

POR #: 077-17



# National Climate Change Adaptation Survey Research Report

Prepared for: Natural Resources Canada

Contract Number: 23483-181152/001/CY

Contract Award Date: January 15, 2018

Date of Delivery: June 12, 2018

Contact Information: [nrcan.por-rop.nrcan@canada.ca](mailto:nrcan.por-rop.nrcan@canada.ca)

*Ce rapport est aussi disponible en français.*

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## EXECUTIVE SUMMARY

Earnscliffe Strategy Group (Earnscliffe) is pleased to present this report to the Department of Natural Resources Canada (NRCan) summarizing the results of the qualitative and quantitative research study regarding climate change adaptation.

In 2009, a National Climate Change Adaptation Benchmark Survey was conducted to establish a benchmark to be used to evaluate progress on adapting to climate change and the impact of the Government of Canada adaptation programming. 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 past research was also used to inform federal program design.

NRCan required updated research to assess Canada's progress in addressing adaptation and the impact of federal investments in adaptation to climate change. This research contributes to an assessment of Canada's progress in addressing adaptation and the impact of federal investments in adaptation to climate change in Canada and will be used to measure change in awareness and actions on adaptation in communities and businesses; assess decision-making information and tools; and identify barriers to action. 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.

The total cost to conduct this research was \$109,249.81 including HST.

Earnscliffe conducted a two-part research program, with both a quantitative and qualitative phase.

For the quantitative phase, we conducted a telephone survey in collaboration with our quantitative sub-contractor, Léger. 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 350 individuals, including 100 who occupy Chief, Manager or Director of Planning positions in municipalities across Canada and 250 individuals occupying Head of Operations or Chief Risk Officer positions in natural resource industries across Canada. The survey was conducted between February 5 and March 14, 2018. The average length of each interview was 15 minutes.

For both the municipal and business samples, stratified random sampling was used. In the case of municipalities, the final sample was fairly consistent with the known distribution of small, medium and large municipalities and as a result, the results have not been weighted. The aggregate municipal results can be considered accurate to within +/-9.8% at the 95% confidence level.

In the case of the business sample, the distribution of small, medium and large businesses within each sector was similar enough to the known distribution that it was decided that no weight would be applied based upon size. However, 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 the aggregate results of the business sample would be representative of the universe being studied. The aggregate business results can be considered accurate to within +/-6.2% at the 95% confidence level.

The qualitative phase consisted of 13 in-depth interviews with representatives from the associations representing small businesses and commerce, companies in the oil and gas, mining, forestry and utilities industries, an association representing municipalities, as well as some individuals 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-depth in the survey. The interviews were conducted between February 27 and March 21, 2018.

*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 from the research are presented separately for each of the two samples—business and municipal.

## Business Findings

### Awareness and Impressions of Climate Change Relevance

- **There is broad agreement that climate change is happening right now.** Business respondents cite more frequent and severe weather events as the most serious impact of climate change in their region/community and are concerned about economic effects.
- The majority of business respondents (62%) expect that climate change will have at least a moderate impact, including 19% who expect it will have a major impact on their region.
- **One quarter of business respondents (25%) report that climate change is having an impact on their organization.** There is variation between sectors—those in mining (34%) and power (38%) are more likely than respondents in the other sectors to say climate change is having an impact on their organization.
- **Roughly the same number of business respondents (29%) think climate change will impact their organization in the next 1–5 years.**
- Among those who expect that climate change will have an impact, business respondents are far more likely to feel the impact will be negative than positive and the main concern is economic loss.
- The majority of all businesses and within each sector surveyed, save for mining, report that climate change does not present a significant challenge to their organization.

### Climate Change Adaptation

- The majority of businesses across the four sectors surveyed are not taking action to adapt to climate change, although one quarter of these businesses (24%) report they plan to engage in climate change adaptation activities.

- Businesses engaging in climate change adaptation activities tend to report operational initiatives.
- **A minority of businesses say they have been incorporating climate change in decision-making for years, though results vary by sector.**

### Incorporating Climate Change Considerations in Decision-Making

- **The primary source of information about climate change for businesses (56%) is the media.**
- When asked whether potential barriers to adaptation are significant, minor, or not a barrier at all, business respondents indicated that the cost of adapting presents the most significant barrier (30% identify it as a significant barrier), followed by the complexity of the policy change process (28%) and lack of experience (23%).
- Over two thirds of businesses agree they have the information they need to make decisions about climate change adaptation. Among those who feel they do need more information, the top request from businesses is climate data and future projections of climate conditions.

### Municipal Findings

#### Awareness and Impressions of Climate Change Relevance

- **There is broad agreement that climate change is happening right now.** Municipal respondents cite more frequent and severe weather events as the most serious impact of climate change in their region/community and are particularly concerned about flooding.
- Overall, the majority of municipal respondents expect climate change will have at least a moderate impact on their community (68%), including one in ten (11%) who expect it will have a major impact on their community.
- **Half of the municipal respondents (51%) report that climate change is having an impact on their organization.**
- **One third (35%) of municipal respondents think climate change will impact their community in the next 1-5 years,** though this opinion varies widely by size of municipality.
- Among municipal respondents, the vast majority report climate change will have a negative impact on their community, with flooding being the most frequently cited negative impact.
- For municipal respondents, climate change, while not the greatest issue they face, is still a significant challenge. Over half across all municipality sizes hold this view.

## Climate Change Adaptation

- Across all sizes of municipalities, over 50% report that they are taking action to adapt to climate change and among the other half, 42% report they plan to engage in climate change adaptation activities.
- **Overall, municipal respondents report being fairly advanced in climate change adaptation planning.** Most of their adaptation activities revolve around emergency preparedness and natural disasters/major weather events. For example, 51% of those who are taking action reported their activities include emergency response/disaster planning, and 44% mentioned flood management activities. Following those two activities, planning activities such as preparing a plan (33%) and incorporating adaptation into long-term planning (33%) were the most frequently mentioned.

## Incorporating Climate Change Considerations in Decision-Making


- **The primary source of information about climate change for municipal respondents (26%) is the media.**
- Overall, municipal respondents report facing multiple significant barriers to taking climate change into decision making. The most significant barrier, reported as such by almost three quarters of the municipal respondents, is the cost. A lack of capacity to apply tools and information (48%) and lack of experience (40%) are also significant barriers for pluralities of the municipal sample.
- Information is not the main barrier for municipal respondents, with over two thirds agreeing they have the information they need to make decisions about climate change adaptation. Among those who feel they do need more information, the top request for municipal respondents is more regionally or locally specific impacts.

Research Firm: Earnscliffe Strategy Group Inc. (Earnscliffe)

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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 29, 2018

Doug Anderson  
Principal, Earnscliffe

## INTRODUCTION

Earnscliffe Strategy Group (Earnscliffe) is pleased to present this report to Natural Resources Canada (NRCan) summarizing the results of the qualitative and quantitative research study regarding climate change adaptation.

In 2009, a National Climate Change Adaptation Benchmark Survey was conducted to establish a benchmark to be used to evaluate progress on adapting to climate change and the impact of the Government of Canada adaptation programming. 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 past research was also used to inform federal program design.

### Objectives:

NRCan required updated research to assess Canada's progress in addressing adaptation and the impact of federal investments in adaptation to climate change. This research contributes to an assessment of Canada's progress in addressing adaptation and the impact of federal investments in adaptation to climate change in Canada and will be used to measure change in awareness and actions on adaptation in communities and businesses; assess decision-making information and tools; and identify barriers to action. 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 these objectives, Earnscliffe conducted a two-part research program, which included both a quantitative telephone survey and a series of in-depth interviews.

For the quantitative phase, a telephone survey was conducted. The telephone survey questionnaire was developed in consultation with NRCan, drawing on the 2009 National Climate Change Adaptation Benchmark Survey 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

Data was collected by one of Earnscliffe's quantitative sub-contractors, Léger. 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 350 individuals, including 100 who occupy Chief, Manager or Director of Planning positions in municipalities across Canada and 250 individuals occupying Head of Operations or Chief Risk Officer positions in natural resource industries across Canada. The survey was conducted between February 5 and March 14, 2018. The average length of each interview was 15 minutes.

For both the municipal and business samples, stratified random sampling was used. In the case of municipalities, the final sample was fairly consistent with the known distribution of small, medium and large municipalities and as a result, the results have not been weighted. The aggregate municipal results can be considered accurate to within +/-9.8% at the 95% confidence level.

In the case of the business sample, the distribution of small, medium and large businesses within each sector was similar enough to the known distribution that it was decided that no weight would be applied based upon size. However, 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 the aggregate results of the business sample would be representative of the universe being studied. The aggregate business results can be considered accurate to within +/-6.2% at the 95% confidence level.

The qualitative phase consisted of 13 in-depth interviews with representatives from the associations representing small businesses and commerce, companies in the oil and gas, mining, forestry and utilities industries, an association representing municipalities, as well as some individuals 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-depth in the survey. The interviews were conducted between February 27 and March 21, 2018.

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 in a variety of industries and of various sizes.

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 North American Industry Classification System NAICS 2017 codes below provided by the client.

As per common practice of Statistics Canada, small businesses were classified as those with fewer 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 to 29,999, medium municipalities were those with a population of 30,000 to 99,999, and large municipalities were those with a population of 100,000 or more. For the municipal sample, quotas were set to ensure representation of small, medium and large municipalities and the data are unweighted. For the business sample, quotas were set for size within each sector and results were weighted by industry size.



The sampling frame for businesses was as follows:

BUSINESSES	Actual (N)				Sample (n)			
	Small	Med	Lrg	Total	Small	Med	Lrg	Total
<b>Oil &amp; Gas</b> (NAICS: 211, 237120, 4861, 4862, 4869, 324110, 324190)	3,329	167	45	3,541	70	8	2	80
<b>Mining</b>	689	344	64	1,097	14	5	3	22
(NAICS: 2121, 212210, 212220, 212231, 212232, 212233, 212299, 212392, 212393, 212395, 212396, 212397, 212398)	240	71	38	346	12	4	2	18
(NAICS: 331)	449	104	26	579	2	1	1	4
<b>Forestry</b> (NAICS: 1131, 1132, 1133, 3221, 3222)	4,783	194	9	4,986	72	10	1	83
<b>Power</b> (NAICS: 221111, 221112, 221113, 221119, 221121, 221122, 237130)	1,276	143	38	1457	56	7	2	65
<b>TOTAL</b>					212	30	8	250

The sampling frame for municipalities was as follows:

MUNICIPALITIES	Actual (N)	Sample (n)
Small	1,944	50
Medium	95	30
Large	54	20
<b>TOTAL</b>		100

The tables below provide the demographic profile of the sample.

#### SAMPLE PROFILE: DISTRIBUTIONS

Businesses	Sample size	Percentage
<b>Oil &amp; Gas</b> (NAICS: 211, 237120, 4861, 4862, 4869, 324110, 324190)	77	31%
<b>Mining</b> (NAICS: 2121, 212210, 212220, 212231, 212232, 212233, 212299, 212392, 212393, 212395, 212396, 212397, 212398)	25	10%
<b>Forestry</b> (NAICS: 1131, 1132, 1133, 3221, 3222)	83	33%
<b>Power</b> (NAICS: 221111, 221112, 221113, 221119, 221121, 221122, 237130)	65	26%

Businesses	Sample size	Percentage
Atlantic	27	11%
Quebec	53	21%
Ontario	78	31%
Prairies	71	28%
British Columbia	21	8%

<b>Businesses</b>	<b>Sample size</b>	<b>Percentage</b>
Large (500+ employees)	8	3%
Medium (100–499 employees)	30	12%
Small (< 100 employees)	212	85%

<b>Municipalities</b>	<b>Sample size</b>	<b>Percentage</b>
Small	76	76%
Medium	13	13%
Large	11	11%

<b>Municipalities</b>	<b>Sample size</b>	<b>Percentage</b>
Atlantic	11	11%
Quebec	24	24%
Ontario	28	28%
Prairies	23	23%
British Columbia	14	14%

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 Survey Methodology Report at Appendix A; also appended to this report are the interview guide and survey instruments (English and French) and detailed tabular results (presented under a separate cover).

## DETAILED FINDINGS: BUSINESS RESPONDENTS

This section describes the findings from the 250 interviews conducted among business respondents.

### Awareness and Impressions of Climate Change Relevance

Among business respondents, the plurality associates the term “climate change” with warmer temperatures and warmer weather. Respondents acknowledge that “climate change” also means more extreme and unpredictable weather events. Those in the power industry were most likely to cite extreme and unpredictable weather events (31%), while those in oil and gas were the least likely (12%).

The vast majority of business respondents agree that climate change is happening right now (70%). Those who work in oil and gas and forestry were slightly less likely than other business respondents to agree climate change is happening right now (69% and 67% respectively), while those who work in the power industry were the most likely to agree (82%). A larger proportion of large business respondents agree (88%) compared to small businesses (69%), though the sample size of large businesses is too small to draw any conclusions (n = 7).

*Exhibit A1 – Q8: What do you first think of when you hear the term “climate change”? What’s the next thing that comes to mind related to climate change? [OPEN-END WITH PRECODED LIST, DO NOT READ LIST]*

Climate Change – Top of Mind Ideas	
	Business (n = 250)
Warmer temperatures/warmer weather	37%
Weather events more extreme/unpredictable	19%
Colder temperatures/colder weather	10%
Water levels are higher	6%
More air pollution/lower air quality	7%
Climate changes (unspecified)	5%
More flooding/more severe flooding	4%
More storms	2%
Melting ice caps	4%
Stronger winds	1%
Need to adapt	3%
Less ice/snow	2%
Less rain/drought	1%
More ice/snow	1%
More rain	1%
More forest fires	0%
Other (SPECIFY)	5%
Don’t know/Prefer not to say/No answer	7%

*Exhibit A2 – Q9: Which of these best describes what is happening in terms of climate change in the regions of Canada in which your organization operates?*

Climate Change in Your Region/Community	
	<b>Business (n = 250)</b>
Climate change is happening right now	70%
Climate change is not happening right now, but it will happen in the foreseeable future	17%
Climate change is not happening right now and will not happen in the foreseeable future	11%
Don't know/Prefer not to say/No answer	2%

*Exhibit A3 – Which of these best describes what is happening in terms of climate change in the regions of Canada in which your organization operates?*

Climate Change in Your Region/Community					
	<b>Business (n = 250)</b>	<b>Oil &amp; Gas (n = 77)</b>	<b>Mining (n = 25)</b>	<b>Forestry (n = 83)</b>	<b>Power (n = 65)</b>
Climate change is happening right now	70%	69%	75%	67%	82%
Climate change is not happening right now, but will happen in the foreseeable future	17%	14%	16%	20%	14%
Climate change is not happening right now and will not happen in the foreseeable future	11%	12%	9%	12%	3%
DN/NR	2%	5%	-	-	2%

### Qualitative Insight

One-on-one interviews echoed what was found in the survey, with unanimous consensus that climate change is occurring and all participants able to cite multiple sources of evidence for this view. Virtually all pointed to the increased frequency and severity of extreme weather events as one sort of evidence. In addition, those in industry associations tended to cite issues like increased incidence of forest fires, unprecedented permafrost conditions, and invasive species migrating into regions where there were previously unseen.

Business respondents alike mentioned more frequent and severe weather events/storms as the most or second most serious impact of a changing climate. After severe weather events, economic effects—including loss of productivity and negative trade impacts—are top of mind for business respondents (9% name it as the most serious impact, 10% say it is the second most serious). Changing sea and lake levels, as well as erosion, are not far behind with 17% naming them as the first or second most serious consequence of climate change.

*Exhibit A4. – Q10. [IF Q9 = 1, 2 or 9] 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? [DO NOT READ]*

<b>Most Serious Impact of Climate Change – Business (n = 250)</b>		
	Most serious	Next most serious
More frequent or more severe weather events/storms	<b>18%</b>	<b>13%</b>
Economic effects (loss of productivity, negative trade impacts, increased trade opportunities)	<b>9%</b>	<b>10%</b>
Changing sea/lake levels/coastal erosion	<b>10%</b>	<b>7%</b>
Flooding	4%	6%
Droughts	4%	6%
Effects on wildlife (changing migration patterns, species loss, invasive species, loss of habitat)	4%	5%
Heat waves/higher temperatures/warmer winters	2%	3%
Impacts on water supply	6%	4%
Effects on agriculture (growing season changes, crop failures)	2%	5%
Permafrost change (melting, thawing, instability)	3%	3%
Forest (or wildland) fires	2%	4%
Human health impacts	3%	2%
Pollution	1%	2%
Changes in lifestyle	0%	3%
Melting of the polar ice cap	1%	0%
Effects on infrastructure	1%	0%
All of the above	1%	0%
Other	5%	5%
No one most serious impact	5%	6%
Don't know/Prefer not to say/No answer	8%	11%

Overall, 19% of businesses respondents say that climate change will have a major impact on their region, while 43% say it will have a moderate impact. Those in the oil and gas sector are the least likely among businesses to report that climate change will have a major impact on their region (15%), though another 47% say it will have a moderate impact. In contrast, 22% in the mining sector expect climate change will have a major impact on their region, while 31% say it will have a moderate impact.

*Exhibit A5 – Q11. [IF Q9 = 1, 2 or 9] 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...?*

Climate Change Impacts Your Organization					
	Business (n = 227)	Oil & Gas (n = 68)	Mining (n = 23)	Forestry (n = 73)	Power (n = 63)
Major impact	19%	15%	22%	21%	22%
Moderate impact	43%	47%	31%	42%	46%
Minor impact	26%	24%	49%	23%	25%
No impact at all	11%	13%	-	14%	5%
Depends	-	-	-	-	2%
DK/NR	-	1%	-	-	-

One quarter of business respondents agree that climate change is having an impact on their organization, while 46% expect climate change will have an impact on their organization. However, opinion varies among the industries surveyed. Those in the mining and power sectors are more likely than those in the forestry and oil and gas sectors to report that climate change is impacting or will have an impact on their organization. For example, over one third of those in the mining industry (34%) report climate change is having an impact, compared to 19% of those in the forestry industry and 26% in the oil and gas industry.

*Exhibit A6 – Q12. Thinking about how your organization may or may not be impacted, is climate change something that is already having an impact on your organization in any way, is not having an impact on the organization, but it may have an impact on the organization in the future, or is climate change something that will not have an impact on your organization?*

Climate Change Impacts Your Organization					
	Business (n = 250)	Oil & Gas (n = 77)	Mining (n = 25)	Forestry (n = 83)	Power (n = 65)
It is having an impact on the organization	25%	26%	34%	19%	38%
It is not having an impact on the organization but it is possible	46%	46%	49%	47%	43%
It will not have an impact on the organization	28%	27%	17%	34%	17%
DK/NR	1%	1%	-	-	2%

### Qualitative Insight

Participants in the qualitative research were in agreement that there are already changing climatic patterns to which they are having to adapt. Almost all were comfortable describing this as a changing climate, but one did emphasize that while the recent changes are more dramatic than their industry had witnessed previously, a changing climate has always meant that industry is constantly adapting practices and thus, the recent kinds of changes are only about magnitude rather than a new realization of a need to adjust operations or assumptions to suit a new climate. That said, in terms of the expectations going forward, the tendency was to temper the sense of the future impact based upon the sense that actions are already being taken or plans being made that will sufficiently mitigate the impact of a changing climate.

Roughly similar proportions of the business respondents who expect climate change will impact their organization in the future believe it will happen in the next 1–5 years. Just over one quarter overall (26%) agree, compared to 26% of those in oil and gas, 33% of those in mining, and 29% in both forestry and power. That said, there is some variation in the proportion who believe climate change won't impact their organization for the next 20 years or more—25% of both those in the mining and power samples expect this is the case.

*Exhibit A7 – Q13: [IF Q12 = 2] How many years from now do you believe your organization will start to see impacts from a changing climate?*

Years Until Climate Changes Impacts Your Organization					
	Business (n = 113)	Oil & Gas (n = 35)	Mining (n = 12)	Forestry (n = 38)	Power (n = 28)
1–5 years	29%	26%	35%	29%	28%
6–10 years	26%	37%	0%	24%	28%
11–19 years	18%	12%	39%	18%	14%
20 years or more in the future	17%	12%	26%	17%	25%
Don't know/Prefer not to say/No answer	11%	14%	0%	12%	4%

Well over half of business respondents (61%) expect climate change will have a mainly negative impact. There is some variation between sectors. Those in the mining sector are the least likely to report it will have a mainly negative impact (44%) while those in the forestry sector are the most likely to do so (70%). Individuals in the power sector are the most likely to say climate change will have a mainly positive impact (30%). Those who expect the impacts of climate change will be mainly positive for their organization primarily say it will bring new business opportunities (66%), extend their operating season (23%) and result in warmer winter, thus lower energy costs (18%) and lower snow removal costs (18%). Another 18% also anticipate less seasonal unemployment and/or new employment opportunities. Those who report it will have a negative impact expect climate change will result in economic losses for their business (46%), increase infrastructure costs (29%), and mean more heat waves, leading to high cooling bills (24%), among other concerns.

*Exhibit A8 – Q14. [IF Q12 = 1, 2 or 9] Overall, will changing climate have a mainly negative or mainly positive impact on your organization?*

Net Impact of Climate Change in Your Organization					
	Business (n = 186)	Oil & Gas (n = 56)	Mining (n = 21)	Forestry (n = 55)	Power (n = 54)
Mainly positive impact	18%	18%	23%	11%	30%
Both positive and negative impacts	10%	11%	23%	6%	7%
Neutral or no impact	6%	7%	-	8%	-
Mainly negative impact	61%	55%	44%	70%	61%
DK/NR	6%	9%	10%	4%	2%

*Exhibit A9 – Q15: [IF Q14 = 1] What, specifically, are some of the positive impacts or opportunities for your organization resulting from a changing climate? PROBE: Any others?*

Positive Impacts of Climate Change	
	Business (n = 38)
New business opportunities	66%
Reduced winter snow clearing costs	18%
Earlier/longer operating season	23%
Warmer winters/lower energy costs	18%
Increased active transportation (walking/cycling)	16%
Less seasonal unemployment/new employment opportunities	18%
Increased crop yields	11%
Better conditions for livestock/wildlife	12%
Increased water supply	14%
Increased tourism/longer tourism season	11%
Other (SPECIFY)	8%
Don't know/Prefer not to say/No answer	5%

*Exhibit A10 – Q16: [IF Q14 = 2] What, specifically, are some of the negative impacts or risks for your organization resulting from a changing climate? PROBE: Any others?*

Negative Impacts of Climate Change	
	Business (n = 111)
Economic losses	46%
Infrastructure impacts/costs	29%
More floods	22%
Change in water levels/water supply	22%
More drought	20%
Increased heat waves/cooling costs	24%
Increase in forest/wildland fire	23%
More storm surges/damage from sea level rise	19%
More pests/diseases	18%
Shorter winter tourism season	9%
More smog	9%
Effects on agriculture/crops	1%
Supply (electricity, logs)	6%
Transport cost	3%
Other (SPECIFY)	7%
Don't know/Prefer not to say/No answer	7%

The majority of all businesses and sectors surveyed, save for mining, report that climate change does not present a significant challenge to their organization. That said, 45% overall say climate change is either one of the most significant challenges or a significant challenge. This proportion is slightly lower in the oil and gas sector. Of the 7 large business respondents, 41% say climate change is one of their most significant challenges, compared to 16% of medium-sized business respondents and 7% of small business respondents.



*Exhibit A11 – Q17. Which of the following best describes your ORGANIZATION’S view regarding climate change? Is it that...*

Challenges of Climate Change in Your Organization					
	Business (n = 250)	Oil & Gas (n = 77)	Mining (n = 25)	Forestry (n = 83)	Power (n = 65)
Climate change is one of the most significant challenges your organization faces	8%	5%	9%	10%	7%
Climate change is a significant challenge, but not as serious as others your organization faces	37%	39%	43%	33%	40%
Climate change does not present a significant challenge to your organization	52%	50%	44%	56%	52%
Climate change is not happening	1%	3%	4%	-	-
DK/NR	2%	4%	-	1%	-

### Qualitative Insight

In the qualitative interviews, there was an expressed assumption that a changing climate brought drawbacks, although when probed, a small number were able to name something that may, at least theoretically, be a benefit. However, the consensus among the industry participants was that a changing climate is only being considered in terms of how to reduce its adverse effects and discussions about benefits were clearly somewhat alien. Each sector cited some unique impacts, typically affecting productivity and/or investment requirements. For example, energy participants mentioned construction and maintenance practices having to be revised in order to withstand new conditions, expanding production to meet increased demand directly resulting from a changing climate and repairs due to extreme weather events. Mining mentioned road construction and accessibility issues due to changing patterns of permafrost and ice road sustainability.

*Exhibit A12 – Q18: 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?*

Client & Stakeholder Perspectives					
	Business (n = 250)	Oil & Gas (n = 77)	Mining (n = 25)	Forestry (n = 83)	Power (n = 65)
Very concerned	10%	8%	13%	8%	17%
Somewhat concerned	42%	51%	47%	34%	40%
Not very concerned	19%	7%	26%	27%	15%
Not at all concerned	22%	25%	8%	26%	16%
DK/NR	7%	9%	6%	4%	13%

## Climate Change Adaptation

Across each of the four sectors, the majority of businesses surveyed say they are not currently taking action to adapt to climate change. Overall, 32% of business respondents report they are taking action and 24% claim they will take action in the future. Almost half (46%) say they are either currently taking action and/or plan to in the future. Climate change adaptation activities are the least common in the forestry industry (27%), while 43% of those in the power industry report that their organization is taking action. Small business respondents are slightly less likely to currently be doing anything to adapt (30%), while almost half of medium-sized businesses (49%) and roughly three quarters of the large business respondents surveyed (74%) report that their organizations are taking action.

*Exhibit A13 – Q19: Adapting to a changing climate means taking actions that reduce the risks or take advantage or opportunities from changes in climate (e.g. changes in precipitation, temperature, sea level, or storms). Is your organization currently doing anything to adapt to the risks and opportunities resulting from a changing climate?*

Have Current Adaptation Activities					
	Business (n = 250)	Oil & Gas (n = 77)	Mining (n = 25)	Forestry (n = 83)	Power (n = 65)
Yes	32%	34%	34%	27%	43%
No	66%	63%	66%	70%	57%
DK/NR	2%	3%	-	3%	-

*Exhibit A14 – Q21: Does your organization have any specific plans for FUTURE actions designed to ADAPT to the risks and opportunities provided by a changing climate?*

Plans for Future Adaptation Activities					
	Business (n = 250)	Oil & Gas (n = 77)	Mining (n = 25)	Forestry (n = 83)	Power (n = 65)
Yes	24%	24%	25%	22%	24%
No	72%	67%	75%	77%	64%
DK/NR	4%	9%	-	2%	2%

*Exhibit A15 – Q19/Q21: % Who are either taking actions now or planning to in the future?*

Taking Action Now or in the Future					
	Business (n = 250)	Oil & Gas (n = 77)	Mining (n = 25)	Forestry (n = 83)	Power (n = 65)
	46%	44%	44%	42%	52%

Just over one quarter of business respondents (27%) report installing green infrastructure. Twenty-two percent mention broadly implementing their plan, and another 22% report changing the operation or maintenance of their infrastructure.

Exhibit A16 – Q20: [IF Q19 = 1] What, specifically, is your organization currently doing to ADAPT to a changing climate? [DO NOT READ] PROBE: Anything else?

Current Climate Change Adaptation Activities	
	Business (n = 89)
Implementing actions/measures in our plan	24%
Assess the costs to the organization	23%
Education/awareness building activities	23%
Emergency response/disaster planning	22%
Incorporate adaptation actions in long-term planning/other corporate plans (e.g. risk management)	22%
Assess the risks from climate change on the organization	21%
Preparing a climate change adaptation plan	20%
Creating guidelines or policies	19%
Changes to energy distribution system	17%
Install natural or green infrastructure	15%
Change design or location of infrastructure	14%
Other (respondent to specify)	14%
Drought management actions/reducing water use	13%
Summer heat alert system/build awareness of risks from heat waves	13%
Change operation/maintenance of infrastructure	12%
Habitat protection	12%
Flood management activities – flood mapping, land-use restrictions, downspout disconnection	10%
Reducing carbon/CO2 footprint	9%
Build retaining walls to protect from storm surges	5%
Have an adaptation plan	-
Don't know/Prefer not to say/No answer	%

Business respondents' top three future planned activities are all related to planning, whether that be implementing plans already developed (24%), incorporating climate change adaptation into long-term planning (22%) or emergency response/disaster planning (22%). They also report aiming to assess the costs to their organization (23%) and engage in education/awareness initiatives (23%).

*Exhibit A17 – Q22: [IF Q21 = 1] What actions are specifically planned? [DO NOT READ] PROBE: Anything else?*

Planned Climate Change Adaptation Activities	
	Business (n = 67)
Implementing actions/measures in our plan	24%
Education/awareness building activities	23%
Assess the costs to the organization	23%
Emergency response/disaster planning	22%
Incorporate adaptation actions in long-term planning/other corporate plans (e.g. risk management)	22%
Assess the risks from climate change on the organization	21%
Preparing/prepared a climate change adaptation plan	20%
Creating guidelines or policies	19%
Changes to energy distribution system	17%
Install natural or green infrastructure	15%
Change design or location of infrastructure	14%
Drought management actions/reducing water use	13%
Summer heat alert system/build awareness of risks from heat waves	13%
Change operation/maintenance of infrastructure	12%
Habitat protection	12%
Flood management activities—flood mapping, land-use restrictions, downspout disconnection	10%
Reducing footprint/waste	9%
Build retaining walls to protect from storm surges	5%
Other (respondent to specify)	14%
Don't know/Prefer not to say/No answer	5%

Of all the industries surveyed, those in oil and gas report they have been considering climate change in their decision-making for the longest time: 19% report it has been a consideration for 6–10 years, and 18% say they have been accounting for it for over 10 years. One quarter of those in the power industry also indicate they have considered climate change in their planning for 6–10 years, while an additional 14% say it's been going on for 10 or more years.

*Exhibit A18 – Q23. [IF Q19 = 1] For how long has your organization been considering a changing climate in its decision-making?*

Climate Change in Decision-Making-Business					
	Business (n = 89)	Oil & Gas (n = 27)	Mining (n = 9)	Forestry (n = 25)	Power (n = 28)
Less than one year	8%	12%	-	10%	4%
1–2 years	14%	12%	32%	16%	4%
3–5 years	34%	29%	50%	29%	46%
6–10 years	18%	19%	-	19%	25%
11 or more years	14%	18%	12%	12%	14%
DK/NR	11%	11%	6%	15%	7%

## Incorporating Climate Change Considerations in Decision-Making

The primary source of information about climate change for businesses (56%) is the media, followed by internet searches (20%) and scientific journals and magazines (15%).

*Exhibit A19 – Q24: What are your organization’s sources of information regarding climate change? PROBE: Any other sources? [DO NOT READ]*

Source of Information About Climate Change	
	Business (n = 250)
The media	56%
Internet searches	20%
Scientific journals/magazines	15%
Internal/our own information/data	6%
Industry associations/municipal associations	6%
Non-governmental organizations	5%
Universities and researchers	4%
No information at organizational level	4%
Government sources	2%
Conferences/workshops/seminars	2%
Environment Canada	2%
Government (unspecified)	2%
Provincial government	-
Other (SPECIFY)	5%
Don’t know/Prefer not to say/No answer	8%

For business respondents, the cost of adapting to climate change is the largest barrier to taking climate change into account in decision-making (30% say it is significant) followed by the complexity of the policy change process (28%) and lack of experience (23%). Over half do not feel that they lack the capacity to apply tools and information, or feel they need to wait for other departments and/or organizations to act first before they can. The cost of adapting appears less of a concern to large businesses—just 12% of those surveyed say it is a significant barrier. Oil and gas, as well as mining respondents find the complexity of the policy change process more challenging (34% and 39% say it is a significant barrier, respectively) compared to those in the forestry and power sectors.

*Exhibit A20 – Q25. To what extent does each of the following represent a barrier to your organization better taking climate change into account in its decision-making?*

<b>Barriers to Climate Change in Businesses (n = 250)</b>				
	Significant barrier	Minor barrier	Not a barrier	DK/NA
The cost of adapting to the impacts of a changing climate	30%	32%	35%	4%
The complexity of policy change processes	28%	32%	36%	4%
Lack of experience	23%	30%	45%	3%
The need to have other departments/organizations act first, before we act	20%	26%	52%	3%
Lack of information about climate change and its impacts	20%	32%	46%	2%
Making a business case for implementing actions	15%	35%	48%	2%
Competing organizational priorities	16%	29%	48%	6%
Lack of capacity to apply tools and information	12%	34%	51%	3%

Over two thirds of business respondents (72%) agree they have the information they need to make decisions about climate change adaptation. However, among those who do feel they are missing information, the most common needs among businesses are projections of future climate conditions (34%), economic information (33%) and regional impact information (33%).

*Exhibit A21 – Q27: Do you have access to the information and tools you need to make adaptation-related decisions?*

<b>Access to Climate Change Information</b>	
	<b>Business (n = 250)</b>
Yes	72%
No	24%
Don't know/Prefer not to say/No answer	4%

*Exhibit A22 – Q28: [IF Q25f = 1] Specifically, what types of information do you lack?*

<b>Missing Information About Climate Change</b>	
	<b>Business (n = 106)</b>
Projections of future climate conditions/climate data	34%
Information on impacts specific to region	33%
Economic information (costs/benefits of action)	33%
Relevant case studies/examples of what other organizations like ours are doing	30%
Best practices information	27%
Technology and design alternatives for infrastructure	26%
Other (SPECIFY)	6%
Don't know/Prefer not to say/No answer	30%

Finally, businesses report that tools and resources such as climate data (31%), regulations (31%), cost/benefit analysis (31%), risk assessment methods (30%) as well as codes/standards (30%) would assist them in adapting to climate change.

*Exhibit A23 – Q29: 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?*

Resources Needed to Address Impacts of Climate Change	
	Business (n = 250)
Climate Data	31%
Regulations	31%
Cost/benefit analysis	31%
(Adaptation) Planning guidance	30%
Codes or standards	30%
Risk assessment methods	30%
Other data	28%
None	10%
Do not have/use such resources	4%

### Qualitative Insight

In the one-on-one interviews, industry associations were, for the most part, already being proactive in terms of ensuring members are aware of the specific aspects of climate change that businesses will have to consider in adapting to new environmental conditions. While cost is a significant issue for all, the degree to which it was a barrier was not consistent. For those where cost was regarded as less of a barrier to taking action to adapt to a changing climate, the reasons tended to be either that these kinds of actions are already a key part of their long-term planning (including financial planning) or the changes they feel are most necessary do not necessarily require a large investment.

Several associations specifically commended NRCan for programs and collaborations that have helped advance their industry's understanding and planning on adapting to a changing climate, but some suggested that further sharing of information (particularly, changing data or science on weather modelling) would be impactful. Some associations also offered unique additional requests specifically relating to what governments can do, including helping develop materials to bring CEOs more understanding of the relevance of a changing climate to their operations and bottom line and helping address regulatory requirements that are becoming newly problematic, given changing operational and investment needs that are directly due to the changing climate.

As examples:

- regulations requiring the same species of tree be planted to replace those harvested, but fail to appreciate that a changing climate means that species will no longer have the same chance of survival as it had when the regulations were written;
- regulations stipulating the specific times of year when branches can and cannot be cut are no longer appropriate and present a barrier to taking emergency action; and
- the need to invest in infrastructure in a sector where regulators establish rules on pricing can present difficulties for budgeting unanticipated major infrastructure investments.

## DETAILED FINDINGS: MUNICIPAL RESPONDENTS

This section describes the findings from the 100 interviews conducted among municipal respondents.

### Awareness and Impressions of Climate Change Relevance

Among municipal respondents, the plurality associates the term “climate change” with warmer temperatures and warmer weather. Respondents acknowledge that “climate change” also means more extreme and unpredictable weather events. Those from Atlantic Canada were most concerned about extreme and unpredictable weather (55%), though the sample size was small (n = 11). Of note, the third most frequently mentioned topic is cold temperatures and colder weather. Taken together, the results suggest that discussion around climate change for these stakeholders includes how it will affect their communities beyond simply warmer temperatures and weather.

The vast majority agree that climate change is happening right now (82%). Across the municipalities, all of those surveyed from large municipalities agreed that climate change is happening right now, followed by 85% of those who work with medium-sized municipalities, and 79% of those who work with small municipalities.

*Exhibit B1 – Q8: What do you first think of when you hear the term “climate change”? What’s the next thing that comes to mind related to climate change? [OPEN-END WITH PRECODED LIST, DO NOT READ LIST]*

Climate Change – Top of Mind Ideas	
	Municipal (n = 100)
Warmer temperatures/warmer weather	32%
Weather events more extreme/unpredictable	28%
Colder temperatures/colder weather	12%
More storms	11%
More flooding/more severe flooding	10%
Stronger winds	9%
Climate changes (unspecified)	8%
Need to adapt	8%
Water levels are higher	7%
More ice/snow	5%
More rain	5%
More air pollution/lower air quality	3%
More forest fires	3%
Less rain/drought	2%
Melting ice caps	1%
Less ice/snow	1%
Other (SPECIFY)	5%
Don’t know/Prefer not to say/No answer	3%



*Exhibit B2 – Q9: Which of these best describes what is happening in terms of climate change in your region?*

Climate Change in Your Region	
	Municipal (n = 100)
Climate change is happening right now	82%
Climate change is not happening right now, but it will happen in the foreseeable future	11%
Climate change is not happening right now and will not happen in the foreseeable future	4%
Don't know/Prefer not to say/No answer	3%

*Exhibit B3 – Which of these best describes what is happening in terms of climate change in your region?*

Climate Change in Your Region				
	Municipal (n = 100)	Large (n = 11)	Medium (n = 13)	Small (n = 76)
Climate change is happening right now	82%	100%	85%	79%
Climate change is not happening right now, but will happen in the foreseeable future	11%	-	15%	12%
Climate change is not happening right now and will not happen in the foreseeable future	4%	-	-	5%
DN/NR	3%	-	-	4%

### Qualitative Insight

One-on-one interviews echoed what was found in the survey, with unanimous consensus that climate change is occurring and all participants able to cite multiple sources of evidence for this view. Virtually all pointed to the increased frequency and severity of extreme weather events as one sort of evidence. Those in coastal municipalities also cited evidence such as increased flooding and the emergence of new flood plains.

Municipal respondents mentioned more frequent and severe weather events/storms and flooding as the most, or second most serious impacts of a changing climate. Effects on agriculture, changing water levels and impacts on water supplies are also of concern to municipalities.

*Exhibit B4. – Q10. [IF Q9 = 1, 2 or 9] 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? [DO NOT READ]*

Most Serious Impact of Climate Change – Municipalities (n = 100)		
	Most serious	Next most serious
More frequent or more severe weather events/storms	23%	15%
Flooding	23%	9%
Effects on agriculture (growing season changes, crop failures)	8%	10%
Changing sea/lake levels/coastal erosion	6%	9%
Impacts on water supply	10%	4%
Economic effects (loss of productivity, negative trade impacts, increased trade opportunities)	2%	10%
Forest (or wildland) fires	4%	6%
Droughts	4%	5%
Human health impacts	2%	5%
Permafrost change (melting, thawing, instability)	3%	1%
Effects on wildlife (changing migration patterns, species loss, invasive species, loss of habitat)	0%	4%
Heat waves/higher temperatures/warmer winters	2%	2%
Effects on tourism related to poorer weather	1%	2%
Changes in lifestyle	0%	2%
Effects on infrastructure	1%	0%
Other	6%	1%
No one most serious impact	0%	0%
Don't know/Prefer not to say/No answer	2%	-

Among municipal respondents, 11% feel climate change will have a major impact on their community, while 57% say it will have a moderate impact. Almost all of the large (82%) and medium sized (85%) municipality respondents expect climate change will have a major or moderate impact on their community, while fewer of the small municipality respondents say the same (64%).

*Exhibit B5 – Q11. [IF Q9 = 1, 2 or 9] 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...?*

Climate Change Impacts Your Organization				
	Municipal (n = 96)	Large (n = 11)	Medium (n = 13)	Small (n = 72)
Major impact	11%	27%	23%	7%
Moderate impact	57%	55%	62%	57%
Minor impact	27%	18%	15%	31%
No impact at all	1%	-	-	1%
Depends	2%	-	-	3%
DK/NR	1%	-	-	1%

Agreement that climate change is having an impact on their community is fairly consistent across municipalities. Overall, 51% agree, and an additional 43% expect climate change will have an impact. The percentage who say climate change is currently having an impact is highest among medium-sized municipalities (62%) and lowest among small municipalities (49%).

*Exhibit B6 – Q12. Thinking about how your organization may or may not be impacted, is climate change something that is already having an impact on your organization in any way, is not having an impact on the organization, but it may have an impact on the organization in the future, or is climate change something that will not have an impact on your organization?*

Climate Change Impacts Your Organization				
	Municipal (n = 100)	Large (n = 11)	Medium (n = 13)	Small (n = 76)
It is having an impact on the organization	51%	55%	62%	49%
It is not having an impact on the organization but it is possible	43%	45%	38%	43%
It will not have an impact on the organization	6%	-	-	8%
DK/NR	-	-	-	-

#### Qualitative Insight

Participants in the qualitative research were in agreement that there are already changing climatic patterns to which they are having to adapt.

*Exhibit B7 – Q13: [IF Q12 = 2] How many years from now do you believe your organization will start to see impacts from a changing climate?*

Years Until Climate Changes Impacts Your Organization				
	Municipal (n = 43)	Large (n = 5)	Medium (n = 5)	Small (n = 33)
1–5 years	35%	60%	60%	27%
6–10 years	30%	40%	20%	33%
11–19 years	9%	-	20%	9%
20 years or more in the future	14%	-	-	15%
Don't know/Prefer not to say/No answer	12%	-	-	1%

Overall, 35% of municipal respondents believe climate change will impact their community in the next 1–5 years, though this opinion varies widely between the sizes of municipality. Sixty percent of both large and medium-sized municipal respondents believe their community will feel the effects of climate change in 1–5 years, but among the small municipalities, just 27% agree. It is worth noting that the sample sizes for both large and medium-sized municipalities are small (n = 5 each), as only those who answered Q12 with “*It is not having an impact on the organization, but it is possible*” were asked Q13.

Among municipal respondents, those in medium-sized municipalities are most likely to say climate change will have a negative impact (77%), while 70% of small and 64% of large municipalities offer this perspective. Among the few who expect their community will experience positive impacts from climate change, the majority (60%) mentioned some other positive impact, but due to the small sample size, this is really three individual responses that did not fit any pre-coded category. Forty percent report it will reduce snow-clearing costs, and an equal percentage say it will result in more active transportation, such as walking and cycling. Among those who anticipate

negative impacts, flooding and infrastructure costs are the top concern (55%), followed closely by economic losses (52%). Over one third (36%) also expect that changing water levels will negatively impact their community. Other weather events and consequences, including droughts (33%), forest fires (24%), storm surge damage (24%) and heat waves (24%), are also worrisome. Respondents from Atlantic Canada are particularly concerned about flooding (88%), and respondents in BC are worried most about forest fires (67%).

*Exhibit B8 – Q14. [IF Q12 = 1, 2 or 9] Overall, will changing climate have a mainly negative or mainly positive impact on your organization?*

Net Impact of Climate Change in Your Organization				
	Municipal (n = 94)	Large (n = 11)	Medium (n = 13)	Small (n = 70)
Mainly positive impact	5%	9%	-	6%
Both positive and negative impacts	11%	18%	8%	10%
Neutral or no impact	4%	9%	-	4%
Mainly negative impact	70%	64%	77%	70%
DK/NR	10%	-	15%	10%

*Exhibit B9 – Q15: [IF Q14 = 1] What, specifically, are some of the positive impacts or opportunities for your organization resulting from a changing climate? PROBE: Any others?*

Positive Impacts of Climate Change	
	Municipal (n = 5)
Reduced winter snow clearing costs	40%
Increased active transportation (walking/cycling)	40%
New business opportunities	20%
Earlier/longer operating season	20%
Increased crop yields	20%
Warmer winters/lower energy costs	-
Less seasonal unemployment/new employment opportunities	-
Better conditions for livestock/wildlife	-
Increased water supply	-
Increased tourism/longer tourism season	-
Other (SPECIFY)	60%
Don't know/Prefer not to say/No answer	-

*Exhibit B10 – Q16: [IF Q14 = 2] What, specifically, are some of the negative impacts or risks for your organization resulting from a changing climate? PROBE: Any others?*

Negative Impacts of Climate Change	
	Municipal (n = 66)
Infrastructure impacts/costs	55%
More floods	55%
Economic losses	52%
Change in water levels/water supply	36%
More drought	33%
Increase in forest/wildland fire	24%
More storm surges/damage from sea level rise	24%
Increased heat waves/cooling costs	23%
More pests/diseases	21%
Shorter winter tourism season	17%
More smog	12%
Effects on agriculture/crops	6%
Transport cost	3%
Supply (electricity, logs)	-
Other (SPECIFY)	%
Don't know/Prefer not to say/No answer	%

For municipalities, climate change, while not the greatest issue they face, is still a significant challenge. Over half across all municipality sizes hold this view. This proportion is notably higher in Atlantic Canada, where 91% of respondents report that climate change is a significant, though not their greatest, challenge.

*Exhibit B11 – Q17. Which of the following best describes your ORGANIZATION'S view regarding climate change? Is it that...*

Challenges of Climate Change in Your Organization				
	Municipal (n = 100)	Large (n = 11)	Medium (n = 13)	Small (n = 76)
Climate change is one of the most significant challenges your organization faces	11%	18%	23%	8%
Climate change is a significant challenge, but not as serious as others your organization faces	59%	73%	62%	57%
Climate change does not present a significant challenge to your organization	26%	9%	15%	30%
Climate change is not happening	1%	-	-	1%
DK/NR	3%	-	-	4%

Roughly half of municipalities (57%) describe their stakeholders as being at least somewhat concerned about climate change. This number is lower among larger municipalities (36%).

### Qualitative Insight

In the qualitative interviews, there was an expressed assumption that a changing climate brought drawbacks, although when probed, a small number were able to name something that may, at least theoretically, be a benefit. However, the consensus among the municipal respondents, was that a changing climate is only being considered in terms of how to reduce its adverse effects and discussions about benefits were clearly somewhat alien. Coastal municipalities were rather focused on water—increased frequency and severity of flooding, changing flow patterns, expanding/emerging flood plains, rising sea levels—largely in terms of the impact on infrastructure and for establishing responsible engineering specifications for developers.

*Exhibit B12 – Q18: 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?*

Client & Stakeholder Perspectives				
	Municipal (n = 100)	Large (n = 11)	Medium (n = 13)	Small (n = 76)
Very concerned	9%	18%	15%	7%
Somewhat concerned	49%	18%	46%	54%
Not very concerned	27%	55%	31%	22%
Not at all concerned	10%	-	8%	12%
DK/NR	5%	9%	-	5%

## Climate Change Adaptation

Across all sizes of municipalities, over 50% report that they are taking action to adapt to climate change, while 42% of all municipal respondents have plans to take action in the future. Combined together, 72% of municipal respondents claim they are either already taking action or will in the future. Larger municipalities, as well as those in Atlantic Canada and BC are more likely to report currently taking action.

*Exhibit B13 – Q19: Adapting to a changing climate means taking actions that reduce the risks or take advantage or opportunities from changes in climate (e.g. changes in precipitation, temperature, sea level, or storms). Is your organization currently doing anything to adapt to the risks and opportunities resulting from a changing climate?*

Doing Anything				
	Municipal (n = 100)	Large (n = 11)	Medium (n = 13)	Small (n = 76)
Yes	57%	64%	54%	57%
No	42%	36%	46%	42%
DK/NR	1%	-	-	1%

*Exhibit B14 – Q21: Does your organization have any specific plans for FUTURE actions designed to ADAPT to the risks and opportunities provided by a changing climate?*

Future Plans				
	Municipal (n = 100)	Large (n = 11)	Medium (n = 13)	Small (n = 76)
Yes	42%	55%	54%	38%
No	56%	45%	38%	61%
DK/NR	2%	-	8%	1%

*Exhibit B15 – Q19/Q21: % Who are either taking actions now or planning to in the future?*

Taking Action Now or in the Future				
	Municipal	Large	Medium	Small
	72%	82%	69%	71%

Municipal respondents report that their top activities are predominantly related to preparing for emergencies and/or natural disasters. For example, over half who are taking action report their activities include emergency response/disaster planning (51%) and 44% say they are engaging in flood management activities. In addition, 33% say they are both incorporating adaptation into long-term planning and preparing a climate change adaptation plan. Just over one quarter (28%) also report that they are engaging in drought management activities.

*Exhibit B16 – Q20: [IF Q19 = 1] What, specifically, is your organization currently doing to ADAPT to a changing climate? [DO NOT READ] PROBE: Anything else?*

Current Climate Change Adaptation Activities	
	Municipal (n = 57)
Emergency response/disaster planning	51%
Flood management activities – flood mapping, land-use restrictions, downspout disconnection	44%
Preparing a climate change adaptation plan	33%
Incorporate adaptation actions in long-term planning/other corporate plans (e.g. risk management)	33%
Assess the risks from climate change on the organization	30%
Implementing actions/measures in our plan	28%
Change operation/maintenance of infrastructure	28%
Drought management actions/reducing water use	28%
Change design or location of infrastructure	26%
Creating guidelines or policies	25%
Habitat protection	23%
Have an adaptation plan	21%
Install natural or green infrastructure	19%
Changes to energy distribution system	18%
Assess the costs to the organization	18%
Education/awareness building activities	14%
Summer heat alert system/build awareness of risks from heat waves	14%
Build retaining walls to protect from storm surges	5%
Reducing carbon/CO2 footprint	4%
Other (respondent to specify)	7%
Don't know/Prefer not to say/No answer	2%

Municipal respondents' future activities underline their concern about flooding—36% report planning flood management activities. Almost one third (31%) report they will prepare a climate change adaptation plan, and the same proportion say they will engage in disaster planning.

*Exhibit B17 – Q22: [IF Q21 = 1] What actions are specifically planned? [DO NOT READ] PROBE: Anything else?*

Planned Climate Change Adaptation Activities	
	Municipal (n = 42)
Flood management activities – flood mapping, land-use restrictions, downspout disconnection	36%
Emergency response/disaster planning	31%
Preparing/prepared a climate change adaptation plan	31%
Education/awareness building activities	29%
Implementing actions/measures in our plan	26%
Incorporate adaptation actions in long term planning/other corporate plans (e.g. risk management)	26%
Assess the risks from climate change on the organization	26%
Change operation/maintenance of infrastructure	24%
Creating guidelines or policies	21%
Assess the costs to the organization	19%
Drought management actions/reducing water use	19%
Install natural or green infrastructure	17%
Change design or location of infrastructure	17%
Summer heat alert system/build awareness of risks from heat waves	17%
Habitat protection	17%
Changes to energy distribution system	12%
Build retaining walls to protect from storm surges	5%
Reducing footprint/waste	-
Other (respondent to specify)	7%
Don't know/Prefer not to say/No answer	17%

Among municipal respondents, almost two thirds report that they have been considering climate change in decision making for five years or less, while 18% say it has been part of planning for 6–10 years, and 12% say 11 years or more.

*Exhibit B18 – Q23. [IF Q19 = 1] For how long has your community been considering a changing climate in its decision-making?*

Climate Change in Decision-Making				
	Municipal (n = 57)	Large (n = 7)	Medium (n = 7)	Small (n = 43)
Less than one year	4%	-	-	5%
1–2 years	23%	29%	29%	21%
3–5 years	37%	43%	43%	35%
6–10 years	18%	14%	14%	19%
11 or more years	12%	-	14%	14%
DK/NR	7%	14%	-	7%



## Incorporating Climate Change Considerations in Decision-Making

The most commonly cited primary source of information about climate change for municipalities is the media (26%). Perhaps unsurprisingly, municipal respondents also frequently mention government sources (20%) and provincial government (18%).

*Exhibit B19 – Q24: What are your organization’s sources of information regarding climate change? PROBE: Any other sources? [DO NOT READ]*

Source of Information About Climate Change	
	Municipal (n = 100)
The media	26%
Government sources	20%
Internet searches	18%
Provincial government	18%
Environment Canada	11%
Internal/our own information/data	10%
Industry associations/Municipal associations	10%
Conferences/workshops/seminars	10%
Government (unspecified)	9%
Scientific journals/magazines	8%
Non-governmental organizations	8%
Universities and researchers	7%
No information at organizational level	2%
Other (SPECIFY)	8%
Don’t know/Prefer not to say/No answer	9%

The cost of adapting stands out as the single most significant barrier for municipal respondents—almost three quarters report it is a significant barrier. A plurality also reports that lack of capacity (48%) and lack of experience (40%) are significant barriers. Respondents from Quebec (63%) and BC (64%) are more likely to cite a lack of capacity as a major obstacle. Lack of information and the need to make a business case are less concerning for municipal respondents.

*Exhibit B20 – Q25. To what extent does each of the following represent a barrier to your organization better taking climate change into account in its decision-making?*

<b>Barriers to Climate Change Influenced Decision-Making – Municipalities (n = 100)</b>				
	Significant barrier	Minor barrier	Not a barrier	DK/NA
The cost of adapting to the impacts of a changing climate	73%	16%	9%	2%
Lack of capacity to apply tools and information	48%	36%	15%	1%
Lack of experience	40%	39%	19%	2%
The complexity of policy change processes	38%	42%	14%	6%
Competing organizational priorities	38%	32%	27%	3%
The need to have other departments/organizations act first, before we act	36%	32%	30%	2%
Lack of information about climate change and its impacts	32%	40%	28%	-
Making a business case for implementing actions	30%	45%	22%	3%

Two thirds (67%) of municipal respondents agree they have the information they need to make decisions about climate change adaptation. Municipal respondents would like more information on regional impacts (59%), as well as best practices (57%), economic information (50%) and projections of future conditions (46%).

*Exhibit B21 – Q27: Do you have access to the information and tools you need to make adaptation-related decisions?*

<b>Access to Climate Change Information</b>	
	<b>Municipal (n = 100)</b>
Yes	67%
No	30%
Don't know/Prefer not to say/No answer	3%

*Exhibit B22 – Q28: [IF Q25f = 1] Specifically, what types of information do you lack?*

<b>Missing Information About Climate Change</b>	
	<b>Municipal (n = 56)</b>
Information on impacts specific to region	59%
Economic information (costs/benefits of action)	50%
Projections of future climate conditions/climate data	46%
Relevant case studies/examples of what other organizations like ours are doing	54%
Best practices information	57%
Technology and design alternatives for infrastructure	38%
Other (SPECIFY)	2%
Don't know/Prefer not to say/No answer	14%

Finally, almost half of municipal respondents (45%) would like cost/benefit analysis, adaptation/planning guidance (44%), codes or standards and climate data (both 42%).

*Exhibit B23 – Q29: 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?*

<b>Resources Needed to Address Impacts of Climate Change</b>	
	<b>Municipal (n = 100)</b>
Climate Data	42%
Regulations	39%
(Adaptation) Planning guidance	44%
Cost/benefit analysis	45%
Codes or standards	42%
Risk assessment methods	38%
Other data	33%
None	17%
Do not have/use such resources	3%

### **Qualitative Insight**

In the one-on-one interviews, municipal respondents were equally interested in greater access to climate modelling data, express a much greater need for assistance in funding/financing the necessary infrastructure improvements, and some pointed out their difficulties in reconciling contradictory requirements imposed by their provincial government and the federal government. Municipal respondents described a very difficult set of circumstances due not only to the scarce resources available to cover the high cost of the work that needs to be done to be adequately prepared for a changing climate, but also due to the need to obtain support at a political level and by extension, the potential need to obtain buy-in among the constituency. A municipal government faces many short-term budgetary tests, do so with limited resources and it can often be the case that achieving buy-in for a dramatic investment in long-term infrastructure that yields no discernible improvement in the life of any resident or the success of any business can be extremely difficult.

## CONCLUSIONS

The findings from both the qualitative and quantitative phases of the study, and both samples of respondents, clearly demonstrate there is widespread understanding within both Canadian municipalities and the business sectors surveyed that climate change is occurring, that it is evidenced by the increasing frequency and severity of extreme weather events and flooding and that it will certainly have an impact on their municipal or business planning and operations.

While a few do feel there may be some benefits to a changing climate, the overwhelming tendency is certainly to see the impacts of a changing climate as being predominantly negative. There is some variance on the magnitude of the impact a changing environment will have on their organization, but no matter the sector or the size of municipality, the majority tend to feel the impact will be at least moderate, if not major. The one-on-one interviews shed more light on the impressions of the magnitude of impact with some who feel that the impact will “only” be moderate feel that is because they anticipate being prepared and ready to adapt to the changing climate. Asked what the impact would be if they did not prepare, the response was always that the impact would be much more severe. Similarly, while the vast majority of respondents indicate being no more than “somewhat concerned,” interviews suggested concern may be tempered by a level of confidence in the ability to adapt.

However, there is a notable difference between municipal respondents and business respondents when it comes to whether or not that are already taking or planning to take action in order to adapt to a changing climate. While the vast majority of municipal respondents say this is already the case, just under half of the business respondents surveyed offer the same response. The one-on-one interviews with trade associations offered some insight on this, suggesting that many of their member companies—and more particularly the smaller enterprises—may be in situations where action may be expected, but is not yet in the planning stage, perhaps as questions about the best course of action are more clearly answered. The data also indicate that compared to municipal respondents, business respondents are more confident they already have the information they need, less likely to identify any specific barrier as preventing them from taking action and are less likely to feel that any particular resource or tool would help enable them to take action.

Business respondents are about equally interested in any resource offered, with roughly one quarter to one third indicating any of the items offered would be of interest. Interviews with the industry associations included in this study suggested that helping develop communications directed at owners and operators in their sector may be helpful for accelerating the planning process and this may include the provision of compelling and scientific evidence of the impact on their respective operations, as well as assistance with aligning regulations and the policies of regulatory bodies with the imperative of taking action to adapt to a changing climate.

Municipal respondents, on the other hand, are clearer about there being a hierarchy of barriers with most describing cost as a significant barrier. Further, when asked what tools or resources would be helpful for taking action, access to information that is specific to their region and best practices stand out as the types of information most commonly needed.

## APPENDIX A: SURVEY 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 and 250 individuals occupying Head of Operations or 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 questionnaire was designed in English in consultation with NRCan, drawing on the 2009 National Climate Change Adaptation Benchmark Survey as appropriate. The survey was then translated, and offered to respondents in both English and French and completed based on their preferences.

### Sample Design and Selection

The total sample for the telephone survey was 350 individuals, which included:

- Municipalities—a random sample of 100 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 250 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 defined as those with fewer than 100 employees, medium-sized businesses as those with 100–499 employees, and large businesses as those with 500 or more employees. Small municipalities were defined as 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.

### Data Collection

Interviews were conducted via telephone from Léger's centralized call centre using state of the art Computer Aided Telephone Interviewing (CATI) system. The CATI system manages all the calling mechanics (e.g. random dialling, setting appointments, managing call backs) as well as the questionnaire management mechanics (e.g. skip patterns, auto-coding) thereby freeing up the live interviewer to develop a rapport with the respondent and complete the survey more efficiently and effectively. In addition, to help with response rates, all calls are routed through a local area code (rather than a 1–800 number) to encourage potential respondents with call displays to answer the telephone. Data collection occurred from February 5, 2018, to March 14, 2018.

### Targets

Quotas were set to ensure participation from industries across provinces and regions. Quotas were established on business size, sector and municipality size as follows:

**SAMPLING PLAN**

BUSINESSES	Actual (N)				Sample (n)			
	Small	Med	Lrg	Total	Small	Med	Lrg	Total
<b>Oil &amp; Gas</b> (NAICS: 211, 237120, 4861, 4862, 4869, 324110, 324190)	3329	167	45	3,541	<b>70</b>	<b>8</b>	<b>2</b>	<b>80</b>
<b>Mining</b>	689	344	64	1,097	<b>14</b>	<b>5</b>	<b>3</b>	<b>22</b>
(NAICS: 2121, 212210, 212220, 212231, 212232, 212233, 212299, 212392, 212393, 212395, 212396, 212397, 212398)	240	71	38	346	12	4	2	18
(NAICS: 331)	449	104	26	579	2	1	1	4
<b>Forestry</b> (NAICS: 1131, 1132, 1133, 3221, 3222)	4,783	194	9	4,986	<b>72</b>	<b>10</b>	<b>1</b>	<b>83</b>
<b>Power</b> (NAICS: 221111, 221112, 221113, 221119, 221121, 221122, 237130)	1,276	143	38	1,457	<b>56</b>	<b>7</b>	<b>2</b>	<b>65</b>
<b>TOTAL</b>					<b>212</b>	<b>30</b>	<b>8</b>	<b>250</b>

MUNICIPALITIES	Actual (N)	Sample (n)
Small	1,944	50
Medium	95	30
Large	54	20
<b>TOTAL</b>		<b>100</b>

In the case of municipalities, the final sample was fairly consistent with the known distribution of small, medium and large municipalities and as a result, the results have not been weighted. The aggregate municipal results can be considered accurate to within +/-9.8% at the 95% confidence level.

In the case of the business sample, the distribution of small, medium and large businesses within each sector was similar enough to the known distribution that it was decided that no weight would be applied based upon size. However, 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 the aggregate results of the business sample would be representative of the universe being studied. The aggregate business results can be considered accurate to within +/-6.2% at the 95% confidence level.

**Quality Controls**

Prior to launching the full survey, Earnscliffe and Léger conducted 77 probing pre-tests. In addition to the questions in the survey, respondents were asked if they found any aspect of the survey difficult to understand, if the language was clear and if they found any of the terms confusing.

## Results

### **FINAL DISPOSITIONS**

The telephone survey achieved a response rate of 5.71%.

<b>Total Numbers Attempted</b>	<b>7178</b>
Invalid	15
NIS, fax/modem, business/non-res.	545
<b>Unresolved (U)</b>	<b>3008</b>
Busy	49
No answer, answering machine	2959
<b>In-scope - Non-responding (IS)</b>	<b>3232</b>
Household refusal	876
Respondent refusal	
Language problem	14
Illness, incapable	17
Selected respondent not available	655
Qualified respondent break-off	1670
<b>In-scope - Responding units (R)</b>	<b>378</b>
Language disqualify	28
No one 18+	
Other disqualify	
Completed interviews	350
<b>Response Rate = R/(U+IS+R)</b>	<b>5.71%</b>

### **SAMPLE PROFILE: DISTRIBUTIONS**

Businesses	Sample size	Percentage
<b>Oil &amp; Gas</b> (NAICS: 211, 237120, 4861, 4862, 4869, 324110, 324190)	77	31%
<b>Mining</b> (NAICS: 2121, 212210, 212220, 212231, 212232, 212233, 212299, 212392, 212393, 212395, 212396, 212397, 212398)	25	10%
<b>Forestry</b> (NAICS: 1131, 1132, 1133, 3221, 3222)	83	33%
<b>Power</b> (NAICS: 221111, 221112, 221113, 221119, 221121, 221122, 237130)	65	26%

Businesses	Sample size	Percentage
Atlantic	27	11%
Quebec	53	21%
Ontario	78	31%
Prairies	71	28%
British Columbia	21	8%

Businesses	Sample size	Percentage
Large (500+ employees)	7	3%
Medium (100–499 employees)	27	11%
Small (< 100 employees)	214	86%

Municipalities	Sample size	Percentage
Small	76	76%
Medium	13	13%
Large	11	11%

Municipalities	Sample size	Percentage
Atlantic	11	11%
Quebec	24	24%
Ontario	28	28%
Prairies	23	23%
British-Columbia	14	14%

***SURVEY DURATION***

The average survey duration was 15 minutes.



## APPENDIX B: QUESTIONNAIRE

### English

#### Objectives

This research will provide NRCan with the data and analysis required to examine the extent to which municipal governments and natural resource industries have made plans towards climate change adaptation. More specifically, this study is designed to:

- Examine the extent to which municipal governments and natural resource industries have progressed in assessing risks to organizations and businesses from a changing climate and the types of adaptation actions being planned and undertaken; and
- Better define enablers of action on this issue and any remaining barriers to action that may need to be addressed by the federal government programming, including that of Natural Resources Canada.

Unless otherwise noted, answer categories were read out to respondents.

#### 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 Earnsccliffe, 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 a changing climate 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 Marketing Research and Intelligence Association, the project number is XXXX.
- 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 XXXX. XXXX telephone number is (613) XXX-XXXX and XXXX e-mail address is XXXX@canada.ca
- The results of this survey will be available on the Library and Archives Canada web site in the Fall of 2018]

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

8. What do you first think of when you hear the term “climate change?” What’s the next thing that comes to mind related to climate change? [OPEN-END WITH PRECODED LIST, DO NOT READ LIST]

Warmer temperatures/warmer weather	1
Colder temperatures/colder weather	2
Weather events more extreme/unpredictable	3
More storms	4
Stronger winds	5
More air pollution/lower air quality	6
Water levels are lower	7
Water levels are higher	8
More flooding/more severe flooding	9
Less ice/snow	10
Less rain/drought	11
More ice/snow	12
More rain	13
Affecting tundra/permafrost	14
More forest fires	15
Melting ice caps	16
Other (SPECIFY)	98
Don’t know/Prefer not to say/No answer	99

9. 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

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 one most serious impact	97
Other (SPECIFY)	98
Don't know/Prefer not to say/No answer	99

11. [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

12. Thinking about how your organization may or may not be impacted, is climate change something that is already having an impact on your organization in any way, is not having an impact on the organization, but it may have an impact on the organization 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 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. [IF Q12 = 2] How many years from now do you believe your organization 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 |
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 |
15. [IF Q14=1] 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 |
16. [IF Q14 = 2] What, specifically, are some of the negative impacts or risks for your organization resulting from a changing climate? PROBE: Any others?
- |  |    |
|--|----|
| Increased heat waves/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  |
| 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 |

17. 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

18. 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

19. 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 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

20. [IF Q19 = 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 mgmt)	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. 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. [IF Q21 = 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 mgmt)	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. [IF Q19 = 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. 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. To what extent does each of the following represent a barrier to your organization better 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. Lack of expertise
- b. The COST of adapting to the impacts of a changing climate
- 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 to apply tools and information
- 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. What other barriers or challenges, if any, limit your organization’s ability to make decisions about adapting to climate change?

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

27. 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
28. [IF Q25f = 1 OR Q27 = 2] Specifically, what types of information do you lack?	
Information on impacts specific to region	1
Technology and design alternatives for infrastructure	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
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] Don't know/Prefer not to say/No answer	99
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
31. [DO NOT ASK – RECORD SAMPLE TYPE]	
Business	1
Municipal	2

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 XXXXX at Natural Resources Canada. XXXX telephone number is (613) XXX-XXXX and XXXX e-mail address is XXXX@canada.ca

## APPENDIX C: IN-DEPTH INTERVIEW GUIDE

### English

#### Objectives

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 fourteen (14) 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;
- Four (4) interviews among decision makers in coastal municipalities.

#### Interview Introduction

Hello/Bonjour. My name is \_\_\_\_\_ and I am calling from Earncliffe, 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 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?

Yes

No

[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 XXXX. XXXX telephone number is (613) XXX-XXXX and XXXX e-mail address is XXXX@canada.ca
- The results of this research will be available on the Library and Archives Canada web site in the Fall of 2018]

## Screening

1.	[DO NOT ASK – RECORD GENDER]	
	Male	1
	Female	2
2.	[DO NOT ASK – RECORD ORGANIZATION]	
	Specify	98
3.	[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
4.	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 survey.

## Climate Adaptation Questions

5. 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 |

6. What are the reasons you have that impression?

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7. 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 |

8. [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 |

9. What are the reasons you have that impression?

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

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11. 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

12. [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?]

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13. [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?]

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14. [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?

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15. 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

16. 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?

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17. 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?

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

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19. Is it enough? Why/why not?

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20. 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?

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21. [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

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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 to apply tools and information

---

p. Competing organizational priorities

---



22. 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

23. 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?

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24. 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?

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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 XXXXX at Natural Resources Canada. XXXX telephone number is (613) XXX-XXXX and XXXX e-mail address is XXXX@canada.ca