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National Climate Change Adaptation Survey (2023) Final Report

Prepared for Natural Resources Canada

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Canada

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March 2023

This public opinion research report presents the results of a telephone survey and in-depth interviews conducted by Earnscliffe Strategy Group on behalf of Natural Resources Canada. The quantitative research was conducted from November 2022 to March 2023 and the qualitative research was conducted from November 2022 to January 2023.

Cette publication est aussi disponible en français sous le titre : Enquête nationale sur l'adaptation au changement climatique (2023)

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National Climate Change Adaptation Survey (2023)

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Executive Summary

Earnscliffe Strategy Group (Earnscliffe) is pleased to present this report to Natural Resources (NRCan) summarizing the results of quantitative and qualitative research undertaken to assess Canada's progress in addressing climate change adaptation.

In 2009, a National Climate Change Adaptation Benchmark Survey was conducted to establish a benchmark to evaluate progress on adapting to climate change and indirectly, the impact of the adaptation programming by the Government of Canada. The survey targeted government and business decision-makers and gathered information about their awareness and understanding of the potential impacts of climate change; whether and how their organizations are currently adapting; and barriers to action. This research was also used to inform federal program design.

A second research project, conducted by Earnscliffe in 2018, updated the information with a focus on communities and businesses in the natural resource sector. It examined Canada's progress in addressing climate change adaptation. Specifically, it measured changes in awareness and actions on adaptation in communities and businesses; assessed decision-making information and tools; and identified barriers to action. These results were used to support public reporting of progress on adaptation.

Building on this previous work, this project sought to update and expand on the 2018 findings with the goals of assessing progress towards addressing climate change adaptation and support public reporting on adaptation efforts. The contract value for this project was $133,063.15 including HST.

To meet the research objectives, Earnscliffe conducted a two-phased research program involving both quantitative and qualitative research that ran concurrently.

For the quantitative phase we conducted a telephone survey in collaboration with our quantitative subcontractor, Leger. The survey was conducted via telephone from Léger's centralized call-centre using state of the art Computer Aided Telephone Interviewing (CATI) system. The total sample was 361 individuals, including 152 who occupy Chief, Manager or Director of Planning positions in municipalities across Canada and 209 individuals occupying Head of Operations or Chief Risk Officer positions in natural resource industries across Canada. The survey was conducted between November 7, 2022, and March 15, 2023, and the average length of each interview was 17 minutes.

For both the municipal and business samples, stratified random sampling was used. In the case of municipalities, the final sample was weighted to match the unweighted distribution obtained in 2018 in order to make the results as comparable as possible. The aggregate municipal results can be considered accurate to within +/-7.7% at the 95% confidence level.

In the case of the business sample, since the relative sizes of the sectors in the stratified quota structure was not reflective of reality, a weight was applied by sector so that that aggregate results of the business sample results would be representative of the combined universe being studied. Due to sampling limitations, the responses from medium and large businesses were

combined in all sectors except power, where only one category was possible. The aggregate business results can be considered accurate to within +/-6.7% at the 95% confidence level.

The qualitative phase consisted of 18 in-depth interviews with representatives from associations representing small businesses and commerce, as well as with companies in the oil and gas, mining, forestry, and utilities industries. Some interviews were also conducted with associations representing municipalities and representatives from municipalities in coastal regions. The purpose of the qualitative research was to gather some deeper insights from specific perspectives that may not have been explored in detail in the survey. The interviews were conducted between November 27, 2022, and January 29, 2023.

For the purposes of this report, wherever findings from the in-depth interviews are presented, it is important to note that qualitative research is a form of scientific, social, policy, and public opinion research. Qualitative research is designed to elicit the full range of ideas, attitudes, experiences, and opinions of a selected sample of participants on a defined topic. Because of the small numbers involved, the participants are not representative in a statistical sense of the larger population from which they are drawn, and findings cannot reliably be generalized beyond their number.

The key findings of this research are presented separately for each of the two samples: business and municipal.

Business Findings

Awareness and Impression of Climate Change Relevance

- In line with results for 2018, seven in ten (69%) respondents say that climate change is happening right now. Another 14% of respondents say that climate change is not happening right now, but will happen in the foreseeable future, while 11% say it is not happening now and will not happen in the foreseeable future.

- Among those who feel that climate change is not happening now but will in the future, a plurality (37%) believe climate change is likely to start impacting the regions in which their business operates in 6 to 10 years while a quarter (25%) and one fifth (19%) say the same of 20 or more years and 1 to 5 years respectively.

- Those who indicated that they feel climate change is happening, or that it will in the foreseeable future, were asked about the impact. A quarter said it would be major (24%), two in five said it would be moderate (42%), and another quarter said it would be minor (23%).

- Echoing 2018, more frequent or more severe weather events and storms was again the most likely to be selected by respondents as the most serious impact (at 18%) of a changing climate over the next 20 years. This was followed by economic effects (10%), wildfires (8%), and heat waves (7%).

- Respondents are equally split between those who say a changing climate is having an impact on the organization (37%) and those who say it is not currently having an impact but

that it might in the future (37%). They are less divided on the impact. Two thirds (65%) say that a changing climate will have a mainly negative impact on their business whereas, by contrast, 15% say that it will have a mainly positive impact.

- In the in-depth interviews, all business participants had the view that climate change is already happening and easily pointed to multiple types of evidence for why they hold that impression. Typically, participants cited the extreme weather they have witnessed, or new conditions they have had to consider.

- Those who foresee a positive impact of a changing climate highlight new business opportunities (33%), warmer winters and lower energy costs (28%), and increased tourism (18%) as opportunities. Those who forecast a negative impact underscore economic loses (32%), impacts on infrastructure (18%), as well as increased heatwaves (18%) and wildfires (17%).

- One interpretive element uncovered during the in-depth interviews is that the use of the term “mitigation” was often used in reference to adaptation. Where it was used in the context of mitigating risks to climate change, responses were left verbatim, and analysis was based on the intended use of “mitigation” to refer to an adaptation action. For communications purposes, this suggests that using the term mitigation to only mean mitigating the impact on climate change, rather than reducing the impact of climate change, may not always be received with that distinction recognized. Mitigation was often used to describe how to mitigate a risk posed, which is a typical approach to developing business strategy, although in this case, policy-makers tend to reserve mitigation for a different aspect of climate change dialog.

- Respondents were evenly split between those who say that climate change is a significant challenge, if not the most serious challenge, facing their organization (43%) and those who say that it does not present a significant challenge to their organization (46%).

- While all business participants in the in-depth interviews felt that climate change would have an impact, opinion was mixed over whether that impact would be major or moderate. For those who felt it would be moderate rather than major, it was not because the climate was not going to be pose significant new challenges, but rather, their impression tended to be based upon the sense that their industry was preparing and adapting.

- Business respondents in the in-depth interviews were readily able to identify risks and impacts both general and those specific to their operations or industry. The interviews demonstrated there is a wide range of ways business are considering having to adapt, some of them causing more concern than others but, as a whole, certainly occupying the minds of many in the industries studied.

- When asked about the levels of concern among client and stakeholders, over half (52%) of all respondents say they notice that they are at least somewhat concerned. Another quarter (25%) say they appear not very concerned, while just over one in ten (14%) are not at all concerned – a decline from 22% who said the same in 2018.

- On the perspectives of their stakeholders, in-depth interview participants were more nuanced, often indicating some contrast with the participants’ own perspectives. Many were able to describe specific aspects that were concerning their stakeholders, some of them

being greatly concerning, while some others indicated that they have witnessed some variance in the degree of engagement of stakeholders.

Climate Change Adaptation

- In a shift from 2018 when one third of respondents said they were taking climate change adaptation measures and two thirds (66%) said they were not, respondents are now split fairly evenly with 45% saying they are and 50% saying they are not.

- In terms of climate adaptation measures, business participants interviewed in the qualitative phase all described both doing things currently as well as planning additional things to implement.

- Three in twenty (15%) respondents noted that their organization had completed or conducted a climate change risk assessment, compared with four in five (80%) who said they had not.

- When it comes to adapting to a changing climate, the most mentioned measures are emerging response and disaster planning (14%), changing infrastructure (12%), and implementing actions laid out in their plans (11%). Despite not being a climate adaptation measure, carbon footprint reduction was also mentioned by 12% of respondents.

- Consistent with 2018, a quarter (23%) of organizations surveyed have specific plans for future actions designed to adapt to the risks and opportunities provided by a changing climate.

- In a shift from 2018, the most cited plans for future adaptation actions among respondents who had plans to do so were installing natural or green infrastructure (18%) and preparing an adaptation plan (13%). One in ten (12%) also mentioned reducing their carbon footprint.

- Two thirds (65%) of respondents note that their organization has been considering a changing climate in their decision-making for at least 3 years, if not more. Only one in ten (11%) say that this has been a consideration for less than a year.

Barriers to Incorporating Climate Change Considerations

- In line with the findings in 2018, the most common source an organization uses to get information on climate change is the media, with 46% of all businesses using it.

- Identified by one third (31%) of respondents, the complexity of the policy change processes was, as with in 2018, the most likely to be identified by respondents as a significant barrier to taking climate change into account in decision-making processes. When asked in a follow-up about any additional barriers not tested in the initial question, one in ten (10%) respondents identified the associated financial costs.

- Across all industries surveyed, only 7% of respondents say that some or all of their staff have taken climate change adaptation training.

- In 2022, half (51%) of respondents say they have the resources they need to make decisions related to climate change adaptation. This is down significantly from 2018 when almost three quarters (72%) said the same.

- When asked about additional tools or resources that would be helpful, respondents noted relevant case studies of similar organization (27%), economic information on costs and benefits (26%), information on best practices (24%), and information on regional impacts (24%).

- Through the course of the in-depth interviews, participants described certain barriers that exist and comments relevant to the specific items in the subsequent section will provide more detail. The things that are driving both action and plans tend to be the evolving knowledge of what specific climate impacts to expect in very localized areas, as well as the availability of capital and personnel.

- Getting into a deeper conversation about the barriers faced to making further advancement on climate change adaptation, participants in the in-depth interviews identified a variety of barriers and often had suggestions for what would most help remove those barriers, including specific suggestions or requests of NRCan.

Municipal Findings

Awareness and Impressions of Climate Change Relevance

- Consistent with the results in 2018, eight in ten respondents say that climate change is happening now (78%). One in six respondents (16%) believe that climate change will happen in the foreseeable future, and 3% say climate change will not occur.

- All municipal participants in the qualitative phase were uniformly of the opinion that climate change is already occurring. All could easily point out reasons for their response and some were taken somewhat aback at being asked that question, given all the scientific evidence that exists and all the extreme weather events that have occurred in recent years.

- Among those respondents who feel that climate change is not happening now but will in the future, a similar number believe the impact will be noticeable in 1 to 5 years (28%), 6 to 10 years (33%), or 11 to 19 years (30%). Fewer (9%) feel that the impact of a changing climate would be seen in 20 years or more.

- Up 15 percentage points since 2018, one-quarter of respondents who believe there is a changing climate (26%) say that a changing climate will have a major impact on their community in the next 20 years. The remainder assess that impact as ‘moderate’ (52%) and one-fifth (20%) believe that a changing climate will have a minor impact on their community.

- Combining the most and next most serious impacts provided by respondents, the most common impacts, which are consistent with 2018, are more frequent or more severe weather events (29%), flooding (25%), effects on agriculture (20%), drought (17%), and forest or wildland fires (16%).

- In the in-depth interviews, municipal participants readily discussed a long list of impacts being anticipated for their community, many of them quite significant and concerning and often with evidence the changes have begun to affect the community. As with the business respondents, municipal participants were divided over whether they would describe the impacts of a changing climate on their community as being moderate or major.

- More than half of respondents (54%) believe that a changing climate is already having an impact on their organization, while 37% say it is not currently but it is possible that it will in the future. Only 6% of respondents believe a changing climate will not have an impact on their organization in the future.

- Up 16% percentage points since 2018, 86% of respondents who believe climate change has or will impact their organization believe that the impact of a changing climate will be mainly negative. Few respondents believe the impact will be mainly positive (5%) or say a changing climate will have both positive and negative impacts on their organization (3%).

- In the in-depth interviews, most municipal participants described having experienced organizational impacts including the establishment of units, mandates, and activities specifically to address the need for adaptation and put governments in a position to do the work that needs to be done.

- The most common negative impacts cited are a change in water levels or supply (39%), costs and impacts to infrastructure (38%), economic losses or the cost of adaptation (37%), and increased floods (37%) and drought (28%).

- The most common mentions of positive impacts are warmer winters or lower energy costs (79%), increased crop yields (57%) and reduced winter snow clearing costs (22%).

- As in 2018, the majority of respondents (60%) say that climate change is a significant challenge faced by their organization but is not as serious as other challenges, one-quarter (27%) say that it does not present a significant challenge, and 12% say it is one of the most significant challenges their organization faces.

- Two-thirds of respondents (65%) say that their clients or stakeholders are concerned with climate change, while one-third say their clients or stakeholders are not concerned.

- Municipal participants in the qualitative phase tended to describe communities they serve as being at least somewhat concerned with the need to adapt to a changing climate, but many described challenges with the level of understanding of what is coming, what is required, the immensity of the challenge, the costs associated with it. As a result of these factors, many noted that the public is not necessarily educated and engaged enough to accept the tough decisions that Mayors and Councils will be forced to make if they are to adopt appropriate plans.

- In the in-depth interviews, the public opinion environment was often described as being one of heightened awareness but still challenging in a variety of ways related to the lack of understanding or willingness to consider difficult trade-off choices that are inevitable.

Climate Change Adaptation

- When it comes to adaptation, over six in ten respondents (64%) say that their organization is currently taking adaptation steps, while one-third (34%) say they are not.

- All municipal participants in the in-depth interviews described both having already undertaken climate adaptation actions and having plans to do more in the future. Indeed, there was a widespread sense that turning the plans into actions is more of a problem than assigning adequate priority to implementing plans. The activities described are quite widespread, although in a small number of cases, there was conflation of mitigation initiatives with adaptation initiatives.

- As it relates specifically to risk assessments, the majority of respondents (66%) say their organization has not conducted one while one-quarter (26%) say their organization has.

- Looking toward the future, the majority of respondents (61%) say that their organization does not have any future actions planned to adapt to the risks and opportunities provided by a changing climate, while 36% say their organization does – results that mirror 2018 findings.

- The majority of respondents (62%) who indicated that their organization had specific adaptation plans for the future say their organization has been considering a changing climate in its decision-making for 1 to 5 years, which is unchanged since 2018. One quarter of respondents (26%) say their organization has considered a changing climate in its decision-making for 6 years or more, and 8% say it has only been considered within the past year.

- As in the business interviews, municipal participants in the qualitative phase were asked what is driving whether action is taken or being planned. The responses very consistently pointed to the increasing rate of extreme weather being experienced in their own community as driving action to be taken and securing the funding for implementing, or even planning, the said actions. Often, responses on this question focused more on what prevents action rather than what drives it.

Barriers to Incorporating Climate Change Considerations

- Top sources of information regarding climate change for respondents are provincial government sources (25%), the media (20%), the federal government (19%; up from 0% in 2018), industry associations (17%), and internal sources (16%).

- Among an aided list of barriers, the most significant barriers to taking climate change into account in decision-making are lack of capacity (56%), in-house expertise (48%), complexity

of policy change processes (48%), and competing organizational priorities (47%) – all of which are consistent with 2018.

- On an unaided basis – that is, respondents were not prompted with a list of options beforehand – the financial cost of adaptation is the only barrier volunteered by a material proportion of respondents (42%).

- Municipal participants were remarkably consistent in describing funding as, by far, the single biggest barrier facing them when it comes to climate change adaptation. Costs of the adaptation activities required are exorbitant and participants described additional barriers relating to funding due to procedural requirements, processes that do not fit well with what a municipality is able to do, or the alignment of the timing of stages of funding applications and municipal budget approvals. The misalignment was often cited as very frustrating and unnecessarily causing a delay.

- In addition to the overwhelming funding challenges, internal capacity was often named as a challenge. Many described having a lack of capacity, even in the cases where they had sufficient access to expertise such as engineers. There was a repeated message that there are too few people with the necessary skillsets and that there is a human resource challenge that limits the volume or pace of action and would continue to do so, even if the funding challenges were solved.

- The majority of respondents (56%) are at least aware of adaptation training courses, including one quarter (26%) who say that some or all of their staff have already taken such courses. The remainder say they are not aware of any adaptation training opportunities (36%) or do not need adaptation training (7%).

- Remaining unchanged since 2018, two-thirds of respondents (66%) say they have access to the information and tools they need to make adaptation-related decisions; three in ten (30%) say they do not.

- As it relates to assisting organizations in addressing the impacts of climate change, the most common required tools or technical resources volunteered are climate data (19%), a cost/benefit analysis (17%), regulations (17%), and risk assessment methods (15%). All others are cited by fewer than 15% of respondents.

- Often discussed in the context of barriers, municipal participants identified many things that would help municipalities take more action on climate adaptation. Three of these were offered on a remarkably consistent basis: increased and accelerated access to funding; increased capacity in terms of expanding the workforce – usually in terms of expertise, but also sometimes expressed in terms of labourers or tradespeople – that will be required to develop and execute climate adaptation plans; and very geographically granular forecasting data for their specific location. Data was often described as being more accessible than ever before, but too generalized to be of value for establishing plans within a specific municipality or watershed.

- In addition to these three frequent themes, a variety of other barriers were identified that were not necessarily common to all participants, but nevertheless mentioned multiple times. These include the complexity or volume of the policy changes that need to be developed

and introduced, as well as convincing the public to accept some very difficult choices – at least in terms of allocating funds.

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I hereby certify as a representative of Earnscliffe Strategy Group that the final deliverables fully comply with the Government of Canada political neutrality requirements outlined in the Communications Policy of the Government of Canada and Procedures for Planning and Contracting Public Opinion Research. Specifically, the deliverables do not include information on electoral voting intentions, political party preferences, standings with the electorate, or ratings of the performance of a political party or its leaders.

Signed: Date: March 31, 2023

Doug Anderson
Principal, Earnscliffe

Introduction

Earnscliffe Strategy Group (Earnscliffe) is pleased to present this report to Natural Resources (NRCan) summarizing the results of quantitative and qualitative research undertaken to assess Canada's progress in addressing climate change adaptation.

In 2009, a National Climate Change Adaptation Benchmark Survey was conducted to establish a benchmark to evaluate progress on adapting to climate change. The survey targeted government and business decision-makers and gathered information about their awareness and understanding of the potential impacts of climate change; whether and how their organizations are currently adapting; and barriers to action. This research was also used to inform federal program design.

A second research project, conducted by Earnscliffe in 2018, updated the information with a focus on communities and businesses in the natural resource sector. It examined Canada's progress in addressing climate change adaptation measures and the impact of federal investments into these measures. Specifically, it measured changes in awareness and actions on adaptation in communities and businesses; assessed decision-making information and tools; and identified barriers to action. These results were used to support public reporting of progress on adaptation.

Building on this previous work, this project sought to update and expand on the 2018 findings with the goals of assessing progress towards addressing climate change adaptation and the impact of federal investments on this progress. As with the previous iteration, the results will support public reporting of progress on adaptation under the Charter on Effective Action on Climate Change and the Horizontal Management Framework on Clean Growth and Climate Change.

To meet the research objectives, Earnscliffe conducted a two-phased research program involving both quantitative and qualitative research that ran concurrently.

For the quantitative phase we conducted a telephone survey in collaboration with our quantitative subcontractor, Leger. The telephone survey questionnaire was developed in consultation with NRCan, drawing on previous research projects as appropriate. The survey was designed to reach a broad group of municipalities and companies operating in a variety of sectors, as outlined below. The quantitative findings are divided into 3 sections:

- Awareness and Impressions of Climate Change Relevance
- Climate Change Adaptation
- Barriers to Incorporating Climate Change Considerations in Decision-Making

The survey was conducted via telephone from Léger's centralized call-centre using state of the art Computer Aided Telephone Interviewing (CATI) system. The total sample was 361 individuals, including 152 who occupy Chief, Manager or Director of Planning positions in municipalities across Canada and 209 individuals occupying Head of Operations or Chief Risk Officer positions in natural resource industries across Canada. The survey was conducted between November 7, 2022, and March 15, 2023. The average length of each interview was 17 minutes.

For both the municipal and business samples, stratified random sampling was used. In the case of municipalities, the final sample was weighted to match the unweighted distribution obtained in 2018 in order to make the results as comparable as possible. The aggregate municipal results can be considered accurate to within +/-7.7% at the 95% confidence level.

In the case of the business sample, since the relative sizes of the sectors in the stratified quota structure was not reflective of reality, a weight was applied by sector so that aggregate results of the business sample results would be representative of the universe being studied. Due to sampling limitations, the responses from medium and large businesses were combined in all sectors except power, where only one category was possible. The aggregate business results can be considered accurate to within +/-6.7% at the 95% confidence level.

The qualitative phase consisted of 18 in-depth interviews with representatives from associations representing small businesses and commerce, as well as with companies in the oil and gas, mining, forestry, and utilities industries. Some interviews were also conducted with associations representing municipalities and representatives from municipalities in coastal regions. The purpose of the qualitative research was to gather some deeper insights from specific perspectives that may not have been explored in detail in the survey. The interviews were conducted between November 27, 2022, and January 29, 2023.

For the purposes of this report, wherever findings from the in-depth interviews are presented, it is important to note that qualitative research is a form of scientific, social, policy, and public opinion research. Qualitative research is designed to elicit the full range of ideas, attitudes, experiences, and opinions of a selected sample of participants on a defined topic. Because of the small numbers involved, the participants are not representative in a statistical sense of the larger population from which they are drawn, and findings cannot reliably be generalized beyond their number.

The following sampling approach was used for the telephone survey to ensure the research included perspectives from small, medium, and large municipalities, as well as businesses of various sizes from targeted industries.

The target populations were:

- Municipalities: a stratified sample of individuals occupying Chief, Manager or Director of Planning positions in municipalities across Canada that reflect the geographic distribution of the population.
- Natural resource industries: a stratified sample of individuals occupying Head of Operations or Chief Risk Officer positions across Canada as identified by the NAICS codes below provided by the client.

In line with Statistics Canada, small businesses were classified as those with less than 100 employees, medium-sized businesses will be those with 100-499 employees, and large businesses were those with 500 or more employees. Small municipalities were those with a population of 1,000 up to 29,999, medium were those with a population of 30,000-99,999, and large municipalities were those with a population of 100,000 or more.

Due to smaller sample sizes, for both the business and municipal samples Alberta, Saskatchewan, and Manitoba are aggregated and reported as Prairies. Similarly, responses from Newfoundland and Labrador, Nova Scotia, New Brunswick, and Prince Edward Island are aggregated and reported as Atlantic Canada. Two municipalities in the territories were sampled

and are reported as part of the coastal municipal sample, but not included in the regional breakdown.

For the municipal sample, quotas were set to ensure representation of small, medium, and large municipalities. For the business sample, quotas were set for size within each sector.

The sampling frame for businesses is summarized in the table below. It organizes the sample according to the North American Industry Classification System (NAICS), a system used to provide common definitions of the industrial structure of Canada, Mexico, and the United States. The actual (N) refers to the total number of businesses in Canada, distributed by their respective NAICS codes. The sample (n) refers to number of interviews sought for this study, again distributed by NAICS codes.

Exhibit A1: Business Sampling Frame.

Businesses	Actual (N)				Sample (n)			
	Small	Med	Large	Total	Small	Med	Large	Total
Oil & Gas (NAICS: 211, 237120, 4861, 4862, 4869, 324110, 324190)	3329	167	45	3541	66	8	2	76
Mining	689	344	64	928	24	5	3	32*
(NAICS: 2121, 212210, 212220, 212231, 212232, 212233, 212299, 212392, 212393, 212395, 212396, 212397, 212398)	240	71	38	346	22	4	2	28*
(NAICS: 331)	449	104	26	579	2	1	1	4
Forestry (NAICS: 1131, 1132, 1133, 3221, 3222)	4783	194	9	4986	70	8	1	79
Power (NAICS: 221111, 221112, 221113, 221119, 221121, 221122, 237130)	1276	143	38	1457	54	7	2	63
Total	-	-	-	10912	214	28	8	250

The sampling frame for municipalities is summarized in the table below:

Exhibit A2: Municipalities Sampling Frame.

Municipalities	Actual (N)	Sample (n)
Small	1,944	50
Medium	95	30
Large	54	20
Total	2093	100

The tables below provide the demographic profile of the samples in 2018 and 2023.

Exhibit A3: Sample Profile Distributions

Businesses	Sample Size		Percentage	
	2018	2023	2018	2023
Oil & Gas (NAICS: 211, 237120, 4861, 4862, 4869, 324110, 324190)	77	68	31%	33%
Mining (NAICS: 2121, 212210, 212220, 212231, 212232, 212233, 212299, 212392, 212393, 212395, 212396, 212397, 212398, 331)	25	21	10%	10%
Forestry (NAICS: 1131, 1132, 1133, 3221, 3222)	83	76	33%	36%
Power (NAICS: 221111, 221112, 221113, 221119, 221121, 221122, 237130)	65	44	26%	21%

Businesses	Sample Size		Percentage	
	2018	2023	2018	2023
Atlantic	27	27	11%	13%
Quebec	53	54	21%	26%
Ontario	78	43	31%	21%
Prairies	71	62	28%	30%
British Columbia	21	23	8%	11%

Businesses	Sample size		Percentage	
	2018	2023	2018	2023
Large (500+ employees)	8	7	3%	3%
Medium (100-499 employees)	30	11	12%	5%
Small (<100 employees)	212	191	85%	91%

Municipalities	Sample Size		Percentage	
	2018	2023	2018	2023
Small	76	132	76%	87%
Medium	13	13	13%	9%
Large	11	7	11%	5%

Municipalities	Sample Size		Percentage	
	2018	2023	2018	2023
Atlantic	11	12	11%	8%
Quebec	24	36	24%	24%
Ontario	28	35	28%	23%
Prairies	23	53	23%	35%
British Columbia	14	14	14%	9%
Territories	0	2	0	1%

The detailed findings from this research are presented in subsequent sections of this report. Additional details about the survey design, methodology, and sampling approach of the survey may be found in the appendices included at the end of this report.

Detailed Findings

The following report presents the analysis of both the quantitative and qualitative research. It is divided into two mains sections: findings from businesses in the natural resource sector (Section A) and those from municipalities (Section B). Within each section, the narrative of the results is presented based on the quantitative research with the insights of the qualitative research woven throughout. Three main topics are explored in each section: awareness and impressions of climate change relevance, climate change adaptation measures, and barriers to incorporating climate change considerations.

Details about the survey design, methodology, sampling approach, and weighting of the results may be found in the Quantitative methodology report in Appendix A. Details about the interview design, methodology, and analysis may be found in the Qualitative methodology report in Appendix B.

Guidance for interpreting the data

For the purposes of this report the tables included have been identified with column labels (e.g., A, B, and so on) in order to identify statistically significant results. Letters that are depicted under percentages indicate results that are significantly different than those found in the comparison columns indicated by the letter in the column labels. For example, if you see a data point in column B (in this case, the Oil and Gas sector) at 11% with a “D” underneath it, that is indicating that it is statistically different from the 1% result found in column D (in this case, the Forestry sector).

It is also worth noting that while there may sometimes be differences in percentages, these differences may not necessarily be statistically significant due to relatively small sample sizes – hence the importance of referring to the letters found under certain percentages. Unless otherwise noted, differences highlighted are statistically significant at the 95% confidence level. The statistical test used to determine the significance of the results was the Z-test. Due to rounding, results may not add to 100%.

Except where specifically identified, the qualitative findings represent the combined results across the various audiences and for both English and French. Quotations used throughout the report were selected to bring the analysis to life and provide unique verbatim commentary from participants across the various audiences.

For both the municipal and business samples, stratified random sampling was used. Stratified sampling is when a population is divided into smaller subpopulations known as strata. In the case of municipalities, the final sample was weighted to match the unweighted distribution obtained in 2018 in order to make the results as comparable as possible. Put another way, some answers were given more or less importance in the more recent study so as to match the distribution of sample in 2018. The aggregate municipal results can be considered accurate to within +/-7.7% at the 95% confidence level.

In the case of the business sample, since the relative sizes of the sectors in the stratified quota structure was not reflective of reality, a weight was applied by sector so that aggregate results of the business sample results would be representative of the universe being studied. That is to say, some responses were given more or less importance to better align the results with the

known distribution of relevant businesses in Canada. Due to sampling limitations, the responses from medium and large businesses were combined in all sectors except power, where only one category was possible. The aggregate business results can be considered accurate to within +/- 6.7% at the 95% confidence level.

Section A: Business Respondents

This section summarizes the findings from the survey conducted among 209 business respondents, as well as the 6 in-depth interviews done with representatives from the associations representing small businesses and commerce, as well as from companies in the oil and gas, mining, forestry, and utilities industries.

Awareness and Impressions of Climate Change Relevance

The survey began by asking respondents about their impressions of climate change to assess their impressions and awareness of the issue. Across all business sectors surveyed, seven in ten believe (69%) that climate change is happening right now – the same proportion of respondents who said the same in 2018 (70%).

Among those who do not believe climate change is happening right now, 14% of all respondents say it will happen in the foreseeable future and another 11% said it is not happening now and will not happen in the foreseeable future.

Exhibit B1 – Q8. Which of these best describes what is happening in terms of climate change in the regions of Canada in which your organization operates?
Base: All business respondents

Column %	Total business	Oil & Gas	Mining	Forestry	Power
Climate change is happening right now	69%	67%	69%	70%	70%
Climate change is not happening right now, but it will happen in the foreseeable future	14%	9%	12%	18%	16%
Climate change is not happening right now and will not happen in the foreseeable future	11%	13%	8%	11%	7%
Don't know/Prefer not to say	6%	11%	12%	1%	7%
	-	D	-	-	-
Sample size	209	68	21	76	44
Column label	A	B	C	D	E

Exhibit B2 – Q8. Which of these best describes what is happening in terms of climate change in the regions of Canada in which your organization operates?
Base: All business respondents

Column %	2022	2018
Climate change is happening right now	69%	70%
Climate change is not happening right now, but it will happen in the foreseeable future	14%	17%
Climate change is not happening right now and will not happen in the foreseeable future	11%	11%
Don't know/Prefer not to say	6%	2%
	B	-
Sample size	209	250
Column label	A	B

Other demographic differences:

- Respondents in the Prairies are the least likely to say that climate change is happening right now (51%) and the most likely to say it is not happening now and will not happen in the foreseeable future (23%).

Qualitative insights

In the in-depth interviews, all business participants had the view that climate change is already happening and easily pointed to multiple types of evidence for why they hold that impression. Typically, participants cited the extreme weather they have witnessed, or new conditions they have had to consider.

One thing that should be noted about the in-depth interviews is that the use of the term "mitigation" was often used in reference to adaptation. Where it was used this way, responses were left verbatim, but analysis was based on what was actually meant rather than the term used. For communications purposes, this suggests that using the term mitigation to only mean mitigating the impact on climate change, rather than reducing the impact of climate change, may not always be received with that distinction recognized. Mitigation was often used to describe how to mitigate a risk posed, which is a typical approach to developing business strategy, although in this case, policy-makers tend to reserve mitigation for a different aspect of climate change dialog.

"[We are] a firm believer that climate change is happening and, in particular, our forests are feeling the effects of a changing climate. Things like wildfire patterns we haven't seen before, forest pest outbreaks, unprecedented changes in climate variability that are affecting forestry options."

"The variety and frequency of extreme weather, including storms we've never heard of before."

> "When big storms come in, they can cause very broad based and lengthy outages. When there is not electricity, nothing is happening. Our economy is stopped. Could be hours, could be days. In 2013, the ice storm was devastating, as an example. And we are seeing things happen more frequently, outages last longer, and major damage to our equipment and infrastructure."

Respondents who believe that climate change is not happening in the present, but that it would in the foreseeable future, were then asked a follow-up question specifying timelines. A plurality (37%) say climate change is likely to start impacting the regions in which their business operates in 6 to 10 years, while a quarter (25%) and one fifth (19%) say the same of 20 or more years and 1 to 5 years respectively.

Exhibit B3 – Q9. How many years from now do you believe the regions of Canada in which your organization operates will start to see impacts from a changing climate?
Base: Business respondents who said that climate change is not happening right now, but it will happen in the foreseeable future in Q8.

Column %	Total business	Oil & Gas	Mining	Forestry	Power
1-5 years	19%	7%	0%	23%	29%
6-10 years	37%	37%	100%	38%	0%
11-19 years	8%	19%	0%	8%	0%
20 years or more in the future	25%	37%	0%	15%	57%
Don't know/Prefer not to say	11%	0%	0%	15%	14%
Sample size	29	6	3	13	7

There are no other demographic differences.

Everyone who expressed that climate change was either happening or would happen was then asked about the impact of a changing climate on the regions of Canada in which their business operates. Two in five (42%) respondents chose to describe the impact as moderate, while a quarter characterised it as major (24%) or minor (23%) respectively. There are no statistically significant changes from the findings in 2018.

Among the sectors surveyed, respondents from forestry (54%) were more likely to predict a moderate impact than those in the oil and gas (26%) or power (29%) industries. Echoing this, those in the oil and gas sector were significantly more likely to report only a minor impact (33%) than those in forestry (15%).

Exhibit B4 – Q10. How MUCH of an impact will a changing climate will have on the regions of Canada in which your organization operates, in the next 20 years? Would you say it will have a…?
Base: Business respondents who did not say that climate change is not happening right now and will not happen in the foreseeable future in Q8.

Column %	Total business	Oil & Gas	Mining	Forestry	Power
Major impact	24%	30%	4%	22%	29%
Moderate impact	42%	26%	58%	54%	29%
	-	-	-	B E	-
Minor impact	23%	33%	17%	15%	29%
	-	D	-	-	-
No impact at all	8%	4%	21%	8%	10%
Don't know/Prefer not to say	3%	7%	0%	2%	2%
Sample size	187	59	19	68	41
Column label	A	B	C	D	E

Exhibit B5 – Q10. How MUCH of an impact will a changing climate will have on the regions of Canada in which your organization operates, in the next 20 years? Would you say it will have a…?
Base: Business respondents who did not say that climate change is not happening right now and will not happen in the foreseeable future in Q8.

Column %	2022	2018
Major impact	24%	19%
Moderate impact	42%	43%
Minor impact	23%	26%
No impact at all	8%	11%
Don't know/Prefer not to say	3%	0%
	B	-
Sample size	187	227
Column label	A	B

Other demographic differences:

- Echoing the findings above, those in the Prairies are the least likely (10%) to say that climate change will have a major impact, and the most likely to say it will have a minor one (42%).
- Respondents in Atlantic Canada (85%), British Columbia (84%), and Quebec (79%) are the most likely to say that there will be a major or moderate impact.

Qualitative insights

While all business participants in the in-depth interviews felt that climate change would have an impact, opinion was mixed over whether that impact would be major or moderate. For those who felt it would be moderate rather

than major, it was not because the climate was not going to be pose significant new challenges, but rather, their impression tended to be based upon the sense that their industry was preparing and adapting.

"Businesses are already adapting on mitigation, but on an adaptation standpoint, it's a case-by-case basis right now. It depends a lot on location. The impact is going to be felt differently in different ways. All are worried about the impact on supply chains – interprovincial or international."

"It has the potential to have a major impact, but with adaptation measures and more planning as a whole, there are opportunities to mitigate that. We're already seeing major impacts, but forest management has an opportunity to mitigate that – impacts in the managed forests are actually less than in the unmanaged ones."

"Hard to quantify across the whole industry. Hard to say none, can't say major. A lot of sites are already designed to much higher standards than a lot of public infrastructure is. We are accounting for impacts on supply chains. The other aspect is that there is potential for positive impacts: the possibility for longer shipping seasons, longer growing seasons, that could increase the success of mine reclamation activities (probably longer term than 20 years)."

At two in five (18%), more frequent or more severe weather events and storms was, as in 2018, the most likely to be selected by respondents as the most serious impact of a changing climate over the next 20 years. There was some variation by industry, however, with those in forestry being the most likely to highlight wildfires (23%), heat waves (20%), droughts (18%). This compared with those in the power sector who were the most likely to select changing sea or lake levels (at 15%).

Exhibit B6 – Q11 Thinking about the regions of Canada in which your organization operates, what do you think will be the most serious impact of a changing climate over the next 20 years? What do you think will be the next-most serious impact?
Base: Business respondents who did not say that climate change is not happening right now and will not happen in the foreseeable future in Q8.

Column %	Most serious	Next most serious
More frequent or more severe weather events/storms	18%	13%
Economic effects (loss of productivity, negative trade impacts, increased trade opportunities)	10%	10%
Forest (or wildland) fires	8%	5%
Heat waves	7%	6%
Impacts on water supply	4%	4%
Droughts	4%	8%
Flooding	4%	5%
Effects on agriculture (growing season changes, crop failures)	4%	3%
Changing sea/lake levels/coastal erosion	3%	3%
Change of temperatures / temperature fluctuations	2%	0%
Supply/Material shortages	2%	0%
Human health impacts	2%	5%
Permafrost change (melting, thawing, instability)	2%	5%
Warmer winters	2%	2%
Change of length of seasons	2%	0%
Effects on wildlife (changing migration patterns, species loss, invasive species, loss of habitat)	2%	3%
More rain/snow events	1%	0%
Government regulations	1%	0%
Extreme weather (hot, cold)	1%	0%
Increase costs	1%	0%
Transportation / Transit	1%	0%
Effects on infrastructure	1%	1%
Other	3%	15%
No single impact	3%	0%
No serious impact	5%	2%
Don’t know/Prefer not to say	8%	11%

Exhibit B7 – Q11 Thinking about the regions of Canada in which your organization operates, what do you think will be the most serious impact of a changing climate over the next 20 years? What do you think will be the next-most serious impact?
Base: Business respondents who did not say that climate change is not happening right now and will not happen in the foreseeable future in Q8.

Column % Combined most serious and next most serious	Total business	Oil & Gas	Mining	Forestry	Power
More frequent or more severe weather events/storms	29%	36%	42%	22%	29%
Economic effects (loss of productivity, negative trade impacts, increased trade opportunities)	18%	22%	4%	18%	12%
Heat waves	12%	6%	4%	20%	7%
	-	-	-	B E	-
Forest (or wildland) fires	11%	0%	0%	23%	5%
	-	-	-	B E	-
Droughts	11%	6%	0%	18%	10%
	-	-	-	B	-
Flooding	8%	6%	8%	10%	7%
Impacts on water supply	7%	2%	18%	8%	12%
Human health impacts	6%	9%	0%	7%	2%
Effects on agriculture (growing season changes, crop failures)	6%	6%	8%	5%	12%
Permafrost change (melting, thawing, instability)	6%	6%	8%	5%	10%
Changing sea/lake levels/coastal erosion	5%	6%	4%	2%	15%
	-	-	-	-	D
Effects on wildlife (changing migration patterns, species loss, invasive species, loss of habitat)	4%	6%	0%	3%	5%
Warmer winters	3%	4%	14%	1%	0%
Change of temperatures / temperature fluctuations	2%	4%	4%	0%	5%
More rain/snow events	2%	0%	0%	3%	2%
Effects on infrastructure	1%	1%	0%	1%	2%
Extreme weather (hot, cold)	1%	2%	0%	0%	2%
Other	19%	25%	8%	16%	17%
No single impact	3%	2%	0%	3%	5%
No serious impact	7%	11%	13%	2%	10%
	-	D	-	-	-
Don’t know/Prefer not to say	17%	17%	35%	16%	10%
Sample size	187	59	19	68	41
Column Names	A	B	C	D	E

Exhibit B8 – Q11 Thinking about the regions of Canada in which your organization operates, what do you think will be the most serious impact of a changing climate over the next 20 years? What do you think will be the next-most serious impact?
Base: Business respondents who did not say that climate change is not happening right now and will not happen in the foreseeable future in Q8.

Column % Combined most serious and next most serious	2022	2018
More frequent or more severe weather events/storms	29%	29%
	-	-
Economic effects (loss of productivity, negative trade impacts, increased trade opportunities)	18%	17%
	-	-
Heat waves	12%	5%
	B	-
Forest (or wildland) fires	11%	6%
	-	-
Droughts	11%	9%
	-	-
Flooding	8%	10%
	-	-
Impacts on water supply	7%	9%
	-	-
Human health impacts	6%	4%
	-	-
Effects on agriculture (growing season changes, crop failures)	6%	6%
	-	-
Permafrost change (melting, thawing, instability)	6%	6%
	-	-
Changing sea/lake levels/coastal erosion	5%	16%
	-	A
Effects on wildlife (changing migration patterns, species loss, invasive species, loss of habitat)	4%	9%
	-	-
Warmer winters	3%	4%
	-	-
Change of temperatures / temperature fluctuations	2%	0%
	B	-
More rain/snow events	2%	1%
	-	-
Effects on infrastructure	1%	1%
	-	-
Extreme weather (hot, cold)	1%	7%
	-	A
Other	19%	16%
	-	-
No single impact	3%	1%
	-	-
No serious impact	7%	10%

	-	-
Don’t know/Prefer not to say	17%	18%
	-	-
Sample size	187	227
Column Names	A	B

Other demographic differences:

- Respondents in Quebec (10%) are the most likely to cite wildfires as a serious impact of climate change over the next 20 years.
- Those in Prairies are the most likely to note effects on agriculture (8%) as a serious impact, or to say that there will be no serious impact (13%).

In terms of impacts to businesses, respondents are equally split between those who say it is having an impact on the organization (37%) and those who say it is not currently having an impact but that it might in the future (37%). A quarter (24%) say there will be no impact on their business.

Exhibit B9 – Q12. Is climate change something that is already having an impact on your organization in any way, is not yet having an impact on the organization, but it may have an impact in the future, or is climate change something that will not have an impact on your organization?
Base: All business respondents

Column %	Total business	Oil & Gas	Mining	Forestry	Power
It is having an impact on the organization	37%	41%	29%	35%	41%
It is not yet having an impact on the organization, but it is possible	37%	33%	52%	40%	30%
Will not have an impact on the organization	24%	26%	20%	22%	27%
Don’t know/Prefer not to say	2%	0%	0%	3%	2%
Sample size	209	68	21	76	44

Other demographic differences:

- Echoing findings above, those in Prairies are the most likely to say that a changing climate will not have an impact on their organization (at 38%).

Two thirds (65%) of respondents who think that climate change is having or will have an impact on their organization say that a changing climate will have a mainly negative impact on their business. In contrast, 15% say that it will have a mainly positive impact.

Exhibit B10 – Q13. Overall, will changing climate have a mainly negative or mainly positive impact on your organization?
Base: Respondents who did not say that climate change will not have an impact on their organization in Q12.

Column %	Total business	Oil & Gas	Mining	Forestry	Power
Mainly negative impact	65%	55%	56%	77%	50%
	-	-	-	B E	-
Mainly positive impact	15%	16%	15%	11%	25%
Both positive and negative impacts	8%	15%	15%	2%	9%
	-	D	-	-	-
Neutral or no impact	2%	2%	0%	2%	6%
Don’t know/Prefer not to say	10%	11%	15%	9%	9%
Sample size	158	50	16	60	32
Column label	A	B	C	D	E

Exhibit B11 – Q13. Overall, will changing climate have a mainly negative or mainly positive impact on your organization?
Base: Respondents who did not say that climate change will not have an impact on their organization in Q12.

Column %	2022	2018
Mainly negative impact	65%	61%
Mainly positive impact	15%	18%
Both positive and negative impacts	8%	10%
Neutral or no impact	2%	6%
Don’t know/Prefer not to say	10%	6%
Sample size	158	186

There are no other demographic differences.

New business opportunities (33%), warmer winters and lower energy costs (28%), as well as increased tourism (18%) were the main positive impacts of climate change cited by respondents.

Exhibit B12 – Q14. What, specifically, are some of the positive impacts or opportunities for your organization resulting from a changing climate? Any others?
Base: Respondents who said that climate change had at least some positive impact on their organization in Q13.

Column %	Total business	Oil & Gas	Mining	Forestry	Power
New business opportunities	33%	46%	67%	0%	50%
Warmer winters/lower energy costs	28%	41%	33%	17%	25%
Increased tourism/longer tourism season	18%	27%	0%	17%	13%
Reduced winter snow clearing costs	12%	27%	0%	0%	13%
Less seasonal unemployment/new employment opportunities	11%	0%	0%	17%	25%
Earlier/longer operating season	11%	14%	33%	0%	13%
Increased water supply	10%	14%	0%	0%	25%
Increased crop yields	8%	14%	0%	0%	13%
Better conditions for livestock/wildlife	8%	14%	0%	0%	13%
Increased active transportation (walking/cycling)	8%	14%	0%	0%	13%
Other	18%	27%	0%	17%	13%
Don’t know/Prefer not to say	11%	0%	0%	33%	0%
Sample size	25	8	3	6	8

Exhibit B13 – Q14. What, specifically, are some of the positive impacts or opportunities for your organization resulting from a changing climate? Any others?
Base: Respondents who said that climate change had at least some positive impact on their organization in Q13.

Column %	2022	2018
New business opportunities	33%	66%
Warmer winters/lower energy costs	28%	18%
Increased tourism/longer tourism season	18%	11%
Reduced winter snow clearing costs	12%	18%
Less seasonal unemployment/new employment opportunities	11%	18%
Earlier/longer operating season	11%	23%
Increased water supply	10%	14%
Increased crop yields	8%	11%
Better conditions for livestock/wildlife	8%	12%
Increased active transportation (walking/cycling)	8%	16%
Other	18%	8%
Don’t know/Prefer not to say	11%	5%
Sample size	25	38

There are no other demographic differences.

While those who see positive impacts of a changing climate are most likely to cite new business opportunities as the reason why, the majority who see climate change as bringing negative impacts also point to economic consequences – albeit negative ones. At one third (32%), respondents were most likely to note economic losses or the costs of adapting as risks for their organization. This was followed by impacts on infrastructure (18%), increased heatwaves (18%), and increases in wildfires (17%).

The way that negative impacts of a changing climate are understood for an organization have shifted over time. Of note, concern over economic losses, while still the top concern at 32%, is down from 46% in 2018. Those citing changes in water levels, flooding, storm surges, more pests and diseases, and smog have also all decreased from 2018. The only statistically significant risks that increased from 2018 to 2022 were shorter operating seasons, extreme weather changes, and supply or material shortages.

Exhibit B14 – Q15. What, specifically, are some of the negative impacts or risks for your organization resulting from a changing climate? Any others?
Base: Respondents who said that climate change had at least some negative impact on their organization in Q13.

Column %	Total business	Oil & Gas	Mining	Forestry	Power
Economic losses / cost of adapting	32%	33%	9%	36%	19%
Infrastructure impacts/costs	18%	18%	37%	15%	25%
Increased heatwaves/cooling costs	18%	13%	9%	20%	25%
Increase in forest/wildland fire	17%	8%	0%	25%	6%
Shorter operating season	12%	4%	9%	18%	0%
More drought	11%	12%	0%	14%	6%
Change in water levels/water supply	7%	8%	0%	6%	13%
Shorter winter tourism season	6%	11%	0%	5%	6%
More storm surges/damage from sea level rise	6%	1%	0%	8%	13%
Supply/Material shortages	6%	0%	0%	9%	6%
Transport cost	5%	0%	0%	7%	13%
More floods	5%	8%	9%	2%	6%
Extreme weather changes	5%	8%	0%	2%	13%
More pests/diseases	4%	0%	0%	7%	0%
Effects on agriculture and crops	3%	4%	0%	2%	6%
Staff shortages	2%	4%	0%	1%	0%
More smog	1%	0%	0%	2%	0%
Other	13%	17%	0%	10%	25%
Don’t know/Prefer not to say	6%	5%	28%	5%	0%
Sample size	99	29	7	47	16

Exhibit B15 – Q15. What, specifically, are some of the negative impacts or risks for your organization resulting from a changing climate? Any others?
Base: Respondents who said that climate change had at least some negative impact on their organization in Q13.

Column %	2022	2018
Economic losses / cost of adapting	32%	46%
	-	A
Infrastructure impacts/costs	18%	29%
Increased heatwaves/cooling costs	18%	24%
Increase in forest/wildland fire	17%	23%
Shorter operating season	12%	0%
	B	-
More drought	11%	20%
Change in water levels/water supply	7%	22%
	-	A
Shorter winter tourism season	6%	9%
More storm surges/damage from sea level rise	6%	19%
	-	A
Supply/Material shortages	6%	0%
	B	-
Transport cost	5%	3%
More floods	5%	22%
	-	A
Extreme weather changes	5%	0%
	B	-
More pests/diseases	4%	18%
	-	A
Effects on agriculture and crops	3%	1%
Staff shortages	2%	0%
More smog	1%	9%
	-	A
Other	13%	16%
Don't know/Prefer not to say	6%	7%
Sample size	99	111
Column label	A	B

There are no other demographic differences.

Qualitative insights

Business respondents in the in-depth interviews were readily able to identify risks and impacts both general and those specific to their operations or industry. The interviews demonstrated there is a wide range of ways business are already considering having to adapt, some of them causing more concern than others but, as a whole, certainly occupying the minds of many in the industries studied.

"A range of risks: supply chain risks; risks associated with other catastrophic events; potential impacts on sites (operational, mine-side infrastructure, health

and safety, e.g., a company in Australia has had to restrict certain activities after they've had employees fall sick or die due to operating in extreme heat); extreme precipitation events (on-site infrastructure), more precipitation over a long period of time; drought conditions (mine waste management strategies); in the North permafrost is an issue, impact on buildings and roads. Lots of ways it impacts us."

"Some of the most significant risks will be a loss of wood supply. The area that is essentially set by provincial governments for sustainable tenure. More forest fires or insect outbreaks has a significant negative impact on the on-going wood supply. The ability to meet the wood supply needs of the manufacturing sector domestically and globally. Other impacts include supply chain effects; transportation of goods; risks to physical infrastructure safety and communities."

Respondents were evenly split between those who say that climate change is a significant challenge, if not the most serious challenge, facing their organization (43%) and those who say that it does not present a significant challenge to their organization (46%).

At 17% those in the oil and gas sector are the most likely to say climate change is one of the most significant challenges facing their organization. It is worth noting that it is unclear as to whether this is in reference to an existential challenge posed by a potential transition to other sources of energy, or if this is in reference specifically to the ways in which climate change is impacting the sector's operations.

Exhibit B16 – Q16. Which of the following best describes your organization's view regarding climate change? Is it that...
Base: All business respondents

Column %	Total business	Oil & Gas	Mining	Forestry	Power
Climate change is one of the most significant challenges your organization faces	9%	17%	0%	8%	5%
	-	E	-	-	-
Climate change is a significant challenge, but not as serious as others your organization faces	43%	44%	57%	41%	39%
Climate change does not present a significant challenge to your organization	46%	38%	43%	50%	55%
Climate change is not happening	0%	0%	0%	0%	0%
Don't know/Prefer not to say	1%	2%	0%	1%	2%
Sample size	209	68	21	76	44
Column label	A	B	C	D	E

Exhibit B17 – Q16. Which of the following best describes your organization's view regarding climate change? Is it that...
Base: All business respondents

Column %	2022	2018

Climate change is one of the most significant challenges your organization faces	9%	8%
Climate change is a significant challenge, but not as serious as others your organization faces	43%	37%
Climate change does not present a significant challenge to your organization	46%	52%
Climate change is not happening	0%	1%
Don't know/Prefer not to say	1%	2%
Sample size	209	250

Other demographic differences:

- Respondents from Quebec were the most likely to say that climate change is one of the most significant challenges their organization is facing (at 17%) – this in contrast with Ontario where none of the respondents say the same.

When asked about the levels of concern about a changing climate among client and stakeholders, over half (52%) of all respondents say they are at least somewhat concerned. Another quarter (25%) said they are not very concerned, while just over one in ten (14%) are not at all concerned – a decline from 22% who said the same in 2018.

At a quarter (25%), respondents from the power sector are the least likely to say that their clients or stakeholders are not concerned about the impacts of climate change.

Exhibit B18 – Q17. What about your clients or stakeholders? Would you say that they are generally very concerned, somewhat concerned, not very concerned or not at all concerned about climate change?
Base: All business respondents

Column %	Total business	Oil & Gas	Mining	Forestry	Power
Very concerned	15%	18%	4%	12%	20%
Somewhat concerned	38%	32%	53%	40%	36%
Not very concerned	25%	27%	27%	26%	18%
Not at all concerned	14%	16%	16%	14%	7%
Don't know/Prefer not to say	8%	7%	0%	8%	18%
Sample size	209	68	21	76	44

Exhibit B19 – Q17. What about your clients or stakeholders? Would you say that they are generally very concerned, somewhat concerned, not very concerned or not at all concerned about climate change?
Base: All business respondents

Column %	2022	2018
Very concerned	15%	10%
Somewhat concerned	38%	42%
Not very concerned	25%	19%
Not at all concerned	14%	22%
	-	A
Don't know/Prefer not to say	8%	7%
Sample size	209	250
Column label	A	B

Other demographic differences:

- Mirroring findings above, those in Quebec are the most likely to say that their clients are very concerned (24%) whereas those in Prairies are the most likely to say they are not at all concerned (21%).

Qualitative insights

On the perspectives of their stakeholders, participants were more nuanced, often indicating some contrast with the participants' own perspectives. Many were able to describe specific aspects that were concerning their stakeholders, some of them being greatly concerning, while some others indicated that they have witnessed some variance in the degree of engagement of stakeholders. There was also a sense that this varied geographically.

"We are quite concerned, especially looking at NRCan vulnerability assessments. We are very much a future-looking sector because trees take a long time to grow. On a day-to-day basis, member companies don't all see it as urgent, although some do – particularly, those in BC."

"The trend data is bad, and the trend lines are getting worse. The reliability of our infrastructure to serve customers is at risk. Erosion of equipment is occurring. They have insurance, but insurance policies are changing and more concerning over liability due to failing to provide electricity to customers. Cost of the investment required and the difficulty in figuring out how to protect the assets. You can't just harden the assets by making concrete poles or dig up all of [the province] and burying all of the assets. So, they have to figure out how to mitigate the best way for the budget they have. We're never going to be able to withstand all of the storms."

"It varies as a cross section of society. There is definitely an awareness that there are vulnerabilities, concerns. Certainly, a recognition that we need to be adapting to it and hence the measures taken. Geographically, that level of concern varies: sites in the Arctic where temperature changes are higher, potential extreme events – everything is higher there. Areas like Ontario or

Quebec, generally the projections suggest less impact and the concern is less. The geographic diversity of the industry, including a strong northern component, you get quite different levels of concern about the kinds of risk."

Climate Change Adaptation

Respondents are split between those saying that their organization is currently doing something to adapt to the risks and opportunities resulting from a changing climate (45%) and those saying that they are not (50%). This represents a significant shift from 2018 in which one third (32%) said they were taking climate change adaptation measures and two thirds (66%) said they were not.

Among the sectors surveyed, respondents in the power sector were the most likely to say that they have not taking any actions to adapt (59%).

Exhibit B20 – Q18. Adapting to a changing climate means taking actions that reduce the risks or take advantage of opportunities from changes in climate. Is your organization currently doing anything to adapt to the risks and opportunities resulting from a changing climate?
Base: All business respondents

Column %	Total business	Oil & Gas	Mining	Forestry	Power
Yes	45%	53%	45%	42%	36%
No	50%	40%	55%	54%	59%
	-	-	-	-	B
Don't know/Prefer not to say	5%	7%	0%	4%	5%
Sample size	209	68	21	76	44
Column label	A	B	C	D	E

Exhibit B21 – Q18. Adapting to a changing climate means taking actions that reduce the risks or take advantage of opportunities from changes in climate. Is your organization currently doing anything to adapt to the risks and opportunities resulting from a changing climate?
Base: All business respondent

Column %	2022	2018
Yes	45%	32%
	B	-
No	50%	66%
	-	A
Don't know/Prefer not to say	5%	2%
Sample size	209	250
Column label	A	B

Other demographic differences:

- Respondents in Ontario were the least likely to say that their organization is doing something to adapt to the risks and opportunities of a changing climate (at 27%).

Three in twenty (15%) respondents note that their organization completed or conducted a climate change risk assessment, compared with four in five (80%) who say they have not. This

varies by industry, with those in in the oil and gas sector being the most likely to have completed one at 24%, and respondents working in the forestry and electricity sectors being the least likely to have done so at 10%.

Exhibit B22 – Q19. Has your organization completed (or conducted) a climate change risk assessment?
Base: All business respondents

Column %	Total business	Oil & Gas	Mining	Forestry	Power
Yes	15%	24%	17%	10%	11%
	-	D	-	-	-
No	80%	68%	83%	87%	86%
	-	-	-	B	B
Don't know/Prefer not to say	4%	8%	0%	3%	2%
Sample size	209	68	21	76	44
Column label	A	B	C	D	E

Other demographic differences:

- Respondents in Quebec (23%) and Prairies (20%) were the most likely to say they had completed a climate change risk assessment, whereas those in Ontario (5%) and British Columbia (5%) were the least likely to say the same.
- At one quarter (25%), respondents who say that climate change is going to have a major impact are the most likely to have conducted a climate change risk assessment.

The most common things that respondents reported doing to adapt to a changing climate are emerging response and disaster planning (14%), reducing their carbon footprint (12%), changing infrastructure (12%), assessing the risks from climate change on the organization (12%), and implementing actions laid out in their plans (11%).

Changes between years are minimal, with the exception of those who said they are installing natural or green infrastructure which dropped from (26%) in 2018 to (7%) in 2022.

At 21%, respondents from the oil and gas sector, of note, were the most likely to report working to reduce their carbon footprint.

Exhibit B23 – Q20. What, specifically, is your organization currently doing to ADAPT to a changing climate? Anything else?
Base: Respondents who said their organization is currently acting to adapt to the risks and opportunities resulting from a changing climate in Q18.

Column %	Total business	Oil & Gas	Mining	Forestry	Power
Emergency response/disaster planning	14%	12%	9%	16%	13%
Reducing carbon/co2 footprint	12%	21%	0%	5%	19%
	-	D	-	-	-
Change operation /maintenance of infrastructure	12%	6%	0%	20%	13%
Assess the risks from climate change on the organization	12%	9%	0%	13%	25%
Implementing actions/measures in our plan	11%	16%	0%	10%	6%
Changes to energy distribution system	9%	4%	9%	10%	25%
Have an adaptation plan	9%	9%	0%	10%	13%
Change design or location of infrastructure	9%	10%	0%	7%	19%
Education/awareness building activities	8%	12%	0%	7%	6%
Incorporate adaptation actions in long term planning/other corporate plans (e.g. risk mgmt)	8%	13%	0%	3%	13%
Assess the costs to the organization	8%	9%	0%	7%	13%
Install natural or green infrastructure	7%	9%	17%	3%	6%
Flood management activities – flood mapping, land use restrictions, downspout disconnection	5%	6%	0%	5%	6%
Recycle where possible	5%	3%	0%	7%	6%
Preparing a climate change adaptation plan	4%	6%	0%	3%	6%
Work to reduce environmental impact	4%	7%	0%	3%	0%
Habitat protection	4%	3%	0%	7%	0%
Summer heat alert system /build awareness of risks from heat waves	4%	3%	0%	7%	0%
Drought management actions /reducing water use	4%	6%	0%	3%	0%
Alternative fuel	3%	3%	0%	5%	0%
Offer eco friendly products	3%	1%	0%	7%	0%
Creating guidelines or policies	3%	3%	0%	0%	19%
Build retaining walls to protect from storm surges	2%	3%	0%	0%	6%

Working to reduce wildfires/forest fires	1%	0%	0%	3%	0%
Reduce fuel consumption	1%	3%	0%	0%	0%
Water protection	0%	0%	0%	0%	0%
Other	10%	4%	37%	8%	19%
Don't know/Prefer not to say	21%	22%	37%	18%	13%
Sample size	92	36	7	33	16
Column label	A	B	C	D	E

Exhibit B24 – Q20. What, specifically, is your organization currently doing to ADAPT to a changing climate? Anything else?
Base: Respondents who said their organization is currently acting to adapt to the risks and opportunities resulting from a changing climate in Q18.

Column %	2022	2018
Emergency response/disaster planning	14%	14%
Reducing carbon/co2 footprint	12%	16%
Change operation /maintenance of infrastructure	12%	17%
Assess the risks from climate change on the organization	12%	15%
Implementing actions/measures in our plan	11%	20%
Changes to energy distribution system	9%	20%
Have an adaptation plan	9%	17%
Change design or location of infrastructure	9%	9%
Education/awareness building activities	8%	16%
Incorporate adaptation actions in long term planning/other corporate plans (e.g. risk mgmt)	8%	14%
Assess the costs to the organization	8%	16%
Install natural or green infrastructure	7%	26%
	-	A
Flood management activities – flood mapping, land use restrictions, downspout disconnection	5%	7%
Recycle where possible	5%	0%
	B	-
Preparing a climate change adaptation plan	4%	17%
	-	A
Work to reduce environmental impact	4%	0%
Habitat protection	4%	17%
	-	A
Summer heat alert system /build awareness of risks from heat waves	4%	10%
Drought management actions /reducing water use	4%	10%
Alternative fuel	3%	0%
Offer eco friendly products	3%	0%
Creating guidelines or policies	3%	10%
Build retaining walls to protect from storm surges	2%	1%
Working to reduce wildfires/forest fires	1%	0%
Reduce fuel consumption	1%	0%

Water protection	0%	0%
Other	10%	14%
Don’t know/Prefer not to say	21%	5%
	B	-
Sample size	92	89
Column label	A	B

There are no other demographic differences.

A quarter (23%) of organizations surveyed have specific plans for future actions designed to adapt to the risks and opportunities provided by a changing climate, a number consistent with findings in 2018. Those in forestry industry were, compared with the other sectors, the least likely to have plans for future actions at 14% saying they do.

Exhibit B25 – Q21. Does your organization have any specific plans for FUTURE actions designed to ADAPT to the risks and opportunities provided by a changing climate?
Base: All business respondents

Column %	Total business	Oil & Gas	Mining	Forestry	Power
Yes	23%	28%	45%	14%	30%
	-	D	-	-	D
No	70%	60%	55%	82%	61%
	-	-	-	B E	-
Don’t know/Prefer not to say	7%	11%	0%	5%	9%
Sample size	209	68	21	76	44
Column label	A	B	C	D	E

Exhibit B26 – Q21. Does your organization have any specific plans for FUTURE actions designed to ADAPT to the risks and opportunities provided by a changing climate?
Base: All business respondents

Column %	2022	2018
Yes	23%	24%
No	70%	72%
Don’t know/Prefer not to say	7%	4%
Sample size	209	250

There are no other demographic differences.

Among those who had plans for future actions to adapt to climate change, the most cited ones were installing natural or green infrastructure (18%), preparing an adaptation plan (13%), and reducing their carbon footprint (12%). These represent a shift from 2018, when the top three were implementing actions or measures in their plan (24%), working on education and awareness building activities (23%), and assessing the costs to the organization (23%).

Exhibit B27 – Q22. What actions are specifically planned? Anything else?
Base: Respondents who said their organization has specific future actions designed to adapt to the risk and opportunities provided by a changing climate in Q21.

Column %	Total business	Oil & Gas	Mining	Forestry	Power
Install natural or green infrastructure	18%	21%	17%	10%	23%
Preparing/prepared a climate change adaptation plan	13%	11%	37%	10%	0%
Reducing footprint/reducing waste	12%	25%	0%	0%	15%
Changes to energy distribution system	10%	2%	9%	10%	31%
Habitat protection	8%	6%	9%	10%	8%
Drought management actions/reducing water use	8%	6%	0%	20%	0%
Emergency response/disaster planning	8%	6%	0%	15%	8%
Assess the risks from climate change on the organization	6%	6%	9%	10%	0%
Incorporate adaptation actions in long term planning/other corporate plans (e.g. risk mgmt)	6%	6%	9%	10%	0%
Change operation/maintenance of infrastructure	5%	0%	0%	0%	31%
Education/awareness building activities	5%	6%	9%	0%	8%
Update equipment (less fuel, electric, etc.)	5%	6%	0%	10%	0%
Change design or location of infrastructure	5%	2%	9%	0%	15%
Energy efficient	4%	0%	0%	10%	8%
Flood management activities – flood mapping, land use restrictions, downspout disconnection	4%	6%	9%	0%	0%
Move to electric vehicles	4%	2%	9%	0%	8%
Implementing actions/measures in our plan	3%	0%	9%	0%	8%
Creating guidelines or policies	3%	0%	0%	10%	0%
Summer heat alert system/build awareness of risks from heat waves	2%	6%	0%	0%	0%
Build retaining walls to protect from storm surges	2%	6%	0%	0%	0%
Assess the costs to the organization	1%	0%	9%	0%	0%
Plant trees	0%	0%	0%	0%	0%
Water protection	0%	0%	0%	0%	0%

Other	12%	6%	9%	25%	8%
Don't know/Prefer not to say	17%	14%	37%	10%	15%
Sample size	51	20	7	11	13

Exhibit B28 – Q22. What actions are specifically planned? Anything else?
Base: Respondents who said their organization has specific future actions designed to adapt to the risk and opportunities provided by a changing climate in Q21.

Column %	2022	2018
Install natural or green infrastructure	18%	15%
Preparing/prepared a climate change adaptation plan	13%	20%
Reducing footprint/reducing waste	12%	9%
Changes to energy distribution system	10%	17%
Habitat protection	8%	12%
Drought management actions/reducing water use	8%	13%
Emergency response/disaster planning	8%	22%
	-	A
Assess the risks from climate change on the organization	6%	21%
	-	A
Incorporate adaptation actions in long term planning/other corporate plans (e.g. risk mgmt)	6%	22%
	-	A
Change operation/maintenance of infrastructure	5%	12%
Education/awareness building activities	5%	23%
	-	A
Update equipment (less fuel, electric, etc.)	5%	0%
Change design or location of infrastructure	5%	14%
Energy efficient	4%	0%
Flood management activities – flood mapping, land use restrictions, downspout disconnection	4%	10%
Move to electric vehicles	4%	0%
Implementing actions/measures in our plan	3%	24%
	-	A
Creating guidelines or policies	3%	19%
	-	A
Summer heat alert system/build awareness of risks from heat waves	2%	13%
	-	A
Build retaining walls to protect from storm surges	2%	5%
Assess the costs to the organization	1%	23%
	-	A
Plant trees	0%	2%
Relocate	0%	7%
	-	A
Water protection	0%	0%
Other	12%	22%
Don't know/Prefer not to say	17%	5%

Sample size	51	67
Column label	A	B

There are no other demographic differences.

Qualitative insights

In terms of climate adaptation measures, business participants interviewed in the qualitative phase all described both doing things and planning additional things to implement.

“Yes, both doing things now and need to do things for the future. Tree trimming, for example. Winds and ice drop a branch on a (power) line or hits a transformer. We have regulations to control our tree trimming, but climate change is making things grow faster and the regulations limit how often we get to trim and the approved budget.”

“Things we are doing: On tree species, (we are adjusting) the seed stock of next generations; foresters are assisting in moving trees further north to adapt to the future climate; on directed harvest, chief foresters in provinces are helping identify the most at-risk species (e.g., mountain pine beetle) to identify more resilient species in the future; we’re designing roads to better withstand climate changes (culvert size, etc.); vulnerability assessments are being done for regions. About 40% of companies have undertaken these to understand their adaptation options and to implement them once they can – some of them require regulatory changes or more investment.”

“We now have a sustainability program that's mandatory for members. That sustainability program includes performance measurement protocol around climate change. We had an older protocol that was focused on GHG emissions and updated in 2021 to update the emissions side to include specific impacts associated with climate change, how they'd need to adapt or mitigate those impacts. Also, we have a quite detailed guide on assessing and managing risks associated with climate change that is designed to support those performance measurement requirements.”

“We’re tracking outages due to weather, and they are increasing over time and that is related to climate change. Therefore, we need to protect our infrastructure and equipment from effect – from flooding, forest fires, wind, ice, snowstorm. Plus, we're trying to electrify our economy and that means we need to electrify and protect our assets from all this crazy weather.”

Beyond organization specific measures undertaken, some underscored collaborative efforts done with other industry stakeholders, NRCan, and universities.

“Jointly with NRCan, we developed we developed a climate adaptation guide. There has been a positive uptake in using it and no pushback. All members are experiencing the effects of weather-related impacts.”

> "Ideally all companies will have vulnerability assessments underway, knowledge and capacity building. Some of that is starting to take place. There are two university micro-certificates for upgrading education of foresters in Canada (e.g., UBC program). There's professional development."

Two thirds (65%) of respondents note that their organization has been considering a changing climate in their decision-making for at least 3 years, if not more. Only one in ten (11%) say that this has been a consideration for less than a year.

Exhibit B29 – Q23. For how long has your organization been considering a changing climate in its decision-making?
Base: Respondents who said their organization is currently acting to adapt to the risks and opportunities resulting from a changing climate in Q18.

Column %	Total business	Oil & Gas	Mining	Forestry	Power
Less than one year	11%	13%	9%	10%	13%
1-2 years	18%	22%	28%	7%	38%
3-5 years	33%	30%	37%	38%	19%
6-10 years	20%	13%	17%	25%	25%
11 or more years	12%	15%	0%	15%	0%
Don't know/Prefer not to say	7%	6%	9%	7%	6%
Sample size	92	36	7	33	16

Exhibit B30 – Q23. For how long has your organization been considering a changing climate in its decision-making?
Base: Respondents who said their organization is currently acting to adapt to the risks and opportunities resulting from a changing climate in Q18.

Column %	2022	2018
Less than one year	11%	8%
1-2 years	18%	14%
3-5 years	33%	34%
6-10 years	20%	18%
11 or more years	12%	14%
Don't know/Prefer not to say	7%	11%
Sample size	92	89

There are no other demographic differences.

Barriers to Incorporating Climate Change Considerations

Echoing the findings in 2018, the most common source an organization uses to get information on climate change is the media, with 46% of all businesses using it – a number which rises to 55% of those in forestry.

Exhibit B31 – Q24. What are your organization's sources of information regarding climate change? Any other sources?
Base: All business respondents.

Column %	Total business	Oil & Gas	Mining	Forestry	Power
The media	46%	41%	39%	55%	36%
	-	-	-	E	-
Internet searches	18%	21%	12%	18%	14%
Industry associations/municipal associations	11%	9%	0%	12%	18%
Scientific journals/magazines	10%	6%	12%	11%	16%
No information at organizational level	6%	3%	4%	7%	11%
Internal/our own information/data	6%	5%	4%	5%	9%
Universities and researchers	3%	4%	0%	3%	7%
Provincial government (various)	3%	6%	0%	1%	2%
Non-governmental organizations	3%	2%	0%	3%	7%
Environment Canada	3%	3%	0%	2%	5%
Conferences/workshops/seminars	2%	3%	0%	1%	5%
Federal government	2%	4%	0%	0%	2%
Government (unspecified)	1%	1%	0%	1%	5%
Public safety	0%	0%	0%	0%	0%
Ministry of Environment	0%	0%	0%	0%	0%
Other	9%	9%	25%	6%	7%
Don't know/Prefer not to say	17%	22%	21%	13%	11%
Sample size	209	68	21	76	44
Column label	A	B	C	D	E

Exhibit B32 – Q24. What are your organization's sources of information regarding climate change? Any other sources?
Base: All business respondents.

Column %	2022	2018
The media	46%	56%
Internet searches	18%	20%
Industry associations/municipal associations	11%	6%
Scientific journals/magazines	10%	15%
No information at organizational level	6%	4%
Internal/our own information/data	6%	6%
Universities and researchers	3%	4%

Provincial government (various)	3%	0%
	B	-
Non-governmental organizations	3%	5%
Environment Canada	3%	2%
Conferences/workshops/seminars	2%	2%
Federal government	2%	0%
Government (unspecified)	1%	3%
Public safety	0%	0%
Ministry of Environment	0%	0%
Other	9%	12%
Don’t know/Prefer not to say	17%	8%
	B	-
Sample size	209	250
Column label	A	B

Other demographic differences:

- Respondents in Ontario are the most likely to say that they rely on internet searches to find sources of information on climate change (at 35%). Those in Prairies (15%) and Quebec (7%), by contrast, are the least likely to say the same.

Qualitative insights

Through the course of the interviews, participants described certain barriers that exist and comments relevant to the specific items in the subsequent section will provide more detail. The things that are driving the action and plans tend to be the evolving knowledge of what specific climate impacts to expect in very localized areas, as well as the availability of capital and personnel.

“The national adaptation strategy was just released, but understanding what more is needed to adapt and mitigate large-scale wildfires will require regulatory changes but that is starting to be planned.”

“[What is driving action] varies. It depends on where the mines located and what the risks are (in that area). There is also an element of corporate culture to that in terms of how they approach it, but that is less of a factor now as they're being pushed by insurers and investors. What's driving the pace of it is whether or not there are significant milestones in the life of a mine, such as new infrastructure that can be built from the ground up versus upgrading older infrastructure.”

“There is a regional component, relating to where climate change has already affected a company or a region. Also, NRCan had a funding program for vulnerability assessments and five member companies were able to access that fund in order to complete an assessment. The funding program was really helpful and this program was sunset. [We are] asking for it to be renewed in budget 2023. There’s a sustainable forestry initiative certificate program and 100 million hectares are certified to that standard, and they've just renewed that standard. There's a new indicator around fire resiliency and climate

> mitigation. We are required to undertake vulnerability assessments and then will be audited going forward. Companies who have already done this are in a good spot."
>
> "It's great to have buy in, but is it enough? No. Given, unfortunately, some of the vulnerability falls to the weakest links – some of the public infrastructure that we all use are not addressed from a climate change perspective or adaptation perspective, that will have effects on major industrial sectors. The other thing is a whole of society approach to climate change adaptation, and I think Canada is just starting the journey on adaptation – there's a lot more work to do as far as awareness of the public and other industrial sectors. Infrastructure, de-siloing emergency preparedness, de-siloing how land use decisions are made and working towards a more aligned whole of society approach for addressing climate change impacts."

The barrier to taking climate change into account in decision-making processes most likely to be identified as significant by respondents is the complexity of policy change processes, identified by one third (31%) of respondents. Suppliers lacking expertise was the least likely to be identified as a significant barrier at 13%, while the remaining six barriers tested scored between 18-20%.

There was some variation among barriers by industry, with those in mining and the oil and gas sectors being the most likely to highlight competing organizational priorities (at 27%).

Exhibit B33 – Q25. To what extent does each of the following represent a barrier to your organization taking climate change into account in its decision-making? For each one I read, please tell me how much of a barrier it represents to your organization.
Base: All business respondents

Row %	Significant barrier	Minor barrier	Not a barrier	Don't know/Prefer not to say
The complexity of policy change processes	31%	30%	35%	5%
Lack of capacity in my organization	20%	36%	41%	3%
Competing organizational priorities	20%	34%	42%	4%
My organization lacks in-house expertise to apply climate change tools and information	19%	40%	36%	5%
Lack of information about climate change and its impacts	19%	38%	40%	3%
Making a business case for implementing actions	19%	36%	41%	5%
The need to have other departments/organizations act first, before we can act	18%	32%	46%	4%
My suppliers lack expertise to apply climate change tools and information	13%	37%	44%	6%

Exhibit B34 – Q25. To what extent does each of the following represent a barrier to your organization taking climate change into account in its decision-making? For each one I read, please tell me how much of a barrier it represents to your organization.
Base: All business respondents

Column % % significant barrier	Total business	Oil & Gas	Mining	Forestry	Power
The complexity of policy change processes	31%	34%	23%	32%	23%
Lack of capacity in my organization	20%	18%	23%	21%	23%
Competing organizational priorities	20%	27%	27%	15%	11%
	-	E	-	-	-
My organization lacks in-house expertise to apply climate change tools and information	19%	16%	16%	21%	25%
Lack of information about climate change and its impacts	19%	17%	8%	21%	25%
Making a business case for implementing actions	19%	25%	12%	18%	11%
The need to have other departments/organizations act first, before we can act	18%	18%	16%	20%	16%
My suppliers lack expertise to apply climate change tools and information	13%	10%	4%	14%	20%
Sample size	209	68	21	76	44
Column label	A	B	C	D	E

Exhibit B35 – Q25. To what extent does each of the following represent a barrier to your organization taking climate change into account in its decision-making? For each one I read, please tell me how much of a barrier it represents to your organization.
Base: All business respondents

Column % % significant barrier	2022	2018
The complexity of policy change processes	31%	28%
Lack of capacity in my organization	20%	12%
	B	-
Competing organizational priorities	20%	16%
My organization lacks in-house expertise to apply climate change tools and information	19%	23%

Lack of information about climate change and its impacts	19%	20%
Making a business case for implementing actions	19%	15%
The need to have other departments/organizations act first, before we can act	18%	20%
My suppliers lack expertise to apply climate change tools and information	13%	-
Sample size	209	209
Column Names	A	B

Other demographic differences:

- Those in Quebec are the most likely of any region to cite a lack of expertise to apply climate change tools and information (20%), the complexity of policy change processes (40%), and the lack of information about climate change and its impacts (33%) as significant barriers of any region.

Although a plurality (41%) of respondents say that there are no other barriers or challenges to their organizations ability to make decisions about adapting to climate change, among those who did identify another, the financial cost of adaptation was the most selected at 10% of respondents.

Exhibit B36 – Q26. What other barriers or challenges, if any, limit your organization's ability to make decisions about adapting to climate change?
Base: All business respondents

Column %	Total business	Oil & Gas	Mining	Forestry	Power
Financial cost of adaptation	10%	8%	8%	10%	18%
Government legislation	5%	4%	4%	5%	7%
Accuracy of information	3%	5%	0%	2%	5%
Lack of information	3%	5%	0%	1%	5%
Lack of cooperation/buy in	2%	3%	0%	3%	2%
Expertise	2%	2%	0%	4%	0%
Lack of political will / awareness from government/elected officials	2%	2%	0%	1%	7%
Education/perception	2%	2%	0%	1%	5%
Lack of staff	2%	2%	0%	3%	0%
Taxes	1%	3%	0%	0%	0%
Small company	1%	1%	0%	1%	0%
Access to resources	0%	0%	0%	0%	0%
Other	6%	5%	21%	4%	2%
None	41%	44%	44%	38%	43%
Don't know/Prefer not to say	22%	20%	23%	27%	9%
	-	-	-	E	-
Sample size	209	68	21	76	44

Exhibit B37 – Q26. What other barriers or challenges, if any, limit your organization's ability to make decisions about adapting to climate change?
Base: All business respondents

Column %	2022	2018
Financial cost of adaptation	10%	5%
Government legislation	5%	8%
Accuracy of information	3%	7%
Lack of information	3%	0%
	B	-
Lack of cooperation/buy in	2%	0%
	B	-
Expertise	2%	2%
Lack of political will / awareness from government/elected officials	2%	0%
	B	-
Education/perception	2%	1%
Lack of staff	2%	0%
Taxes	1%	2%
Small company	1%	0%
Access to resources	0%	0%
Other	6%	4%
None	41%	17%
	B	-
Don't know/Prefer not to say	22%	54%
	-	A
Sample size	209	250
Column label	A	B

Other demographic information:

- Respondents in Quebec are the most likely to cite expertise as a barrier or challenge for their organization's attempts to tackle climate change (at 9%), while those from Prairies are the most likely to report the accuracy of information as a barrier (at 7%).

Across all industries surveyed, only 7% of respondents say that some or all of their staff have taken climate change adaptation training – a number which rises to a high of 13% among those in the oil and gas sector. Conversely, those in the mining and power sectors are the most likely to say that their staff do not need adaptation training courses as 48% and 38% respectively.

Exhibit B38 – Q27. Which statement best describes the situation in your organization:
Base: All business respondents

Column %	Total business	Oil & Gas	Mining	Forestry	Power
Some or all of our staff have taken climate change adaptation training	7%	13%	0%	5%	2%
	-	E	-	-	-
We are aware that adaptation training courses exist but have not taken any	16%	16%	8%	19%	9%
We are not aware of any adaptation training opportunities	48%	51%	44%	46%	50%
We don't need adaptation training courses	29%	20%	48%	29%	39%
	-	-	-	-	B
Don't know/Prefer not to say	0%	0%	0%	0%	0%
Sample size	209	68	21	76	44
Column label	A	B	C	D	E

Other demographic differences:

- Respondents in Quebec are the most likely to say that some or all of their staff have taken climate change adaptation training (at 13%), whereas those in Ontario (45%) and Prairies (41%) are the most likely to say they do not need adaptation training courses.

Half (51%) of respondents say they have the resources they need to make decisions related to climate change adaptation – a number which remains consistent in all industries examined. This is down significantly from 2018, when almost three quarters (72%) said they had the resources they required.

Exhibit B39 – Q28. Do you have access to the information and tools you need to make adaptation-related decisions?
Base: All business respondents

Column %	Total business	Oil & Gas	Mining	Forestry	Power
Yes	51%	49%	51%	51%	52%
No	41%	44%	45%	40%	34%
Don't know/Prefer not to say	8%	7%	4%	8%	14%
Sample size	209	68	21	76	44

Exhibit B40 – Q28. Do you have access to the information and tools you need to make adaptation-related decisions?
Base: All business respondents

Column %	2022	2018
Yes	51%	72%
	-	A
No	41%	24%
	B	-
Don't know/Prefer not to say	8%	4%
Sample size	209	250

Column label	A	B

There are no other demographic differences.

Those who identified a lack of information and tools required to make climate change adaptation related decisions were then asked what specifically they were missing. The top resources identified by respondents were relevant case studies of similar organization (27%), economic information on costs and benefits (26%), information on best practices (24%), and information on regional impacts (24%).

When compared with 2018 when a third (34%) identified future climate change predictions and data as something they were missing, in 2022 this was only true of one fifth (21%) of respondents. Conversely, those seeking general information rose from 0% in 2018 to 5% in 2022.

Exhibit B41 – Q29. Specifically, what types of information do you lack?
Base: Respondents who indicated that their organization lacks the information or tools they need when it comes to climate change in Q25 or Q28.

Column %	Total business	Oil & Gas	Mining	Forestry	Power
Relevant case studies/examples of what other organizations like ours are doing	27%	30%	34%	20%	37%
Economic information (costs/benefits of action)	26%	35%	0%	23%	32%
Best practices information	24%	20%	26%	26%	32%
Information on impacts specific to region	24%	13%	16%	31%	32%
Projections of future climate conditions/climate data	21%	23%	26%	14%	42%
Alternative designs and technologies	20%	20%	8%	22%	26%
Information (general)	5%	9%	0%	3%	5%
Regulations/Policies	3%	3%	0%	3%	5%
Accurate information	2%	6%	0%	0%	0%
Other	5%	7%	8%	3%	11%
Everything	1%	0%	0%	0%	5%
None	3%	0%	8%	4%	5%
Don’t know/Prefer not to say	28%	26%	42%	33%	5%
Sample size	103	35	8	41	19

Exhibit B42 – Q29. Specifically, what types of information do you lack?
Base: Respondents who indicated that their organization lacks the information or tools they need when it comes to climate change in Q25 or Q28.

Column %	2022	2018
Relevant case studies/examples of what other organizations like ours are doing	27%	30%
Economic information (costs/benefits of action)	26%	33%
Best practices information	24%	27%
Information on impacts specific to region	24%	33%
Projections of future climate conditions/climate data	21%	34%
	-	A
Alternative designs and technologies	20%	26%
Information (general)	5%	0%
	B	-
Regulations/Policies	3%	0%
Accurate information	2%	6%
Other	5%	6%
Everything	1%	0%
None	3%	4%
Don't know/Prefer not to say	28%	30%
Sample size	103	106
Column label	A	B

There are no other demographic differences.

At two in five (39%), respondents were more likely to say they did not need any additional information to assist their organization in addressing the impacts of climate change than to select any specific resource. Of all the resources tested, none received more than 8% among all business respondents in 2022. It is worth noting, however, that this represents significant decreases across the board from the responses received in 2018 – this is to say that the perceived need for resources is smaller now than it was previously.

Exhibit B43 – Q30. Are there any decision-making tools or technical resources that would assist your organization in addressing the impacts of climate change? Any other types?
Base: All business respondents

Column %	Total business	Oil & Gas	Mining	Forestry	Power
Regulations	8%	9%	8%	8%	5%
Cost/benefit analysis	8%	6%	4%	8%	11%
Climate data	8%	9%	4%	8%	5%
Codes or standards	7%	10%	4%	5%	5%
Risk assessment methods	6%	8%	8%	4%	9%
Other data	6%	8%	0%	7%	5%
(Adaptation) Planning guidance	6%	8%	4%	5%	2%
Expertise	2%	3%	0%	1%	2%
Industry specific information	2%	2%	0%	1%	5%
Other	6%	5%	4%	7%	7%
None	39%	39%	44%	37%	45%

Don’t know/Prefer not to say	31%	28%	32%	34%	27%
Sample size	209	68	21	76	44

Exhibit B44 – Q30. Are there any decision-making tools or technical resources that would assist your organization in addressing the impacts of climate change? Any other types?
Base: All business respondents

Column %	2022	2018
Regulations	8%	31%
	-	A
Cost/benefit analysis	8%	31%
	-	A
Climate data	8%	31%
	-	A
Codes or standards	7%	30%
	-	A
Risk assessment methods	6%	30%
	-	A
Other data	6%	28%
	-	A
(Adaptation) Planning guidance	6%	30%
	-	A
Expertise	2%	0%
Industry specific information	2%	0%
Other	6%	0%
	B	-
None	39%	41%
Don’t know/Prefer not to say	31%	10%
	B	-
Sample size	209	250
Column label	A	B

Other demographic differences:

- Over half (54%) of those in Prairies say they do not need any other resources or tools, making them the most likely to say so among all regions.

A majority (60%) of respondents did not have any further comments about what might help businesses such as theirs face the challenges associated with climate change. Among those who did, no one selected better education, expertise, or needing more staff as something that would help them. The most selected response for what might be helpful, albeit with only 6% of respondents, was more information generally (this does rise to 11% of respondents in the oil and gas sector).

Exhibit B45 – Q31. Do you have any final comments about what would help organizations such as yours to face the challenges associated with a changing climate?
Base: All business respondents

Column %	Total business	Oil & Gas	Mining	Forestry	Power
More information (general)	6%	11%	4%	3%	2%
	-	D E	-	-	-
More government leadership	5%	6%	4%	4%	5%
More people on board / Buy in	4%	3%	0%	4%	9%
More funding	3%	2%	0%	3%	7%
Accurate information	2%	4%	4%	1%	5%
Cut carbon tax / eco fees	2%	0%	0%	4%	0%
Too much red tape / Bureaucracy	2%	2%	0%	3%	0%
Courses / Training	1%	1%	0%	1%	5%
Industry specific information	1%	0%	0%	0%	7%
Coordinated effort from federal and provincial governments	1%	2%	0%	0%	0%
Better education	0%	0%	0%	0%	2%
Expertise	0%	0%	0%	0%	0%
Need more staff	0%	0%	0%	0%	0%
Other	9%	8%	0%	13%	5%
No	60%	60%	84%	58%	57%
Don't know/Prefer not to say	5%	3%	4%	6%	2%
Sample size	209	68	21	76	44
Column label	A	B	C	D	E

Other demographic differences:

- Respondents in Ontario (11%) and Prairies (10%) are the most likely to note the need for more information generally.

Qualitative insights

Getting into a deeper conversation about the barriers faced to making further advancement on climate change adaptation, participants identified a variety of barriers and often had suggestions for what would most help remove those barriers, including specific suggestions or requests of NRCan.

Some suggested that regulated companies faced a particular set of challenges in that they had limited capacity for action – and that this was often constrained by political decisions.

Another major barrier highlighted by a number of respondents was the cost of the measures identified as being necessary, and the ability of the businesses in question to carry these costs.

"[Cost is] huge. Especially for the smaller utilities cannot afford assessments, let alone investments."

“There are three things NRCan can help on: 1. Provide subject matter expertise on how different sectors can or need to adapt; 2. Financial support. We have a lot of pressure on the private sector to decarbonize and support climate measures … and 3. Workforce development. A third of businesses in Canada are struggling to attract and/or retain talent.”

“I'll reiterate the need for financial support, public/private partnerships and thought leadership … there will need to be industry champions identified. They should start to think now about identifying what companies are making large investments in adaptation now and communicating that out.”

Another barrier noted was the lack of easily accessible information in a format and framing understandable to non-expert audiences. Some mentioned this in the context of sector specific data, while others highlighted the need for forecasting and trend data.

“As a sector we're quite well informed on the risks, but sufficient training: no. A lot of respect for Canadian Forestry Service but the information they provide needs to be digestible and in a regional format. Consistent and accessible impacts and climate change mapping would be very helpful to our members … What would be most useful: scenario analysis and climate analysis information and mapping; it’s early days, but we also need to know how effective different adaption measures are. We'll try to do this, but we are having it done under an experimental design format so we can have an idea of how useful it is. It's starting but there's more room for governments.”

“When we talk about our smaller members, one thing that would have utility is the forecasts for [regions] in terms of climate and weather in 5, 10, 15, 20 years on a regional basis. For example, in the Northwest where there are ton of minerals and metals. What will we need to do to tap those in 20-30 years. There's a resilience component as well in terms of the infrastructure, be it rail or road, to get products into and back out of market. Members need to be confident that the transportation isn't going to be out for two weeks because of flood or fire.”

“Localized trend data and new approaches or designs to electrical infrastructure. The electricity sector would welcome additional training on adapting to climate change. People would like to learn more. Would love to work with NRCan on something like that. Better informing the public – a.k.a. "ratepayers" – on the challenges and costs to help the public understand the costs and how electrification has costs plus adapting to climate change has costs…. Public pressure is unrealistic on how significant a challenge it can be to keep lights on in this changing climate.”

Beyond making the information more accessible, another need identified was to equip more people with the tools required to digest, access, understand, and act on the information that does exist.

“The other big one is literally the expertise. We find that there may be 2-3 individuals in all of Canada that have this knowledge to actually help companies do these vulnerability assessments – hence the importance of

micro-certificate programs. There is more “train the trainer” programs needed paired with funding.”

In addition to doing more to inform the public of some of the challenges faced by industry, some also spoke of the need to mount an education campaign among governments other stakeholders.

“There's a gap between the provinces in terms of understanding mining and how it actually works. There's a need to work together with our Indigenous partners. Is there an ability to collaborate that would be helpful and accelerate?”

“We've already done work within the sector. There is a role that Government of Canada should be playing in terms of providing leadership, the bully pulpit. It should be showing leadership in this space. There's a lack of understanding about the complexity of these challenges. Better appreciation and understanding of these issues. That would allow for actions to be taken, which need to be taken.”

Section B: Municipal Respondents

This section summarizes the findings from the survey conducted among 152 municipal respondents, as well as the 12 in-depth interviews done with associations representing municipalities and representatives from municipalities in coastal regions.

Awareness and Impressions of Climate Change Relevance

To contextualize awareness of and impressions of climate change relevance, all respondents were asked whether climate change was happening now or would in the future. Mirroring 2018 results (at 82%) and consistent across municipality size, approximately eight in ten respondents say that climate change is happening now (78%). One-sixth of respondents (16%) believe that climate change will happen in the foreseeable future, and the remainder say climate change will not occur (3%) or are unable to provide a response (3%).

Exhibit C1 – Q8. Which of these best describes what is happening in terms of climate change in your region?
Base: All municipal respondents.

Column %	Total municipal	Large	Medium	Small
Climate change is happening right now	78%	85%	100%	75%
Climate change is not happening right now, but it will happen in the foreseeable future	16%	0%	0%	19%
Climate change is not happening right now and will not happen in the foreseeable future	3%	0%	0%	3%
Don't know/Prefer not to say	3%	15%	0%	3%
Sample size	152	7	13	132

Exhibit C2 – Q8. Which of these best describes what is happening in terms of climate change in your region?
Base: All municipal respondents.

Column %	2022	2018
Climate change is happening right now	78%	82%
Climate change is not happening right now, but it will happen in the foreseeable future	16%	11%
Climate change is not happening right now and will not happen in the foreseeable future	3%	4%
Don't know/Prefer not to say	3%	3%
Sample size	152	100

Other demographic differences:

- Respondents in the Prairies are the least likely to say that climate change is happening now (at 55%).

Qualitative insights

All municipal participants in the qualitative phase were uniformly of the opinion that climate change is already occurring. All could easily point out reasons for their response and some were taken somewhat aback at being asked that question, given all the scientific evidence that exists and all the extreme weather events that have occurred in recent years. Many simply listed all the effects that they had or were experiencing.

"Science. Increased precipitation events, intensity of storms, prolonged drought, wildfires, heat domes."

"We accept the international science on why it is happening, that it is happening. We are experiencing climate events that everyone is recognizing now. Hurricanes, for example. Increased frequency and severity of storms. Damage. Species migration."

"Sea level rise, extreme weather events, flooding, winds, extensive power outages, damage to infrastructure and communities, migration … the effect of heat on vulnerable populations."

For this wave, respondents who felt that climate change will happen in the foreseeable future were asked how many years their community will have before they start to see the impacts from a changing climate and the responses were varied. Approximately three in ten respondents feel that a noticeable impact will occur in 1 to 5 years (28%), 6 to 10 years (33%), or 11 to 19 years (30%). Fewer (9%) feel that the impact of a changing climate would be seen in 20 years or more.

Exhibit C3 – Q9. How many years from now do you believe your community will start to see impacts from a changing climate?
Base: Municipal respondents who said that climate change is not happening right now, but it will happen in the foreseeable future in Q8.

Column %	%
1-5 years	28%
6-10 years	33%
11-19 years	30%
20 years or more in the future	9%
Don't know/Prefer not to say	0%
Sample size	27

There are no other demographic differences.

Respondents who believe that climate change will occur in the foreseeable future were asked what impact a changing climate will have on their community. Up 15 percentage points since 2018, one-quarter of respondents (26%) say that a changing climate will have a major impact on their community in the next 20 years. Half of respondents (52%) assess that impact as 'moderate' and one-fifth (20%) believe that a changing climate will have a minor impact on their community. No respondents (0%) say that there will be no impact on their community.

While not statistically significant, medium, and large communities are directionally more likely to say that a changing climate will have a major impact on their communities than small communities.

Exhibit C4 – Q10. How MUCH of an impact will a changing climate will have on your community in the next 20 years? Would you say it will have a…?
Base: Municipal respondents who did not say that climate change is not happening right now and will not happen in the foreseeable future in Q8.

Column %	Total municipal	Large	Medium	Small
Major impact	26%	44%	40%	23%
Moderate impact	52%	42%	52%	53%
Minor impact	20%	15%	0%	22%
No impact at all	0%	0%	0%	0%
Don't know/Prefer not to say	2%	0%	7%	1%
Sample size	143	7	13	123

Exhibit C5 – Q10. How MUCH of an impact will a changing climate will have on your community in the next 20 years? Would you say it will have a…?
Base: Municipal respondents who did not say that climate change is not happening right now and will not happen in the foreseeable future in Q8.

Column %	2022	2018
Major impact	26%	11%
	B	-
Moderate impact	52%	57%
Minor impact	20%	27%
No impact at all	0%	1%
Don't know/Prefer not to say	2%	1%
Sample size	143	96
Column label	A	B

There are no other demographic differences.

As in the previous question, those respondents were then asked what the most and next most serious impacts of a changing climate over the next 20 years will be. Topping the list of most serious impacts is flooding, which is volunteered by 18% of respondents on an unaided basis. Flooding is followed by increased frequency and severity of extreme weather events (17%), and effects on agriculture (12%). Rounding out the top five most serious impacts are the impacts on water supply (9%) and forest or wildland fires (9%). Other impacts are marked as most serious by 7% or fewer of respondents.

Exhibit C6 – Q11. Thinking about your community, what do you think will be the most serious impact of a changing climate over the next 20 years? What do you think will be the next-most serious impact?
Base: Municipal respondents who did not say that climate change is not happening right now and will not happen in the foreseeable future in Q8.

Column %	Most serious	Next most serious
Flooding	18%	7%
More frequent or more severe weather events/storms	17%	14%
Effects on agriculture (growing season changes, crop failures)	12%	8%
Impacts on water supply	9%	4%
Forest (or wildland) fires	8%	9%
Droughts	7%	10%
Changing sea/lake levels/coastal erosion	7%	7%
Economic effects (loss of productivity, negative trade impacts, increased trade opportunities)	4%	3%
Change of temperatures / temperature fluctuations	4%	0%
Effects on infrastructure	3%	0%
Extreme weather (hot, cold)	2%	1%
Heat waves	1%	8%
Increase costs	1%	0%
Permafrost change (melting, thawing, instability)	1%	3%
Human health impacts	1%	4%
Other	1%	10%
No serious impact	1%	1%
Don’t know/Prefer not to say	3%	10%

Looking at the impacts volunteered by respondents as being either the most or next most serious impacts reveals some differences. For starters, the most common impact among respondents is more frequent or more severe weather events, listed by three in ten respondents overall (29%). Flooding is cited by one-quarter of respondents (25%), and one in five (20%) believe the effects on agriculture will be the most or next most serious impact on their community. Rounding out the top five are droughts (17%) and forest or wildland fires (16%).

While not statistically significant due to sample sizes, respondents from large communities are directionally more likely to volunteer flooding (44%) and heat waves (29%) as the most or next most serious impacts of a changing climate on their community.

The list of impacts shared by respondents is very similar to those volunteered by respondents in 2018, with only one notable difference. In 2018, fewer than 1% of respondents volunteered

change in temperature or temperature fluctuations as the most of next most serious impact of a changing climate, and in 2022 4% of respondents have.

Exhibit C7 – Q11. Thinking about your community, what do you think will be the most serious impact of a changing climate over the next 20 years? What do you think will be the next-most serious impact?
Base: Municipal respondents who did not say that climate change is not happening right now and will not happen in the foreseeable future in Q8.

Column % Combined most serious and next most serious	Total municipal	Large	Medium	Small
More frequent or more severe weather events/storms	29%	0%	30%	31%
Flooding	25%	44%	32%	22%
Effects on agriculture (growing season changes, crop failures)	20%	15%	20%	21%
Droughts	17%	15%	6%	19%
Forest (or wildland) fires	16%	0%	16%	17%
Changing sea/lake levels/coastal erosion	13%	15%	29%	11%
Impacts on water supply	13%	0%	13%	13%
Heat waves	9%	29%	14%	7%
Economic effects (loss of productivity, negative trade impacts, increased trade opportunities)	7%	12%	7%	7%
Human health impacts	4%	0%	13%	4%
Change of temperatures / temperature fluctuations	4%	12%	0%	4%
More rain/snow events	4%	15%	0%	4%
Effects on infrastructure	3%	0%	7%	3%
Permafrost change (melting, thawing, instability)	2%	0%	0%	3%
Extreme weather (hot, cold)	2%	0%	0%	3%
Effects on wildlife (changing migration patterns, species loss, invasive species, loss of habitat)	1%	0%	0%	1%
Warmer winters	1%	0%	7%	0%
Other	6%	29%	6%	5%
No serious impact	2%	0%	0%	2%
Don’t know/Prefer not to say	13%	15%	0%	14%
Sample size	143	7	13	123

Exhibit C8 – Q11. Thinking about your community, what do you think will be the most serious impact of a changing climate over the next 20 years? What do you think will be the next-most serious impact?
Base: Municipal respondents who did not say that climate change is not happening right now and will not happen in the foreseeable future in Q8.

Column % Combined most serious and next most serious	2022	2018
More frequent or more severe weather events/storms	29%	33%
Flooding	25%	32%
Effects on agriculture (growing season changes, crop failures)	20%	19%
Droughts	17%	9%
Forest (or wildland) fires	16%	10%
Changing sea/lake levels/coastal erosion	13%	14%
Impacts on water supply	13%	15%
Heat waves	9%	3%
Economic effects (loss of productivity, negative trade impacts, increased trade opportunities)	7%	11%
Human health impacts	4%	7%
Change of temperatures / temperature fluctuations	4%	0%
	B	-
More rain/snow events	4%	2%
Effects on infrastructure	3%	1%
Permafrost change (melting, thawing, instability)	2%	4%
Extreme weather (hot, cold)	2%	1%
Effects on wildlife (changing migration patterns, species loss, invasive species, loss of habitat)	1%	4%
Warmer winters	1%	0%
Other	6%	14%
No serious impact	2%	0%
Don’t know/Prefer not to say	13%	13%
Sample size	143	96
Column label	A	B

Qualitative insights

Municipal participants readily discussed a long list of impacts being anticipated for their community, many of them quite significant and concerning and often with evidence the changes have begun to affect the community. As with the business respondents, municipal participants were divided over whether they would describe the impacts of a changing climate on their community as being moderate or major.

“The shoreline is collapsing, we have to think about things like the cemetery. How are we going to protect infrastructure, people, houses? What's the plan. We have flooding even throughout the summer season, and it is flooding further and further inland, so we have to raise the roads so that we have an ability to evacuate if we need to.”

“Particularly the heat and the smoke. In our early days, we focused on sea level rise, but that is a very long-term game and the heat and smoke affect day-to-day lives already. Every pipe we put in the ground is with climate change in mind now. Every tree we plant. We now require air conditioning for any new multi-unit developing. Somewhere between a moderate and a major [impact]. Significant in terms of heat, drought, wildfire. Can we adapt and respond quickly enough to those risks? We're now exploring the ideas of painting roofs white and tin foil on windows. We've had long periods without rain that have not yet emptied our reservoirs.”

“Increasing storm severity. Coastline erosion. Maybe moderate, but 20 years is a long time. A lot can happen. Plus, affordability due to things like oil prices.”

“Given recent events, lots of members may say "major impact" anecdotally – referring to particular extreme events that hit particular locations. For them, in the short-term it was a major event. If you think over the long term, if you try and average out the various impacts in the community, it probably comes closer to [only being] moderate. Over that time frame, there will be a lot of adaptation efforts. At the same time, organisations will be more used to these extreme events – they may not view them as major as they once did. The norm is shifting over time through which we plan and manage communities. Is the perspective from today, or from the future?”

“The strain on infrastructure posed by the storms themselves. Critical infrastructure that municipalities are already charged with keeping in a good state of repair. Need to respond to a possibility of these events happening (e.g., flood concerns, coastal surges). The impetus to respond lies with varying levels of government. Sometimes the province downloads the responsibility to the municipalities. There's an active debate around how much responsibility municipalities should take on.”

“In [our region], the coastal impacts are the overwhelmingly obvious ones: sea level rising, land is sinking, receiving more stormy weather (e.g., hurricanes), extreme rain, flooding (in-land, coastal flooding), winters getting milder (ecosystems impacts, e.g., hardly any snow here this year). Overall, that is what you would hear if you talk to people. Other potential impacts include drought … (impacts on agricultural industry) – overall we may be getting more water, but it becomes a matter of when it arrives, how its stored, etc. The agricultural community may need to look at reservoirs and more managed sources of water.”

Not all respondents qualified the changes as uniformly negative, however, with some pointing to potentially favourable side-effects such as easier shipping in Northern Canada or more favourable temperatures in some parts of the country.

> “Temperatures might actually be more pleasant for a lot of people. Heat pumps can probably handle the heat, so we can probably adapt to that. Hurricanes might be more damaging going forward. Our flood plain mapping is updated and continually being adjusted. Plus, infrastructure is already being designed to handle higher volumes of water.”

In 2022, all respondents were asked whether a changing climate is already having an impact on their organization in any way or whether it will have an impact in the future. Slightly more than half of respondents (54%) believe that a changing climate is already having an impact on their organization, while 37% say it is not currently but it is possible that it will in the future. Only 6% of respondents believe a changing climate will not have an impact on their organization in the future.

Exhibit C9 – Q12. Is climate change something that is already having an impact on your organization in any way, is not yet having an impact on the organization, but it may have an impact in the future, or is climate change something that will not have an impact on your organization?
Base: All municipal respondents.

Column %	Total municipal	Large	Medium	Small
It is having an impact on the organization	54%	58%	93%	49%
It is not yet having an impact on the organization, but it is possible	37%	27%	7%	41%
Will not have an impact on the organization	6%	0%	0%	8%
Don’t know/Prefer not to say	3%	15%	0%	2%
Sample size	152	7	13	132

Other demographic differences:

- Respondents in the Prairies are the least likely to say that climate change is having an impact on the organization (at 30%).

Respondents who believe that climate change will have an impact on their organization in the future were asked whether that impact would be mostly negative or positive. Up 16% percentage points since 2018, nearly nine in ten respondents (86%) believe that the impact of a changing climate on their organization in the future will be mainly negative. Few respondents believe the impact will be mainly positive (5%) or say a changing climate will have both positive and negative impacts on their organization (3%).

Exhibit C10 – Q13. Overall, will changing climate have a mainly negative or mainly positive impact on your organization?
Base: Respondents who did not say that climate change will not have an impact on their organization in Q12.

Column %	Total municipal	Large	Medium	Small
Mainly negative impact	86%	85%	94%	85%
Mainly positive impact	5%	15%	0%	5%
Both positive and negative impacts	3%	0%	0%	3%
Neutral or no impact	3%	0%	0%	3%
Don't know/Prefer not to say	4%	0%	6%	4%
Sample size	140	7	13	120

Exhibit C11 – Q13. Overall, will changing climate have a mainly negative or mainly positive impact on your organization?
Base: Respondents who did not say that climate change will not have an impact on their organization in Q12.

Column %	2022	2018
Mainly negative impact	86%	70%
	B	-
Mainly positive impact	5%	5%
Both positive and negative impacts	3%	11%
	-	A
Neutral or no impact	3%	4%
Don't know/Prefer not to say	4%	10%
Sample size	140	94
Column label	A	B

There are no other demographic differences.

The handful of respondents who felt that the impact of a changing climate would have at least some positive impacts on their organization were asked what some of those positive impacts will be. The most common mentions are warmer winters or lower energy costs (79%), increased crop yields (57%) and reduced winter snow clearing costs (22%).

Exhibit C12 – Q14. What, specifically, are some of the positive impacts or opportunities for your organization resulting from a changing climate? Any others?
Base: Respondents who said that climate change had at least some positive impact on their organization in Q13.

Column %	2022	2018
Warmer winters/lower energy costs	79%	0%
Increased crop yields	57%	20%
Reduced winter snow clearing costs	22%	40%
Earlier/longer operating season	17%	20%
Increased tourism/longer tourism season	17%	0%
Oher	21%	100%
Don't know/Prefer not to say	0%	0%
Sample size	7	5

There are no other demographic differences.

Respondents who said that the impact on their organization would be negative were also asked what those negative impacts will be. As in 2018, the impacts volunteered by respondents are wide-ranging and are similar across community size. The most common impacts, shared by more than one-quarter of respondents, are a change in water levels or supply (39%), costs and impacts to infrastructure (38%), economic losses or the cost of adaptation (37%), and increased floods (37%) and drought (28%).

Compares to 2018, fewer respondents in 2022 volunteered impact to and cost for infrastructure (38% versus 55%), more floods (37% versus 55%) and more pests or diseases (7% versus 21%). Conversely, more respondents in 2022 say that a shorter operating season will have a negative impact on their organization (7% versus 0%).

Exhibit C13 – Q15. What, specifically, are some of the negative impacts or risks for your organization resulting from a changing climate? Any others?
Base: Respondents who said that climate change had at least some negative impact on their organization in Q13.

Column %	Total municipal	Large	Medium	Small
Change in water levels/water supply	39%	34%	58%	36%
Infrastructure impacts/costs	38%	34%	54%	35%
Economic losses/cost of adapting	37%	17%	36%	39%
More floods	37%	32%	42%	36%
More drought	28%	17%	13%	31%
Increase in forest/wildland fire	24%	17%	10%	27%
Increased heatwaves/cooling costs	20%	17%	13%	21%
More storm surges/damage from sea level rise	14%	0%	33%	12%
Shorter winter tourism season	9%	0%	0%	11%
More pests/diseases	7%	0%	7%	8%
Shorter operating season	7%	0%	0%	9%
More smog	3%	0%	0%	4%
Extreme weather changes	3%	14%	0%	3%
Supply/Material shortages	2%	0%	0%	3%
Effects on agriculture and crops	1%	0%	8%	1%
Staff shortages	1%	0%	0%	2%
Transport cost	1%	0%	0%	1%
Other	11%	0%	21%	11%
Don’t know/Prefer not to say	1%	17%	0%	0%
Sample size	120	6	12	102

Exhibit C14 – Q15. What, specifically, are some of the negative impacts or risks for your organization resulting from a changing climate? Any others?
Base: Respondents who said that climate change had at least some negative impact on their organization in Q13.

Column %	2022	2018
Change in water levels/water supply	39%	36%
Infrastructure impacts/costs	38%	55%
	-	A
Economic losses/cost of adapting	37%	52%
More floods	37%	55%

	-	A
More drought	28%	33%
Increase in forest/wildland fire	24%	24%
Increased heatwaves/cooling costs	20%	23%
More storm surges/damage from sea level rise	14%	24%
Shorter winter tourism season	9%	17%
More pests/diseases	7%	21%
	-	A
Shorter operating season	7%	0%
	B	-
More smog	3%	12%
Extreme weather changes	3%	0%
Supply/Material shortages	2%	0%
Effects on agriculture and crops	1%	6%
Staff shortages	1%	0%
Transport cost	1%	3%
Other	11%	5%
Don’t know/Prefer not to say	1%	3%
Sample size	120	66
Column label	A	B

There are no other demographic differences.

Qualitative insights

Most municipal participants described having experienced organizational impacts including the establishment of units, mandates, and activities specifically to address the need for adaptation and put governments in a position to do the work that needs to be done.

“Recognition on the level of governments has taken some time. Currently we're at the point of acknowledgement, especially municipal governments – declaring climate emergencies. [A local community] "declared war" on climate change. The impact that it's having on our environments (e.g., storm severity, flooding, etc.). People are acting on the challenges.”

“Changes in operations and planning are occurring, but that is not necessarily negative. Being proactive is a good thing. I’m not feeling climate grief because I am planning. I'm doing something about. Resilience planning is top of mind and something we are doing already.”

“The increased appreciation [within the government] of environmental responsibility – there's more of a sensitivity towards sensitive ecosystems. The rush of housing developments that's happening right now, that can lead to some tough decisions.”

All respondents were asked to describe their organization’s view regarding the extent of challenge climate change poses. The same as in 2018 and similar across community size, the majority of respondents (60%) say that climate change is considered a significant challenge faced by their organization but is not as serious as other challenges. One quarter of

respondents (27%) say that climate change does not present a significant challenge to their organization, while 12% say it is one of the most significant challenge their organization faces.

Exhibit C15 – Q16. Which of the following best describes your organization's view regarding climate change? Is it that...
Base: All municipal respondents.

Column %	Total municipal	Large	Medium	Small
Climate change is one of the most significant challenges your organization faces	12%	15%	34%	9%
Climate change is a significant challenge, but not as serious as others your organization faces	60%	42%	66%	60%
Climate change does not present a significant challenge to your organization	27%	29%	0%	31%
Climate change is not happening	0%	0%	0%	0%
Don't know/Prefer not to say	1%	15%	0%	0%
Sample size	152	7	13	132

Exhibit C16 – Q16. Which of the following best describes your organization's view regarding climate change? Is it that...
Base: All municipal respondents.

Column %	2022	2018
Climate change is one of the most significant challenges your organization faces	12%	11%
Climate change is a significant challenge, but not as serious as others your organization faces	60%	59%
Climate change does not present a significant challenge to your organization	27%	26%
Climate change is not happening	0%	1%
Don't know/Prefer not to say	1%	3%
Sample size	152	100

Other demographic differences:

- Respondents in the Prairies are the most likely to say that climate change does not present a significant challenge to their organization (at 58%).

Respondents were then asked to consider how concerned their clients or stakeholders are regarding climate change. Two-thirds of respondents (65%) say that their clients or stakeholders are concerned with climate change, either very (12%) or somewhat (53%). One-quarter of respondents (25%) say their clients or stakeholders are not very concerned with climate change, and 8% say they are not at all concerned.

The extent of concern is similar across community size, and while not statistically different due to the sample sizes, compared to 2018, 10% more respondents in 2022 say their client or stakeholders are concerned about climate change.

Exhibit C17 – Q17. What about your clients or stakeholders? Would you say that they are generally very concerned, somewhat concerned, not very concerned or not at all concerned about climate change?
Base: All municipal respondents.

Column %	Total municipal	Large	Medium	Small
Very concerned	12%	29%	20%	10%
Somewhat concerned	53%	56%	59%	52%
Not very concerned	25%	0%	21%	27%
Not at all concerned	8%	0%	0%	9%
Don't know/Prefer not to say	2%	15%	0%	2%
Sample size	152	7	13	132

Exhibit C18 – Q17. What about your clients or stakeholders? Would you say that they are generally very concerned, somewhat concerned, not very concerned or not at all concerned about climate change?
Base: All municipal respondents.

Column %	2022	2018
Very concerned	12%	9%
Somewhat concerned	53%	49%
Not very concerned	25%	27%
Not at all concerned	8%	10%
Don't know/Prefer not to say	2%	5%
Sample size	152	100

Other demographic differences:

- At 70%, respondents in the Prairies are the most likely to say their clients or stakeholders are not concerned.

Qualitative insights

Municipal participants tended to describe communities they serve as being at least somewhat concerned with the need to adapt to a changing climate, but many described challenges with the level of understanding of what is coming, what is required, the immensity of the challenge, the costs associated with it and as a result, the public is not necessarily educated and engaged enough to accept the tough decisions that Mayors and Councils will be forced to make if they are to adopt appropriate plans.

The public opinion environment was often described as being one of heightened awareness but still challenging in a variety of ways related to the lack of understanding or willingness to consider difficult trade-off choices that are inevitable.

“More and more people are recognizing the changes to their community and landscape. It's a community of gatherers and hunters. They harvest food from the land in order to survive. They can't afford to be buying from the local grocery store every day. They are seeing and understanding the changes to their environment, the land they travel on, the ice they travel on, the different types of ice.”

“We poll on this and around 90% are very or somewhat concerned.”

While there was a widespread sense that communities recognized that changes were occurring, some expressed concern that the sheer complexity of the situation was not being adequately grasped.

“It depends if you are asking about what they are seeing or about their understanding. I’m not seeing anyone completely understanding [the implications of what they are seeing].”

“It's not at the forefront of daily discussions [in the community], but on the administrative and political level, it is on the agenda and a topic of discussion. It's not like people think it's not a big deal and we don't need to talk about it now.”

“They understand and are worried about it, but they don't know what to do about it.”

Many respondents also noted that community opinions varied alongside extreme weather events.

“People are mostly looking to government. It’s not priority one [to the community] but it does show up in surveys. It's not really mainstream yet. Storms ramp up intensity of feeling, but we've been hit by lots of really good weather and a few rain events that people find hard to link directly to climate change.”

Climate Change Adaptation

As in the last survey conducted in 2018, respondents were asked about their organization’s current and future plans to adapt to a changing climate, including where in the planning and implementation process their organization currently is.

To understand at what stage communities are at when it comes to climate change adaptation, all respondents were asked if their organization is currently doing anything to adapt to the risk and opportunities that result from a changing climate. Directionally higher than in 2018 (57%), over six in ten respondents (64%) say that their organization is currently taking adaptation steps, while one-third (34%) say they are not.

While not statistically different due to sample size, respondents from large and medium communities appear more likely to say that their organization has taken steps to adapt to the risk and opportunity that result from a changing climate.

Exhibit C19 – Q18. Adapting to a changing climate means taking actions that reduce the risks or take advantage of opportunities from changes in climate. Is your organization currently doing anything to adapt to the risks and opportunities resulting from a changing climate?
Base: All municipal respondents.

Column %	Total municipal	Large	Medium	Small
Yes	64%	71%	86%	61%
No	34%	15%	14%	38%
Don't know/Prefer not to say	2%	15%	0%	1%
Sample size	152	7	13	132

Exhibit C20 – Q18. Adapting to a changing climate means taking actions that reduce the risks or take advantage of opportunities from changes in climate. Is your organization currently doing anything to adapt to the risks and opportunities resulting from a changing climate?
Base: All municipal respondents.

Column %	2022	2018
Yes	64%	57%
No	34%	42%
Don't know/Prefer not to say	2%	1%
Sample size	152	100

Other demographic differences:

- At two thirds (64%), respondents in the Prairies are the most likely to say they are not currently doing anything to adapt to the risks and opportunities resulting from climate change.

As it relates specifically to risk assessments, the majority of respondents (66%) say their organization has not conducted one whereas one-quarter (26%) say their organization has. Results are fairly similar across community size.

Exhibit C21 – Q19. Has your organization completed (or conducted) a climate change risk assessment?
Base: All municipal respondents.

Column %	Total municipal	Large	Medium	Small
Yes	26%	42%	73%	19%
No	66%	44%	20%	73%
Don't know/Prefer not to say	8%	15%	7%	8%
Sample size	152	7	13	132

Other demographic differences:

- Nearly all respondents in the Prairies (91%) say their organization has not done a risk assessment.

Respondents who indicated that their organization has taken steps to adapt to a changing climate were asked what specifically their organization is currently doing. Responses are wide-ranging and many noted by fewer respondents than in 2018, however, one-fifth or more respondents volunteer that their organization is currently undertaking: flood management

activities (33%), emergency response or disaster planning (31%), changing operations or maintenance of infrastructure (22%), risk assessments (20%), or specific actions or measure in accordance with their adaptation plan.

Exhibit C22 – Q20. What, specifically, is your organization currently doing to ADAPT to a changing climate? Anything else?
Base: Respondents who said their organization is currently acting to adapt to the risks and opportunities resulting from a changing climate in Q18.

Column %	Total municipal	Large	Medium	Small
Flood management activities – flood mapping, land use restrictions, downspout disconnection	33%	21%	24%	35%
Emergency response/disaster planning	31%	0%	29%	34%
Change operation /maintenance of infrastructure	22%	21%	41%	19%
Assess the risks from climate change on the organization	20%	21%	22%	20%
Implementing actions/measures in our plan	20%	0%	38%	18%
Preparing a climate change adaptation plan	16%	0%	50%	11%
Incorporate adaptation actions in long term planning/other corporate plans (e.g. risk mgmt)	15%	21%	14%	15%
Change design or location of infrastructure	14%	21%	34%	10%
Drought management actions /reducing water use	14%	0%	14%	15%
Install natural or green infrastructure	13%	0%	23%	13%
Habitat protection	13%	0%	32%	10%
Creating guidelines or policies	12%	21%	14%	10%
Education/awareness building activities	10%	0%	0%	13%
Changes to energy distribution system	10%	21%	9%	10%
Have an adaptation plan	8%	21%	0%	9%
Assess the costs to the organization	7%	21%	0%	7%
Summer heat alert system /build awareness of risks from heat waves	6%	0%	0%	7%
Water protection	5%	0%	0%	6%
Reducing carbon/co2 footprint	4%	0%	0%	5%
Reduce fuel consumption	3%	17%	0%	3%
Build retaining walls to protect from storm surges	3%	0%	0%	4%
Working to reduce wildfires/forest fires	3%	0%	0%	3%
Other	5%	0%	0%	6%
Don’t know/Prefer not to say	5%	0%	0%	6%
Sample size	89	5	11	73

Exhibit C23 – Q20. What, specifically, is your organization currently doing to ADAPT to a changing climate? Anything else?
Base: Respondents who said their organization is currently acting to adapt to the risks and opportunities resulting from a changing climate in Q18.

Column %	2022	2018
Flood management activities – flood mapping, land use restrictions, downspout disconnection	33%	44%
Emergency response/disaster planning	31%	51%
	-	A
Change operation /maintenance of infrastructure	22%	28%
Assess the risks from climate change on the organization	20%	30%
Implementing actions/measures in our plan	20%	28%
Preparing a climate change adaptation plan	16%	33%
	-	A
Incorporate adaptation actions in long term planning/other corporate plans (e.g. risk mgmt)	15%	33%
	-	A
Change design or location of infrastructure	14%	26%
Drought management actions /reducing water use	14%	28%
	-	A
Install natural or green infrastructure	13%	19%
Habitat protection	13%	23%
Creating guidelines or policies	12%	25%
Education/awareness building activities	10%	14%
Changes to energy distribution system	10%	18%
Have an adaptation plan	8%	21%
	-	A
Assess the costs to the organization	7%	18%
Summer heat alert system /build awareness of risks from heat waves	6%	14%
Water protection	5%	0%
Reducing carbon/co2 footprint	4%	4%
Reduce fuel consumption	3%	0%
Build retaining walls to protect from storm surges	3%	5%
Working to reduce wildfires/forest fires	3%	0%
Other	5%	7%
Don’t know/Prefer not to say	5%	2%
Sample size	89	57
Column label	A	B

Mirroring the results in 2018, the majority of respondents (61%) say that their organization does not have any future actions planned to adapt to the risks and opportunities provided by a changing climate, while 36% say their organization does.

While not statistically different due to the sample sizes, respondents from large or medium communities appear more likely to say that their organization does have future adaptation actions planned.

Exhibit C24 – Q21. Does your organization have any specific plans for FUTURE actions designed to ADAPT to the risks and opportunities provided by a changing climate?
Base: All municipal respondents.

Column %	Total municipal	Large	Medium	Small
Yes	36%	85%	80%	27%
No	61%	0%	20%	70%
Don't know/Prefer not to say	4%	15%	0%	3%
Sample size	152	7	13	132

Exhibit C25 – Q21. Does your organization have any specific plans for FUTURE actions designed to ADAPT to the risks and opportunities provided by a changing climate?
Base: All municipal respondents.

Column %	2022	2018
Yes	36%	42%
No	61%	56%
Don't know/Prefer not to say	4%	2%
Sample size	152	100

There are no other demographic differences.

Those respondents who indicated that their organizations did in fact have specific adaptation actions planned for the future were asked what those plans were. The plans volunteered are varied, all are cited by fewer than one-fifth of respondents and many are vague. Topping the list in 2022, however, are installing natural or green infrastructure (18%), changing operation or maintenance of infrastructure (18%), emergency response or disaster planning (17%), unspecified mentions of implementation measure in accordance with their organization's plan (17%), risk assessments (17%), and preparing an adaptation plan (17%).

The increase in the variety of responses in 2022, including more specific adaptation actions – including planting trees, reducing waste, water protection, and moving to electric vehicles – has resulted in fewer respondents citing many of the actions listed in 2018.

Exhibit C26 – Q22. What actions are specifically planned? Anything else?
Base: Respondents who said their organization has specific future actions designed to adapt to the risk and opportunities provided by a changing climate in Q21.

Column %	Total municipal	Large	Medium	Small
Install natural or green infrastructure	18%	0%	8%	26%
Change operation/maintenance of infrastructure	18%	17%	21%	17%
Emergency response/disaster planning	17%	0%	8%	25%
Implementing actions/measures in our plan	17%	0%	20%	20%
Assess the risks from climate change on the organization	17%	0%	8%	24%
Preparing/prepared a climate change adaptation plan	17%	0%	17%	20%
Education/awareness building activities	13%	0%	9%	18%
Flood management activities – flood mapping, land use restrictions, downspout disconnection	13%	0%	8%	18%
Assess the costs to the organization	13%	17%	20%	10%
Habitat protection	12%	0%	0%	19%
Changes to energy distribution system	12%	17%	19%	8%
Incorporate adaptation actions in long term planning/other corporate plans (e.g. risk mgmt)	10%	17%	8%	9%
Change design or location of infrastructure	9%	17%	0%	11%
Plant trees	7%	0%	9%	7%
Reducing footprint/reducing waste	7%	17%	18%	0%
Water protection	6%	0%	0%	9%
Move to electric vehicles	5%	0%	0%	8%
Creating guidelines or policies	5%	0%	9%	4%
Summer heat alert system/build awareness of risks from heat waves	4%	0%	0%	7%
Drought management actions/reducing water use	2%	0%	0%	4%
Update equipment (less fuel, electric, etc.)	2%	0%	0%	4%
Energy efficient	2%	0%	9%	0%
Build retaining walls to protect from storm surges	2%	0%	0%	3%
Other	5%	0%	8%	5%
Don’t know/Prefer not to say	9%	49%	9%	0%
Sample size	48	6	10	32

Exhibit C27 – Q22. What actions are specifically planned? Anything else?
Base: Respondents who said their organization has specific future actions designed to adapt to the risk and opportunities provided by a changing climate in Q21.

Column %	2022	2018
Install natural or green infrastructure	18%	17%
Change operation/maintenance of infrastructure	18%	24%
Emergency response/disaster planning	17%	31%
Implementing actions/measures in our plan	17%	26%
Assess the risks from climate change on the organization	17%	26%
Preparing/prepared a climate change adaptation plan	17%	31%
Education/awareness building activities	13%	29%
Flood management activities – flood mapping, land use restrictions, downspout disconnection	13%	36%
	-	A
Assess the costs to the organization	13%	19%
Habitat protection	12%	17%
Changes to energy distribution system	12%	12%
Incorporate adaptation actions in long term planning/other corporate plans (e.g. risk mgmt)	10%	26%
	-	A
Change design or location of infrastructure	9%	17%
Plant trees	7%	0%
Reducing footprint/reducing waste	7%	0%
Water protection	6%	0%
Move to electric vehicles	5%	0%
Creating guidelines or policies	5%	21%
	-	A
Summer heat alert system/build awareness of risks from heat waves	4%	17%
	-	A
Update equipment (less fuel, electric, etc.)	2%	0%
Energy efficient	2%	0%
Build retaining walls to protect from storm surges	2%	5%
Other	5%	12%
Don’t know/Prefer not to say	9%	17%
Sample size	48	42
Column label	A	B

Respondents who indicated that their organization had specific adaptation plans for the future were asked how long their organization has been considering a changing climate in its decision-making. Interestingly, as was in 2018 (60%), the majority of respondents in 2022 (62%) say their organization has been considering a changing climate in its decision-making for 1 to 5 years. One-quarter of respondents (26%) say their organization has considered a changing climate in its decision-making for 6 years or more, and 8% say it has only been considered within the past year.

Exhibit C28 – Q23. For how long has your organization been considering a changing climate in its decision-making?
Base: Respondents who said their organization is currently acting to adapt to the risks and opportunities resulting from a changing climate in Q18.

Column %	Total municipal	Large	Medium	Small
Less than one year	8%	21%	0%	8%
1-2 years	21%	0%	16%	23%
3-5 years	41%	41%	34%	43%
6-10 years	16%	21%	14%	16%
11 or more years	10%	0%	27%	8%
Don't know/Prefer not to say	4%	17%	9%	3%
Sample size	89	5	11	73

Exhibit C29 – Q23. For how long has your organization been considering a changing climate in its decision-making?
Base: Respondents who said their organization is currently acting to adapt to the risks and opportunities resulting from a changing climate in Q18.

Column %	2022	2018
Less than one year	8%	4%
1-2 years	21%	23%
3-5 years	41%	37%
6-10 years	16%	18%
11 or more years	10%	12%
Don't know/Prefer not to say	4%	7%
Sample size	89	57

There are no other demographic differences.

Qualitative insights

All municipal participants in the in-depth interviews described both having already undertaken climate adaptation actions and having plans to do more in the future. Indeed, there was a widespread sense that turning the plans into actions is more of a problem than assigning adequate priority to implementing plans. The activities described are quite widespread, although in a small number of cases, there was conflation of mitigation initiatives with adaptation initiatives.

"Between doing and planning on doing. Engaging in advocacy for sufficient levels of funding for municipalities. We want to see funding support with the increased responsibilities. Advocacy priorities voted on. Infrastructure and sustainability funding is a new addition to the priorities (e.g., helping municipalities make use of the full range of resources available). Building internal capacity to help win grants, get that funding. Doing the research will find out what financial deficits are holding back the municipalities."

"We're [the urban] part of a joint initiative with rural municipalities and the provincial government. We are offering a program that allows municipalities to assess risks, develop plans, and actions implement those plans."

"Passed a new climate plan in 2020 and it is both a mitigation and climate adaptation plan integrated. We had hired a few people specifically to develop the plan and dedicated funding in our 10-year capital plan. Transitioning to electric, resiliency, mapping out risks, and vulnerabilities to public infrastructure, the state of it and where it is in its life cycle, green shore approach to vulnerable roads, flood mapping, extreme water levels, building resilience in communities (e.g., buying freezer trucks to store food during extended power outages), grants for people who have ideas for adaptation. A program to add backup generators to provide heating/cooling places. Vertical coastal setback."

"Storm water system, we have a strategy. Emergency response, forest fires, cooling places in the city, retrofits, changing bylaw (e.g., storm sewer utility), natural asset management, flood zone mapping."

"Might not call it a climate adaptation plan. Have a community energy plan that includes sustainability that was done in 2015 or so. We have targets to meet and action items. The municipality is accepting of those and moving forward with tree planting, management of coastal areas, food security, adaptation of infrastructure standards for resilience."

"Upgrading things like storm water management systems, wastewater. That affects roads and transportation."

Barriers to Incorporating Climate Change Considerations

After gathering an understanding of the adaptation actions and plans among communities, respondents were asked a series of questions about their impressions and the impact of barriers to including climate change consideration in decision-making.

Understanding which sources of information are currently used, is a critical first step in understanding the barriers to incorporation climate change considerations. Outranking the media (at 20% in 2022), which was the most common information source in 2018 (26%), the most common source of information on climate change among respondents is various provincial government sources (at 25%). Rounding out the top three sources is the federal government (19%), which is volunteered by significantly more respondents than in 2018 (0%). Other common sources are industry or municipal associations (17%), internal sources (16%), and general internet searches (14%). All other sources are volunteered by fewer than 10% of respondents.

The top source of information among the respondents who represent large communities is internet searches (44%). Universities and researchers appear to me more common among respondents from medium size communities (32%).

Exhibit C30 – Q24. What are your organization's sources of information regarding climate change? Any other sources?
Base: All municipal respondents.

Column %	Total municipal	Large	Medium	Small
Provincial government (various)	25%	15%	50%	22%
The media	20%	29%	0%	22%
Federal government	19%	15%	58%	14%
Industry associations/municipal associations	17%	0%	13%	19%
Internal/our own information/data	16%	29%	0%	18%
Internet searches	14%	44%	0%	14%
Non-governmental organizations	9%	0%	20%	9%
Conferences/workshops/seminars	7%	0%	6%	8%
Government (unspecified)	7%	15%	26%	4%
Universities and researchers	6%	15%	32%	2%
Scientific journals/magazines	6%	0%	14%	5%
Public safety	4%	0%	6%	4%
Ministry of Environment	4%	0%	6%	4%
No information at organizational level	4%	15%	0%	4%
Environment Canada	3%	0%	0%	3%
Other	14%	15%	6%	14%
Don’t know/Prefer not to say	9%	12%	9%	9%
Sample size	152	7	13	132

Exhibit C31 – Q24. What are your organization’s sources of information regarding climate change? Any other sources?
Base: All municipal respondents.

Column %	2022	2018
Provincial government (various)	25%	18%
The media	20%	26%
Federal government	19%	0%
	B	-
Industry associations/municipal associations	17%	10%
Internal/our own information/data	16%	10%
Internet searches	14%	18%
Non-governmental organizations	9%	8%
Conferences/workshops/seminars	7%	10%
Universities and researchers	6%	7%
Scientific journals/magazines	6%	8%
Public safety	4%	4%
Ministry of Environment	4%	0%
	B	-
No information at organizational level	4%	2%
Environment Canada	3%	11%
	-	A
Government sources (unspecified)	7%	29%
	-	A
Other	14%	15%
Don’t know/Prefer not to say	9%	9%
Sample size	152	100
Column label	A	B

Other demographic differences:

- More than in any other region, 14% of respondents in Quebec say they refer to the Ministry of Environment for information regarding climate change.

Qualitative insights

As in the business interviews, municipal participants in the qualitative phase were asked what is driving whether action is taken or being planned. The responses very consistently pointed to the increasing rate of extreme weather being experienced in their own community as driving action to be taken and securing the funding for implementing, or even planning, the said actions. Often, responses on this question focused more on what prevents action rather than what drives it.

"The urgency of what is happening to our community and the environment."

"One is experiencing extreme events. The other is governments have done a better job of communicating the situation and the need. News agencies have been reporting more on extreme weather, so people recognize things are more intense."

Given the timing of the study, specific extreme weather events featured prominently in the answers of respondents.

"Extreme weather like [Hurricane] Fiona."

"They can easily make a link to the extreme events. For example, Hurricane Fiona is still very fresh in people's minds. People are making the connection between extreme events and climate change, even if there is perhaps not the connection that people think. People have latched on to it enthusiastically. A bit of a double-edged sword. Gives political capital to undertake projects, but other things can also be caught up in the efforts too that aren't really defensible. Quite often, there is a lack of clarity between mitigation and adaptation – very different activities that are not always compatible. Some of these can actually exacerbate things."

A list of potential barriers was provided to all respondents and they were asked to state whether they would describe each as a significant barrier, a minor barrier, or not a barrier to their organization when it comes to taking climate change into account in its decision-making. A majority of respondents (ranging from 62% to 88%) feel that each represents at least a minor barrier to their organization when it comes to considering climate change in its decision-making. The top barriers are a lack of capacity (88%), the complexity of policy change processes (87%) and a lack of in-house expertise (83%).

Conversely, more respondents feel that a lack of information (29%) and suppliers lacking expertise (30%) are not barriers than those who feel they are significant barriers (22% and 19%, respectively).

Exhibit C32 – Q25. To what extent does each of the following represent a barrier to your organization taking climate change into account in its decision-making? For each one I read, please tell me how much of a barrier it represents to your organization.
Base: All municipal respondents.

Row %	Significant barrier	Minor barrier	Not a barrier	Don't know/Prefer not to say
Lack of capacity in my organization	56%	32%	11%	1%
My organization lacks in-house expertise to apply climate change tools and information	48%	35%	15%	1%
The complexity of policy change processes	48%	39%	12%	1%
Competing organizational priorities	47%	31%	19%	2%
The need to have other departments/organizations act first, before we can act	31%	45%	22%	2%
Making a business case for implementing actions	30%	46%	22%	2%
Lack of information about climate change and its impacts	22%	47%	29%	2%
My suppliers lack expertise to apply climate change tools and information	19%	43%	30%	8%

Looking at the challenges that represent significant barriers to organizations reveals no change to the top three overall, and all results are consistent with 2018. While there is no statistical difference due to sample size, respondents from large communities appear more likely to center around lack of capacity (44%) and the complexity of policy change processes (41%), though proportions who say any of the barriers are significant are directionally lower. Conversely, respondents from medium size communities appear more likely to rate many of the barriers as significant, especially competing organizational priorities (72%) and the complexity of policy change processes (62%).

Exhibit C33 – Q25. To what extent does each of the following represent a barrier to your organization taking climate change into account in its decision-making? For each one I read, please tell me how much of a barrier it represents to your organization.
Base: All municipal respondents.

Column % % significant barrier	Total municipal	Large	Medium	Small
Lack of capacity in my organization	56%	44%	57%	57%
My organization lacks in-house expertise to apply climate change tools and information	48%	0%	41%	52%
The complexity of policy change processes	48%	42%	62%	47%
Competing organizational priorities	47%	29%	72%	46%
The need to have other departments/organizations act first, before we can act	31%	15%	36%	31%
Making a business case for implementing actions	30%	0%	41%	30%
Lack of information about climate change and its impacts	22%	15%	7%	25%
My suppliers lack expertise to apply climate change tools and information	19%	0%	38%	18%
Sample size	152	7	13	132

Exhibit C34 – Q25. To what extent does each of the following represent a barrier to your organization taking climate change into account in its decision-making? For each one I read, please tell me how much of a barrier it represents to your organization.
Base: All municipal respondents.

Column % % significant barrier	2022	2018
Lack of capacity in my organization	56%	48%
My organization lacks in-house expertise to apply climate change tools and information	48%	40%
The complexity of policy change processes	48%	38%
Competing organizational priorities	47%	38%
The need to have other departments/organizations act first, before we can act	31%	36%
Making a business case for implementing actions	30%	30%
Lack of information about climate change and its impacts	22%	32%
My suppliers lack expertise to apply climate change tools and information	19%	-
Sample size	152	100

There are no other demographic differences.

To understand what other barriers might exist for organizations, respondents were asked if any other barriers limit their organization's ability to make decision about adapting to climate change, and what are they. Compared to 2018, fewer respondents in 2022 are unsure of or say no other barriers exist for their organization (36% versus 49%). Indeed, significantly more respondents in 2022 than in 2018 say that the financial cost of adaptation (42% versus 14%), lack of political will (8% versus 0%), education or perception (7% versus 0%), lack of staff (5% versus 0%), and lack of cooperation or buy in (4% versus 0%) are barriers to their organization when it comes to making decisions about adapting to climate change.

Consistent with the previous findings, respondents from large communities appear less likely to cite any significant barriers for their organization.

Exhibit C35 – Q26. What other barriers or challenges, if any, limit your organization's ability to make decisions about adapting to climate change?
Base: All municipal respondents.

Column %	Total municipal	Large	Medium	Small
Financial cost of adaptation	42%	29%	51%	42%
Lack of political will/awareness from government/elected officials	8%	0%	6%	9%
Education/perception	7%	0%	7%	7%
Lack of staff	5%	0%	27%	2%
Lack of cooperation/buy in	4%	0%	14%	3%
Lack of information	2%	0%	0%	2%
Access to resources	2%	0%	0%	2%
Government legislation	1%	15%	0%	0%
Accuracy of information	1%	0%	0%	1%
Other	4%	0%	0%	5%
None	25%	29%	21%	25%
Don't know/Prefer not to say	11%	27%	0%	11%
Sample size	152	7	13	132

Exhibit B36 – Q26. What other barriers or challenges, if any, limit your organization's ability to make decisions about adapting to climate change?
Base: All municipal respondents.

Column %	2022	2018
Financial cost of adaptation	42%	14%
	B	-
Lack of political will/awareness from government/ elected officials	8%	0%
	B	-
Education/perception	7%	10%
Lack of staff	5%	0%
	B	-
Lack of cooperation/buy in	4%	0%
	B	-
Lack of information	2%	0%
Access to resources	2%	5%
Government legislation	1%	9%
	-	A
Accuracy of information	1%	4%
Other	4%	14%
	-	A
None	25%	5%
	B	-
Don't know/Prefer not to say	11%	44%
	-	A
Sample size	152	100
Column label	A	B

There are no other demographic differences.

New to the survey in 2022, respondents were asked to consider which situation best describes where their organization is as it relates to adaptation training. The majority of respondents (56%) are at least aware of adaptation training courses, including one-quarter (26%) who say that some or all of their staff have already taken such courses. Over one-third (36%) of respondents say they are not aware of any adaptation training opportunities.

Exhibit C37 – Q27. Which statement best describes the situation in your organization:
Base: All municipal respondents.

Column %	Total municipal	Large	Medium	Small
Some or all of our staff have taken climate change adaptation training	26%	0%	78%	21%
We are aware that adaptation training courses exist but have not taken any	30%	29%	15%	32%
We are not aware of any adaptation training opportunities	36%	29%	7%	40%
We don't need adaptation training courses	7%	15%	0%	7%
Don't know/Prefer not to say	2%	27%	0%	0%
Sample size	152	7	13	132

Other demographic differences:

- More than in any other region, six in ten (62%) of respondents in the Prairies are not aware of any adaptation training opportunities.

Remaining unchanged since 2018, two-thirds of respondents (66%) say they do have access to the information and tools they need to make adaptation-related decisions – this in contrast with three in ten who (30%) say they do not. Respondents from large or medium size communities appear more likely to say they have access to the necessary information and tools (100% and 79%, respectively).

Exhibit C38 – Q28. Do you have access to the information and tools you need to make adaptation-related decisions?
Base: All municipal respondents.

Column %	Total municipal	Large	Medium	Small
Yes	66%	100%	79%	62%
No	30%	0%	21%	33%
Don't know/Prefer not to say	4%	0%	0%	5%
Sample size	152	7	13	132

Exhibit C39 – Q28. Do you have access to the information and tools you need to make adaptation-related decisions?
Base: All municipal respondents.

Column %	2022	2018
Yes	66%	67%
No	30%	30%
Don't know/Prefer not to say	4%	3%
Sample size	152	100

There are no other demographic differences.

Respondents who indicated that their organization lacked information or tools were asked what types of information they lacked. The most common sources of information lacking among respondents are specific regional impact information (57%), economic information (40%), information on best practices (35%), and relevant case studies (35%).

Compared to 2018, fewer respondents in 2022 say they lack information on best practices (35% versus 57%), relevant case studies (35% versus 54%), and future climate projection data (29% versus 46%).

Exhibit B40 – Q29. Specifically, what types of information do you lack?
Base: Respondents who indicated that their organization lacks the information or tools they need when it comes to climate change in Q25 or Q28.

Column %	Total municipal	Large	Medium	Small
Information on impacts specific to region	57%	0%	65%	57%
Economic information (costs/benefits of action)	40%	0%	65%	39%
Best practices information	35%	0%	0%	38%
Relevant case studies/examples of what other organizations like ours are doing	35%	0%	0%	38%
Alternative designs and technologies	29%	0%	0%	32%
Projections of future climate conditions/climate data	29%	100%	0%	29%
Information (general)	9%	0%	0%	10%
Everything	2%	0%	0%	2%
Regulations/Policies	1%	0%	0%	1%
Other	1%	0%	0%	1%
Don’t know/Prefer not to say	15%	0%	35%	14%
Sample size	64	1	3	60

Exhibit C41 – Q29. Specifically, what types of information do you lack?
Base: Respondents who indicated that their organization lacks the information or tools they need when it comes to climate change in Q25 or Q28.

Column %	2022	2018
Information on impacts specific to region	57%	59%
Economic information (costs/benefits of action)	40%	50%
Best practices information	35%	57%
	-	A
Relevant case studies/examples of what other organizations like ours are doing	35%	54%
	-	A
Alternative designs and technologies	29%	38%
Projections of future climate conditions/climate data	29%	46%
	-	A
Information (general)	9%	0%
	B	-
Everything	2%	0%
Regulations/Policies	1%	0%
Other	1%	7%
None	0%	2%
Don’t know/Prefer not to say	15%	14%
Sample size	64	56
Column label	A	B

There are no other demographic differences.

Qualitative insights

Municipal participants were remarkably consistent in describing funding as, by far, the single biggest barrier facing them when it comes to climate change adaptation. Costs of the adaptation activities required are exorbitant and participants described additional barriers relating to funding due to procedural requirements, processes that do not fit well with what a municipality is able to do or the alignment of the timing of stages of funding applications and municipal budget approvals. The misalignment was often cited as very frustrating and unnecessarily causing a delay.

In addition to the overwhelming funding challenges, internal capacity was often named as a challenge. Many described having a lack of capacity, even in the cases where they had sufficient access to expertise such as engineers. There was a repeated message that there are too few people with the necessary skillsets and that there is a human resource challenge that limits the volume or pace of action and would continue to do so, even if the funding challenges were solved.

“Money. We listen to experts who tell us what to do to prepare, learn best practices, hire sustainability development staff, get community engaged and all of that helps both mitigation and adaptation.”

“Financial restrictions are a huge barrier. There needs to be more collaboration with the government across the board and a high level of support among members.”

“Disappointed that the entire funding for the climate change adaptation strategy was basically enough to do a single municipality. It's an order of magnitude difference that is required.”

“With the resources that we have available, we're doing the best we can. Climate change is everyone's responsibility to do their best, but not everyone's ability to address it.”

“Our biggest challenge is financial. It's not self-sustaining for us here to be able to afford the solutions that are required. We do our best. We do what we can to prevent climate change, but we're limited. One thing that climate change will have an effect on is water management. If we get too much precipitation, our reservoir might actually fail. It's not designed to hold that much, but finances are restricted.”

“There are a lot of communities with very limited budgets and maybe a staff of two people, so even if they know they need to plan and take action, they simply have no funds or capacity.”

In addition to the amount of funding, many noted complicating factors such as the timing of the funding or not having enough internal capacity to access the relevant funding opportunities let alone deploy them.

“National programs are just so far away; they tend not to be ‘place-based’ enough. National studies are great, but not specific enough to regional delivery. Also, turnaround times and timing of federal grant programs can be a problem. Out of synch with municipal timelines and sometimes even too fast for a municipal government to be able to act. There's a logistical challenge in there. Sometimes the program requirements are that money be committed in that budget year, but the municipal governments might be legally constrained and cannot commit to the spending without the federal contribution. Sometimes, the federal government is silent on provincial caps. For example, is it first-come first served or regional caps?”

“Funding cycles being out of synch can really delay things. Getting the timing right is very tricky. If there is a matching requirement, we have to assure that we have that money when we need it and get Council approval. If it is with federal dollars, it will be a large sum of money and then becomes complicated for how we put forward an expression of interest. We want to be able to take advantage of it.”

“In terms of funding what would really help is flexibility. We're seeing rapid inflation and a real lack of skilled and unskilled labour. We may be successful in securing funding, but it takes two years before we start and the cost has changed and access to labour is difficult. We've had problems with being on the hook for money that funded a really important study, but the timing of the study meant we couldn't end up getting the funding and were on the hook for 100% in the end.”

“Really it comes down to practical or technical information, but all of it also comes down to resources for infrastructure improvements. There is a very significant infrastructure gap and climate change affects the service requirements and therefore the cost. And they have to forecast that out for 50 years in their very local geographic areas.”

“Most municipalities don't have the capacity or the internal expertise to undertake significant projects on their own. Municipalities don't tend to employ scientists. Traditionally they haven't been able to access the data needed to undertake an adaptation project.”

Beyond a lack of internal capacity, small communities also mentioned the reliance on external experts living in other parts of the country – some of whom did not have a comprehensive understanding of local needs.

“The capacity is a problem. It's a lot that we are doing, but we are a community of a thousand people, running at full speed. You add on all these different layers, it's almost overwhelming. We have people working for us from the outside, as experts. They come and go and it's hard for the community to keep up and ensure continuity. People doing the work are down south [in Ottawa, Toronto, Halifax]. I wish we could do more, but we don't have the capacity or the funding to do more.”

All respondents were asked if there are any decision-making tools or technical resources that would assist their organizing in addressing the impact of climate change. Compared to 2018, nearly all resources are cited by fewer respondents in 2022. However, in 2022 the most common tools or technical resources volunteered are climate data (19%), a cost/benefit analysis (17%), regulations (17%) and risk assessment methods (15%). All others are cited by fewer than 15% of respondents.

Exhibit C42 – Q30. Are there any decision-making tools or technical resources that would assist your organization in addressing the impacts of climate change? Any other types?
Base: All municipal respondents.

Column %	Total municipal	Large	Medium	Small
Climate data	19%	15%	33%	18%
Cost/benefit analysis	17%	15%	7%	19%
Regulations	17%	0%	14%	18%
Risk assessment methods	15%	0%	6%	17%
Other data	14%	15%	14%	14%
(Adaptation) Planning guidance	14%	27%	0%	14%
Codes or standards	13%	15%	7%	13%
Industry specific information	2%	0%	6%	2%
Expertise	1%	0%	0%	2%
Other	7%	0%	9%	7%
None	21%	29%	16%	21%
Don’t know/Prefer not to say	34%	29%	15%	37%
Sample size	152	7	13	132

Exhibit C43 – Q30. Are there any decision-making tools or technical resources that would assist your organization in addressing the impacts of climate change? Any other types?
Base: All municipal respondents.

Column %	2022	2018
Climate data	19%	42%
	-	A
Cost/benefit analysis	17%	45%
	-	A
Regulations	17%	39%
	-	A
Risk assessment methods	15%	38%
	-	A
Other data	14%	33%
	-	A
(Adaptation) Planning guidance	14%	44%
	-	A
Codes or standards	13%	42%
	-	A
Industry specific information	2%	0%
Expertise	1%	0%
Other	7%	0%
	B	-

None	21%	20%
Don’t know/Prefer not to say	34%	13%
	B	-
Sample size	152	100
Column label	A	B

There are no other demographic differences.

At the end of the survey, respondents were offered the opportunity to provide any additional comments they felt would help organizations like theirs to face the challenges associated with a changing climate. As in 2018, the most common comment provided relates to more funding (24%). Indeed, all other comments were provided by fewer than 10% of respondents, and half (50%) said they had no additional comments.

Exhibit C44 – Q31. Do you have any final comments about what would help organizations such as yours to face the challenges associated with a changing climate?
Base: All municipal respondents.

Column %	Total municipal	Large	Medium	Small
More funding	24%	0%	45%	23%
More information (general)	8%	0%	14%	8%
More government leadership	6%	0%	21%	5%
More people on board / Buy in	6%	0%	6%	6%
Courses / Training	5%	0%	0%	6%
Industry specific information	2%	15%	0%	1%
Expertise	2%	0%	6%	1%
Better education	1%	0%	0%	2%
Need more staff	1%	0%	0%	2%
Cut carbon tax / eco fees	1%	15%	0%	0%
Too much red tape / Bureaucracy	1%	0%	0%	1%
Accurate information	1%	0%	6%	0%
Coordinated effort from federal and provincial governments	1%	0%	0%	1%
Other	1%	0%	0%	1%
No	50%	71%	23%	53%
Don’t know/Prefer not to say	2%	0%	0%	2%
Sample size	152	7	13	132

Exhibit C45 – Q31. Do you have any final comments about what would help organizations such as yours to face the challenges associated with a changing climate?
Base: All municipal respondents.

Column %	2022	2018
More funding	24%	19%
More information (general)	8%	0%
More government leadership	6%	0%
More people on board / Buy in	6%	0%
Courses / Training	5%	0%
Industry specific information	2%	0%
Expertise	2%	0%
Better education	1%	3%
Need more staff	1%	0%
Cut carbon tax / eco fees	1%	0%
Too much red tape / Bureaucracy	1%	0%
Accurate information	1%	9%
	-	A
Coordinated effort from federal and provincial governments	1%	10%
	-	A
Support	0%	4%
Other	1%	11%
	-	A
No	50%	40%
Don't know/Prefer not to say	2%	4%
Sample size	152	0
Column label	A	B

There are no other demographic differences.

Qualitative insights

Often discussed in the context of barriers, municipal participants identified many things that would help municipalities take more action on climate adaptation. Three of these were offered on a remarkably consistent basis: increased and accelerated access to funding; increased capacity in terms of expanding the workforce – usually in terms of expertise, but also sometimes expressed in terms of labourers or tradespeople – that will be required to develop and execute climate adaptation plans; and very geographically granular forecasting data for their specific location. Data was often described as being more accessible than ever before, but too generalized to be of value for establishing plans within a specific municipality or watershed.

"Capital funding."

"We can't afford to pay experts a lot of money."

"Billions of dollars for infrastructure projects that are new for us, not things the city was doing 20 years ago."

“The communities need to be provided with staff who can actually do the work that needs to be done.”

“We definitely need engineers and people with specialized skills in order to undertake all the work we will have. Do we have someone in our community or do we have to bring them in? Where do we house them?”

“Generally speaking, municipalities have access to good engineering resources. What they lack is enough to take climate data and filter it down to the local level and take into account their infrastructure needs.”

“NRCan cuts off data to a grid cell level that leaves out our location, or is at high levels of uncertainty, and we are left to either do the work ourselves or ask the province. The provincial government has very little funds dedicated to climate data and nature indicators. So, they are left untracked.”

“Better localized data. We don't have flood-mapping data as a province, for example. They release broad info on weather events over the long-term. We invested in LIDAR but that is really expensive and most municipalities can't afford that.”

In addition to these three frequent themes, a variety of other barriers were identified that were not necessarily common to all participants, but nevertheless mentioned multiple times. These include the complexity or volume of the policy changes that need to be developed and introduced, as well as convincing the public to accept some very difficult choices – at least in terms of allocating funds.

“A new council means new people reviewing staff recommendations. Changing the overall plan takes a lot of time and resources.”

“It can be very difficult to get the priorities we need into the building plan, because there is urgent demand for more housing faster.”

“Political will and buy-in is a challenge, but there are other driving forces. People understand what we stand to lose, but all of it comes down to having budget to do these things. People like to see examples of what CAN be done in order to grasp that they can do that too.”

“The staff time it takes to change some bylaws like subdivision standards is huge, so sometimes things like wastewater requirements are known as things we need to revise but we delay it for 4 years.”

In addition to the comments covered above, when asked what types of information or tools would be most helpful, municipal participants offered a variety of responses.

“Help with staffing or strategic planning at a larger scale than just us in our town. It would be wonderful if the federal government were funding these positions in our municipality. We have 11 grant applications on the go, which is

great, but the projects get pushed because we just don't have the staff to undertake the work for which we got the grant."

"We're lucky we have a great sustainability team, but everything we do has a climate change implication, and it is very hard to have training about how to bring that to every table."

"We finally got the residents on board for a water management action to prevent damage from flooding, but people are dead set against flooding to trails as a result of diverting water from communities and the province is unwilling to convince the public. One other barrier is jurisdiction over watershed authority. There should be better guidance. There are a few places where things get hung up between municipalities and provinces. Development in the watershed, basically. We can get at cross-purposes sometimes and it sometimes ends up in being in court against a developer."

"Adaptation doesn't have a set of targets, just a list of tasks. There's no baseline to benchmark against. It's becoming a barrier to not have standardized the setting of targets or metrics. Urban heat or extreme heat is a huge risk, and it is very difficult to measure progress on urban heat."

"Anything to foster real, meaningful partnerships between governments, operational elements, businesses, communities."

"Always good to have some direction from above. Funding is always great, but it's very limited and hard to know what is available to who and for what. It'd be good to know all the programs the government has available and how to use them. I'm hesitant, but I'm glad to hear there is consultation like this going on. Sometimes the help that is offered isn't as helpful as it could be so hopefully this dialog helps in that way."

"Would like to see stronger provincial-level partnerships. Coaching support would also be helpful. Money gets made available for plans but not as much for the capital projects that have to result. People need help applying. The time it takes for applying is way too long and that delays action."

"If this interview is what they mean by engaging, it's not sufficient. I really enjoy when we have more face time with federal government on climate change, climate policy, and what we are facing locally. If they don't see what we're facing. I would welcome further engagement with federal and provincial governments. Climate hit communities and cities are the ones that have to spot what is needed, do it, and deal with the angry people."

Conclusions

As was the case when this study was conducted in 2018, the findings from both the qualitative and quantitative phases clearly demonstrate there remains a widespread understanding within both Canadian municipalities and the business sectors surveyed that climate change is occurring. Respondents and participants underscored that, to them, this is evidenced by phenomena such as the increasing frequency and severity of extreme weather events. There is

a broad-based understanding that the implications of climate change will play out in their municipal or business planning and operations.

As in 2018, no matter the sector or the size of municipality, the majority tend to feel the impact will be at least moderate if not major. This was also true of both coastal municipalities as well as the municipal organizations. Participants in the qualitative research sometimes volunteered that their understanding of the range of impacts that are occurring, or will occur, has expanded over time. That many of the anticipated consequences – such as rising sea levels, melting ice, seasonal changes, and an increased frequency of extreme weather events – were witnessed first-hand appeared to further lend credence to their expanded views. Additionally, some pointed out that previously unknown effects have emerged (for example, atmospheric rivers or heat domes) or unanticipated consequences have been experienced (such as the need to help residents in the North deal with extreme heat).

In both the government and business samples, opinion from the survey was fairly divided over whether climate change is already impacting their organization or has not yet but will do so. Only one in four business respondents, and even fewer municipal ones, hold the view that climate change will not impact their organization. Among those who felt there is or would be an impact, the majority view in both samples was that it would engender negative impacts on their organization. Minorities in both samples believe there may be a mix of both negative and positive impacts or that it will bring exclusively positive ones. Almost none feel it will have no impact at all.

The survey provided an opportunity for respondents to indicate the types of impacts or risks their organization expects. The most common responses included reference to cost, whether it be the cost of adapting generally, the increasing costs of infrastructure, or increased costs of cooling. There were also economic impacts: understood both generally as well as context-specific (for example, having shorter operating seasons in some business sectors). The qualitative interviews saw a much wider array of impacts or threats brought forward. Many of the municipal participants, and several of the business ones, were able to provide a fairly lengthy list of impacts as well as provide details explaining the nature of the risk and the challenges associated with addressing them.

As was the case in 2018, the vast majority of respondents indicate being no more than somewhat concerned about the impacts of a changing climate. However, looked at in a different way, it certainly is the case that a majority of respondents in the government sample, and about half in the business sample are at least somewhat concerned. By contrast, few in either sample indicate being not at all concerned.

The survey results provide empirical evidence of an important difference between government and business respondents. While neither find more than one in ten feeling that climate change is one of the most significant challenges their organization faces, respondents from municipal governments were more likely than business respondents to describe it as a significant challenge. While municipal respondents were twice as likely to feel it is a significant challenge rather than not, opinion is fairly evenly divided among the businesses surveyed.

However, it is important to note that, as was the case in 2018, the qualitative interviews indicated that even those with a relatively low level of concern did not necessarily mean feeling there are no challenges for their organization. Many held the view that there are challenges but, because of their level of confidence that adequate solutions would be developed and implemented, their level of concern was tempered.

As was the case in 2018, municipal respondents, and to a lesser degree business ones, identify a variety of barriers to taking action on adapting to climate change. While the results show nearly no statistically significant differences compared to 2018, there is an increase in the proportion of businesses feeling their organization lacks internal capacity.

The qualitative interviews generated a lengthy list of areas where both coastal municipalities and businesses felt they could use assistance. For municipal governments, funding was consistently described as a particularly challenging barrier since the costs required to upgrade infrastructure and adjust operations tend to be high and raising funds has a variety of challenges, both politically and practically. For businesses, alleviating cost was certainly welcome, but business participants joined municipal ones in requesting highly geographically localized projections and models in order to better understand and anticipate coming changes.

Overall, the study suggests there is not a large degree of change in awareness or concern, but municipal governments remain quite focused on the task of adapting to a changing climate and, while the business universe may feel less anxious about it, that tends to be due to a sense of confidence rather than disengagement.

Appendix A: Quantitative Methodology Report

Survey methodology

Earnscliffe Strategy Group's overall approach for this study was to conduct a telephone survey of 350 individuals including 100 who occupy Chief, Manager or Director of Planning positions in municipalities across Canada and 250 individuals occupying Head of Operations of Chief Risk Officer positions in natural resource industries across Canada, using Léger's centralized call-centre using state of the art Computer Aided Telephone Interviewing (CATI) system. A detailed discussion of the approach used to complete this research is presented below.

Questionnaire design

The questionnaires for this study were designed by Earnscliffe and provided to Natural Resources Canada for feedback. It drew on the 2018 and 2009 National Climate Change Adaptation Surveys where appropriate. The questionnaires were designed to take 15-minutes and were offered to respondents in both English and French.

Sample design and selection

The total sample for the telephone portion of this study was 350. The target populations were:

- Municipalities: a random sample of individuals occupying Chief, Manager or Director of Planning positions in municipalities across Canada that reflect the geographic distribution of the population.
- Natural resource industries: a stratified sample of individuals occupying Head of Operations or Chief Risk Officer positions across Canada as identified by the NAICS codes below provided by the client.

As per common practice of Statistics Canada, small businesses were those with less than 100 employees, medium-sized businesses were those with 100-499 employees, and large businesses were those with 500 or more employees. Small municipalities were those with a population of 1,000 up to 29,999, medium were those with a population of 30,000-99,999, and large municipalities will be those with a population of 100,000 or more.

Based on the incidence check survey, we set the following targets for the survey:

Exhibit D1: Business Sample Frame

Businesses	Actual (N)				Sample (n)			
	Small	Med	Large	Total	Small	Med	Large	Total
Oil & Gas (NAICS: 211, 237120, 4861, 4862, 4869, 324110, 324190)	3329	167	45	3541	66	8	2	76
Mining	689	344	64	1097	24*	5	3	32*
(NAICS: 2121, 212210, 212220, 212231, 212232, 212233, 212299, 212392, 212393, 212395, 212396, 212397, 212398)	240	71	38	346	22*	4	2	28*
(NAICS: 331)	449	104	26	579	2	1	1	4
Forestry (NAICS: 1131, 1132, 1133, 3221, 3222)	4783	194	9	4986	70	8	1	79
Power (NAICS: 221111, 221112, 221113, 221119, 221121, 221122, 237130)	1276	143	38	1457	54	7	2	63
Total	**-**	**-**	**-**	**-**	**214**	**28**	**8**	**250**

*NOTE: Mining totals are dependent upon achieving n=22 small businesses excluding NAICS 331. Since feasibility is unclear, cases in other sectors may be increased to compensate.

Exhibit D2: Municipal Sampling Frame

Municipalities	Actual (N)	Sample (n)
Small	1,944	50
Medium	95	30
Large	54	20
Total	**-**	**100**

Data Collection

The sample was drawn by our subcontractor, Léger, from either Dun & Bradstreet or Data Axle Canada (formerly known as InfoCanada). Stratified sampling was used to ensure participation from municipalities and industries across provinces and regions to the extent possible with quotas established in collaboration with NRCan. Leger's Interviews were conducted via telephone using Leger's centralized call-centre.

The surveys were conducted in English and in French, based on the respondent's preference. Interviews were conducted between November 7, 2022, and March 15, 2023.

Weighting

For both the municipal and business samples, stratified random sampling was used. In the case of municipalities, the final sample was weighted to match the unweighted distribution obtained in 2018.

In the case of the business sample, since the relative sizes of the sectors in the stratified quota structure was not reflective of reality, a weight was applied by sector so that that aggregate results of the business sample results would be representative of the universe being studied. Due to sampling limitations, the responses from medium and large businesses were combined in all sectors except power, where only one category was possible.

Nonresponse

The potential for non-response bias exists since certain types of people may be less willing to participate in research.

Reporting

Results with upper-case sub-script in the tables presented under a separate cover indicate that the difference between the demographic groups analysed are significantly higher than results found in other columns in the table. In the text of the report, unless otherwise noted, demographic differences highlighted are statistically significant at the 95% confidence level. The statistical test used to determine the significance of the results was the Z-test.

Results

Final dispositions

A total of 424 individuals entered the survey, of which 361 qualified as valid and completed the survey. The response rate for this survey was 21.7%.

Total entered survey: 424
Completed: 356
Not qualified/screen out: 8
Over quota: 3
Suspend/drop-off: 57

Unresolved (U): 0

In-scope non-responding (IS): 1315
Qualified respondent break-off: 0

In-scope responding (R): 364
Completed surveys disqualified – quota filled: 3
Completed surveys disqualified – other reasons: 0
Completed surveys – valid: 361
Response rate = R/(U+IS+R): 21.7%

Margin of Error

The aggregate municipal results can be considered accurate to within +/-7.7% at the 95% confidence level. The aggregate business results can be considered accurate to within +/-6.7% at the 95% confidence level.

Appendix B: Qualitative Methodology Report

Methodology

The second phase of the research was qualitative, ran concurrently with the quantitative element, and involved 18 one-on-one interviews designed to take approximately 15 to 20 minutes to complete. The interviews were conducted between November 27, 2022, and January 29, 2023.

Participants were picked at random from two lists: a list of municipal governments in specific communities and a list of industry associations, associations representing municipalities, and organizations that represent businesses more broadly. The one-on-one interviews were distributed as follows:

- Five (5) interviews among organizations representing municipalities and small businesses;
- Five (5) interviews among decision-makers at trade associations comprised of two (2) interviews from the mining and utilities sectors, as well as one (1) from the mining sector;
- Eight (8) interviews among decision-makers in coastal municipalities, including three (3) from the Atlantic coast, three (3) from the Pacific coast, and two (2) from the Arctic coast.

All were offered the opportunity to participate in their official language of choice irrespective of their location in Canada to accommodate those in official language minority communities (OLMCs).

Recruitment

Participants were recruited by a letter drafted by Earnscliffe and approved by NRCan, outlining the nature of the project and that NRCan commissioned Earnscliffe to undertake the project. The interviews were scheduled internally using our own bilingual recruiters.

A note about interpreting qualitative research results

It is important to note that qualitative research is a form of scientific, social, policy, and public opinion research. Focus group research is not designed to help a group reach a consensus or to make decisions, but rather to elicit the full range of ideas, attitudes, experiences, and opinions of a selected sample of participants on a defined topic. Because of the small numbers involved the participants cannot be expected to be thoroughly representative in a statistical sense of the larger population from which they are drawn, and findings cannot reliably be generalized beyond their number.

Glossary of terms

The following is a glossary of terms which explains the generalizations and interpretations of qualitative terms used throughout the report. These phrases are used when groups of

participants share a specific point of view and emerging themes can be reported. Unless otherwise stated, it should not be taken to mean that the rest of participants disagreed with the point; rather others either did not comment or did not have a strong opinion on the question.

Generalization	Interpretation
Few	Few is used when less than 10% of participants have responded with similar answers.
Several	Several is used when fewer than 20% of the participants responded with similar answers.
Some	Some is used when more than 20% but significantly fewer than 50% of participants respondents with similar answers.
Many	Many is used when nearly 50% of participants responded with similar answers.
Majority/Plurality	Majority or plurality are used when more than 50% but fewer than 75% of the participants responded with similar answers.
Most	Most is used when more than 75% of the participants responded with similar answers.
Vast majority	Vast majority is used when nearly all participants responded with similar answers, but several had differing views.
Unanimous/Almost all	Unanimous or almost all are used when all participants gave similar answers or when the vast majority of participants gave similar answers and the remaining few declined to comment on the issue in question.

Appendix C: Survey Questionnaire

Survey Introduction

BUSINESS SAMPLE: IF CONTACT NAME IS AVAILABLE IN SAMPLE FILE:
Good morning/afternoon. May I please speak with CONTACT NAME?
IF PERSON IS NOT AVAILABLE, ARRANGE FOR CALL-BACK
IF PERSON IS NOT AVAILABLE OVER INTERVIEW PERIOD, ASK FOR ANOTHER DECISION-MAKER IN THE SAME AREA (I.E., WITH RESPONSIBILITY FOR POLICIES AND PLANNING).

BUSINESS SAMPLE: IF CONTACT NAME IS NOT AVAILABLE IN SAMPLE FILE:
Good morning/afternoon. My name is _____ and I am calling from Earnscliffe on behalf of Natural Resources Canada. May I speak to someone in your group or organization who is responsible for risk management, planning and/or operations?
INTERVIEWER INSTRUCTION: THE APPROPRIATE RESPONDENT IS SOMEONE WHO IS A DECISION-MAKER (RATHER THAN A TECHNICIAN).

MUNICIPAL SAMPLE:
Good morning/afternoon. My name is _____ and I am calling from Earnscliffe on behalf of Natural Resources Canada. I would like to speak to someone in the administrator's office who is responsible for planning for your municipality. Can you please direct me to the appropriate person?
INTERVIEWER INSTRUCTION: THE APPROPRIATE RESPONDENT IS SOMEONE WHO IS A DECISION-MAKER (RATHER THAN A TECHNICIAN).

We have been retained by Natural Resources Canada to conduct research on how organizations in the public and private sectors are considering the issue of a changing climate and how it may affect planning and operations over time.

WHEN RESPONDENT IS REACHED REINTRODUCE:

Hello/Bonjour. My name is _____ and I am calling from Earnscliffe, a professional research firm. We have been retained by Natural Resources Canada to conduct research on how organizations in the public and private sectors are considering the issue of physical risks of climate change and how it may affect planning and operations over time.

Would you prefer that I continue in English or French? Préférez-vous continuer en français ou anglais?

Your participation in this survey is voluntary. Please be assured that your responses are confidential and will not be reported individually nor attributed to you personally. The survey will take about 12 minutes to complete. May I continue?

Yes
No

[INTERVIEWER NOTES IF NECESSARY:

- This survey is registered with the Canadian Research Insights Council, the project number is [INSERT].
- BUSINESS SAMPLE: We picked your organization at random from a list of organizations in specific industry groups.
- MUNICIPAL SAMPLE: We picked your municipality at random from a list of municipalities across Canada.
- Natural Resources Canada will use this information to design communications and programs that will assist organizations like yours in meeting the challenges of a changing climate.
- The contact person at Natural Resources Canada in charge of the project is Karl St-Pierre. Public Opinion Research Coordinator, Communications and Portfolio Services, Natural Resources Canada whose telephone number is (613) 290-0763 and e-mail address is Karl.St-Pierre@nrcan-rncan.gc.ca.
- The results of this survey will be available on the Library and Archives Canada web site in the Fall of 2023]

And, just to confirm, have I reached you on a landline phone or a cell phone?

Landline
Cell phone
Don't know/Refused

For your safety, are you currently driving?

Yes – SCHEDULE CALLBACK
No
Don't know/Refused

Section 1: Screening

1. This survey is being directed to people who have responsibility for planning within their organization. Is that part of your current role? [INTERVIEWER NOTE: For municipal, our focus is on planning in communities, not necessarily "policies". For businesses, our target interviewee is the person in charge of planning or operations or in a larger company, risk management.]

Yes	1
No	2
Prefer not to say [DO NOT READ. TERMINATE]	9

2. [IF Q1=2] Can I please speak to the person in your organization with overall responsibility for planning or risk management/operations?

Yes (REINTRODUCE WHEN CORRECT PERSON ON THE LINE)	1
Person unavailable (ARRANGE CALLBACK)	2
Prefer not to say [DO NOT READ. TERMINATE]	9

3. IF JOB TITLE IN SAMPLE FILE: Can I confirm that your job title is [TITLE}? IF NO JOB TITLE IN SAMPLE FILE: What is your job title?

Specify	98
Prefer not to say [DO NOT READ.]	99

4. [DO NOT ASK – RECORD GENDER]

Male	1
Female	2

5. [DO NOT ASK – RECORD PROVINCE FROM SAMPLE LIST]

Newfoundland and Labrador	1
Nova Scotia	2
Prince Edward Island	3
New Brunswick	4
Quebec	5
Ontario	6
Manitoba	7
Saskatchewan	8
Alberta	9
British Columbia	10
Yukon	11
Nunavut	12
Northwest Territories	13

6. [BUSINESS SAMPLE: DO NOT ASK – RECORD SIZE CATEGORY FROM SAMPLE LIST]

Less than 100	1
100-499	2
500+	3

7. [MUNICIPAL SAMPLE: DO NOT ASK – RECORD POPULATION CATEGORY FROM SAMPLE LIST]

1,000-29,999	1
30,000-99,999	2
100,000+	3

Thank you, let’s begin the survey.

ENSURE THIS TEXT IS READ WHEN CORRECT PERSON IS ON THE LINE:
I want to assure you that all of information collected, used and/or disclosed will be used for research purposes only, will not deal with classified or confidential information, and will be

administered as per the requirements of the Privacy Act. Your name or position will not be linked to the results. This survey is registered with the national survey registration system.

Section 2: Awareness & Impressions of Climate Change Relevance

[OLD QUESTION 8 REMOVED]

8. **(Q9)** Which of these best describes what is happening in terms of climate change in (IF GOVERNMENT: your region/IF BUSINESS: the regions of Canada in which your organization operates)? [READ]

Climate change is happening right now	1
Climate change is not happening right now, but it will happen in the foreseeable future	2
Climate change is not happening right now and will not happen in the foreseeable future	
[DO NOT READ] Don't know/Prefer not to say / No answer	9

9. **(NEWQ9)** [IF **Q9**=2] How many years from now do you believe (IF GOVERNMENT: your community /IF BUSINESS: the regions of Canada in which your organization operates) will start to see impacts from a changing climate?

1-5 years	1
6-10 years	2
11-19 years	3
20 years or more in the future	4
[DO NOT READ] Don't know/Prefer not to say / No answer	9

10. **(Q11)** [IF **Q9**=1, 2 or 9] How MUCH of an impact will a changing climate will have on (IF GOVERNMENT: your community /IF BUSINESS: the regions of Canada in which your organization operates), in the next 20 years? Would you say it will have a…?

Major impact	1
Moderate impact	2
Minor impact	3
No impact at all	4
[DO NOT READ] Depends	5
[DO NOT READ] Don't know/Prefer not to say / No answer	9

11. [OLD QUESTION 10] [IF **Q9**=1, 2 or 9] Thinking about (IF GOVERNMENT: your community /IF BUSINESS: the regions of Canada in which your organization operates), what do you think will be the most serious impact of a changing climate over the next 20 years? What do you think will be the next-most serious impact? CODE TWO RESPONSES ONLY - RECORD FIRST MENTION SEPARATELY. [DO NOT READ]

Human health impacts	1
Droughts	2
Impacts on water supply	3
Changing sea/lake levels/coastal erosion	4
Flooding	5
More frequent or more severe weather events/storms	6
Forest (or wildland) fires	7
Heat waves	8
Permafrost change (melting, thawing, instability)	9
Effects on wildlife (changing migration patterns, species loss, invasive species, loss of habitat)	10
Effects on agriculture (growing season changes, crop failures)	11
Effects on tourism related to poorer weather	12
Economic effects (loss of productivity, negative trade impacts, increased trade opportunities)	13
No single impact	14
No serious impact	97
Other (SPECIFY)	98
Don't know/Prefer not to say / No answer	99

12. **(NEWQ12)** Is climate change something that is already having an impact on your organization in any way, is not yet having an impact on the organization, but it may have an impact in the future, or is climate change something that will not have an impact on your organization?

It is having an impact on the organization	1
It is not yet having an impact on the organization, but it is possible	2
Will not have an impact on the organization	3
[DO NOT READ] Don't know/Prefer not to say / No answer	9

13. [OLD QUESTION 14] [IF Q12=1, 2 or 9] Overall, will changing climate have a (mainly negative or mainly positive/mainly positive or mainly negative) impact on your organization? [ALTERNATE SAYING NEGATIVE OR POSITIVE FIRST]

Mainly positive impact	1
Mainly negative impact	2
[DO NOT READ] Both positive and negative impacts	3
[DO NOT READ] Neutral or no impact	4
[DO NOT READ] Don't know/Prefer not to say / No answer	9

14. [OLD QUESTION 15] [IF Q14=1,3] What, specifically, are some of the positive impacts or opportunities for your organization resulting from a changing climate? PROBE: Any others?

Earlier/longer operating season	1
Warmer winters/lower energy costs	2
Increased tourism/longer tourism season	3

Increased water supply	4
Reduced winter snow clearing costs	5
Increased crop yields	6
Better conditions for livestock/wildlife	7
Increased active transportation (walking/cycling)	8
New business opportunities	9
[DO NOT READ] Other (SPECIFY)	98
[DO NOT READ] Don't know/Prefer not to say / No answer	99

15. [OLD QUESTION 16] [IF Q14=2,3] What, specifically, are some of the negative impacts or risks for your organization resulting from a changing climate? PROBE: Any others?

Increased heatwaves/cooling costs	1
Shorter winter tourism season	2
Change in water levels/water supply	3
More drought	4
More floods	5
More smog	6
Economic losses	7
Shorter operating season	
Infrastructure impacts/costs	8
More pests/diseases	9
Increase in forest/wildland fire	10
More storm surges/damage from sea level rise	11
[DO NOT READ] Other (SPECIFY)	98
[DO NOT READ] Don't know/Prefer not to say / No answer	99

16. [OLD QUESTION 18] Which of the following best describes your organization's view regarding climate change? Is it that...

Climate change is one of the most significant challenges your organization faces	1
Climate change is a significant challenge, but not as serious as others your organization faces	2
Climate change does not present a significant challenge to your organization	3
[DO NOT READ] Climate change is not happening	4
[DO NOT READ] Don't know/Prefer not to say / No answer	9

17. [OLD QUESTION 19] What about your clients or stakeholders? Would you say that they are generally very concerned, somewhat concerned, not very concerned or not at all concerned about climate change?

Very concerned	1
Somewhat concerned	2
Not very concerned	3
Not at all concerned	4
[DO NOT READ] Don't know/Prefer not to say / No answer	9

Section 3: Climate Change Adaptation

18. [OLD QUESTION 20] Adapting to a changing climate means taking actions that reduce the risks or take advantage of opportunities from changes in climate. Is your organization currently doing anything to adapt to the risks and opportunities resulting from a changing climate?

Yes	1
No	2
[DO NOT READ] Don't know/Prefer not to say / No answer	9

19. Has your organization completed (or conducted) a climate change risk assessment?

Yes	1
No	2
[DO NOT READ] Don't know/Prefer not to say / No answer	9

20. **(Q21)** [IF Q20=1] What, specifically, is your organization currently doing to ADAPT to a changing climate? PROBE: Anything else? [DO NOT READ LIST]

Assess the risks from climate change on the organization	1
Preparing a climate change adaptation plan	2
Have an adaptation plan	3
Incorporate adaptation actions in long term planning/other corporate plans (e.g. risk management)	4
Assess the costs to the organization	5
Emergency response/disaster planning	6
Education/awareness building activities	7
Creating guidelines or policies	8
Implementing actions/measures in our plan	9
Drought management actions /reducing water use	10
Flood management activities – flood mapping, land use restrictions, downspout disconnection	11
Summer heat alert system /build awareness of risks from heat waves	12
Change design or location of infrastructure	13
Change operation /maintenance of infrastructure	14
Install natural or green infrastructure	15
Build retaining walls to protect from storm surges	16
Changes to energy distribution system	17
Habitat protection	18
Other (respondent to specify)	98
Don't know/Prefer not to say / No answer	99

21. **(Q22)** Does your organization have any specific plans for FUTURE actions designed to ADAPT to the risks and opportunities provided by a changing climate?

Yes	1
No	2
[DO NOT READ] Don't know/Prefer not to say / No answer	9

22. **(Q23)** [IF Q22=1] What actions are specifically planned? PROBE: Anything else? [DO NOT READ LIST]

Assess the risks from climate change on the organization	1
Preparing/prepared a climate change adaptation plan	2
Incorporate adaptation actions in long term planning/other corporate plans (e.g. risk management)	3
Assess the costs to the organization	4
Emergency response/disaster planning	5
Education/awareness building activities	6
Creating guidelines or policies	7
Implementing actions/measures in our plan	8
Drought management actions /reducing water use	9
Flood management activities – flood mapping, land use restrictions, downspout disconnection	10
Summer heat alert system /build awareness of risks from heat waves	11
Change design or location of infrastructure	12
Change operation /maintenance of infrastructure	13
Install natural or green infrastructure	14
Build retaining walls to protect from storm surges	15
Changes to energy distribution system	16
Habitat protection	17
Other (respondent to specify)	98
Don't know/Prefer not to say / No answer	99

23. **(Q24)** [IF Q20=1] For how long has your organization been considering a changing climate in its decision-making?

Less than one year	1
1-2 years	2
3-5 years	3
6-10 years	4
11 or more years	
[DO NOT READ] Don't know/Prefer not to say / No answer	99

Section 4: Barriers to Incorporating Climate Change Considerations in Decision-making

24. **(Q25)** What are your organization's sources of information regarding climate change? PROBE: Any other sources? [DO NOT READ]

Scientific journals/magazines	1

Internet searches?	2
Government sources (SPECIFY)	3
Internal/our own information/data	4
Universities and researchers	5
Industry associations/ Municipal associations	6
Conferences/workshops/seminars	7
Webinars	8
Non-governmental organizations	9
The media	10
No information at organizational level	97
Other (SPECIFY)	98
Don't know/Prefer not to say / No answer	99

25. **(Q26)** To what extent does each of the following represent a barrier to your organization taking climate change into account in its decision-making? For each one I read, please tell me how much of a barrier it represents to your organization. [RANDOMIZE.]

    a. My organization lacks in-house expertise to apply climate change tools and information
    b. My suppliers lack expertise to apply climate change tools and information
    c. The complexity of policy change processes
    d. Making a business case for implementing actions
    e. The need to have other departments/organizations act first, before we can act
    f. Lack of information about climate change and its impacts
    g. Lack of capacity in my organization
    h. Competing organizational priorities

Significant barrier	1
Minor barrier	2
Not a barrier	3
[DO NOT READ] Don't know/Prefer not to say / No answer	9

26. **(Q27)** What other barriers or challenges, if any, limit your organization's ability to make decisions about adapting to climate change?

RECORD VERBATIM	
None	98
[DO NOT READ] Don't know/Prefer not to say / No answer	99

27. Which statement best describes the situation in your organization:

Some or all of our staff have taken climate change adaptation training	1
We are aware that adaptation training courses exist but have not taken any	2
We are not aware of any adaptation training opportunities	3
We don't need adaptation training courses	4
[DO NOT READ] Don't know/Prefer not to say / No answer	9

28. [OLD QUESTION 17] Do you have access to the information and tools you need to make adaptation-related decisions?

Yes	1
No	2
[DO NOT READ] Don't know/Prefer not to say / No answer	9

29. [OLD QUESTION 28] [IF Q26f=1 OR Q17=2] Specifically, what types of information do you lack?

Information on impacts specific to region	1
Alternative designs and technologies	2
Projections of future climate conditions/climate data	3
Relevant case studies/examples of what other organizations like ours are doing	4
Best practices information	5
Economic information (costs/benefits of action)	6
[DO NOT READ] Other (SPECIFY)	98
[DO NOT READ] Don't know/Prefer not to say / No answer	99

30. [OLD QUESTION 29] Are there any decision-making tools or technical resources that would assist your organization in addressing the impacts of climate change? PROBE: Any other types?

Climate Data	1
Other data	2
Cost/benefit analysis	3
Risk assessment methods	4
(Adaptation) Planning guidance	5
Regulations	6
Codes or standards	7
[DO NOT READ] None	96
[DO NOT READ] Do not have/use such resources	97
[DO NOT READ] Other (SPECIFY)	98
[DO NOT READ] Don't know/Prefer not to say / No answer	99

31. [OLD QUESTION 30] Do you have any final comments about what would help organizations such as yours to face the challenges associated with a changing climate?

RECORD VERBATIM	
[DO NOT READ] No	96
[DO NOT READ] Don't know/Prefer not to say / No answer	99

32. [OLD QUESTION 31] [DO NOT ASK – RECORD SAMPLE TYPE]

Business	1

This completes the survey. On behalf of Natural Resources Canada, thank you very much for your time and cooperation. If you would like more information about ways your organization can adapt to a changing climate, you can visit the web site at http://adaptation.nrcan.gc.ca/

IF RESPONDENT ASKS FOR INFORMATION ABOUT THIS SURVEY: You can get more information about this research by contacting Karl St-Pierre. Public Opinion Research Coordinator, Communications and Portfolio Services, Natural Resources Canada whose telephone number is (613) 290-0763 and e-mail address is Karl.St-Pierre@nrcan-rncan.gc.ca.

Appendix D: In-depth Interview Guide

Objective

These interviews will gather some deeper insights from specific perspectives that may not be adequately included in the telephone survey. They are a series of eighteen (18) one-on-one interviews designed to take approximately 15 to 20 minutes to complete, with the sample distributed as follows:

- Two (2) interviews among organizations representing municipalities and small businesses;
- Eight (8) interviews among corporate decision-makers comprised of two (2) interviews from among each of the four (4) sectors of specific interest;

Eight (8) interviews among decision makers in coastal municipalities (4 interviews from municipalities on the Atlantic coast and 4 interviews from municipalities on the Pacific coast).

Interview Introduction

Hello/Bonjour. My name is _____ and I am calling from Earnscliffe, a professional research firm. We have been retained by Natural Resources Canada to conduct research on how organizations in the public and private sectors are considering the impacts of a changing climate and how it may affect planning and operations over time.

Your participation in this research is voluntary. Please be assured that your responses are confidential and will not be reported individually nor attributed to you personally or your organization. The interview will take about 15 to 20 minutes to complete. May I continue?

[INTERVIEWER NOTES IF NECESSARY:

- We picked your organization at random from a list of organizations in specific communities or industry groups.
- Natural Resources Canada will use this information to design communications and programs that will assist organizations like yours in meeting the challenges of a changing climate.
- The contact person at Natural Resources Canada in charge of the project is Karl St-Pierre, Public Opinion Research Coordinator, Communications and Portfolio Services, whose telephone number is (613) 290-0763 and e-mail address is Karl.St-Pierre@nrcan-rncan.gc.ca.

- The results of this research will be available on the Library and Archives Canada web site in the Fall of 2023.]

Screening

1. [DO NOT ASK – RECORD ORGANIZATION]

Specify	98

2. [DO NOT ASK – RECORD PROVINCE FROM SAMPLE LIST]

Newfoundland and Labrador	1
Nova Scotia	2
Prince Edward Island	3
New Brunswick	4
Quebec	5
Ontario	6
Manitoba	7
Saskatchewan	8
Alberta	9
British Columbia	10
Yukon	11
Nunavut	12
Northwest Territories	13

3. IF JOB TITLE IN SAMPLE FILE: Can I confirm that your job title is [TITLE]? IF NO JOB TITLE IN SAMPLE FILE: What is your job title?

Specify	98
Prefer not to say [DO NOT READ.]	99

I want to assure you that all of information collected, used and/or disclosed will be used for research purposes only, will not deal with classified or confidential information, and will be administered as per the requirements of the Privacy Act. Neither your name, position nor organization will be linked to the results.

Thank you, let's begin the interview.

Climate Adaptation Questions

4. Which of these best describes what is happening in terms of climate change in Canada?

Climate change is happening right now	1
Climate change is not happening right now, but it will happen in the foreseeable future	2
Climate change is not happening right now and will not happen in the foreseeable future	3
[DO NOT READ] Don't know/Prefer not to say / No answer	9

5. What are the reasons you have that impression?

6. Thinking about how your (members / industry) may or may not be impacted, is climate change something that is already having an impact on (your members / your industry), is not having an impact, but it may have an impact in the future, or is climate change something that will not have an impact on (your members / your industry)?

It is having an impact on the organization	1
It is not having an impact on the organization, but it is possible	2
Will not have an impact on the organization	3
[DO NOT READ] Don't know/Prefer not to say / No answer	9

7. [IF IS HAVING OR WILL HAVE AN IMPACT] How MUCH of an impact will a changing climate have on (your members / your industry) in the next 20 years?

Major impact	1
Moderate impact	2
Minor impact	3
No impact at all	4
[DO NOT READ] Depends	5
[DO NOT READ] Don't know/Prefer not to say / No answer	9

8. What are the reasons you have that impression?

9. What kinds of risks might climate change pose for your (members / industry)?

10. Adapting to a changing climate means taking actions that reduce the risks or take advantage of opportunities from changes in climate (e.g. changes in precipitation, temperature, sea level, or storms). Is your organization already doing anything or planning on doing something to help your (members / industry) prepare for or adapt to a changing climate?

Yes, doing	1
Yes, planning	2
No	3

11. [IF DOING] What kinds of things are you doing? Are you planning on doing more? [PROBE IF NECESSARY: Are you doing anything on reducing risks from extreme weather, forest fires, sea level rise or other climate impacts?]

12. [IF PLANNING] What kinds of things are you planning? And when would that likely occur? [PROBE IF NECESSARY: Will these include anything on reducing risks from extreme weather, forest fires, sea level rise or other climate impacts?]

13. [IF NEITHER] What is the reason for that? Do you think that will change at some point? What would it take for that to change?

14. How about the (members / industry) you serve? Would you say that people are generally very concerned, somewhat concerned, not very concerned or not at all concerned about climate change?

Very concerned	1
Somewhat concerned	2
Not very concerned	3
Not at all concerned	4
[DO NOT READ] Don't know/Prefer not to say / No answer	9

15. What are the reasons you have that impression? Why do you think they have that level of concern? Is it an appropriate level of concern? Why/why not?

16. What is your sense of what things, if any, your (members are / industry is) doing anything to prepare for or adapt to a changing climate?

17. What seems to be driving whether or not action is being taken or being planned? Is it common or uncommon?

18. Is it enough? Why/why not?

19. I'd like to know more about what factors may be preventing your organization or your (members / industry) from taking climate change into account for long-term business planning. Are there things that would need to happen for action to be planned or taken to prepare for a changing climate? If so, what are they? Events? Information? Training?

20. [IF NECESSARY] I've got a list of a few potential barriers and I'd like you to tell me whether they are at play and if so, what might be done or what would have to happen to remove the barrier.

i. Lack of expertise to apply climate change information and tools

j. The COST of adapting to the impacts of a changing climate

k. The complexity of policy change processes

l. Making a business case for implementing actions

m. The need to have other departments/organizations act first, before we can act

n. Lack of information about climate change and its impacts

o. Lack of capacity

p. Competing organizational priorities

21. Do your staff or members have sufficient access to training on climate change adaptation?

Yes	1
No	2

22. Are there any types of information or tools your organization lacks in order to help your (members / industry) take climate change into their long-term business planning? What would be most helpful?

23. Do you have any final comments about what would the Government of Canada could do to help organizations such as yours to face the challenges associated with a changing climate?

This completes the interview. On behalf of Natural Resources Canada, thank you very much for your time and cooperation.

IF RESPONDENT ASKS FOR INFORMATION: You can get more information about this research by contacting Pamela Kertland, whose telephone number is 613-816-1577 and e-mail address is pamela.kertland@canada.ca.

Conclusion

This concludes what we need to cover in today's interview, but I wanted to leave space for any final thoughts or comments you want to share before we conclude. Is there anything else that you would like to comment on that I haven't already asked you about, or is there a topic or question you would like to circle back to?

I would like to thank you very much for trusting me and sharing your thoughts, feelings and lived experiences.

If there is anything further you would like to share (i.e., stories on issues, concerns, or questions we did not ask), please do not hesitate to follow up by email to: research@earnscliffe.ca.

It was my pleasure to meet and get to know you today/this evening. Thank you and have a nice day/evening.