

Municipal Water Leaders Survey

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Executive Summary

This survey of local water leaders in Ontario was initiated as part of Ryerson Urban Water (RUW)'s strategic five-year plan to generate high quality social survey research focused on the local level as a baseline to gauge current knowledge and opinion of local water managers. The survey was led Dr. Adam Thorn and Dr. Carolyn Johns, funded by internal research funding from Dr. Johns and RUW, and developed with the support from Ryerson Urban Water (RUW)'s Board of Advisors, Executive Committee, and Staff.

The project was modeled after the success of the Center for Local, State, and Urban Policy (CLOSUP) at the University of Michigan, which conducts applied academic research to inform local and state urban policy issues. This research study is a baseline survey designed to provide findings on a range of issues and challenges facing local water leaders in Ontario in hopes that similar surveys can be conducted every few years on a range of water and environmental policy themes.

For this first survey, water leaders in Ontario were surveyed on urban water priorities, challenges, and values to create a baseline response framework for subsequent surveys. A purposive sample of water leaders were surveyed from 334 of Ontario's 444 municipalities with populations over 2,000 and Of the 788 invitations sent out, 134 completed surveys were received and analyzed for a response rate of 18%. A similar survey was sent to water leaders from all of Ontario's 36 Conservation Authorities with 84 invitations sent in which 24 completed surveys were returned (28.6% response rate).

Now that the respondent list has been developed and tested and the baseline survey has been conducted, the framework exists for subsequent annual or biannual surveys on a range of water and environment themes.

The results from our first survey include a few key findings:

- 1) that municipal and conservation authority water leaders rate drinking water as their top priority and infrastructure as their greatest challenge, while identifying fiscal resources as lacking to meet these priorities.
- 2) Interestingly, there is a perception by a slim majority of water leaders (52%) that the public is willing to pay more for water, while they believe that other users (industry, agriculture, and developers) are not willing to pay more for water.
- 3) That respondents have many years of experience in the water sector and a large number of them may be approaching retirement.

Background

In 2016-17 Ryerson Urban Water (RUW) identified social survey research as a strategic priority related to Goal 4 of the RUW Strategic Plan (2017-2022): to establish RUW as the trusted source for rigorous and impartial research related to urban water governance and policy. In 2017 a small group at Ryerson began discussions about the possibility of developing a municipal water leaders survey modelled on the survey work of CLOSUP at the University of Michigan focused on municipalities in Michigan.

The broader goal of this RUW initiative is to work towards an annual survey that creates opportunities for longitudinal data collection about general water management issues and in-depth, thematic surveys on a range of water, water-related, and environmental issues facing municipalities in Ontario.

The goal of this first survey was to identify Ontario's municipal water leaders, generate a participant list, and conduct a baseline survey about municipal water leaders and the challenges they face. This study led by the two investigators (Dr. Carolyn Johns and Dr. Adam Thorn) affiliated with Ryerson Urban Water, presents results from an online survey of municipal environment and water policy leaders in Ontario to identify the water priorities and challenges facing local authorities in Ontario.

The questions in the survey were designed to collect data from policy practitioners on their knowledge, opinions and perceptions about water management priorities in their organizations and in Ontario more broadly. The focus is on generating high quality social survey research related to urban water and other environmental issues to produce knowledge that is valuable for the public and policy makers across municipalities in Ontario and Canada more broadly.

The goals of this project are threefold:

- i) to identify the current perceptions of municipal water leaders and decision-makers about the state of water management and potential future challenges facing in their municipality and Ontario.
- ii) To analyze how different factors such as the background of municipal water leaders, size of a municipality, geographic location, and population density may impact on the perceived challenges to water management at the local level.
- iii) to identify a pool of local leaders with water-related expertise who are willing to participate in future surveys focusing on specific themes around water issues such as storm water management.

In addition to the valuable findings presented in this summary report, the value of our database of municipal environment and water leaders from Ontario's municipalities is an important foundation for future thematic surveys in 2019. A separate survey of water leaders from Ontario's 36 Conservation Authorities was also conducted and findings from that survey are in a separate report.

Methodology

The starting point for this project was generating a list of individuals in Ontario's 444 municipalities and 36 Conservation Authorities (CAs) with knowledge and expertise related to water issues at the local level. To generate the list of possible respondents we started with a list of all municipalities and CAs in Ontario and hired a Research Assistant to conduct research on the individuals with responsibilities related to water in each municipality. Early research indicated that this expertise resided with both environment and water managers and that some municipalities were very small (less than 2000 residents (Association of Municipalities of Ontario 2018)). Based on this, our project focused on 334 municipalities in Ontario with populations over 2000 residents.

The Research Assistant then conducted a search of municipal and government and CA websites and municipal directories to identify water and environmental managers and generate a contact list. Additional email and phone inquiries to the municipal and CA communications/public relations offices were also made when information was not available online. The goal was to identify two water and two environmental leaders in each municipality and using criteria available to indicate if the individuals had water-related responsibilities. Two to three leaders were also identified from each CA. For some of the smaller municipalities only a single name in each category was identified.

Our final 2018 list of water leaders included 788 names and email addresses from the 334 municipalities in Ontario with over 2000 residents and 84 names and email addresses from the 36 CAs in Ontario.

Our first survey instrument focuses on collecting baseline data on water leaders, water issues and priorities at the local and provincial levels. The survey itself was broken into four sections: background, water values and uses, challenges for water management, and demographic questions. Our instrument was pre-tested and research ethics application was approved in Spring 2018. The municipal and CA surveys were largely identical with some variation in question wording that is noted in the results.

The online municipal survey was distributed to potential participants through email on May 15, 2018 and was open for one month. Respondents were sent reminders each week until the end of the survey period (June 15th). From the total of 788 municipal invitations sent we received 134 completed surveys for a response rate of 18%. While this is not high response rate, it is typical of online surveys, allows us to generate some useful findings, and we hope to improve on response rates in future surveys. Of these responses, 101 were from small municipalities, 17 were from medium municipalities and 16 were from large municipalities.¹ The survey was distributed to a sample of water managers from Conservation Authorities from June 15th to July 15th with reminders sent each week. From the 84 CA survey invitations we received 24 responses with a response rate of 28.6%.

Prior to beginning the survey, participants were asked to read and provide their informed consent to participate before gaining access to the survey (Appendix 2). The right to withdraw

¹ For purposes of this study we define small municipalities as those with populations 2,000-50,000; medium 50,001 to 250,000 and large municipalities those with populations over 250,000.

voluntarily at any time was communicated to all participants and if they chose to withdraw, after or during participation, their responses were not included in the analysis. All data collected is confidential and no identifying information is included in the aggregation or dissemination of the results.

The following pages present the results for each question primarily focusing on the municipal results but drawing attention to any significance differences with responses from the CA respondents. The beginning of each section offers a brief summary of some of the more interesting findings.

Survey Results

The summary results presented in this report reflect the 4 main sections (background, water values and uses, challenges, demographic factors) of the survey. The background section of the survey was meant to capture the degree of experience that respondents have related to water issues in their organizations.

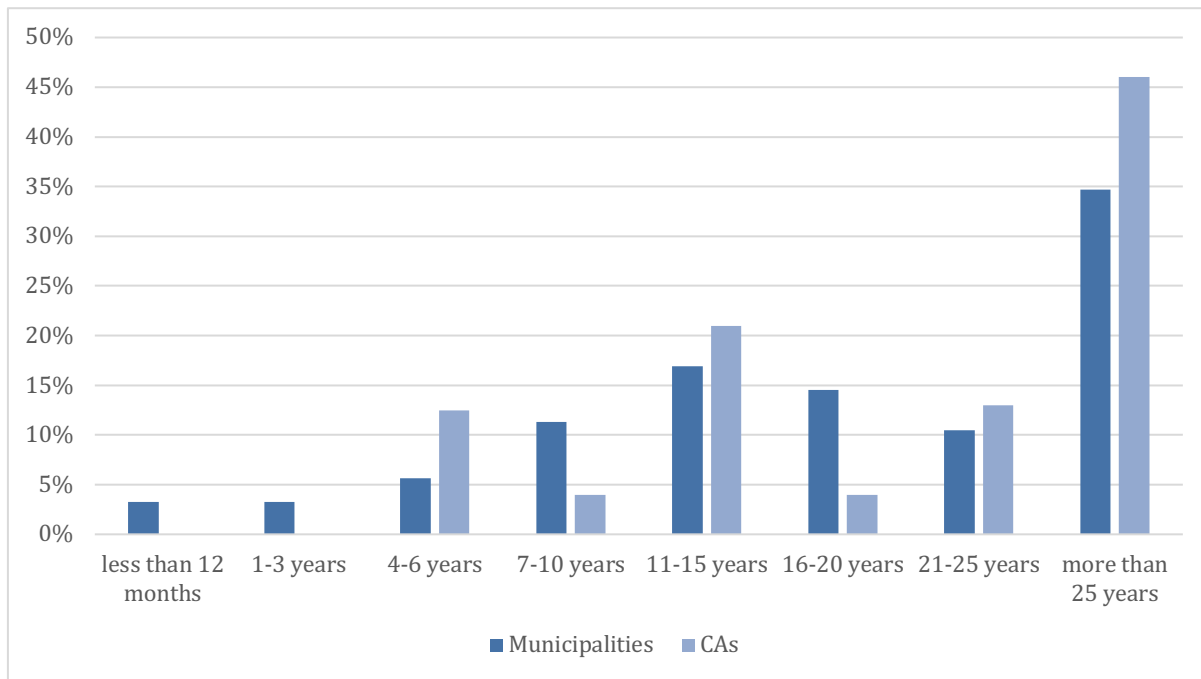
Background and Water Related Experience

Our respondents spend much of their time focused on water issues and have significant experience in water related issues. From the responses it is evident that we reached water managers however there may be some self-selection here as those without water-related expertise may have chosen not to reply to the survey. Overall, most of the respondents are experienced managers who spend much of their time on water issues and much of that time is spent on policy and planning:

- Almost 35% of respondents within municipalities have more than 25 years experience (45% in CAs) with water related issues and over 59% have more than 16 years experience.
- Municipal respondents spent much of their time on water issues (question omitted below): 57% spent more than 40% of their time on water issues and 39% spent over 60% of their time. Unsurprising given their mandate, 91% of CA respondents spent at least 61% of their time on water issues.
- Over 40% of respondents indicated their focus is on surface water: 25% on groundwater and 25% (60% of CA respondents) on both ground and surface water
- The majority of respondents (over 60%) focus on both water quality and quantity aspects of water. Those who checked other (16 respondents) provided answers such as asset management, water drainage, and infrastructure management.
- Municipal respondents work in a variety of areas of water work: Some 68% work on water distribution/supply; 62% on wastewater, and 60% on stormwater. Those who checked other (19 respondents) provided answers such as source water and lake protection (6 respondents) and wastewater (3 respondents). CA respondents primary focused on watershed protection (91%), flood management (83%), and stormwater (70%)
- Very few (less than 10% of municipal respondents and 4% of CA respondents) work on water reuse.
- A very high percentage (79%) of municipal respondents work on policy, planning and/or regulatory compliance and over 60% also indicate they work on operations and water infrastructure maintenance while the smallest percentage indicate they work on R&D and innovation. Over 80% of CA respondents work on policy, planning and/or regulatory compliance with the next highest category is water education (54%) and communications (45%).

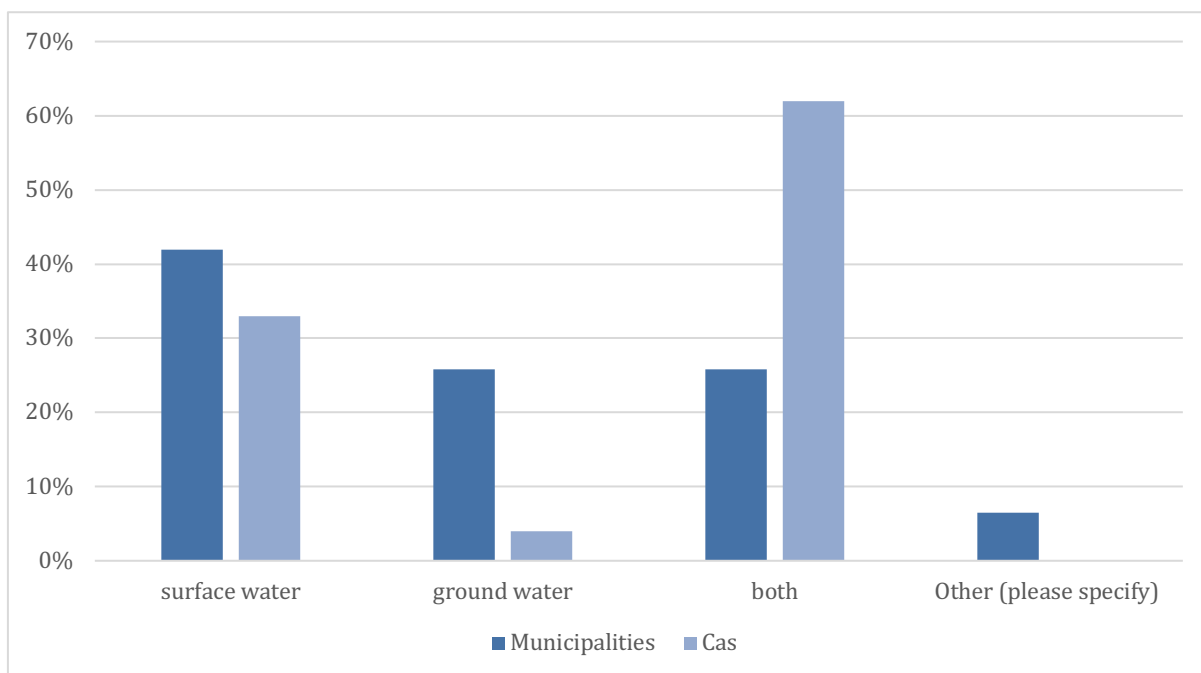
Question 1: How many years of professional experience do you have in water related issues?

Figure 1: Years of Experience (Municipal respondents)



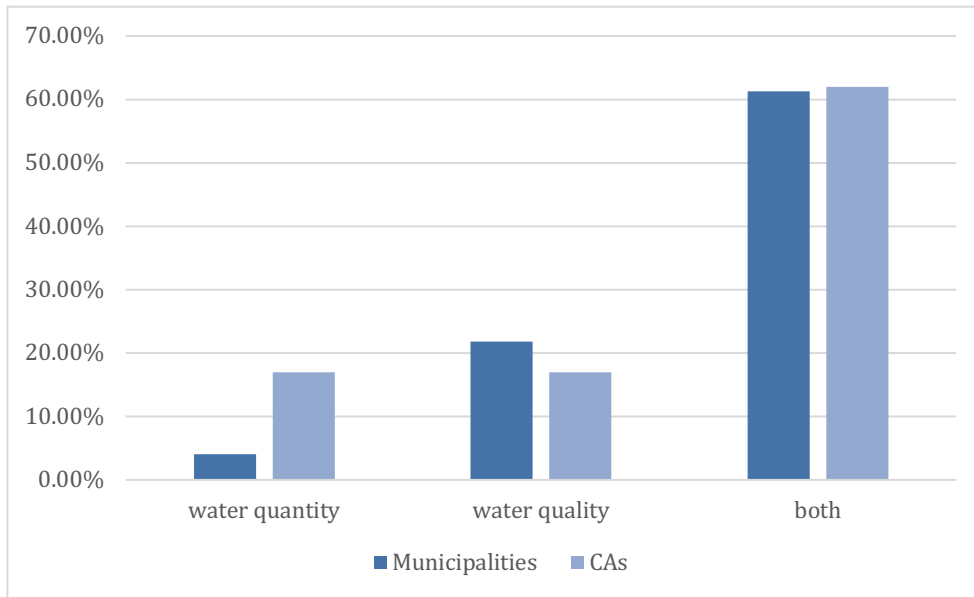
Question 3: What is the primary source of water in your municipality/region?

Figure 2: Primary Source of Water in Municipality



Question 4: In your work, do you primarily focus on?

Figure 3: Primary Focus of Work



Water Values and Uses

The second section of the survey was aimed at gauging the water management priorities of our respondents as well as their opinion on the most important use of water and the degree to which they believe water consumers are willing to pay more for water. Our municipal respondents are focused on the importance of drinking water and this is commensurate with the priorities of their organization: Respondents also believe that this should be the top area for government infrastructure spending but a substantial majority of our respondents also believe that a lack of fiscal resources is the primary impediment their organization faces trying to meet that priority.

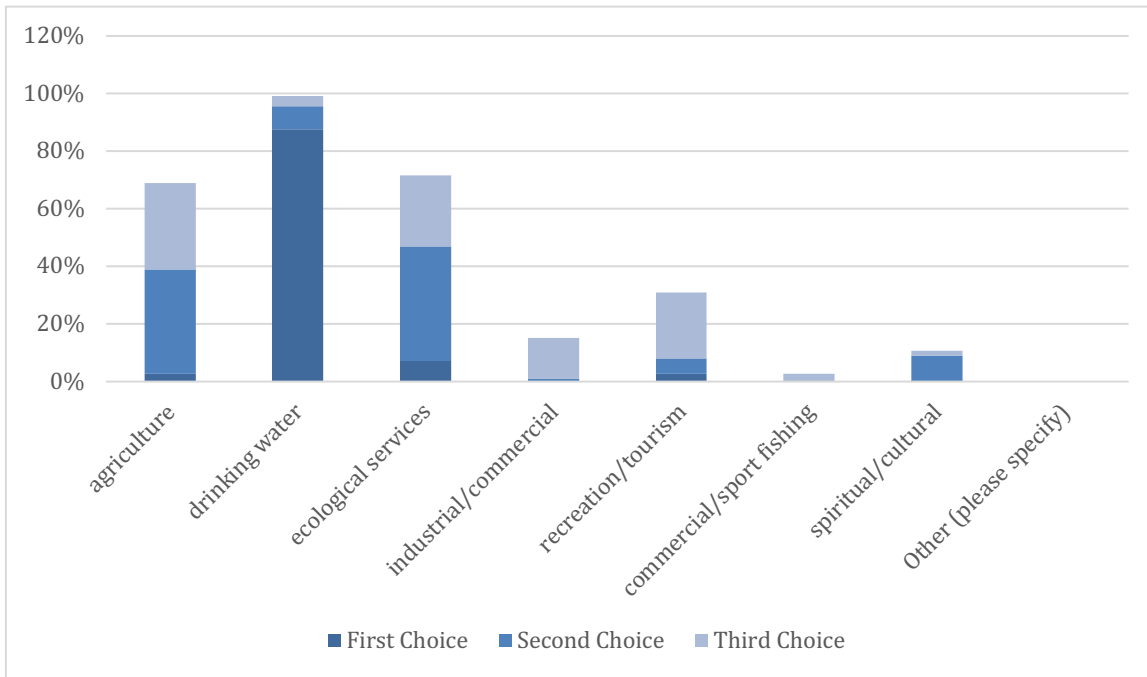
CA respondents show a similarity in that drinking water is the most important use of water but that flooding and wet weather was the most important organizational priority and the most important for government spending. Like municipal respondents, they believe that their organization lacks the fiscal resources to meet this priority. Unfortunately, most of our respondents do not believe that water users are willing to pay more for water. This poses a fundamental challenge for municipalities to meet future drinking water needs.

Summary of Findings:

- Over 91% of municipal respondents selected drinking water as one of the top three important uses of water and 88% of those rated drinking water number one. 100% of CA respondents selected drinking water as one of the top three important uses of water followed by ecological services at 91%.
- 83% of municipal respondents said that drinking water was one of the top three priorities of their organization while 100% of CA respondents said flooding and wet weather was the most important priority
- The responses to the question about top priorities for government spending was more even with 70% of municipal respondents rating drinking water supply as one of the top three areas of government funding followed by sewage treatment and collection at 44%. Unsurprisingly given the above organizational priorities, 83% of CA respondents suggested protecting against flooding and wet weather should be a spending priority
- There is far more agreement about what their organizations lack to meet those priorities: 75% of municipal respondents said their organization lacked the necessary fiscal resources and 79% of CA respondents said the same.
- Only a slim majority of municipal respondents (52%) believe the public is willing to pay more for water, while a majority of respondents believe that other users (industry, agriculture, developers) are not willing to pay more for water. CA respondents are more optimistic with 75% believing the public is more willing to, 58% believing industry will, and 37.5% believing developers are willing to pay more for water. Interestingly, only 12.5% of CA respondents believe agricultural users are willing to pay more for water in contrast with 25% of municipal respondents.

Question 6: What in your opinion are the most important uses of water? [top three]

Figure 4: Most Important Uses of Water (Municipal Respondents)



Question 7: What are the three top priorities of your organization in terms of water management? [top three]

Figure 5a: Top Three Organizational Priorities (Municipal Respondents)

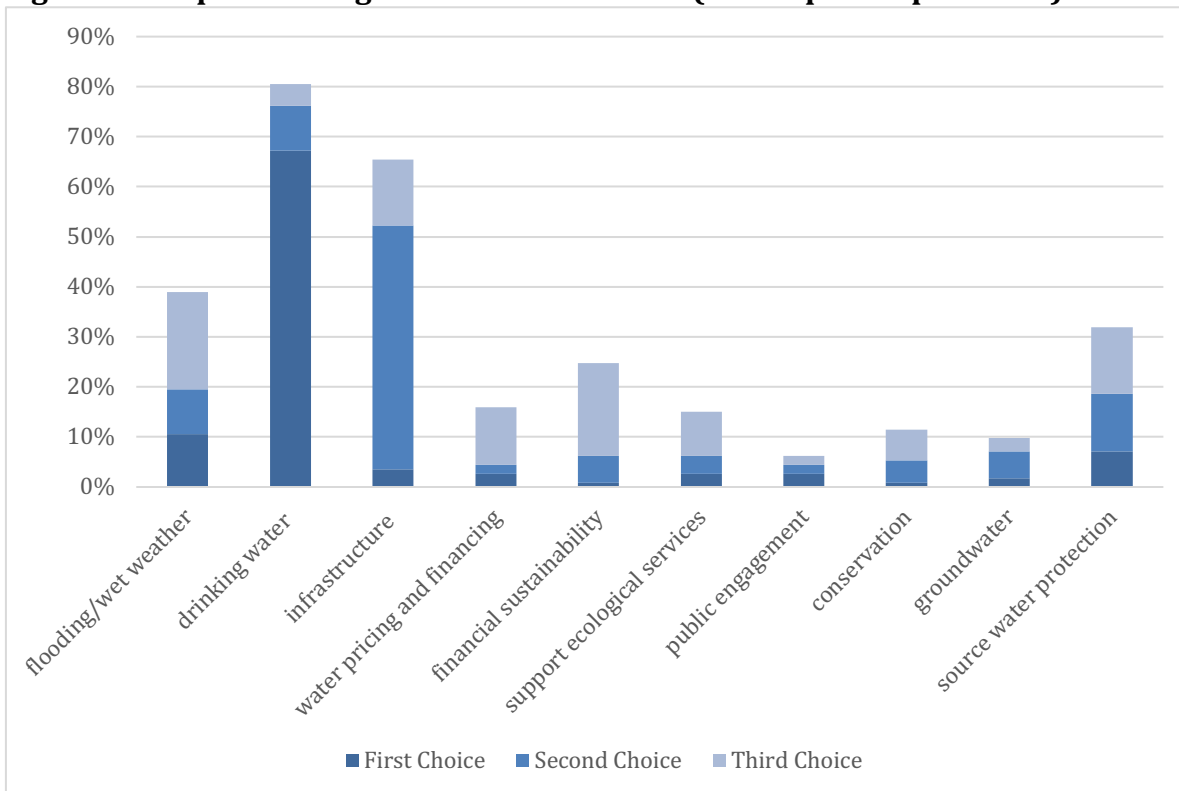
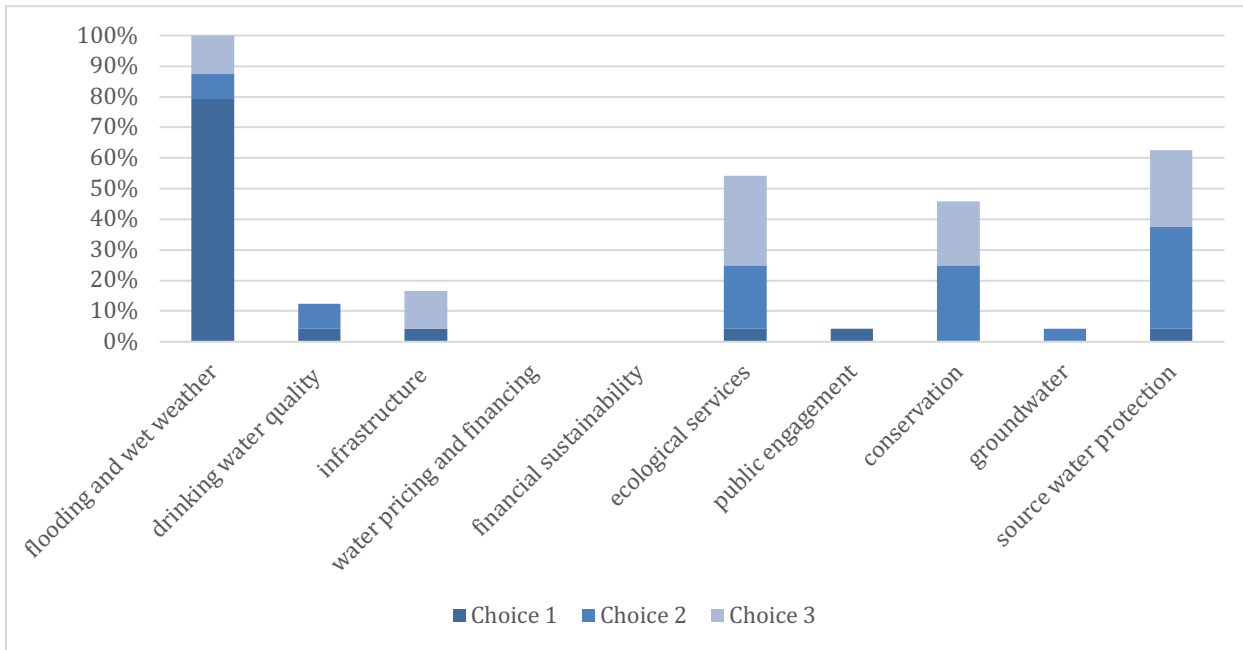


Figure 5b: Top Three Organizational Priorities (CA Respondents)



Question 9: To meet the priorities above, which of the following resources does your organization lack? [top three]

Figure 6a: Organization Resources Lacking (Municipal Respondents)

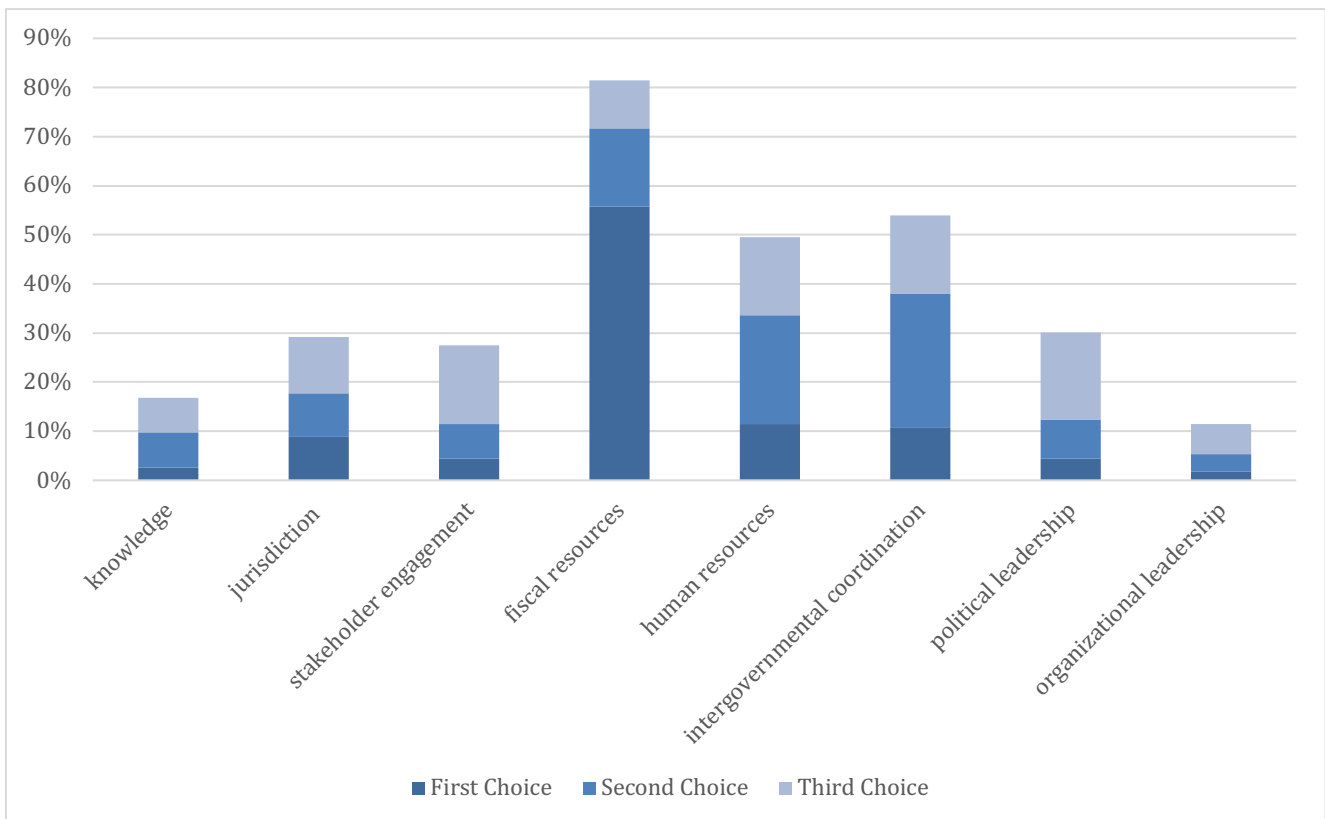
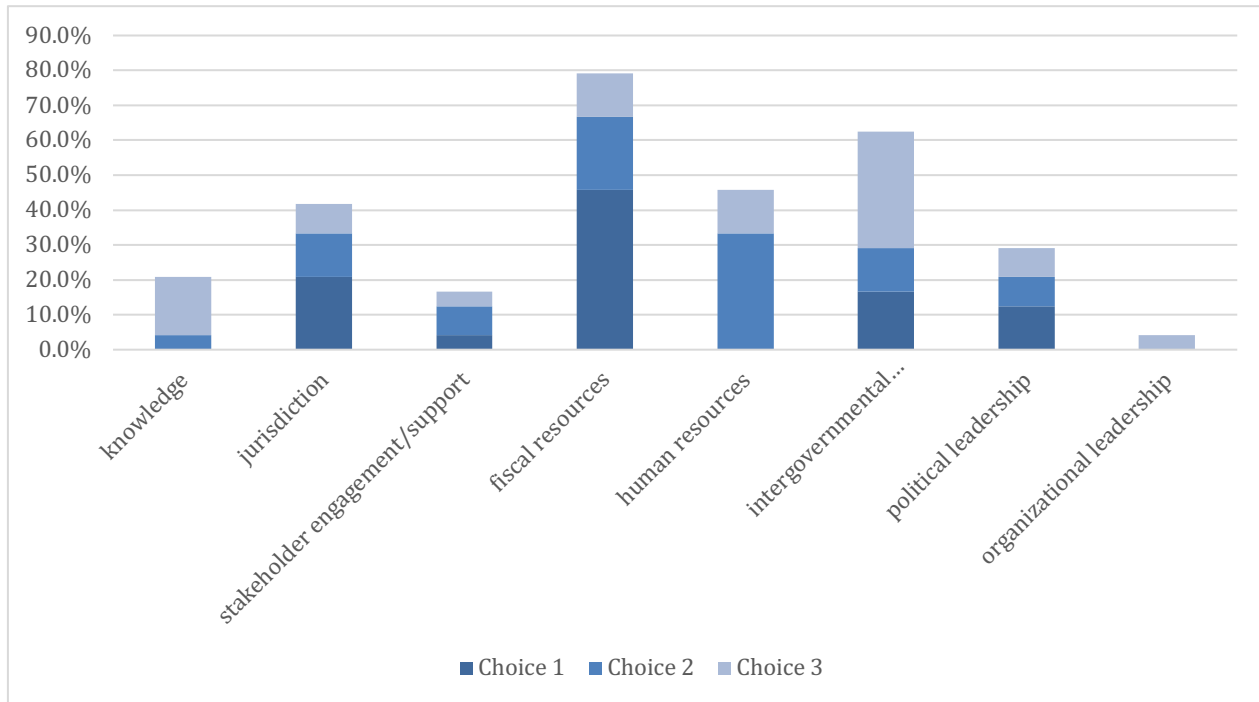
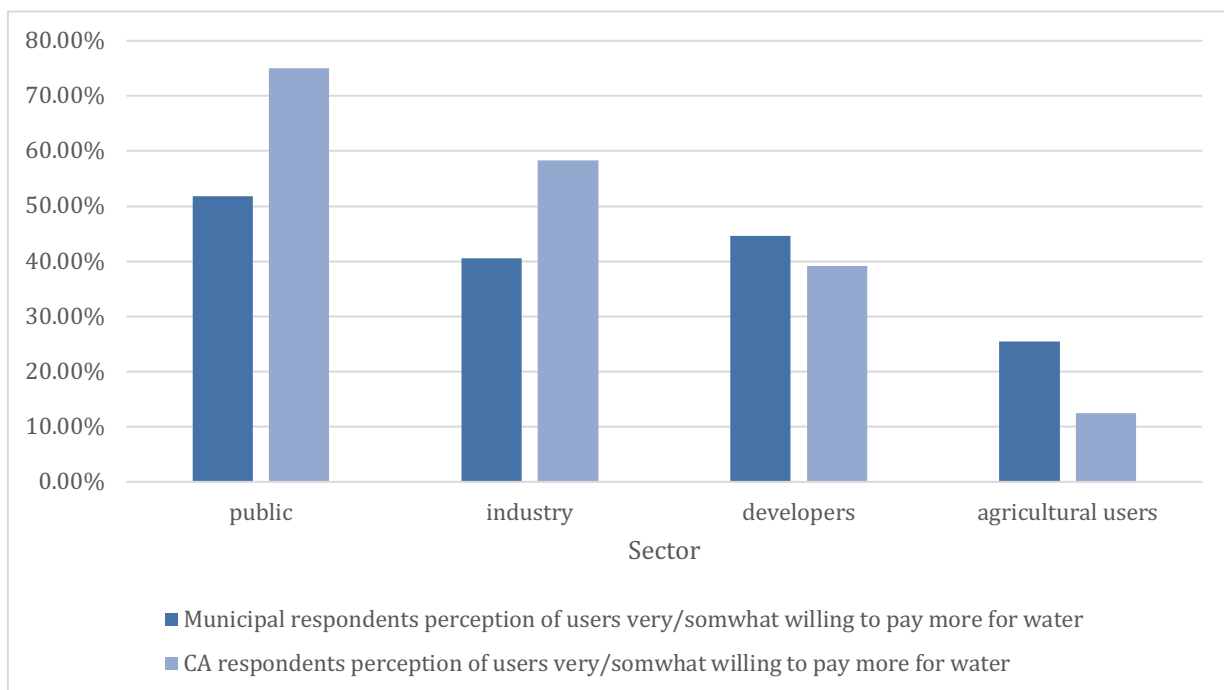


Figure 6a: Organization Resources Lacking (CA Respondents)



Question 10: In your opinion, how willing are the following to pay more for water services?

Figure 7: Perceptions of Willingness to Pay More for Water



Challenges for Water Management

The third section of the survey was intended to capture our respondent's opinions about the biggest challenges that their organization and the province face today and in the future. The survey shows that there is a significant diversity of challenges municipalities and CAs currently face around water management. Responses about the most significant challenges were relatively evenly distributed but a small majority of respondents suggesting that inadequate infrastructure was the number one challenge at the municipal/watershed level. This is consistent with answers to question 14 about the most significant challenge related to water management in Ontario.

In terms of improving water management in Ontario, respondents identified improving revenue and improving regulations have the most potential. The focus on funding is consistent with the lack of fiscal resources identified in Section 2 as the primary impediment their organizations face when improving service. The responses to the question about the most significant future problems in Ontario also reflect the importance of infrastructure identified above.

Summary of Findings:

- 55% of municipal respondents believed that inadequate infrastructure was the most significant challenge to their municipality [Q13] and 63% responded that it was the most important challenge for water management in Ontario [Q14]. 62.5% of CA respondents believe that Climate change is the most significant challenge to their watershed [Q13] and 66% believe that climate change is the most important challenge for water management in Ontario [Q14].
- Just over 70% of respondents said improving revenue is the most important step to improving water management in Ontario [Q15]. Only 12.5% of CA respondents believed the same while 63% believed that improving the knowledge/behavior of water users was the most important.
- The findings related to which technologies will be the most significant in addressing future water challenges in Ontario was mixed; most municipal respondents expressed that several different technologies will be somewhat significant; with 42% indicating smart technologies for industrial and commercial users will be very significant [Q16]. Over 90% of CA respondents believed green infrastructure will be very/somewhat significant and over 70% responding that the other listed technologies will be very/somewhat significant.
- 28% of municipal respondents replied that infrastructure will be the most important issue in Ontario 20 years from now followed by 21% each who said drinking water and water quality [Q17]. 27% of CA respondents reported that flooding will be the most important issue in Ontario 20 years followed by 18% that reported infrastructure.

Question 11: What, in your opinion, are the most significant threats/challenges related to water in your municipality/watershed? [top three]

Figure 8: Threats to Municipal Water (Municipal Respondents)

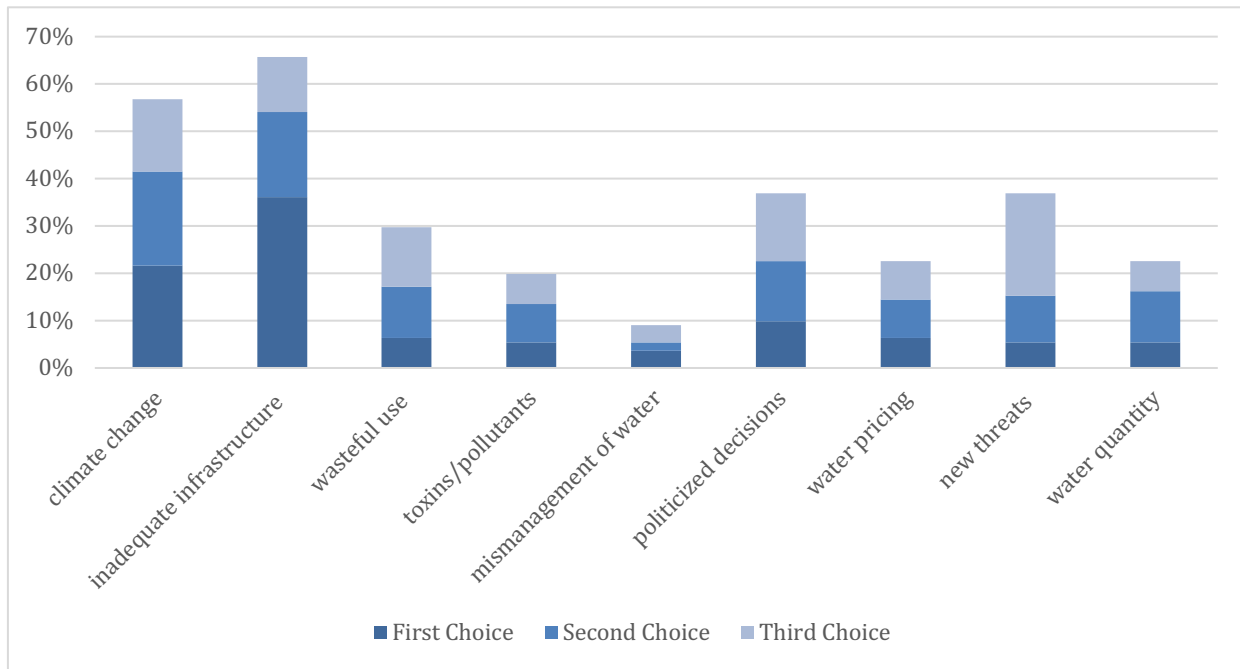
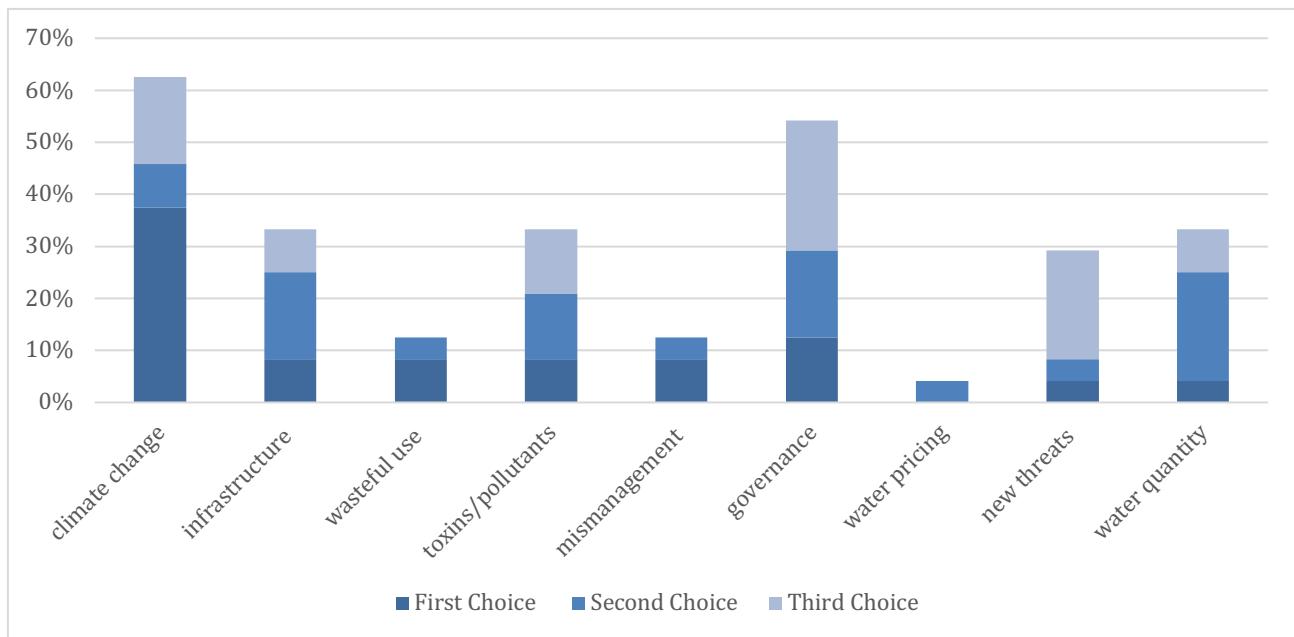


Figure 8b: Threats to Watershed (CA Respondents)



Question 12: What, in your opinion, are the most significant threats/challenges related to water in Ontario? [top three]

Figure 9a: Threats to Ontario Water (Municipal Respondents)

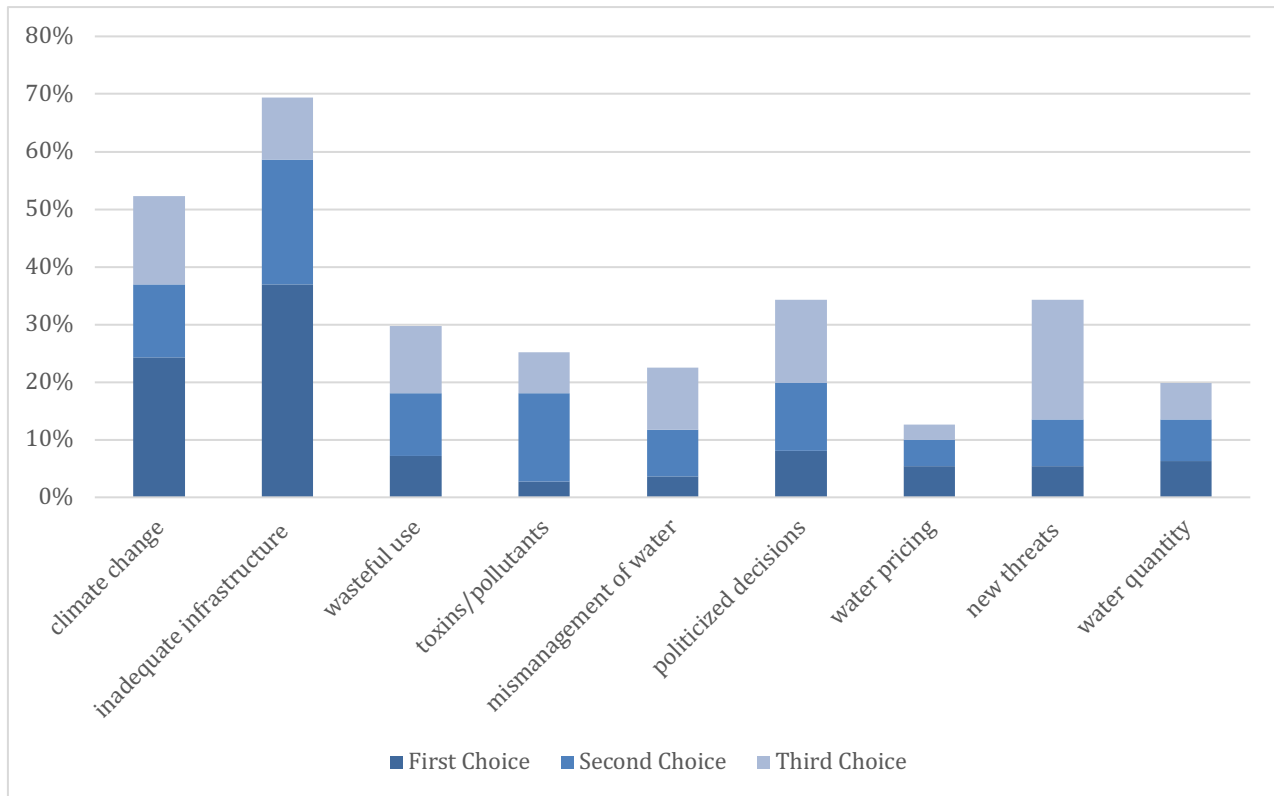
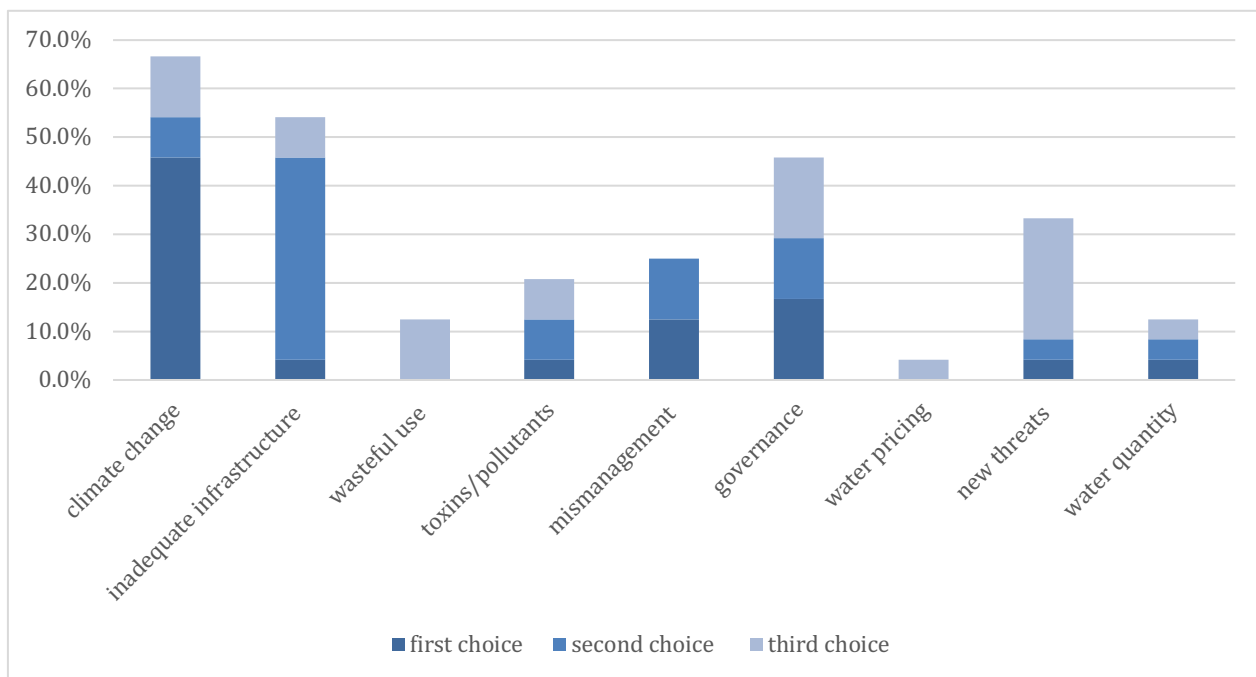


Figure 9b: Threats to Ontario Water (CA Respondents)



Question 13: Which of the following policy/governance approaches have the most potential to improve water management in Ontario in the future? [top three]

Figure 10a: Improving Water Management in Ontario (Municipal Respondents)

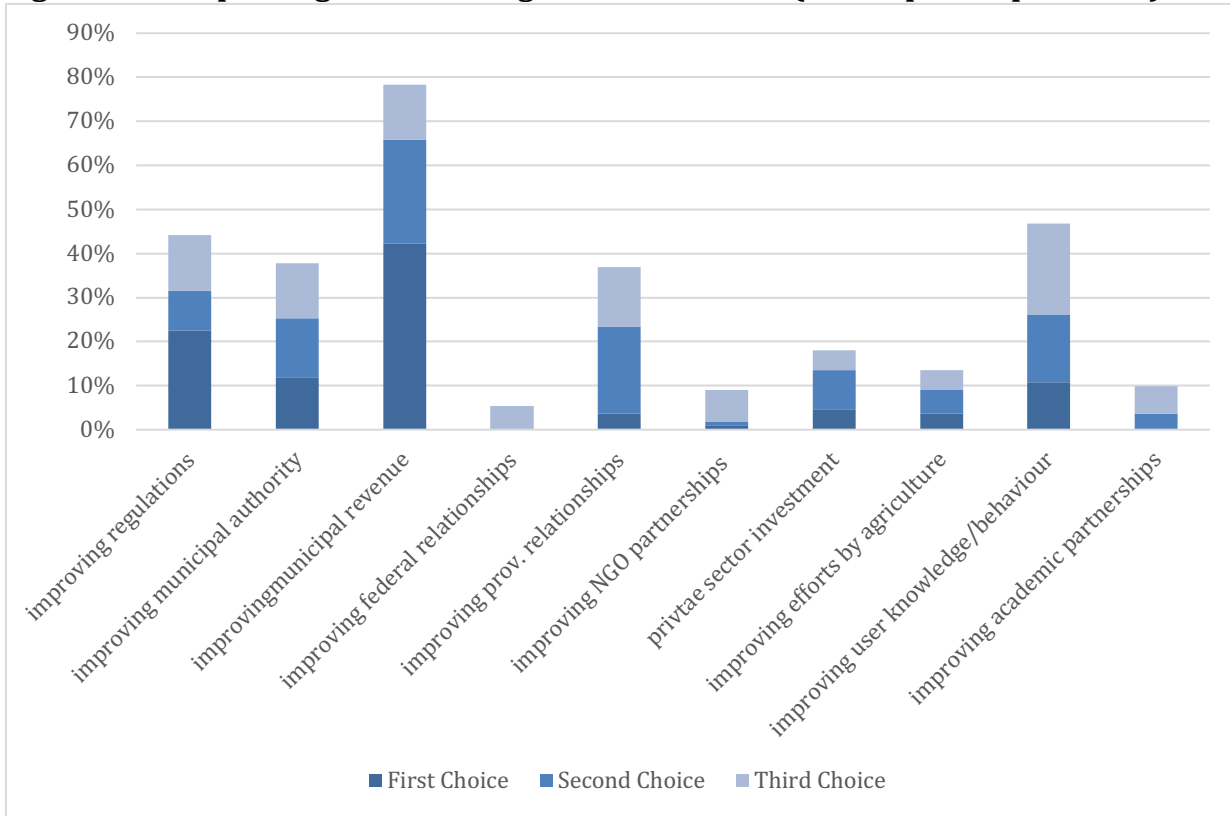
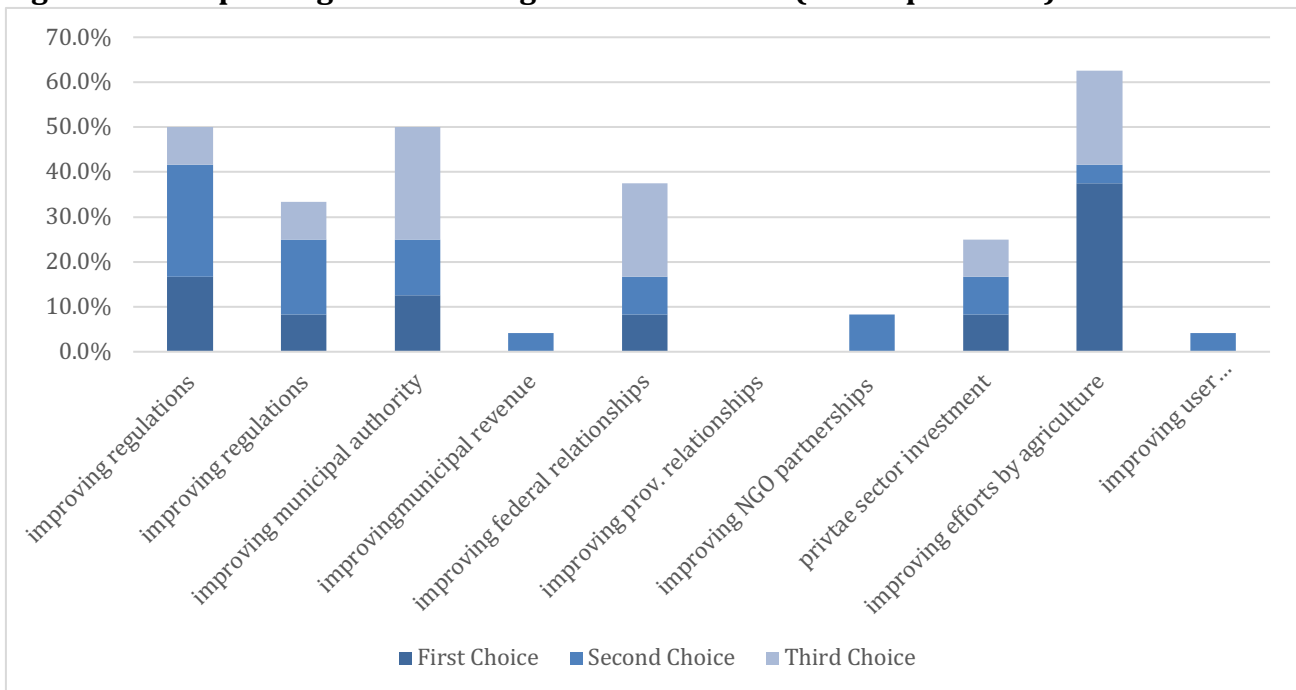
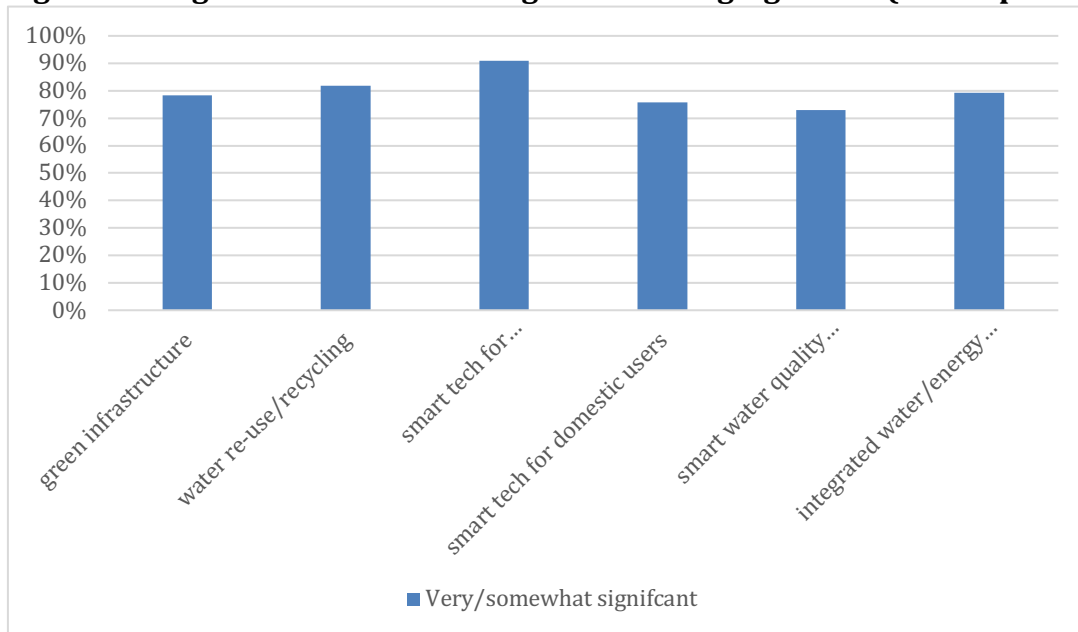


Figure 10b: Improving Water Management in Ontario (CA Respondents)



Question 14: How significant do you think the following technologies will be in addressing water management challenges in Ontario in the future?

Figure 11: Significance of Technologies for Managing Water (Municipal Respondents)



Question 15: What will be the most important water related issue in Ontario 20 years from now?

Figure 12a: Most Important Future Water Issues (Municipal Respondents)

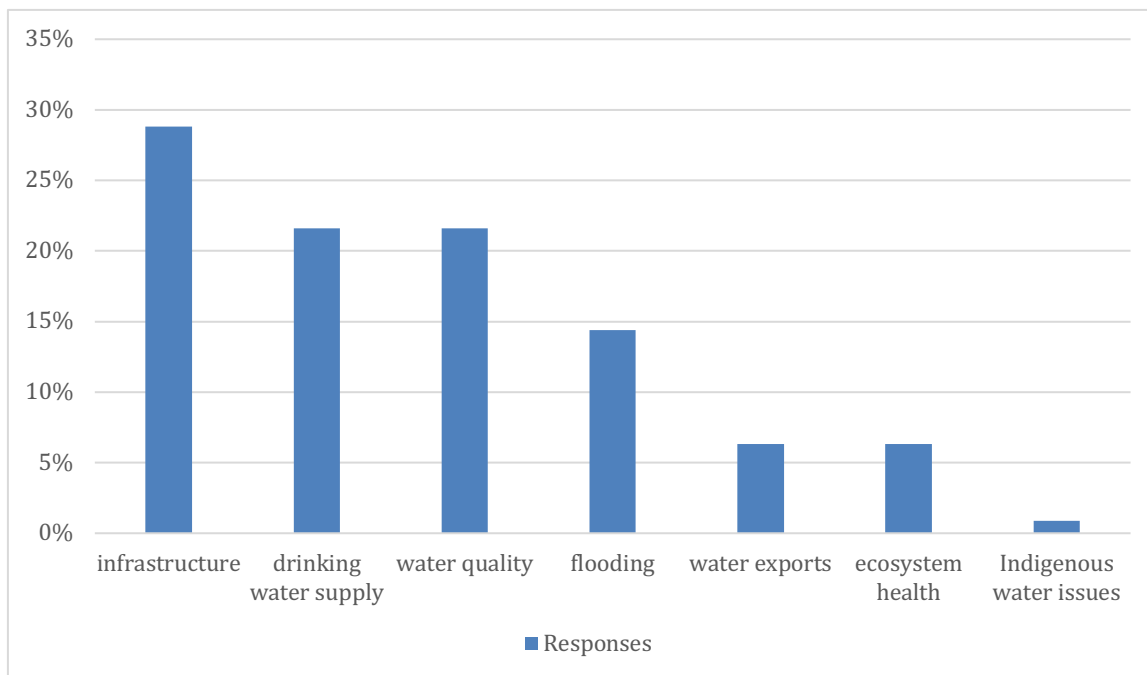
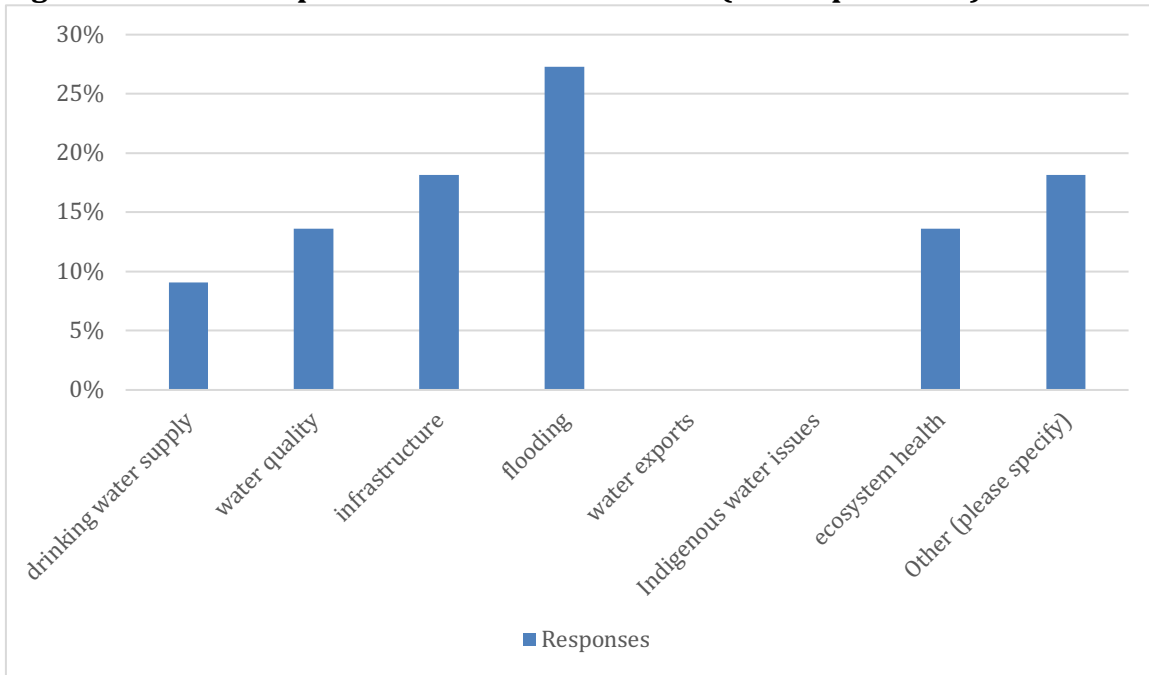


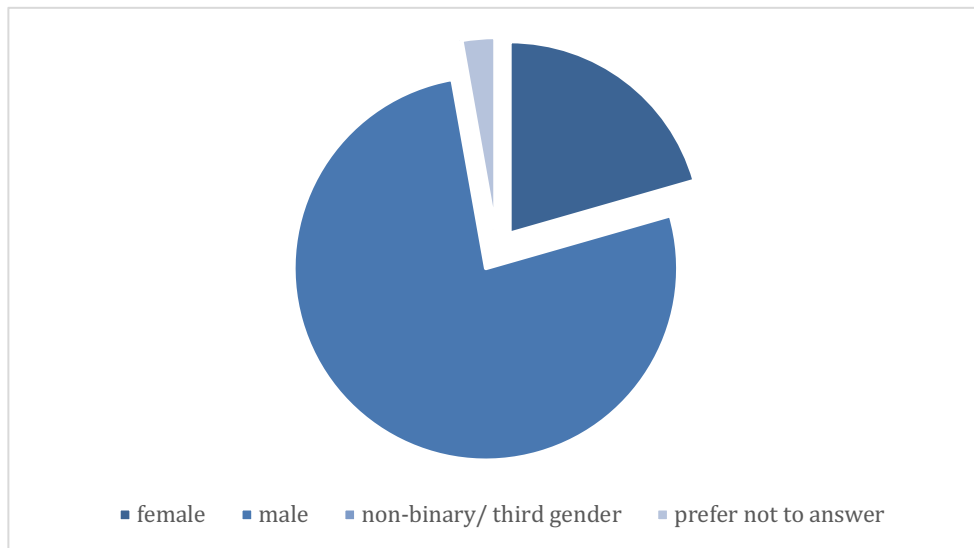
Figure 12b: Most Important Future Water Issues (CA Respondents)



Demographic Profile of Respondents

The final section of the survey presents findings from several demographic questions asked in the survey. It also includes a summary of responses related to the willingness of our respondents to participate in future surveys. Our respondents are mostly male with science and engineering backgrounds. . These are expected findings but do raise interesting questions about the effect of gender and educational background on the opinions of water leaders and we hope to include this in the final analysis. Encouragingly, more than half of respondents are interested in having their voices included in future research.

- Over 76% of respondents from both municipal and CAs were male



- Over 58% of municipal respondents reported that their educational background is engineering while the next most common categories were planning (16.67%) and science (12.9%). Those who checked other (10 respondents) provided answers such as construction/plumbing (3) and environmental management (2). CA respondents were evenly distributed among the same areas of engineering (27%), planning (22%), and science (27%).
- Question 21 had 14 respondents who checked other and answers included operations (5), drainage management (2), and wastewater treatment (3).
- 86% of municipal respondents and 90% of CA respondents consider themselves one of the water leaders in their organization
- 55% of municipal respondents and 68% of CA respondents agreed to participate in future panels and surveys.

Appendix 1: Data Tables

Table 1a: Primary Focus of Work (Municipal respondents)

Answer Choices	Responses	
water distribution/supply	67.74%	84
wastewater	62.10%	77
stormwater	59.68%	74
watersheds	41.13%	51
water treatment	40.32%	50
well water	37.90%	47
small systems	29.03%	36
Other (please specify)	15.32%	19
water reuse	9.68%	12

Table 1b Primary Focus of Work (CA respondents)

Answer Choices	Responses	
watershed protection	91.67%	22
flood management	83.33%	20
stormwater	70.83%	17
well water	41.67%	10
small systems	12.50%	3
wastewater	8.33%	2
water distribution/supply	4.17%	1
water reuse	4.17%	1
water treatment	0.00%	0
Other (please specify)	25.00%	6

Table 2a: Function of Work Related to Water (Municipal respondents)

Answer Choices	Responses	
policy, planning, and/or regulatory compliance	79.03%	98
operations	62.90%	78
water infrastructure maintenance	61.29%	76
water infrastructure construction	54.03%	67
water finance/costing	41.13%	51
communications	40.32%	50
research & development/technology/innovation	13.71%	17
Other (please specify)	8.06%	10

Table 2b: Function of Work Related to Water (CA respondents)

Answer Choices	Responses	
policy, planning, and/or regulatory compliance	83.33%	20
water education	54.17%	13
communications	45.83%	11
research & development/technology/innovation	41.67%	10
operations	20.83%	5
water infrastructure maintenance	16.67%	4
water infrastructure construction	8.33%	2
water finance/costing	0.00%	0
Other (please specify)	20.83%	5

Table 3a: Most Important Uses of Water (Municipal Respondents)

	1	2	3	Total	Weighted Average
drinking water	88.39%	8.04%	3.57%	112	1.15
ecological services (habitat, biodiversity)	9.88%	55.56%	34.57%	81	2.25
agriculture	3.85%	52.56%	43.59%	78	2.4
industrial/commercial	0.00%	40.74%	59.26%	27	2.59
recreation/ tourism	8.57%	17.14%	74.29%	35	2.66
commercial/sport fishing	0.00%	33.33%	66.67%	3	2.67
spiritual/cultural	0.00%	0.00%	100.00%	3	3
Other (please specify)				3	

Table 4a: Top Three Organizational Priorities (Municipal Respondents)

	1	2	3	Total/113	Weighted Average
drinking water					
quality/supply/distribution	83.52%	10.99%	5.49%	91	1.22
public engagement	42.86%	28.57%	28.57%	7	1.86
groundwater	18.18%	54.55%	27.27%	11	2.09
infrastructure					
renewal/maintenance/construction/resiliency	5.41%	74.32%	20.27%	74	2.15
source water protection	22.22%	36.11%	41.67%	36	2.19
flooding and wet weather	27.27%	22.73%	50.00%	44	2.23
water quality to support ecological services	17.65%	23.53%	58.82%	17	2.41
conservation	7.69%	38.46%	53.85%	13	2.46
water pricing and financing	16.67%	11.11%	72.22%	18	2.56
financial sustainability	3.57%	21.43%	75.00%	28	2.71
Other (please specify)				2	

Table 4b: Top Three Organizational Priorities (CA Respondents)

	1	2	3	Total/24	Weighted Average
public engagement	100.00%	0.00%	0.00%	1	1
flooding and wet weather	79.17%	8.33%	12.50%	24	1.33
drinking water					
quality/supply/distribution	33.33%	66.67%	0.00%	3	1.67
groundwater	0.00%	100.00%	0.00%	1	2
source water protection	6.67%	53.33%	40.00%	15	2.33
conservation	0.00%	54.55%	45.45%	11	2.45
water quality to support ecological services	7.69%	38.46%	53.85%	13	2.46
infrastructure					
renewal/maintenance/construction/resiliency	25.00%	0.00%	75.00%	4	2.5
water pricing and financing	0.00%	0.00%	0.00%	0	0
financial sustainability	0.00%	0.00%	0.00%	0	0
Other (please specify)				1	

Table5a: Priority of Government Spending (Municipal Respondents)

	1	2	3	Total	Weighted Average
drinking water supply	61.90%	23.81%	14.29%	42	1.52
water treatment systems upgrading/repairing infrastructure	46.34%	29.27%	24.39%	41	1.78
sewage collection and treatment	36.71%	32.91%	30.38%	79	1.94
stormwater management	24.00%	46.00%	30.00%	50	2.06
protecting against extreme weather and flooding/climate change	23.33%	36.67%	40.00%	30	2.17
asset management	22.50%	35.00%	42.50%	40	2.2
green infrastructure	22.50%	25.00%	52.50%	40	2.3
integrating new technologies	11.11%	44.44%	44.44%	9	2.33
Other (please specify)	12.50%	37.50%	50.00%	8	2.38
				6	

Table5b: Priority of Government Spending (CA Respondents)

	1		2		3		Total	Weighted Average
water treatment systems	50.00%	1	50.00%	1	0.00%	0	2	1.5
drinking water supply	53.85%	7	38.46%	5	7.69%	1	13	1.54
sewage collection and treatment	40.00%	2	40.00%	2	20.00%	1	5	1.8
upgrading/repairing infrastructure	14.29%	1	28.57%	2	57.14%	4	7	2.43
green infrastructure	0.00%	0	10.00%	1	90.00%	9	10	2.9
stormwater management	14.29%	1	57.14%	4	28.57%	2	7	2.14
protecting against extreme weather and flooding/climate change	55.00%	11	30.00%	6	15.00%	3	20	1.6
integrating new technologies	0.00%	0	0.00%	0	100.00%	1	1	3
asset management	14.29%	1	42.86%	3	42.86%	3	7	2.29
Other (please specify)							2	

Table 6a: Organization Resources Lacking (Municipal Respondents)

	1	2	3	Total	Weighted Average
fiscal resources	68.48%	19.57%	11.96%	92	1.43
jurisdiction (legal/regulatory authority)	30.30%	30.30%	39.39%	33	2.09
human resources	23.21%	44.64%	32.14%	56	2.09
intergovernmental coordination/support	19.67%	50.82%	29.51%	61	2.1
knowledge	15.79%	42.11%	42.11%	19	2.26
organizational leadership	15.38%	30.77%	53.85%	13	2.38
stakeholder engagement/support	16.13%	25.81%	58.06%	31	2.42
political leadership	14.71%	26.47%	58.82%	34	2.44
Other (please specify)				7	

Table 6b: Organization Resources Lacking (CA Respondents)

	1		2		3		Total	Weighted Average
knowledge	0.00%	0	20.00%	1	80.00%	4	5	2.8
jurisdiction (legal/regulatory authority)	50.00%	5	30.00%	3	20.00%	2	10	1.7
stakeholder engagement/support	25.00%	1	50.00%	2	25.00%	1	4	2
fiscal resources	57.89%	11	26.32%	5	15.79%	3	19	1.58
human resources	0.00%	0	72.73%	8	27.27%	3	11	2.27
intergovernmental coordination/support	26.67%	4	20.00%	3	53.33%	8	15	2.27
political leadership	42.86%	3	28.57%	2	28.57%	2	7	1.86
organizational leadership	0.00%	0	0.00%	0	100.00%	1	1	3
Other (please specify)							4	

Table 7a: Perceptions of Willingness to Pay More for Water (Municipal Respondents)

	Very willing	Somewhat willing	Somewhat unwilling	Very unwilling	Total
public	3.57%	48.21%	28.57%	19.64%	112
industry	3.60%	36.94%	49.55%	9.91%	111
developers	4.46%	40.18%	36.61%	18.75%	112
agricultural users	1.89%	23.58%	40.57%	33.96%	106

Table 7b: Perceptions of Willingness to Pay More for Water (CA Respondents)

	Very Willing	Somewhat Willing	Somewhat Unwilling	Very Unwilling	Total
public	4.17%	70.83%	16.67%	8.33%	24
industry	12.50%	45.83%	33.33%	8.33%	24
developers	4.35%	34.78%	34.78%	26.09%	23
agricultural users	0.00%	12.50%	50.00%	37.50%	24

Table 8a: Threats to Municipal Water (Municipal Respondents)

	1	2	3	Total	Weighted Average
inadequate infrastructure (leaking pipes etc.)	54.79%	27.40%	17.81%	73	1.63
global warming and climate change	38.10%	34.92%	26.98%	63	1.89
mismanagement of water systems	40.00%	20.00%	40.00%	10	2
water quantity	24.00%	48.00%	28.00%	25	2.04
legal/illegal sources of					
toxins/pollutants	27.27%	40.91%	31.82%	22	2.05
water pricing	28.00%	36.00%	36.00%	25	2.08
politicized decisions/governance	26.83%	34.15%	39.02%	41	2.12
wasteful use by					
consumers/agriculture/industry	21.21%	36.36%	42.42%	33	2.21
new threats (plastic fibres and particles, invasive species, bacterial, pharmaceuticals)	14.63%	26.83%	58.54%	41	2.44
Other (please specify)				6	

Table 8b: Threats to Watershed (CA Respondents)

	1	2	3	Total	Weighted Average
global warming and climate change	60.00%	13.33%	26.67%	15	1.67
inadequate infrastructure (leaking pipes etc.)	25.00%	50.00%	25.00%	8	2
wasteful use by					
consumers/agriculture/industry	66.67%	33.33%	0.00%	3	1.33
legal/illegal sources of					
toxins/pollutants	25.00%	37.50%	37.50%	8	2.13
mismanagement of water systems	66.67%	33.33%	0.00%	3	1.33
politicized decisions/governance	23.08%	30.77%	46.15%	13	2.23
water pricing	0.00%	100.00%	0.00%	1	2
new threats (plastic fibres and particles, invasive species, bacterial, pharmaceuticals)	14.29%	14.29%	71.43%	7	2.57
water quantity	12.50%	62.50%	25.00%	8	2.13
Other (please specify)				4	

Table 9a: Threats to Ontario Water (Municipal Respondents)

	1	2	3	Total	Weighted Average
inadequate infrastructure (leaking pipes etc.)	53.25%	31.17%	15.58%	77	1.62
water pricing	42.86%	35.71%	21.43%	14	1.79
global warming and climate change	46.55%	24.14%	29.31%	58	1.83
water quantity	31.82%	36.36%	31.82%	22	2
wasteful use by consumers/agriculture/industry	24.24%	36.36%	39.39%	33	2.15
legal/illegal sources of toxins/pollutants	10.71%	60.71%	28.57%	28	2.18
politicized decisions/governance	23.68%	34.21%	42.11%	38	2.18
mismanagement of water systems	16.00%	36.00%	48.00%	25	2.32
new threats (plastic fibres and particles, invasive species, bacterial, pharmaceuticals)	15.79%	23.68%	60.53%	38	2.45
Other (please specify)				3	

Table 9b: Threats to Ontario Water (CA Respondents)

	1	2	3	Total	Weighted Average
global warming and climate change	68.75%	12.50%	18.75%	16	1.5
inadequate infrastructure (leaking pipes etc.)	7.69%	76.92%	15.38%	13	2.08
wasteful use by consumers/agriculture/industry	0.00%	0.00%	100.00%	3	3
legal/illegal sources of toxins/pollutants	20.00%	40.00%	40.00%	5	2.2
mismanagement of water systems	50.00%	50.00%	0.00%	6	1.5
politicized decisions/governance	36.36%	27.27%	36.36%	11	2
water pricing	0.00%	0.00%	100.00%	1	3
new threats (plastic fibres and particles, invasive species, bacterial, pharmaceuticals)	12.50%	12.50%	75.00%	8	2.63
water quantity	33.33%	33.33%	33.33%	3	2
Other (please specify)				1	

Table 10a: Improving Water Management in Ontario (Municipal Respondents)

	1	2	3	Total	Weighted Average
improving sources of revenue for municipalities	54.02%	29.89%	16.09%	87	1.62
improving provincial/federal regulations	51.02%	20.41%	28.57%	49	1.78
investments from the private sector (ie. public-private partnerships)	25.00%	50.00%	25.00%	20	2
improving authorities for municipalities	30.95%	35.71%	33.33%	42	2.02
improving efforts by agriculture	26.67%	40.00%	33.33%	15	2.07
improving knowledge/behaviour of water users	23.08%	32.69%	44.23%	52	2.21
improving relations with provincial government	9.76%	53.66%	36.59%	41	2.27
improving academic partnerships	0.00%	36.36%	63.64%	11	2.64
improving partnerships with nongovernment organizations (NGOs)	10.00%	10.00%	80.00%	10	2.7
improving relations with federal government	0.00%	0.00%	100.00%	6	3
Other (please specify)				7	

Table 10b: Improving Water Management in Ontario (CA Respondents)

	1	2	3	Total	Weighted Average
improving provincial/federal regulations	33.33%	50.00%	16.67%	12	1.83
improving authorities for municipalities	25.00%	50.00%	25.00%	8	2
improving sources of revenue for municipalities	25.00%	25.00%	50.00%	12	2.25
improving relations with federal government	0.00%	100.00%	0.00%	1	2
improving relations with provincial government	22.22%	22.22%	55.56%	9	2.33
improving partnerships with nongovernment organizations (NGOs)	0.00%	0.00%	0.00%	0	0
investments from the private sector (ie. public-private partnerships)	0.00%	100.00%	0.00%	2	2
improving efforts by agriculture	33.33%	33.33%	33.33%	6	2
improving knowledge/behaviour of water users	60.00%	6.67%	33.33%	15	1.73
improving academic partnerships	0.00%	100.00%	0.00%	1	2
Other (please specify)				6	

Table 11: Level of Education

Answer Choices	Responses	
less than a high school diploma	0.00%	0
high school diploma or equivalent	6.48%	7
college diploma/certificate	38.89%	42
bachelor's degree (e.g. BEng, BA, BS)	34.26%	37
master's degree (e.g. MA, MSc)	14.81%	16
professional degree (e.g. MD, DDS, DVM)	1.85%	2
doctorate (e.g. PhD)	0.00%	0
Other (please specify)	3.70%	4

Table 12: Educational Background

Answer Choices	Responses	
science	12.96%	14
engineering	58.33%	63
planning	16.67%	18
medical	0.00%	0
law	0.00%	0
business	0.00%	0
economics	0.93%	1
social science	0.93%	1
arts	0.93%	1
Other (please specify)	9.26%	10

Table 13: Area of Expertise

Answer Choices	Responses	
engineering	37.04%	40
planning	13.89%	15
ecology	0.00%	0
environmental studies	4.63%	5
environmental science	8.33%	9
water resource management	13.89%	15
water policy	2.78%	3
water technology	4.63%	5
hydrology	0.00%	0
public health	1.85%	2
Other (please specify)	12.96%	14

Appendix 2: Consent Agreement

Title of Study: **Local Environment and Water Policy Thought Leaders Survey**

You are being asked to participate in a research study. Before you give your consent to be a volunteer, it is important that you read the following information and contact me with any questions you might have related to the study or your participation in it.

Principal Investigators:

Dr. Adam Thorn
Limited Term Faculty
Department of Politics and Public Administration
Ryerson University
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416-979-5000 x 3193

Dr. Carolyn Johns
Associate Professor
Department of Politics and Public Administration
Ryerson University
[cjohns@ryerson.ca]
416-979-5000 x 6146

Purpose of the Study:

The goal of this survey is to produce high quality social survey research about the opinions of water policy elites related to urban water and other environmental issues in order to produce knowledge that is valuable for the public and policy makers. The questions in the survey are designed to collect data on individuals and their opinions and perceptions about their organizations water management priorities and about water management in Ontario broadly.

The questionnaire, administered through a software package called *Survey Monkey*, contains questions that ask participants identify current priorities and future challenges to water management faced by their organization and in the province of Ontario. In order for the survey to generate useful results, we need participation from as many water management policy experts and practitioners as possible.

Description of the Study: Participants in this study will be asked to: 1) review this background information on the project and consent form; 2) consent to participate; and 3) click a link to complete the online survey.

The questionnaire will take approximately 15 minutes of your time to complete.

It includes questions in three parts: 1) general background questions; 2) specific questions about priorities and challenges in water management; 3) demographic questions.

The data analysis for this survey will take place at Ryerson University by the Principal Investigators and two graduate student research assistants. Only these four team members will have access to the primary data and be involved in data aggregation.

Risks or Discomforts: The risks associated with participating are minimal. If you chose to participate in this study you will be asked for your expertise and opinions about water management in your organization and the province. You and other individuals you identify with expertise related to this topic will not be revealed in any research results by name. Confidentially and anonymity will be ensured by only using aggregate numbers to report findings. No titles or any other information that will disclose your identity will be used in presentations or publications of the findings.

If any of the questions make you feel uncomfortable you may discontinue participation in the survey, either temporarily or permanently. You can start the questionnaire, save it and then return to complete it at any time or stop participation altogether at any time.

Benefits of the Study: The benefits of this study relate to the new social science knowledge that will be generated about the management of water in Ontario. By participating in this survey you will contribute to knowledge about the current priorities and future challenges facing the management of water in Ontario. Participants in this study will benefit by receiving email notices of presentations and publications that are produced from this study. However, you will not receive any compensation or direct benefits from participating in this study and your participation is totally voluntary.

Alternative Methods: If you prefer to complete this questionnaire in hard copy form rather than online, we would be happy to mail you a hard copy with a postage-paid return envelope. If you prefer the survey be sent to an email address other than your organizational email address, please let us know.

Confidentiality: Confidentiality of responses received will be ensured by only presenting aggregate results and no identifiable information that may risk your confidentiality or the confidentiality of any other individuals you identify in response to the survey questions. Only numbers and organization names will be used to report findings in presentations or publications. Digital data from the survey will only be analysed and aggregated by the three members of the survey research team and will be stored on password-protected computers. Only aggregated data will be analysed and used in reports and publications. The data will be stored for two years after the completion of the survey (until June 2020). It will then be erased. Confidentiality will be maintained to the extent allowed by law.

Incentives to Participate: Participants will not be paid to participate in this study.

Costs: There are no costs for participation other than participant's time and access to a computer or mobile device.

Voluntariness: Participation in this study is voluntary. Your choice of whether or not to participate will not influence your future relations with Ryerson University. If you decide to participate, you are free to withdraw your consent and to stop your participation at any time by simply exiting the survey and your data will not be collected or submitted.

At the end of the survey you will be invited to indicate your interest in joining a panel of experts who will be surveyed once or twice per year about water and related environmental issues in your organization, region, and the province. This is voluntary and your willingness to participate in that panel in no way will effect your participation in this survey.

Questions about the Study: If you have any questions about the research after reading the background information and consent agreement please use the addresses listed above.

The Ryerson University Research Ethics Board has approved this research project. If you have questions regarding your rights as a human subject and participant in this study, you may contact the Ryerson University Research Ethics Board for information.

Research Ethics Board
c/o Office of the Vice President, Research and Innovation
Ryerson University [rebchair@ryerson.ca]
350 Victoria Street
Toronto, ON M5B 2K3
416-979-5042

Agreement:

Your consent to participate indicates that you have read the information in this agreement and have had a chance to ask any questions you have about the study. Your consent also indicates that you agree to be in the study and have been told that you can change your mind and withdraw your consent to participate at any time. You have been given a copy of this agreement.

You have three options in terms of providing your consent to participate:

1. BY CLICKING ON THE BOX INDICATING YOU ARE GRANTING YOUR INFORMED CONSENT TO PARTICIPATE.
2. You may also give consent by emailing adam.thorn@ryerson.ca and just indicating in the text of your email that you have read the consent agreement and are granting your informed consent to participate.
3. Finally, you have the option of printing, signing, scanning and returning a copy of this consent agreement to Dr. Adam Thorn at the email or mailing address above.

Consent for participation: _____ Date: _____

Consent to participate in future panels: _____ Date: _____

You have been told that by indicating informed consent by proceeding with the survey, providing your consent via email, or signing this consent agreement you are not giving up any of your legal rights.

Appendix 3: Recruitment Letter

Dear Potential Research Participant:

My name is Adam Thorn and I am a researcher at Ryerson University in the Department of Politics and Public Administration. In collaboration with Carolyn Johns from the Department of Politics and Public Administration at Ryerson University and Ryerson Urban Water, I am emailing you today in hopes that you will agree to participate in a research study to share your opinions related to water management priorities in your organization and about water management in Ontario broadly.

The goal of this survey is to produce high quality social survey research from local environmental and water leaders related to urban water and other environmental issues in order to produce knowledge that is valuable for the public and policy makers. At the end of the survey you will be invited to indicate your interest in joining a panel of experts who will be surveyed once or twice per year about water and related environmental issues in your organization, region, and the province.

If you chose to participate in this study you will be asked to provide your insights on this important issue. **Results presented and published from this survey will not reveal your identity or individual responses. Participant's names or organizational affiliation will not be used in any reported findings.**

In order for the survey to generate useful results, we need participation from as many participants as possible. If you are interested and willing to participate please click on the survey link below. You will be presented with the related research ethics documentation and consent agreement. After providing your informed consent you will then be provided with 25 survey questions. Completing **the survey will take approximately 15 minutes** of your time and you can start, stop, continue and submit the survey at anytime. If you choose to discontinue your participation at any time your responses will not be included in our analysis.

The Ryerson University Research Ethics Board has approved this research project. Should you have any questions about the study, research ethics and the consent agreement or the survey itself, please do not hesitate to contact us using the contact information below. Thank you very much. We really appreciate your participation we will email you a summary of findings in the coming months.

Sincerely,

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