

# PERSPECTIVES ON CLIMATE CHANGE IN THUNDER BAY: FINDINGS FROM A COMMUNITY SURVEY



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## **TABLE OF CONTENTS**

<b>INTRODUCTION</b>	<b>3</b>
<b>A. CLIMATE CHANGE BELIEFS AND KNOWLEDGE</b>	<b>4</b>
<b>B. LOCAL EXPERIENCES, IMPACTS, AND RISKS</b>	<b>9</b>
<b>C. HEALTH CONSEQUENCES OF CLIMATE CHANGE</b>	<b>14</b>
<b>D. VIEWS ON INDIVIDUAL AND COLLECTIVE CLIMATE ACTION</b>	<b>16</b>
<b>APPENDIX 1: SURVEY METHODS</b>	<b>21</b>
<b>APPENDIX 2: SURVEY INSTRUMENT</b>	<b>24</b>
<b>APPENDIX 3: PLACE ATTACHMENT SCALE</b>	<b>33</b>

## INTRODUCTION

Climate change is one of the defining issues of our time. The *Perspectives on Climate Change in Thunder Bay* survey was conducted as part of a larger project entitled *Climate Change Communication and Engagement in Canada's Provincial Norths: A Collaborative Place-Based Approach*. To learn more about the diversity of perspectives on climate change in our community, we conducted a representative postal survey of adults in Thunder Bay, aged 18 years and older. We have summarized the survey results in this report. Findings from this study will be used to help community members, community organizations, and municipal staff better understand perspectives on climate change and how to communicate climate change impacts and solutions in ways that promote broader engagement with the issue. Details on the design, implementation, and analysis of the survey can be found in the Appendices of this report.

## A. CLIMATE CHANGE BELIEFS AND KNOWLEDGE

### A.1. Impacts and emotions are top of mind when thinking about climate change

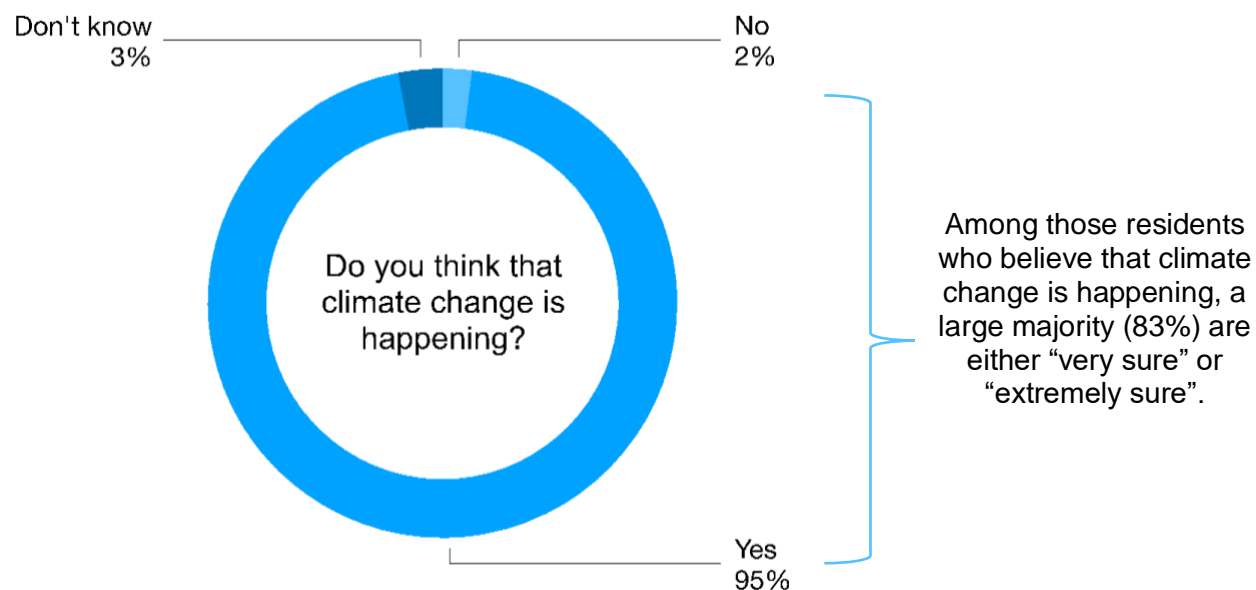
When asked to provide the first words or phrases that come to mind when thinking about climate change, impacts (including global impacts, experienced impacts, and future impacts) and emotional consequences are top of mind among residents of Thunder Bay. The six main themes that emerged from a thematic analysis of the first words or phrases reported when survey respondents were prompted to think about climate change are summarized in the table below.

#### *Thematic analysis of first words or phrases that come to mind when thinking about climate change*

Theme	Frequency	Example responses
Global changes/impacts	79	Global warming, Melting arctic ice, The ocean's warming
Emotion	42	Concerned, Scared, Shame on us!
Noticed/experienced impacts	38	Extreme weather, Storms, Unpredictable
Generic weather-related terms	35	Seasons, Weather, Arctic
Future	33	Impending disaster, Future of my children
Political or economic dimension	32	Controversy, Waste of tax dollars

### A.2. Broad recognition that climate change is happening

Nine out of ten residents of Thunder Bay believe that our climate is changing. In contrast, very few – only 5% – think climate change is not happening or don't know.



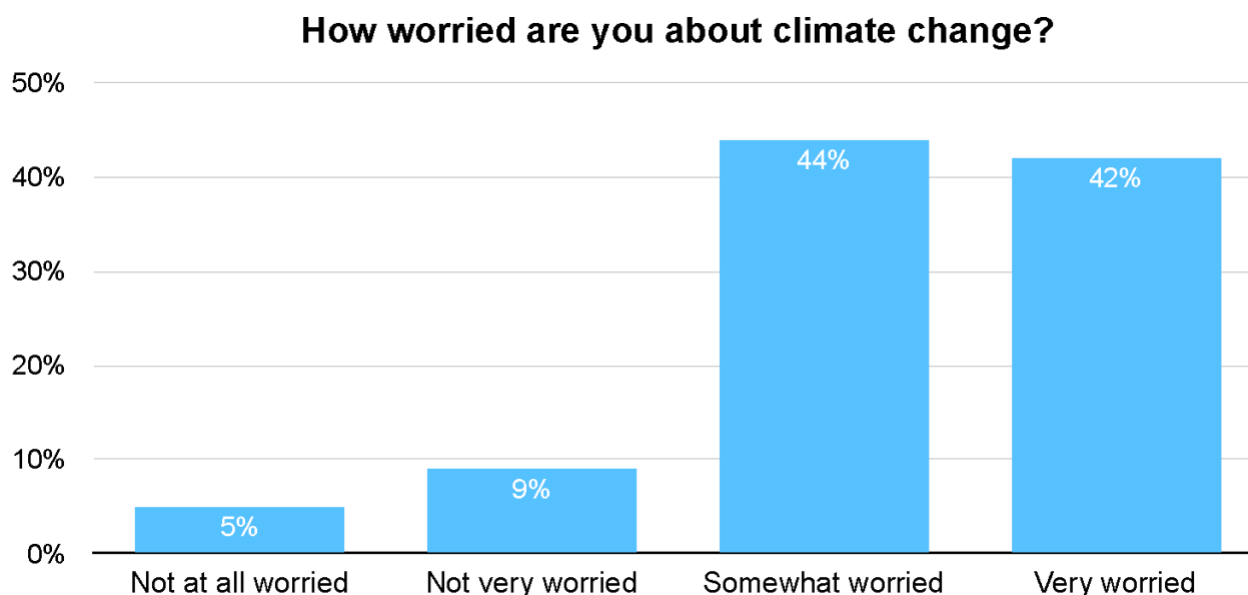
### A.3. The majority of people in Thunder Bay believe climate change is mostly human-caused

Approximately 72% of respondents think that climate change is mostly caused by human activities. Almost all respondents who selected “other” clarified that they believe that climate change is caused by a combination of human activities and natural changes in the environment.

<i>Assuming climate change is happening, do you think it is...</i>	Percent
Caused mostly by human activities	72%
Caused mostly by natural changes in the environment	10%
None of the above because global warming isn't happening	1%
Other	17%

### A.4. People are worried about climate change...four out of ten are very worried

Eight out of ten community members are at least “somewhat worried” about the issue of climate change on a personal level; four out of ten are “very worried”. For the sake of comparison, 30% of Americans reported feeling “very worried” about climate change in 2019 <sup>1</sup>.



<sup>1</sup> [https://www.climatechangecommunication.org/wp-content/uploads/2019/12/Climate\\_Change\\_American\\_Mind\\_November\\_2019b.pdf](https://www.climatechangecommunication.org/wp-content/uploads/2019/12/Climate_Change_American_Mind_November_2019b.pdf)

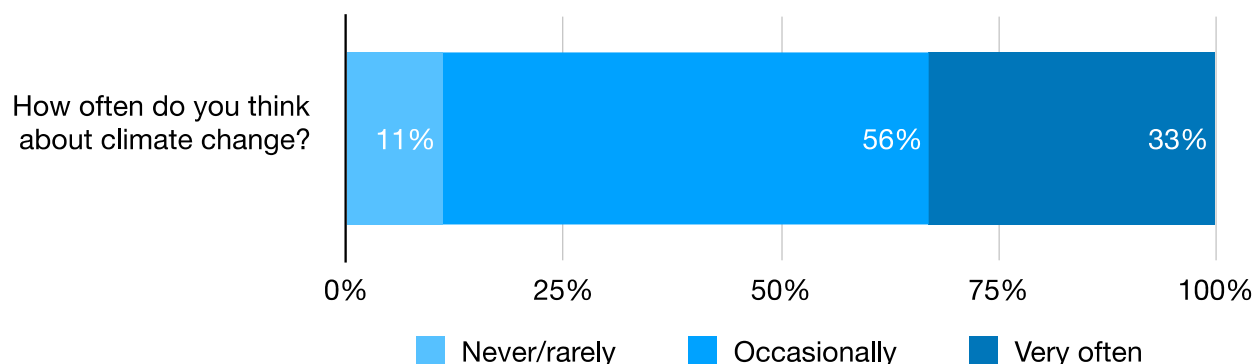
### A.5. Climate change is a very important issue for the people of Thunder Bay

Six out of ten residents of Thunder Bay say that the issue of climate change is either “extremely” (19%) or “very important” (40%) to them personally.

<i>How important is the issue of climate change to you personally?</i>	Percent
Not at all important	2%
Not too important	6%
Somewhat important	33%
Very important	40%
Extremely important	19%

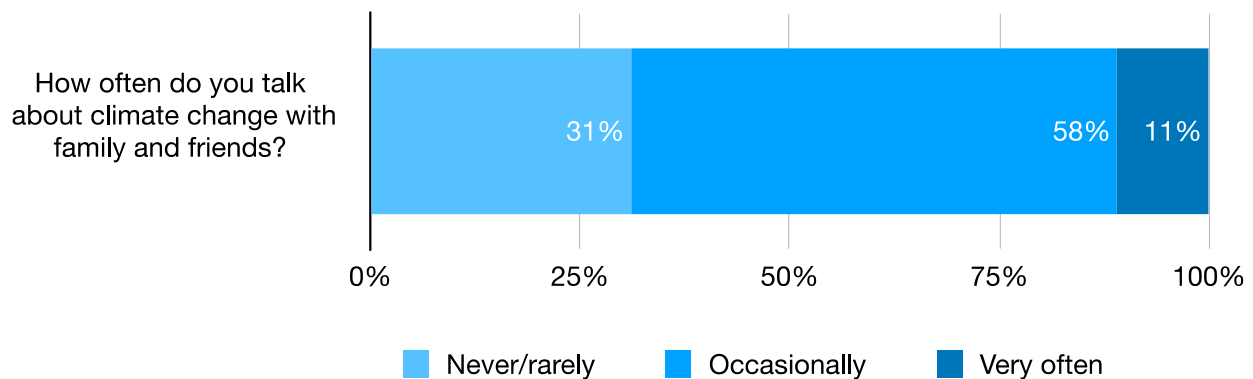
### A.6. People in Thunder Bay are often thinking about climate change

Nearly 90% of community members think about climate change at least “occasionally”, compared to 11% that report “rarely” or “never” thinking about climate change. These data suggest that climate change is on people’s minds.



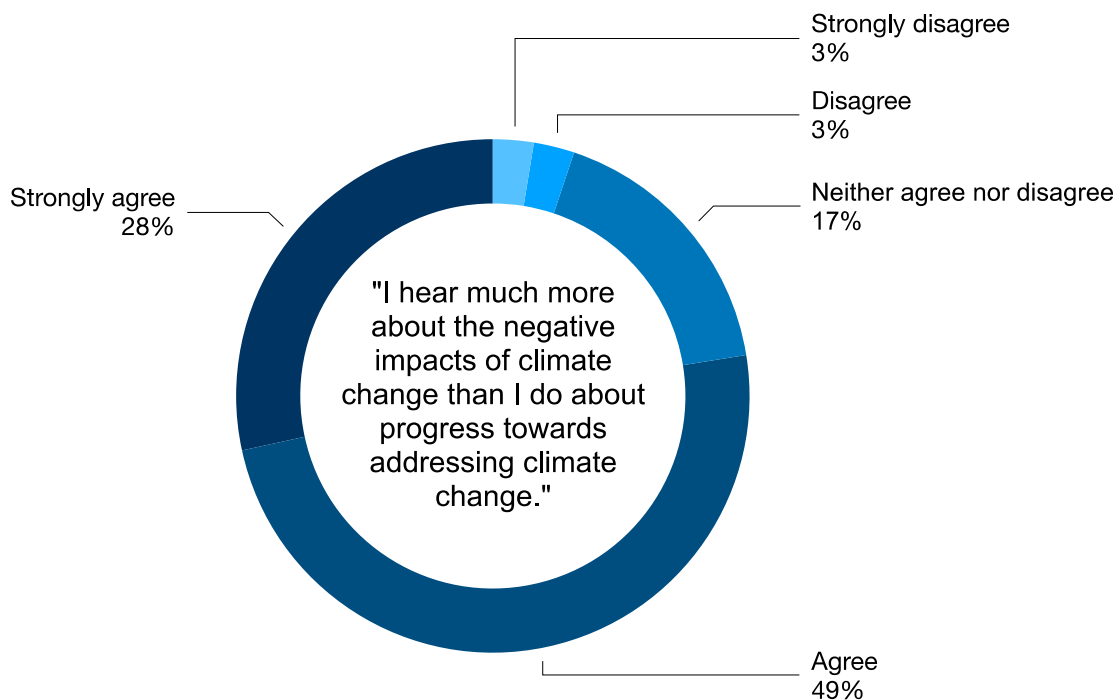
### A.7. People do not talk about climate change as often as they think about it

Approximately 70% of residents say they discuss climate change with friends and family “occasionally” or “very often”. Three in ten community members “never” or “rarely” discuss the issue with friends and family. Approximately 33% think about climate change “very often” while just over 11% speak about it “very often”. The findings indicate that there is a gap between the extent to which people think about climate change and talk about climate change.



#### A.8. People hear more about the negative impacts of climate change than about progress towards addressing the issue

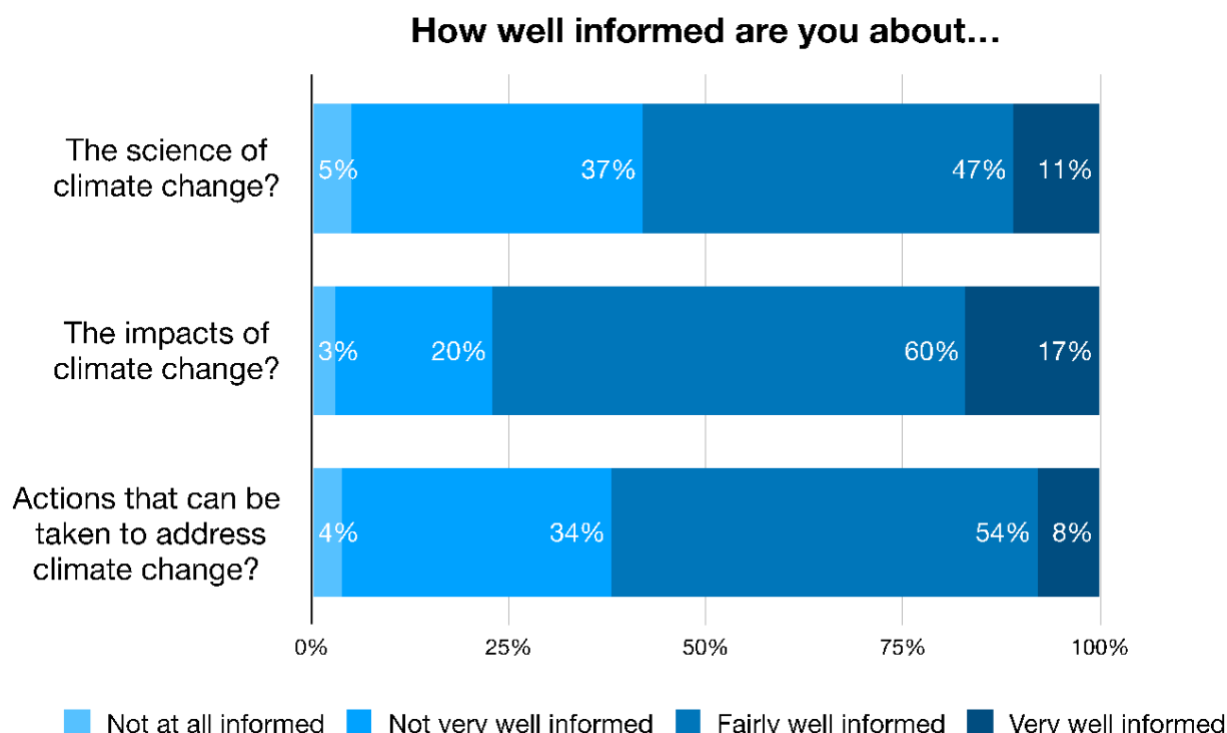
The majority (78%) of residents hear much more about the negative impacts of climate change than about progress towards addressing the issue. The discourse around climate change is dominated by discussions of negative impacts, illustrating an opportunity for more communication on action and solutions.





### A.9. People in Thunder Bay are fairly well informed about climate science, impacts, and action

Approximately half of community members feel “fairly well informed” about climate change science (47%), impacts (60%), and action (54%). Additional educational efforts to work towards a community that is very well informed about climate change is called for. This is particularly true about climate science and the actions that can be taken to address climate change given that over a third of community members are “not very well informed” in these areas.

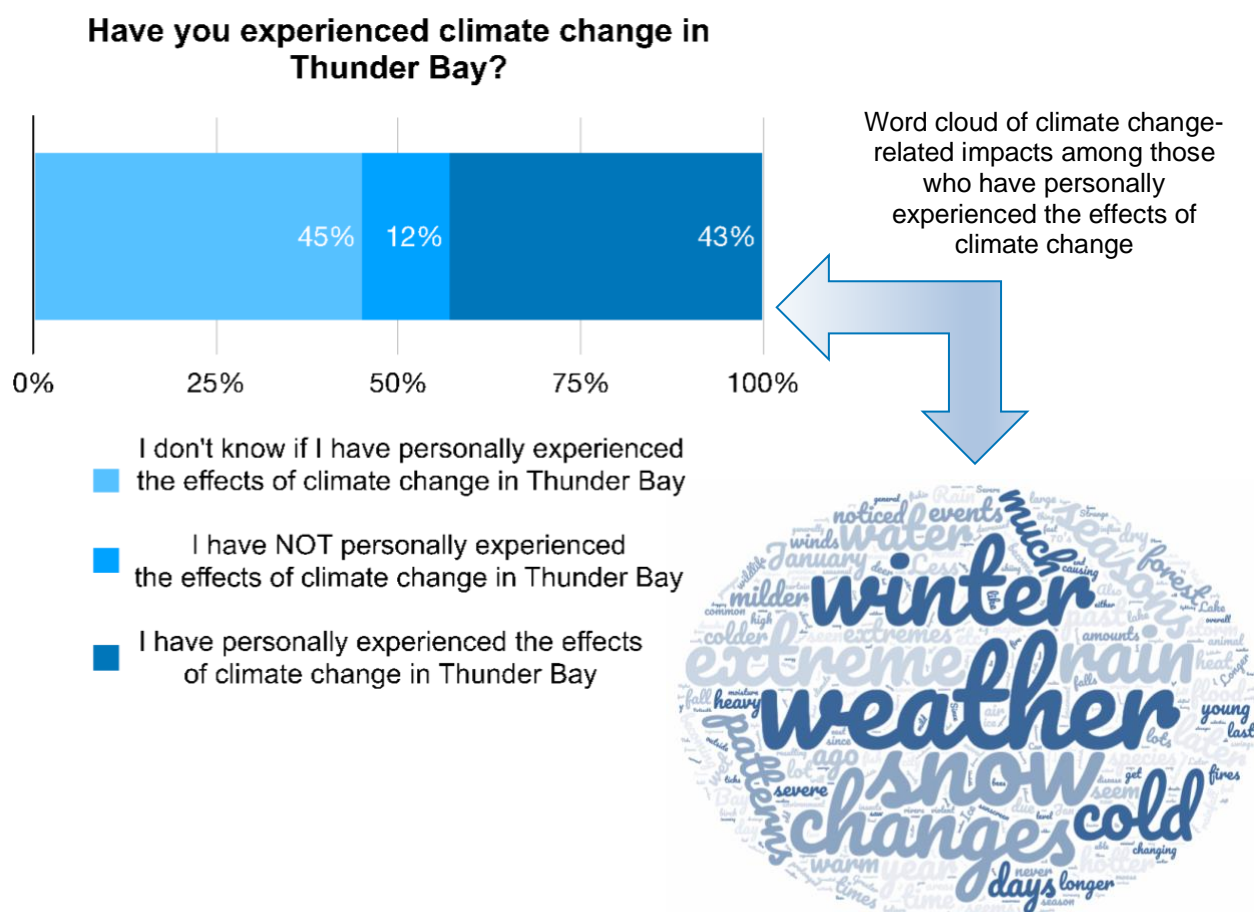


## B. LOCAL EXPERIENCES, IMPACTS, AND RISKS

### B.1. Four in ten residents have experienced personal level impacts of climate change

Forty-three percent of community members of Thunder Bay have personally experienced the effects of climate change in our community. Six in ten are either unsure or have not personally experienced the effects of climate change in Thunder Bay. The large proportion of people reporting that they are unsure may illustrate a limited knowledge of specific local impacts and/or a hesitancy about making a strong statement on climate change impacts.

When asked to provide examples of the climate change-related effects people have experienced, a range of impacts were reported. Precipitation events and shifts in seasonal patterns are the main climate change-related impacts that people in Thunder Bay are experiencing and taking notice of. The six main themes that emerged from a thematic analysis of the examples reported are summarized in the table below.



### ***Thematic analysis of first extreme events experienced***

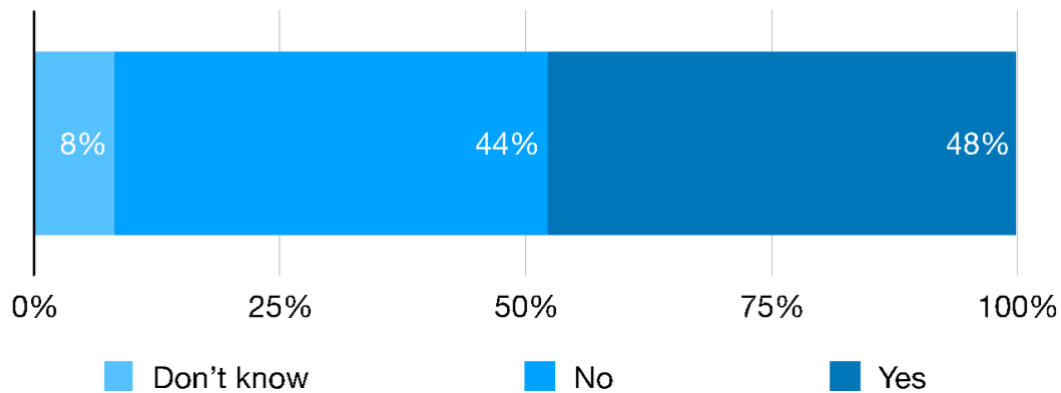
Theme	Frequency	Example responses
Precipitation events	112	Torrential rain, Unusually heavy rainfalls, Dry summers, Ice storms, Noticed less snow here since I've been a child, Longer falls without snowfall, January rain
Seasonal changes and shifts seasons	101	Later springs and later falls, Shifting to longer summer, Winters are now warmer with more rain, ice, sleet
Extremes and unpredictability *	51	More extreme weather, Severe storms, Summers are unpredictable, Weather changes – unpredictable
Wildlife and plants	37	We have insects and wildlife in our region that weren't here 50 years ago, As a fisherman, I have witnessed the PH levels on local lakes become so low from acid rain that the fish are now stunted
Human health and/or livelihood	28	Spread of ticks and Lyme disease, I work in insurance and weather/water related claims have increased dramatically, I felt a burden within me about this winter especially
Waterways	15	Less 'reliable' ice cover on lakes, Water level changes, Lakeshore erosion water up higher

*\*This theme does not include precipitation events as coded a unique theme*

## **B.2. Extreme weather events have affected 50% of Thunder Bay families over the last decade**

Almost half of community members report that they/their family have been affected by an extreme weather event in the last ten years. When asked to describe the type of extreme weather event experienced, the primary theme that emerged from thematic analysis was precipitation events. Many respondents provided examples of the 2012 extreme rain and flood event which caused the City of Thunder Bay to declare a state of emergency, and discussed the associated damage to infrastructure and personal property. When asked to provide examples, more frequent and intense rain events, extreme snowfalls, and winter storms, were commonly mentioned. Forest/wildfires were highlighted by some participants citing more frequent fires in the region and lower quality air as a result of blowing smoke. Respondents also reported experiencing wind storms and the change in frequency and intensity of severe winds and associated wind damage.

**In the last ten years, have you or your family been affected by an extreme weather event in Thunder Bay?**



Word cloud of examples of extreme events among those who have been affected by an extreme event in Thunder Bay



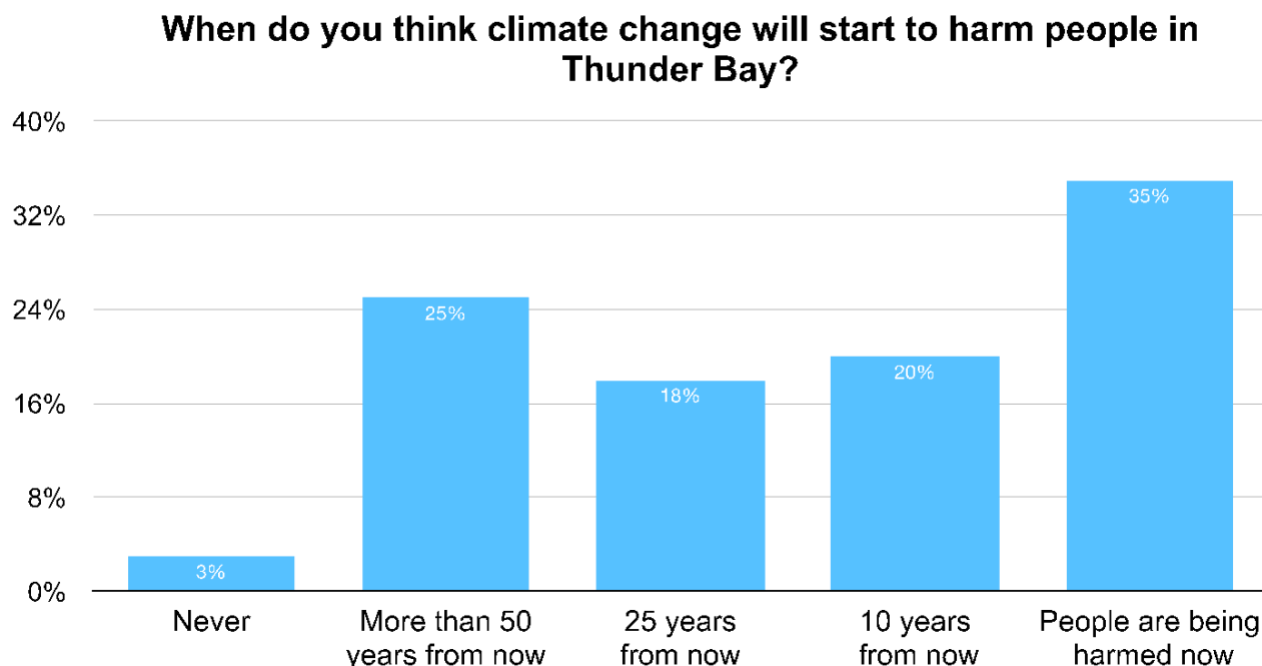
### B.3. Climate change is affecting our weather

The majority of residents (87%) think that climate change is affecting weather in Thunder Bay. One quarter of our community thinks that climate change is affecting local weather “a lot” while 13% either “don’t know” or think that “climate change is not affecting weather in Thunder Bay”. These findings are very similar to data from the US<sup>2</sup>.

<i>How much do you think climate change is affecting weather in Thunder Bay?</i>	Percent
A little	11%
Somewhat	51%
A lot	25%
I don't know if climate change is affecting weather	11%
Climate change is not affecting weather in Thunder Bay	2%

### B.4. Climate change is not yet considered an urgent issue

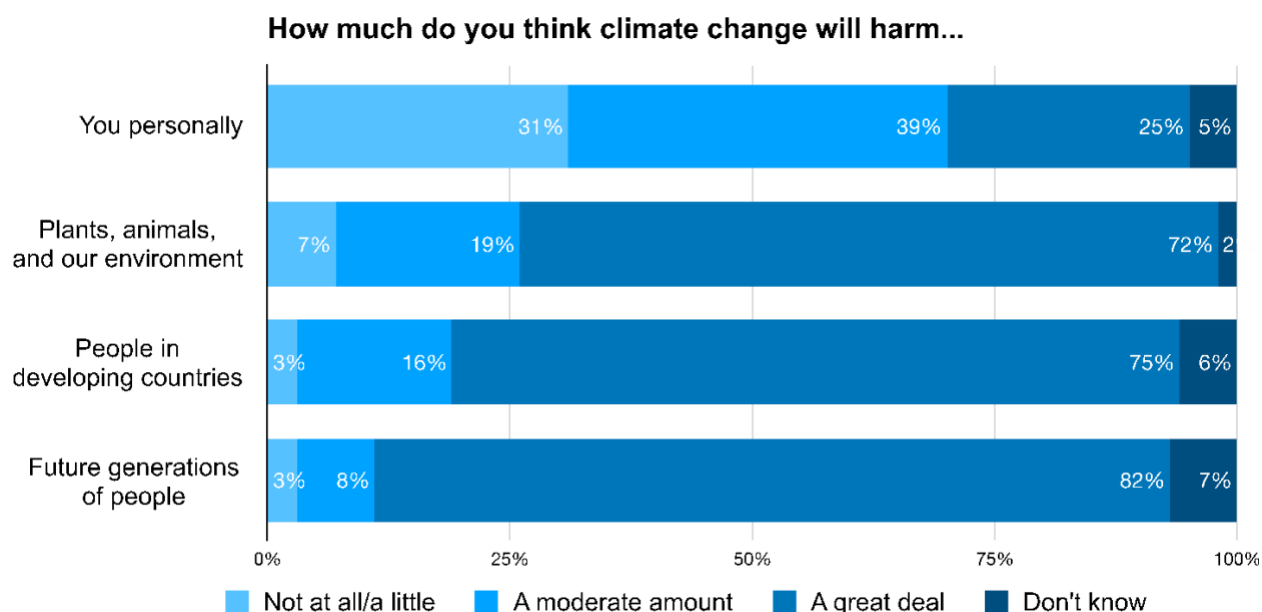
A majority (63%) of community members see climate change as a concern of the future as opposed to an urgent issue causing harm now. That said, 35% believe that climate change is causing harm now, recognizing the urgency of the issue.



<sup>2</sup> [https://www.climatechangecommunication.org/wp-content/uploads/2019/12/Climate\\_Change\\_American\\_Mind\\_November\\_2019b.pdf](https://www.climatechangecommunication.org/wp-content/uploads/2019/12/Climate_Change_American_Mind_November_2019b.pdf)

## B.5. Harm to future generations is a primary concern in the context of climate change

Residents believe that climate change will cause “a great deal” of harm to plants, animals and our environments (72%), people in developing countries (75%), and future generations (82%). The majority of community members believe that climate change will be less harmful to them personally.



## B.6. Who or what will be most harmed? Indigenous communities, waterways, and moose populations across Northern Ontario

With respect to local and regional impacts, residents of Thunder Bay are most concerned about climate change related consequences for Indigenous communities, waterways, and moose populations across Northern Ontario. Local agriculture and food production are areas where residents see potential for opportunities.

Local consequences or opportunities for...	Negative consequences	No effect	Possible opportunities
Indigenous communities across Northern Ontario	90%	5%	5%
Moose populations across Northern Ontario	90%	5%	5%
Lake Superior and other bodies of water	91%	5%	4%
Agriculture and local food production	78%	5%	17%

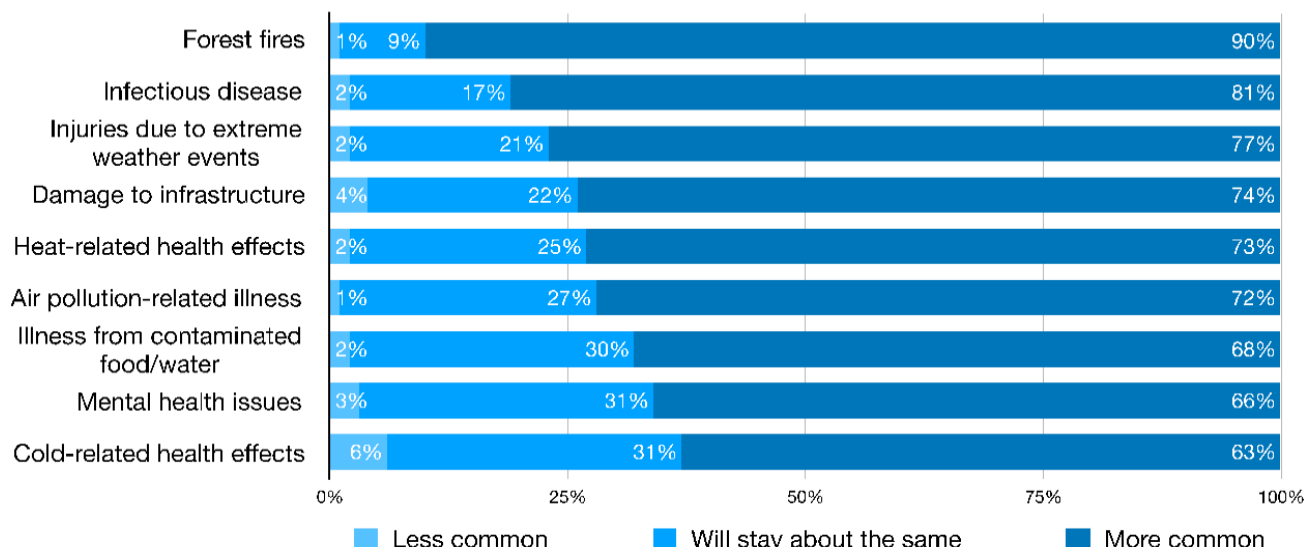
(NB: “Don’t know” removed for reporting)

## C. HEALTH CONSEQUENCES OF CLIMATE CHANGE

### C.1. Community members identify a range of health impacts associated with climate change

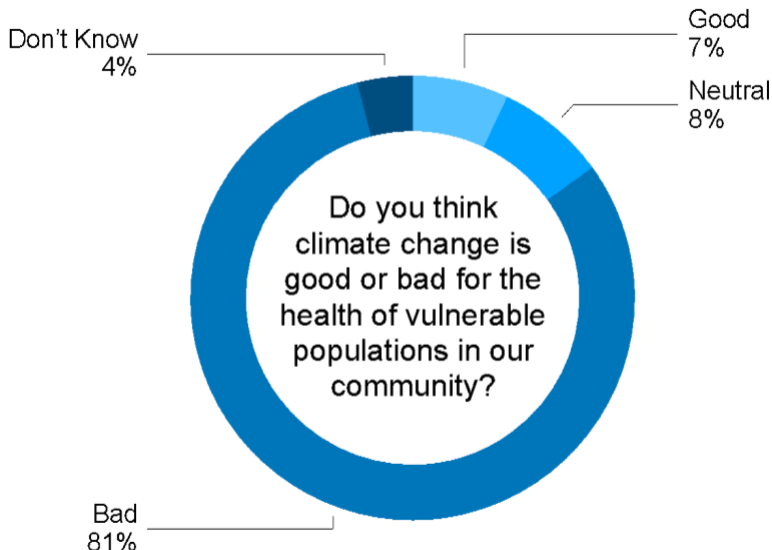
In the absence of action to address climate change, the vast majority of community members believe that climate change will impact health in many different ways over the next decade. Findings illustrate that people of Thunder Bay are most concerned about the health consequences of forest fires, infectious disease, and the risk of injury due to extreme events.

**If nothing is done to address climate change, will the following health issue become more or less common?**



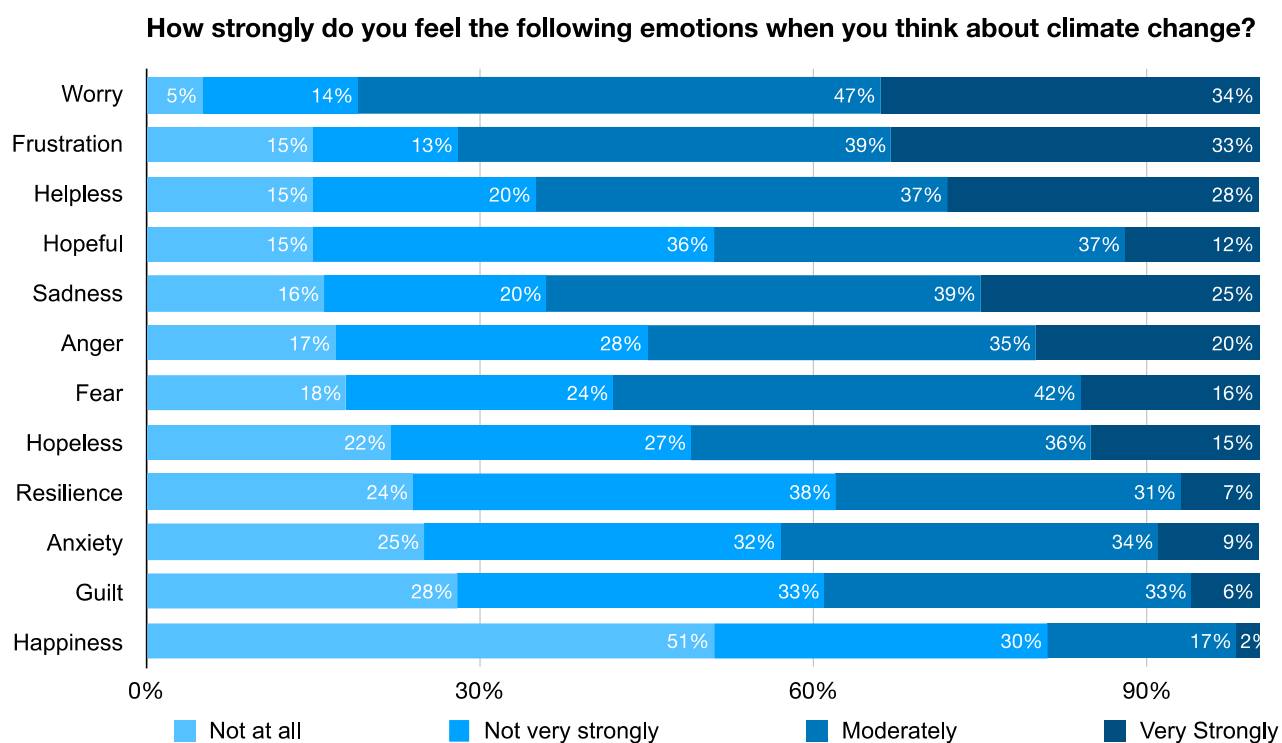
### C.2. Whose health will be impacted the most by climate change? Vulnerable populations in our community

Eight in ten people believe climate change will have negative consequences for the health of vulnerable populations.



### C.3. Climate change is causing a range of negative emotional responses for many people in Thunder Bay

Negative emotions are a common response to climate change among community members, highlighting the emotional health consequences. Approximately 81% feel at least “moderately” worried, 72% feel at least “moderately” frustrated, 64% feel at least “moderately” sad, and 58% feel at least “moderately” fearful. Over 30% of residents report feeling “very” worried or frustrated, while only 7% report feeling “very” resilient and 15% report feeling “not at all” hopeful. Positive emotional responses (i.e. resilience or happiness) are uncommon overall.

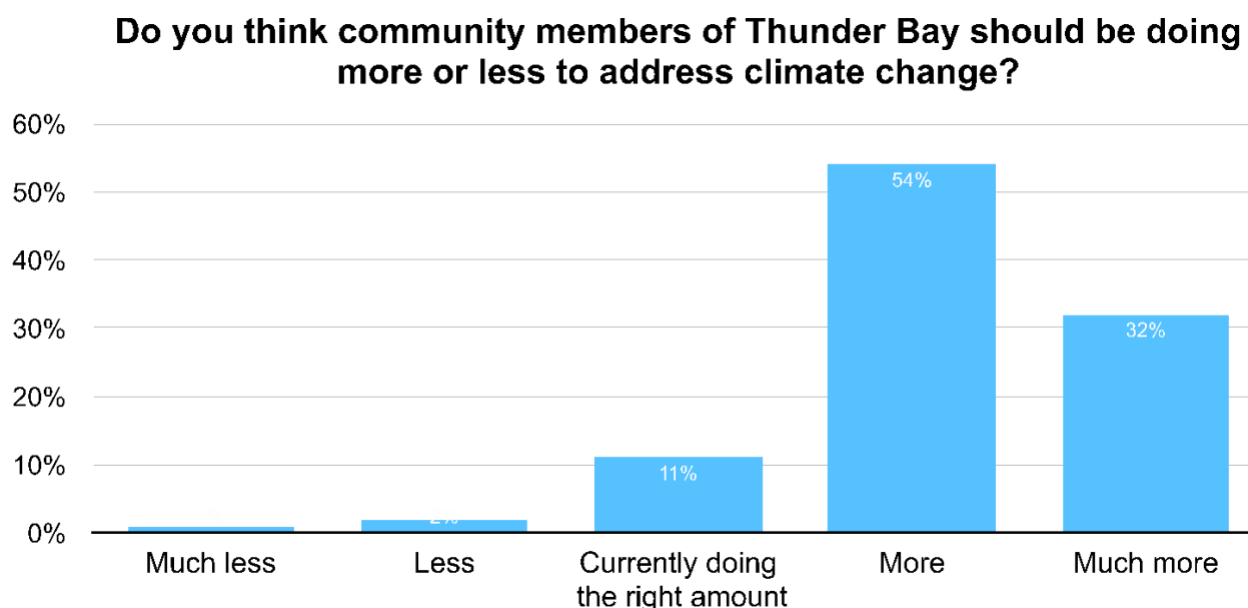




## D. VIEWS ON INDIVIDUAL AND COLLECTIVE CLIMATE ACTION

### D.1. Eight in ten community members think we should all be doing more to address climate change

The large majority (86%) of residents think individual members of our community should be doing “more” (54%) or “much more” (32%) to address climate change. In contrast, only 2% think that we should be doing “less” and 1% think we should be doing “much less”.



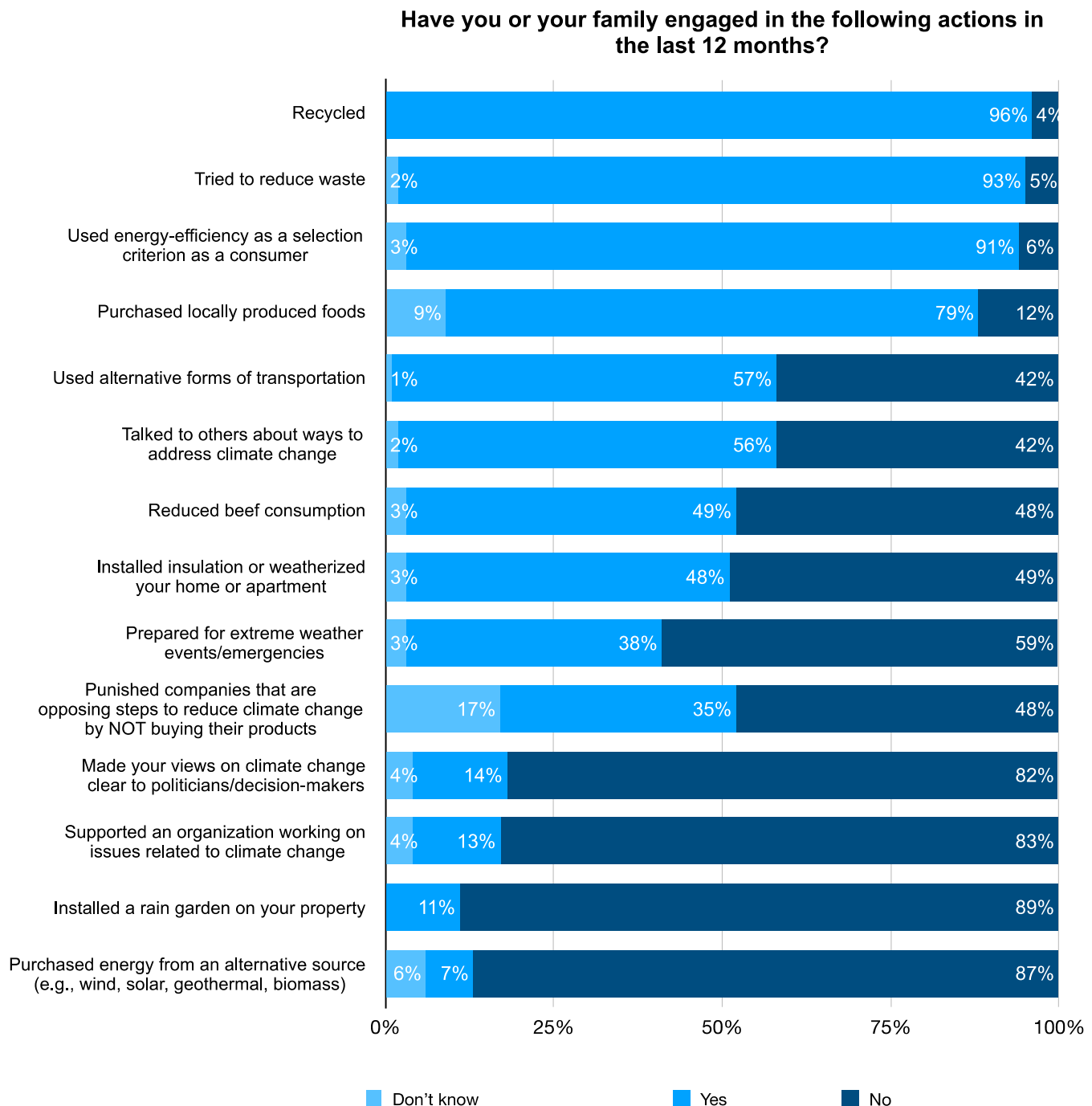
### D.2. Climate change should be considered as a high priority by our local government

Over 60% of community members in Thunder Bay believe that climate change should be a high (31%) or very high (31%) priority issue for our municipal government.

<i>Do you think climate change should be a low, medium, high, or very high priority for our municipal government?</i>	Percent
Low	7%
Medium	32%
High	31%
Very High	31%
Low	7%

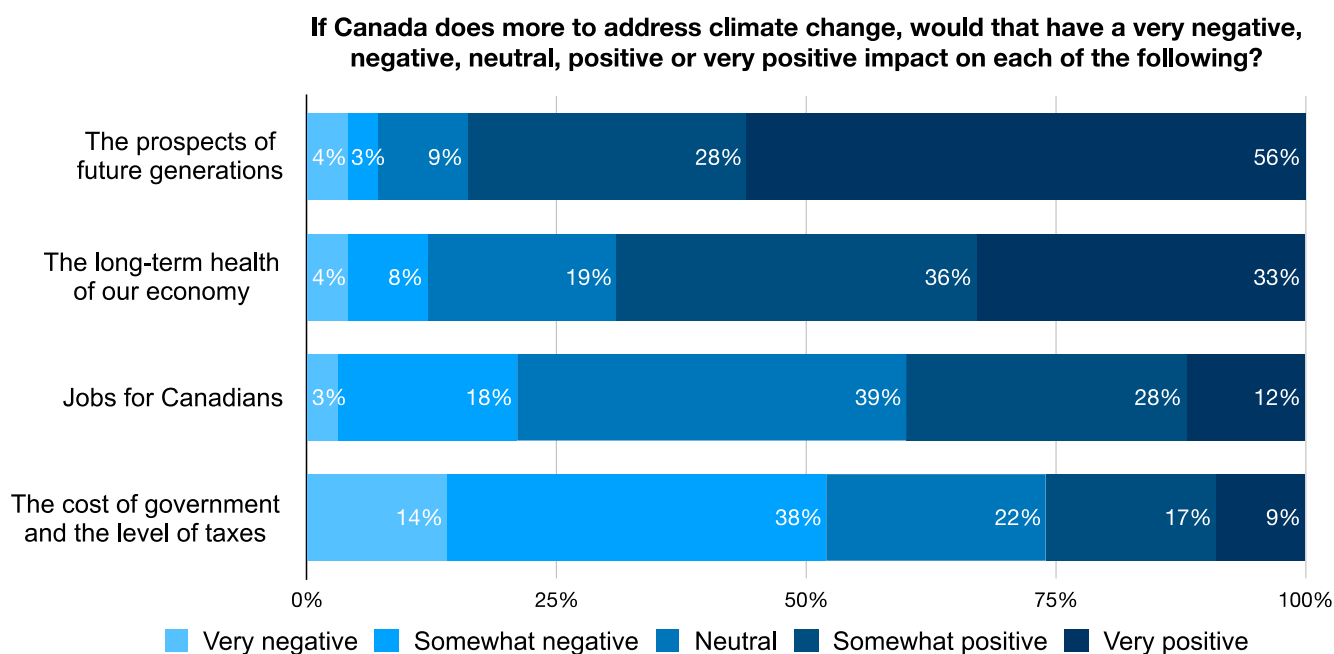
### D.3. Individual level climate action remains limited overall

Findings illustrate that waste reduction, food consumption choices, and energy efficiency improvements are the primary forms of climate action currently being taken. Political and advocacy-related climate action is far less common (14%), as is the use of renewable energy sources (7%). Overall, climate action aside from waste-reduction is limited, indicating the need for incentives and support for higher levels of climate action in Thunder Bay.



#### D.4. Overall, more people see more upsides than downsides when asked about national level climate action

The large majority of community members think that more climate action would have positive impacts for future generations of Canadians (84%) and the long-term economy (69%). However, more than half (52%) also believe that climate action in this country will come at a cost. Specifically, that more climate action at the federal level will have negative impacts on the cost of government and the level of taxes. Beliefs about impacts of climate action on jobs for Canadians varies: 22% believe there will be negative impacts, 38% neutral impacts, and another 40% see potential for positive impacts on jobs. Overall, more respondents see more positive impacts than negative impacts when it comes to national level climate action. These findings can be compared to data from a recent Canada wide survey conducted in 2017<sup>3</sup>. Similarly, across the country, more people see upsides than downsides when it comes to the actions that might be taken to tackle this issue. Most Canadians say that climate action will benefit the prospects of younger generations and will be good for the long-term health of the Canadian economy and jobs (40% positive/22% negative). On the costs to government and taxpayers, 26% of Canadians see an upside, 52% a downside and 22% see neutral impact.



<sup>3</sup> <https://abacusdata.ca/political-risk-climate-action/>

### D.5. People feel uncertainty about whether or not humanity is willing and able to do what is needed to address climate change

Uncertainty exists among respondents with respect to humanity's ability and will to act appropriately and in time to address climate change. More than eight in ten community members think humans *could* address climate change, but also think it is unclear whether we are willing to do what is needed to address climate change. Only 13% are confident that humanity can address climate change successfully, the majority (55%) think that we could but may not adequately address climate change, while approximately 29% believe that we aren't willing to change our behaviour and therefore will not adequately address climate change.

Which of the following statements comes closest to your view?	Percent
Humans can't address climate change, even if it is happening	2%
Humans could address climate change, but people aren't willing to change their behaviour, so we're not going to	25%
Humans could address climate change, but it's unclear whether we will do what's needed	55%
Humans can address climate change, and we will do so successfully	13%
Climate change is not happening	1%

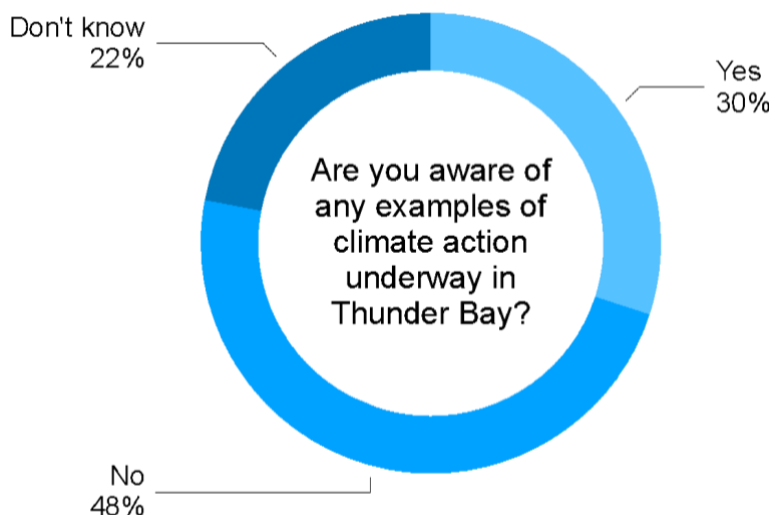
### D.6. Why should we address climate change? Because we have a moral responsibility to future generations

Approximately 42% of respondents believe that we have a moral responsibility to those who will live on the planet after us to act to address climate change; another 27% believe we have a moral responsibility to protect plants, animals and the environment. Less than 10% of respondents felt economic reasons were the most important reason for addressing climate change. These findings suggest that economic arguments may not be as effective as moral arguments in terms of rationalizing climate action.

Which of the following is the best reason to do more to address climate change:	Percent
We will face a catastrophe if we fail to do more to address climate change	23%
We have a moral responsibility to those who will live on the planet after us	42%
We have a moral responsibility to protect plants, animals and the environment	27%
The process of addressing climate change will open up new economic opportunities	3%
Dealing with weather-related disasters is becoming a financial disaster we must avoid	5%
Climate action is not needed because the climate is not changing	1%

## D.7. A majority of Thunder Bay residents are not aware of examples of climate action being taken

A majority of Thunder Bay residents are not aware of climate action being taken (48%) while another 22% don't know if they are aware of examples.



When asked to provide examples of climate action (among those who are aware of action being taken), the main emergent themes were examples of existing organizations, policies or programmes in place (these examples are largely general in nature). Of the organizational examples, the majority of responses centred around EcoSuperior (a local environmental non-profit) and EarthCare Thunder Bay (the municipality's sustainability initiative). Waste reduction, such as recycling and composting, was also a key theme. Interestingly, no examples of political action or advocacy were provided. The six main themes that emerged from a thematic analysis of the examples reported are summarized in the table below.

There is a need to highlight and profile climate action and more diverse forms of climate action underway while also promoting additional climate action beyond waste reduction and gardening in our community.

### *Thematic analysis of examples of climate action underway in Thunder Bay*

Theme	Frequency	Example responses
Existing organizations, policy or programming	78	Earthcare Thunder Bay plans, City building better drainage, Thunder Bay climate adaptation strategy
Waste, composting and 3Rs	57	Recycling, Using less of single-use plastics, Clean up committees
Gardens or planting	37	Community gardens, rain gardens
Energy alternatives or emission reduction	30	EV charging stations, Harnessing methane gas at landfill
Water/flood management	28	City building better rain/drainage options, Water treatment, Water conservation
Alternative transportation	28	Drive a small car, Support for active transport

## APPENDIX 1: SURVEY METHODS

The *Perspectives on Climate Change in Thunder Bay* survey was conducted as part of a larger project entitled *Climate Change Communication and Engagement in Canada's Provincial Norths: A Collaborative Place-Based Approach*. To learn more about the diversity of perspectives on climate change in our community we conducted a representative postal survey. The survey was administered by postal mail in January 2019 and sent to 2,000 randomly selected households in Thunder Bay. Details on the design, implementation, and analysis of the survey are discussed below.

### Design and data collection procedures

**Survey instrument:** The survey instrument was developed to measure community perspectives on climate change, designed based on an extensive literature search. Nearly all questions in the instrument were adapted from survey instruments used on previous studies on perspectives, attitudes, and values in relation to climate change to enhance rigour. A research advisory group reviewed and provided comments on a draft of the survey instrument to enhance relevance for the local setting. The survey instrument was pilot tested with 19 community members prior to administration to ensure clarity of questions and to identify any issues prior to administration. The final instrument consisted of 36 questions using a combination of Likert scale, ranking, fixed-choice answers, and open-ended questions in five main categories: i) Perspectives on climate change in general; ii) Climate change in Thunder Bay; iii) Climate action; iv) Connectedness to nature; and v) Demographic questions.

**Data collection:** The survey was distributed by Canada Post mail to 2,000 random households in Thunder Bay (using the census metropolitan area as a sampling frame, a population of 121,621) to gather data from a representative cross-section of adults. A simple random selection of households was selected from all addresses using the Canada Post address database. The Dillman's<sup>4</sup> Tailored Design method was adapted to increase response rate and involved three waves of mailing; the final reminder included an option for completing the survey electronically. On January 4<sup>th</sup> 2019, survey packets containing the survey instrument, an information letter, and a pre-paid envelope to return the completed survey were sent out. The information letter explained the survey and encouraged participation by an adult member of the household, age 18 or older. If there was more than one adult in the household, instructions indicated that the person in the household who has had the most recent birthday should complete the enclosed survey. The letter also included information about a random draw (\$100 gift card) for those who completed the survey to enhance response rate. On January 18<sup>th</sup> a first reminder postcard was sent. On January 25<sup>th</sup> the second and final reminder postcard was sent, along with information for how to complete the survey electronically. Both reminder postcards also included information about how to get another survey packet in the event that it was never received or was lost.

<sup>4</sup> Dillman DA, Smyth JD, Christian LM (2014) Internet, phone, mail, and mixed-mode surveys: the tailored design method, 4th edn. Wiley, Hoboken  
Climate Change Communication and Engagement in Canada's Provincial Norths

A total of 42 surveys did not reach respondents and were returned to sender and 385 responses were completed (46 were completed electronically). Upon an initial review, 30 responses were excluded as a result of being incomplete (more than 50% of responses left blank) or duplicate entries. The final sample was based on 358 completed surveys, adjusted response rate of 18.3%.

**Weighting and non-response bias:** Once the surveys were completed, data were entered into a database, verified and cleaned by two research assistants. Subsequently, sampling weights were computed for each respondent. Weighting is used in survey analysis to compensate for sample designs and patterns of non-response that can introduce bias in findings. The use of these weights in statistical analysis ensures that the demographic characteristics of the sample closely approximate the demographic characteristics of the national population. The sample was weighted to match the Thunder Bay adult general population parameters. Sampling weights computed for each Data are weighted on key demographic variables to match the 2016 Census by respondents' age, gender, and education level. Weighting was accomplished using the RAKING procedure in R statistics analysis software. Weights were trimmed to prevent individual interviews from having too much influence on the final results. The table below compares weighted and unweighted sample distributions to population parameters.

For this summary report, all NAs have been removed from tables, figures, graphs etc.

Demographic variable	Unweighted Sample, %	Weighted Sample, %	Thunder Bay Census* Population, %
<b>Age category</b>			
18-34	11.6	23.7	23.7
35-54	26.5	31.9	31.9
55-69	37.15	27.7	27.7
Over 70	25.14	16.7	16.7
<b>Sex</b>			
Male	43.14	49.6	49.1
Female	56.00	49.6	50.9
Other	0.86	0.8	NA
<b>Education</b>			
Primary and/or secondary level education	21.51	45.8	46.0
Above secondary and below Bachelors level education	43.85	34.6	34.5
Bachelors or above	34.64	19.6	19.5

\*Census Metropolitan Area (CMA)

All samples are subject to some degree of sampling error – that is, statistical results obtained from a sample can be expected to differ somewhat from results that would be obtained if every member of the target population were interviewed (i.e. a census). The margin of error for this sample is plus or minus 5 percentage points (95% confidence interval). This means that in 95 out every 100 samples drawn using the same methodology, estimated proportions based on the entire sample will be no more than 5 percentage points away from their true values in the population.

**Data analysis:** Basic descriptive statistics were conducted to determine frequency distributions and central tendency of individual variables (using R statistical software). Percentage points are rounded to the nearest decimal place therefore percentages in a given table may total slightly above or below 100%. Open-ended questions were entered into a qualitative analysis software (NVivo) and analysed to identify emergent themes. Survey responses were also imported into data analysis software program NVivo. Responses to each question were analyzed separately for emerging themes. Nodes were developed to reflect each of these themes and the responses were sorted accordingly. Many, if not most, responses contained multiple themes and thus were coded into multiple nodes. In other words, it was common for multiple themes to apply to one single survey response.

Additional multivariate analyses will be conducted (using t-tests and the chi-square test for independence) to identify statistically significant differences between sub-groups.



## APPENDIX 2: SURVEY INSTRUMENT

### SECTION A: Perspectives on climate change in general

The questions in this first section ask about your general perspectives relating to climate change. Please answer the questions based on your own opinions rather than how you think you 'should' answer them.

**1. What is the first word or phrase that comes to mind when you think of climate change?**

---

**2. Do you think that climate change is happening?**

**Yes...**

- ☐ ...and I'm extremely sure
- ☐ ...and I'm very sure
- ☐ ...and I'm somewhat sure
- ☐ ...but I'm not at all sure

**No...**

- ☐ ...and I'm extremely sure
- ☐ ...and I'm very sure
- ☐ ...and I'm somewhat sure
- ☐ ...but I'm not at all sure

**Or...**

- ☐ ...I don't know

**3. Assuming climate change IS happening, do you think it is...**

- ☐ Caused mostly by natural changes in the environment
- ☐ Caused mostly by human activities
- ☐ Other (please specify: \_\_\_\_\_)
- ☐ None of the above because climate change is not happening

**4. How worried are you about climate change?**

- ☐ Not at all worried
- ☐ Not very worried
- ☐ Somewhat worried
- ☐ Very worried

**5. How important is the issue of climate change to you personally?**

- ☐ Not at all important
- ☐ Not too important
- ☐ Somewhat important
- ☐ Very important
- ☐ Extremely important

**6. How many of your friends share your views on climate change?**

- ☐ None
- ☐ A few
- ☐ Some
- ☐ Most
- ☐ All

**7. How often do you think about climate change?**

- ☐ Never  
☐ Rarely  
☐ Occasionally  
☐ Very often

**8. How often do you talk about climate change with your family and friends?**

- ☐ Never  
☐ Rarely  
☐ Occasionally  
☐ Very often

**9. How well-informed are you about ...**

*Please check one box on each row*

	Not at all informed	Not very well informed	Fairly well informed	Very well informed
The science of climate change	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The impacts of climate change	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Actions that can be taken to address climate change	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**SECTION B: Climate Change in Thunder Bay**

The questions in this section ask about your thoughts on the current and possible future impacts of climate change in our community.

**10. Which statement best reflects your view:**

- ☐ I have personally experienced the effects of climate change in Thunder Bay  
☐ I have not personally experienced the effects of climate change in Thunder Bay  
☐ I don't know if I have personally experienced the effects of climate change in Thunder Bay

**10b. If you have personally experienced the effects of climate change, briefly tell us how:**

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**11. How much do you think climate change is affecting weather in Thunder Bay?**

- ☐ A little  
☐ Somewhat  
☐ A lot  
☐ I don't know if climate change is affecting weather  
☐ Climate change is not affecting weather in Thunder Bay

**12.** In the last ten years, have you or your family been affected by an extreme weather event in Thunder Bay (e.g., flood, rain event, forest fire etc.)?

- ☐ Yes  
☐ No  
☐ Don't know

**12b.** If you selected yes above, what kind of extreme weather event was it?

**13.** How much do you think climate change will harm...

<i>Please check one box on each row</i>	Not at all	Only a little	A moderate amount	A great deal	Don't know
...you personally	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
...plants, animals, and our environment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
...people in developing countries	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
...future generations of people	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**14.** When do you think climate change will start to harm people in Thunder Bay, if at all?

- ☐ Never  
☐ 100 years from now  
☐ 50 years from now  
☐ 25 years from now  
☐ 10 years from now  
☐ People are being harmed now

**15.** On a scale from -3 (very bad) to +3 (very good), do you think climate change is bad or good for...:

<i>Please check one box on each row</i>	-3	-2	-1	0 No effect	+1	+2	+3	Don't know
...the community of Thunder Bay	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
...Indigenous communities across Northern Ontario	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
...winter recreational opportunities in the region (e.g., cross country skiing, ice fishing)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
...moose populations across Northern Ontario	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
...hunting and fishing opportunities in the region	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
...agriculture and local food production	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
...the Boreal forest ecosystem	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
...Lake Superior and other bodies of water	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**16.** If nothing is done to address climate change, do you think each of the following will become more or less common in our community/region over the next 10 years:

<i>Please check one box on each row</i>	Much less common	Somewhat less common	Will stay about the same	Somewhat more common	Much more common
Heat-related health effects (e.g., heat stroke)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cold-related health effects	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Injuries due to extreme weather events	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Air pollution-related illness (e.g., asthma, COPD)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Illness caused by contaminated food and/or water	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Infectious disease (e.g., Lyme disease)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mental health issues (e.g., anxiety, depression)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Forest fires	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Damage to infrastructure (e.g., freezing waterlines)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Invasive species	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Diseases affecting trees/forests (e.g., emerald ash borer, mountain pine beetle)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**17.** On a scale from -3 (very bad) to +3 (very good), do you think climate change is bad or good for...:

<i>Please check one box on each row</i>	-3	-2	-1	0 No effect	+1	+2	+3	Don't know
...your health	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
...the health of other people living in Thunder Bay	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
...the health of vulnerable populations in our community (e.g., elderly, children).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**18.** How strongly do you feel each of the following emotions when you think about climate change?

<i>Please check one box on each row</i>	Not at all	Not very strongly	Moderately	Very strongly
Concern/worry	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Frustration	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fear	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Anger	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sadness	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Helpless	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hopeless	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Guilt	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Anxiety	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hopeful	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Happiness	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Confidence/resilience	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**YOU ARE MORE THAN HALFWAY DONE OUR SURVEY ~  
THE REMAINING QUESTIONS SHOULD TAKE YOU ABOUT 5 MINUTES.**

### SECTION C: Climate Action

Now, we have a few questions about your perspectives on climate action as well as action that you/your family have taken to prepare for the impacts of climate change or reduce greenhouse gas emissions.

**19.** Do you think community members of Thunder Bay should be doing more or less to address climate change?

- ☐ Much less
- ☐ Less
- ☐ Currently doing the right amount
- ☐ More
- ☐ Much more

**20.** Do you think climate change should be a low, medium, high, or very high priority for our municipal government?

- ☐ Low
- ☐ Medium
- ☐ High
- ☐ Very high

**21.** In your opinion, which group should be **MOST** responsible for addressing climate change?

*Please rank the options below from 1 to 7, starting with 1 as the most responsible*

Rank here

Individual community members

\_\_\_\_\_

Municipal government

\_\_\_\_\_

Provincial government

\_\_\_\_\_

Federal government

\_\_\_\_\_

Industry

\_\_\_\_\_

Civil society (e.g., Not-for-profit organizations, community organizations)

\_\_\_\_\_

Indigenous groups (e.g., Band Offices, Chiefs and Councils)

\_\_\_\_\_

## 22. Have you or your family engaged in the following actions in the last 12 months?

*Please check YES, NO, or DON'T KNOW for each row*

	Yes	No	Don't know
Tried to reduce waste	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Recycled (e.g., bottles, paper, etc.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Purchased locally produced foods	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Reduced beef consumption	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Installed a rain garden on your property	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Installed insulation or weatherized your home or apartment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Prepared for extreme weather events and emergencies (e.g., you have an emergency plan and/or kit)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Used energy-efficiency as a selection criterion when buying a light bulb, a household appliance, or a motor vehicle	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Purchased energy from an alternative source (e.g., wind, solar, geothermal, biomass)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Used alternative forms of transportation instead of driving (e.g., transit, cycling, walking)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Joined, donated money to, or volunteered with an organization working on issues related to climate change	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Punished companies that are opposing steps to reduce climate change by NOT buying their products	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Talked to family, friends, or colleagues about ways that individuals could help address climate change	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Made your views on climate change clear to politicians/decision-makers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

## 23. If Canada does more to address climate change, would that have a very negative, negative, neutral, positive or very positive impact on each of the following:?

*Please check one box on each row*

	Very negative	Somewhat negative	Neutral	Somewhat positive	Very positive
Jobs for Canadians	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The cost of government and the level of taxes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The long-term health of our economy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The prospects of future generations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



**24.** How much do you agree or disagree with the following statement: "I hear much more about the negative impacts of climate change than I do about progress towards addressing climate change."

- ☐ Strongly disagree
  - ☐ Disagree
  - ☐ Neither agree nor disagree
  - ☐ Agree
  - ☐ Strongly agree
- 

**25.** How much do you agree or disagree with the following statement: "Science and technology will eventually address our problems with climate change."

- ☐ Strongly disagree
  - ☐ Disagree
  - ☐ Neither agree nor disagree
  - ☐ Agree
  - ☐ Strongly agree
- 

**26.** Which of the following statements comes closest to your view?

- ☐ Humans can't address climate change, even if it is happening
  - ☐ Humans could address climate change, but people aren't willing to change their behavior, so we're not going to
  - ☐ Humans could address climate change, but it's unclear whether we will do what's needed
  - ☐ Humans can address climate change, and we will do so successfully
  - ☐ Climate change is not happening
- 

**27.** Which of the following is the best reason to do more to address climate change: Please select one option.

- ☐ We will face a catastrophe if we fail to do more to address climate change
  - ☐ We have a moral responsibility to those who will live on the planet after us
  - ☐ We have a moral responsibility to protect plants, animals and the environment
  - ☐ The process of addressing climate change will open up new economic opportunity
  - ☐ Dealing with weather-related disasters is becoming a financial disaster we must avoid
  - ☐ Climate action is not needed because the climate is not changing
- 

**28.** Are you aware of any examples of climate action underway in Thunder Bay?

- ☐ Yes
- ☐ No
- ☐ Don't know

**28b.** If you selected yes above, please describe an example of climate action.

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## SECTION D: Your connectedness to nature

This section asks about your relationship to nature and the natural environment in Thunder Bay and the surrounding region.

### 29. Please indicate your level of agreement with the following statements:

*Please check one box on each row*

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
I am very attached to the natural environment in Thunder Bay and the surrounding region	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I would feel less attached to Thunder Bay and the surrounding region if the native plants and animals that live here disappear	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I learn a lot about myself when spending time in the natural environment in Thunder Bay and the surrounding region	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
When I spend time in the natural environment in Thunder Bay and the surrounding region, I feel at peace with myself	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
When I spend time in the natural environment in Thunder Bay and the surrounding region, I feel a deep sense of oneness (i.e., connectedness) with the natural environment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

## SECTION E: About you

Finally, we want to know a bit more about you in order to understand who responded to our survey. This information is very important to the study. As a reminder, all of your responses are confidential.

30. How long have you lived in the Thunder Bay area (years)? \_\_\_\_\_

31. In what year were you born? \_\_\_\_\_

32. Do you most strongly identify as... :

☐ Male

☐ Female

☐ Other (please specify) \_\_\_\_\_



**33. What racial or cultural group do you belong to?**

- ☐ White
  - ☐ Chinese
  - ☐ Korean
  - ☐ South, Southeast, or West Asian
  - ☐ Black
  - ☐ Latin American
  - ☐ Arab
  - ☐ Japanese
  - ☐ Aboriginal/Indigenous/Metis/Inuk (Inuit)
  - ☐ Don't know
  - ☐ Other group, please specify: \_\_\_\_\_
- 

**34. Do you have any children?**

- ☐ Yes
  - ☐ Not currently
  - ☐ Not currently (but I would like to have children in the future)
- 

**35. What is the highest degree, certificate, or diploma you have obtained? Please select one.**

- ☐ No certificate, diploma, or degree (i.e., primary school education)
  - ☐ Secondary (high) school diploma or certificate
  - ☐ Postsecondary certificate, diploma or degree (i.e., Technical or trades certificate)
  - ☐ College or other non-university certificate or diploma
  - ☐ University certificate or diploma below bachelor level
  - ☐ University certificate, diploma or degree at bachelor level or above
  - ☐ University certificate or diploma above bachelor level (i.e., Masters, PhD, or medical degree)
- 

**36. Last year, was your total household income from all sources before taxes...**

- ☐ ...less than \$20,000
- ☐ ...between \$20,000 and \$40,000
- ☐ ...between \$40,000 and \$60,000
- ☐ ...between \$60,000 and \$80,000
- ☐ ...between \$80,000 and \$100,000
- ☐ ...more than \$100,000

***THIS IS THE END OF THE SURVEY ~ THANK YOU FOR YOUR PARTICIPATION!***

Please complete the survey, fold it into thirds and mail it back using the enclosed addressed and stamped envelope. After doing so, you will be entered into the random draw for a chance to win one of twenty \$100 gift cards to a local grocery store.

Results will be made available on the Thunder Bay Climate Change Connection website ([www.climatechangetbay.com](http://www.climatechangetbay.com)) in the spring of 2019.

### APPENDIX 3: PLACE ATTACHMENT SCALE

We included a section to measure respondents' place attachment to Thunder Bay and the surrounding region (not reported on above). These five items make up a scale that is used to measure subjective place attachment <sup>5</sup>. We adapted this scale to the context of Thunder Bay and will use it to measure and assess associations between place attachment and perspective of climate change.

<b>Please indicate your level of agreement with the following statements:</b>	<b>Strongly disagree</b>	<b>Disagree</b>	<b>Neither agree nor disagree</b>	<b>Agree</b>	<b>Strongly agree</b>
I am very attached to the natural environment in Thunder Bay and the surrounding region	0.9%	1.4%	21.8%	42.9%	32.9%
I would feel less attached to Thunder Bay and the surrounding region if the native plants and animals that live here disappear	3.8%	4.9%	21.9%	32.2%	37.1%
I learn a lot about myself when spending time in the natural environment in Thunder Bay and the surrounding region	2.0%	4.9%	24.1%	40.5%	28.4%
When I spend time in the natural environment in Thunder Bay and the surrounding region, I feel at peace with myself	0.5%	4.0%	13.8%	47.6%	34.1%
When I spend time in the natural environment in Thunder Bay and the surrounding region, I feel a deep sense of oneness (i.e., connectedness) with the natural environment	24.1%	3.9%	20.2%	27.4%	24.3%

<sup>5</sup> Raymond, C. M., Brown, G., & Weber, D. (2010). The measurement of place attachment: Personal, community, and environmental connections. *Journal of environmental psychology*, 30(4), 422-434.  
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