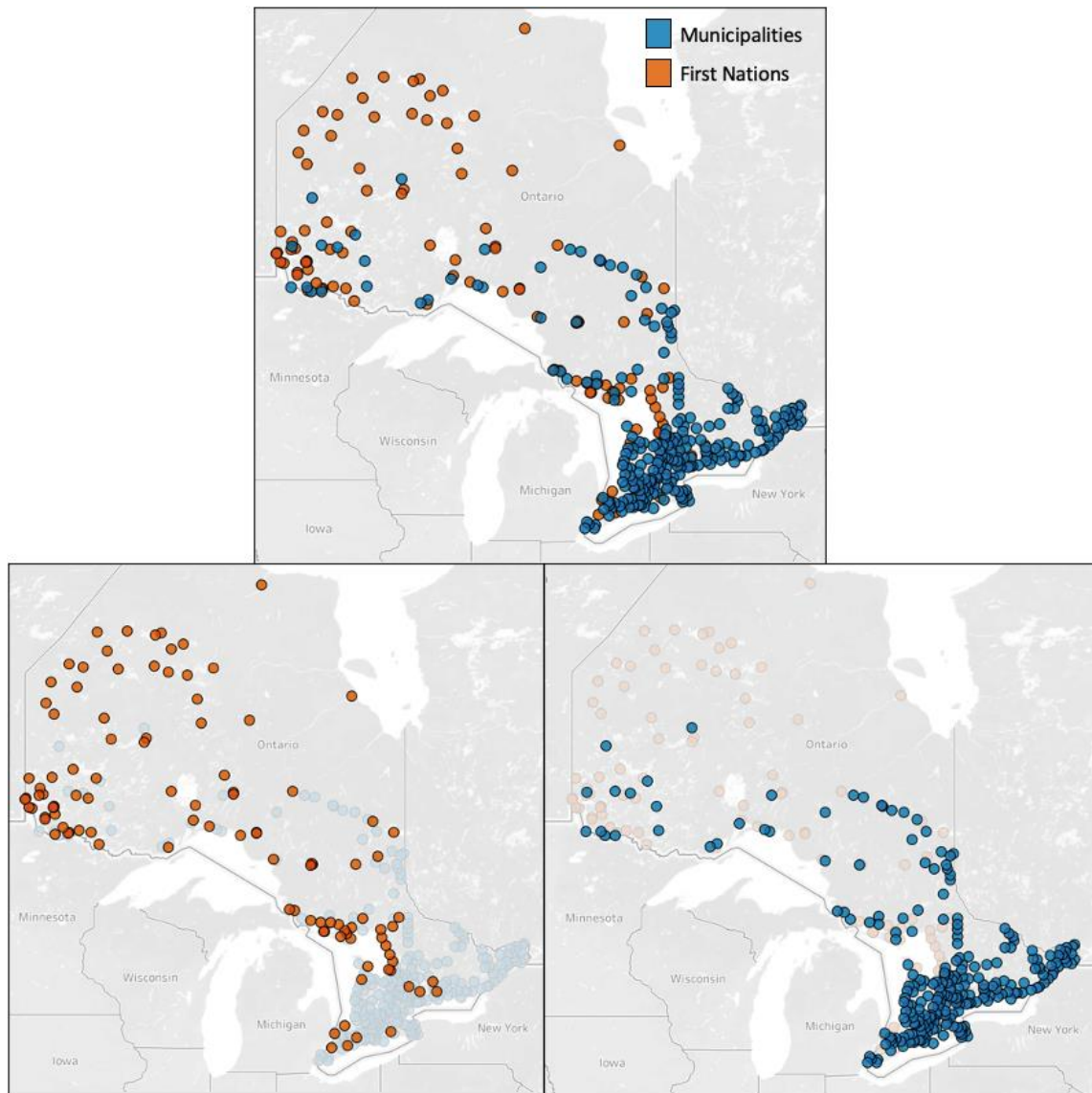


## Appendix



**Figure A1: Centroid Longitude and Latitude Coordinates for Ontario Communities Hosting Water Systems Included in our Regression Analysis**

**Notes:** The dots on the map representing each community are not scaled to community size. Longitude and latitude coordinates have been plotted rather than community boundaries, due to the relatively small size of most First Nation reserves in Ontario, which can make them difficult to identify on a map scaled to the provincial level. As many First Nations and municipalities neighbour each other, particularly in the more densely populated southeastern Ontario region, it can be difficult to differentiate First Nation and municipal communities in the map containing all communities in the upper panel. For this reason we also provide the two additional maps in the bottom panel plotting the centroids of First Nation communities and municipalities separately.

**Table A1: Variable Descriptions**

Variable	Description	Source
<b>Dependent Variable</b>		
DWA	Identifies water systems that were under a drinking water advisory at some time during the study period.	Neegan Burnside (2011); Stager (2011); Water Today (2021)
<b>Water System Characteristics</b>		
WSA	Identifies water systems that receive at least some portion of their water supply through a water sharing arrangement (WSA).	Neegan Burnside (2011); Stager (2011)
LARGE	Identifies large water systems, servicing 100+ connections.	Neegan Burnside (2011); Stager (2011)
GW	Identifies systems supplied from only secure groundwater sources.	Deaton and Lipka (2022); Neegan Burnside (2011); Stager (2011);
<b>Community Socio-Demographic Characteristics</b>		
AREA	Area of the census subdivision (First Nation reserve or municipality) housing the water system, as reported in the 2006 Canadian Census. Measured in square kilometers.	Statistics Canada (2019b)
FN	Identifies water systems located on, and supplying, First Nation communities.	Statistics Canada (2019b)
lnPOPDEN	Natural log of the population density of the community (census subdivision) where the water system is located. Measured in 100s of persons per square kilometer.	Statistics Canada (2019b)
lnINC	2005 median income of the region (census division) where the water system is located. Measured in \$1000s.	Statistics Canada (2019b)
<b>Community Geographic Characteristics</b>		
NORTH	Identifies water systems located in northern municipalities and First Nation communities, as defined by FedNor (the government of Canada’s economic development agency for Northern Ontario).	FedNor (2017)
dumdis1	Identifies water systems located in census subdivisions (First Nation communities or municipalities) that are within 5km of their closest neighbouring census subdivision with water infrastructure. Distance is measured in kilometers from the boundary of the community to the centroid of its nearest neighbour.	Neegan Burnside (2011); Stager (2011); Statistics Canada (2019a)
dumdis2	Identifies water systems located in census subdivisions (First Nation communities or municipalities) that are between 5-10km of their closest neighbouring census subdivision with water infrastructure. Distance is measured in kilometers from the boundary of the community to the centroid of its nearest neighbour.	Neegan Burnside (2011); Stager (2011); Statistics Canada (2019a)
<b>Sensitivity Analysis</b>		
FEAS	Identifies water systems located in census subdivisions (First Nation communities or municipalities) that are within a feasible distance to share water with their closest neighbouring census subdivision with water infrastructure. This feasible distance was defined as the maximum distance between communities where a water sharing arrangement was present (21.8km).	Neegan Burnside (2011); Stager (2011); Statistics Canada (2019a)
FNLMA	Identifies water systems located in a First Nation community that is signatory to the <i>Framework Agreement on First Nations Land Management</i> (1996).	LAB (2022)

**Table A2: Bivariate Probit Regression Results, Average Marginal Effects Reported – Municipal and First Nation Subsets, and Full Sample with Interaction Effect<sup>a</sup>**

Variable	First Nation Water Systems (N=145)	Municipal Water Systems (N=565)	Full Sample with Interaction Effect (N=710)
<b>DWA<sup>b</sup></b>			
<i>WSA</i>	-0.523*** (0.050)	0.026 (0.040)	-0.101** (0.050)
<i>FN</i>	-	-	0.227*** (0.058)
<i>FN*WSA</i>	-	-	-0.348*** (0.091) <sup>c</sup>
<i>NORTH</i>	0.092 (0.125)	0.055* (0.031)	0.066* (0.037)
<i>dumdis1</i>	-0.097 (0.121)	-0.016 (0.028)	-0.045 (0.036)
<i>dumdis2</i>	-0.034 (0.117)	-0.018 (0.026)	-0.030 (0.035)
<i>lnPOPDEN</i>	-0.026 (0.035)	0.003 (0.006)	-0.001 (0.009)
<i>lnINC</i>	1.80*** (0.529)	-0.172 (0.122)	0.179 (0.193)
<i>GW</i>	-0.326*** (0.090)	-0.068** (0.027)	-0.126*** (0.029)
<i>LARGE</i>	0.036 (0.099)	0.033* (0.019)	0.015 (0.027)
<b>WSA<sup>d</sup></b>			
<i>FN</i>	-	-	-0.121* (0.067)
<i>NORTH</i>	0.011 (0.045)	0.036 (0.081)	0.016 (0.062)
<i>dumdis1</i>	0.089 (0.057)	0.325*** (0.072)	0.239*** (0.063)
<i>dumdis2</i>	0.107* (0.056)	0.302*** (0.093)	0.206*** (0.076)
<i>lnPOPDEN</i>	-0.063*** (0.018)	0.018 (0.016)	0.009 (0.013)
<i>AREA</i>	-0.001*** (0.000)	-0.000*** (0.000)	-0.000*** (0.000)
<i>lnINC</i>	0.557** (0.240)	1.739*** (0.323)	1.486*** (0.262)
<i>LARGE</i>	0.279*** (0.064)	0.097* (0.055)	0.129*** (0.043)
Wald Test of $\rho=0$	$\rho=0.9998$ Prob > $\chi^2 = 0.5940$	$\rho=-0.0488$ Prob > $\chi^2 = 0.8326$	$\rho=0.1504$ Prob > $\chi^2 = 0.5871$

**Notes:** <sup>a</sup> Standard errors are in parentheses, and are clustered by census subdivision (i.e., community housing the water system). Significance level of result: \*\*\* 1% significance level; \*\* 5% significance level; \* 10% significance level.

<sup>b</sup> Dependent variable = 1 if Drinking Water Advisory was in effect at some point during the study period (2009/10), 0 otherwise.

<sup>c</sup> Stata does not generate marginal effects for interaction terms (in our case, *i.WSA###i.FN*) using the standard “margins” command. The marginal effect for this interaction term was calculated separately using the following command: `margins WSA, dydx(FN) pwcompare(effects)`. This marginal effect compares First Nation communities supplied through WSAs to First Nation communities that are independently supplied.

<sup>d</sup> Dependent variable =1 if water system is supplied in whole or in part through a WSA, 0 otherwise.

**Table A3: Probit Regression Results for Feasible Distance Samples, Average Marginal Effects Reported – Municipal and First Nation Subsets (Equation 3), and Full Sample with Interaction Effect (Equation 4)<sup>a</sup>**

Variable <sup>b</sup>	First Nation Water Systems (95)	Municipal Water Systems (N=551)	Full Sample with Interaction Effect (N=646)
<i>WSA</i>	-0.382*** (0.074)	0.031 (0.025)	-0.042* (0.024)
<i>FN</i>	-	-	0.215*** (0.062)
<i>FN*WSA</i>	-	-	-0.335*** <sup>c</sup> (0.097)
<i>NORTH</i>	0.162 (0.124)	0.037 (0.030)	0.048 (0.035)
<i>dumdis1</i>	0.045 (0.150)	0.018 (0.038)	0.015 (0.037)
<i>dumdis2</i>	0.079 (0.147)	0.017 (0.049)	0.026 (0.043)
<i>lnPOPDEN</i>	-0.020 (0.048)	0.001 (0.006)	-0.004 (0.008)
<i>lnINC</i>	1.996*** (0.564)	-0.169 (0.114)	0.136 (0.150)
<i>GW</i>	-0.268** (0.108)	-0.060** (0.024)	-0.097*** (0.026)
<i>LARGE</i>	0.034 (0.118)	0.030* (0.017)	0.026 (0.023)
Pseudo R <sup>2</sup>	0.1487	0.1322	0.2557

**Notes:** <sup>a</sup> Standard errors are in parentheses, and are clustered by census subdivision (i.e., community housing the water system). Significance level of result: \*\*\* 1% significance level; \*\* 5% significance level; \* 10% significance level.

<sup>b</sup> Dependent variable = 1 if Drinking Water Advisory was in effect at some point during the study period (2009/10), 0 otherwise.

<sup>c</sup> Stata does not generate marginal effects for interaction terms (in our case, *i.WSA##i.FN*) using the standard “margins” command. The marginal effect for this interaction term was calculated separately using the following command: `margins WSA, dydx(FN) pwcompare(effects)`. This marginal effect compares First Nations communities supplied through WSAs to First Nation’s communities that are independently supplied.

**Table A4: Probit and Bivariate Probit Regression Results for First Nation Subsample with Inclusion of *FNLMA* – Average Marginal Effects Reported<sup>a</sup>**

Variable	First Nation Water Systems (N=145)	
	Probit	Recursive Bivariate Probit
<b>DWA<sup>b</sup></b>		
<i>WSA</i>	-0.439*** (0.093)	-0.521*** (0.046)
<i>NORTH</i>	0.069 (0.134)	0.059 (0.127)
<i>dumdis1</i>	-0.042 (0.125)	-0.012 (0.114)
<i>dumdis2</i>	0.034 (0.132)	0.063 (0.114)
<i>lnPOPDEN</i>	-0.025 (0.036)	-0.028 (0.034)
<i>lnINC</i>	1.635*** (0.591)	1.792*** (0.522)
<i>GW</i>	-0.280*** (0.099)	-0.276*** (0.086)
<i>LARGE</i>	-0.036 (0.095)	0.040 (0.089)
<i>FNLMA</i>	-0.265** (0.108)	-0.244** (0.103)
<b>WSA<sup>c</sup></b>		
<i>NORTH</i>	-	0.008 (0.047)
<i>dumdis1</i>	-	0.099 (0.062)
<i>dumdis2</i>	-	0.128** (0.053)
<i>lnPOPDEN</i>	-	-0.065*** (0.020)
<i>AREA</i>	-	-0.001*** (0.000)
<i>lnINC</i>	-	0.581** (0.249)
<i>LARGE</i>	-	0.271*** (0.057)
<i>FNLMA</i>	-	-0.034 (0.030)
Pseudo R <sup>2</sup>	0.1828	
Wald Test of $\rho=0$	-	$\rho=1.000$ Prob > $\chi^2 = 0.0000$

**Notes:** <sup>a</sup> Standard errors are in parentheses, and are clustered by census subdivision (i.e., community housing the water system). Significance level of result: \*\*\* 1% significance level; \*\* 5% significance level; \* 10% significance level.

<sup>b</sup> Dependent variable = 1 if Drinking Water Advisory was in effect at some point during the study period (2009/10), 0 otherwise.

<sup>c</sup> Dependent variable = 1 if water system is supplied in whole or in part through a WSA, 0 otherwise