key – at the national level. If the Federal government wants to truly solve the water problems present on reserve, it will happen.
 - The Provincial governments are to blame as well.

