PERSPECTIVES ON CLIMATE CHANGE IN PRINCE GEORGE: FINDINGS FROM A COMMUNITY SURVEY

UNBC UNIVERSITY OF NORTHERN BRITISH COLUMBIA

Lakehead UNIVERSITY

***Investigators**:* Lindsay P. Galway, Chris Buse, Maya K. Gislason, Margot W. Parkes.

Credits, cover photo: Chris Buse

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INTRODUCTION

Climate change is one of the defining issues of our time. The *Perspectives on Climate Change in Prince George* 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 Prince George, 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. Personal experiences, extremes, and emotions are top of mind when thinking about climate change

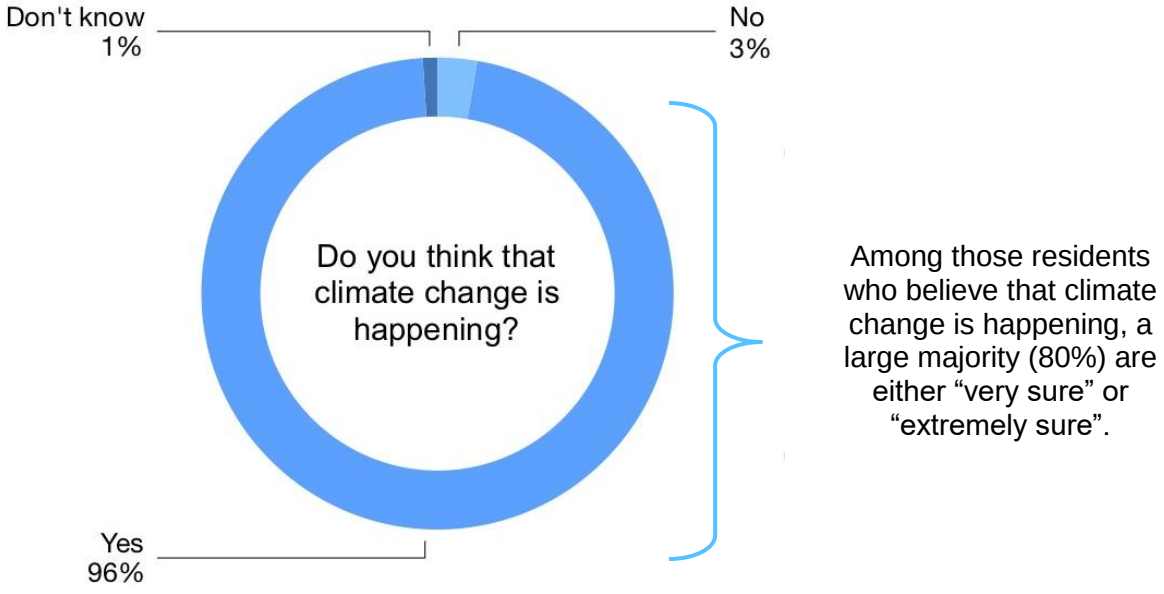
When asked to provide the first words or phrase that come to mind when thinking about climate change, community members of Prince George described changes and extremes experienced, as well as thoughts about more general global changes and climate change impacts. The six main themes that emerged from 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
Noticed/experienced changes and extremes	104	Storms; Unpredictable; Extinction; Dry; Water shortage; Drought; Drier forests
Global changes/impacts	66	Mild winters; Heat; Warming planet; Arctic ice melt
Emotion	30	Fear; Serious; Confusion; Hopeless; We're screwed
Action and legitimacy	28	Here now; It's happening; How long do we have?
Causes or mechanisms	22	Pollution; Greenhouse gases; Human-caused; Fracking; Deforestation
Skepticism and denial	30	Scam; Inevitable; Money grab

A.2. Broad recognition that climate change is happening

More than nine in ten residents of Prince George believe that our climate is changing. In contrast, very few – only 4% - think climate change is not happening or don't know.



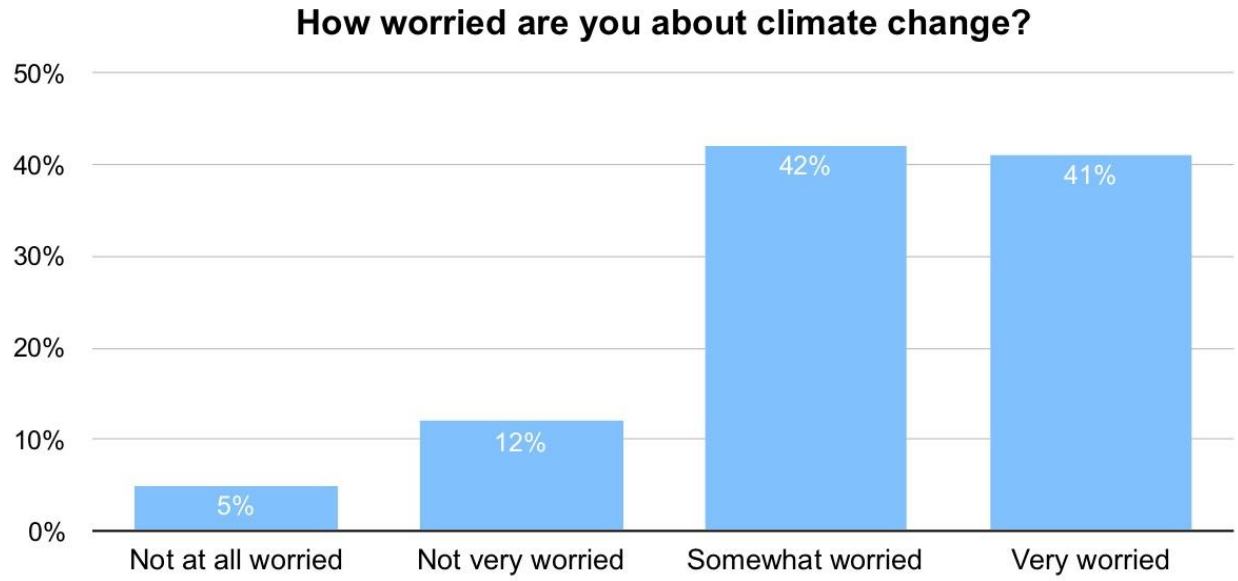
A.3. The majority of people in Prince George believe climate change is mostly human-caused

Approximately 58% of respondents understand that climate change is caused mostly by human activities. Almost all of the 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.

Assuming climate change is happening, do you think it is…	Percent
Caused mostly by human activities	58%
Caused mostly by natural changes in the environment	14%
None of the above because global warming isn't happening	1%
Other	27%

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, 3 out of ten of Americans reported being "very worried" about climate change in 2019[1].



[1] https://climatecommunication.yale.edu/publications/climate-change-in-the-american-mind-november-2019/

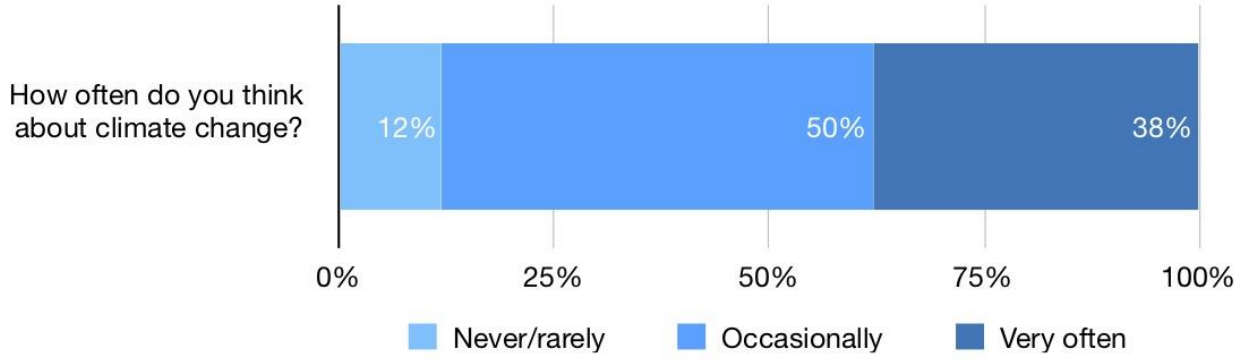
A.5. Climate change is an important issue for the people of Prince George

Five out of ten residents of Prince George say that the issue of climate change is either “extremely” (18%) or “very important” (32%) to them personally.

How important is the issue of climate change to you personally?	Percent
Not at all important	5%
Not too important	10%
Somewhat important	35%
Very important	32%
Extremely important	18%

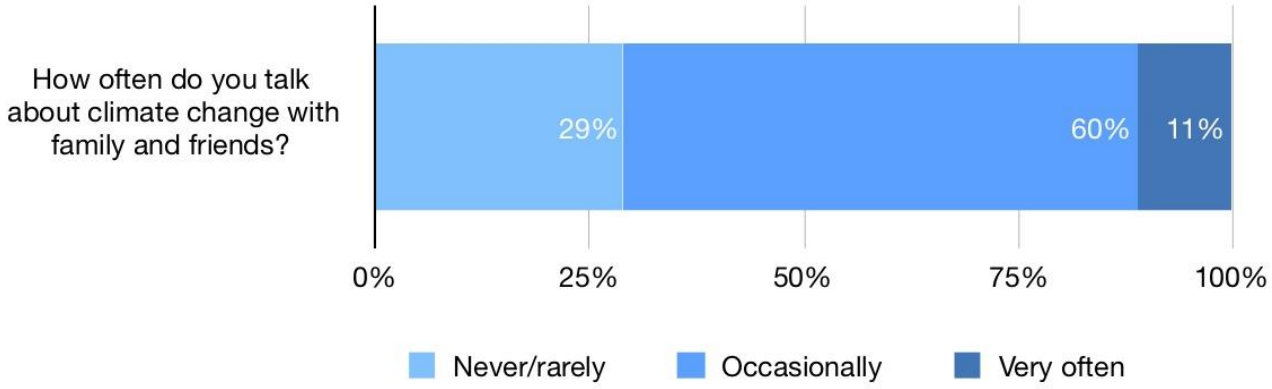
A.6. People in Prince George are often thinking about climate change

Nearly 90% of community members think about climate change at least “occasionally” compared to 12% that report “rarely” or “never” thinking about climate change. These data suggest that climate change is on people’s minds.



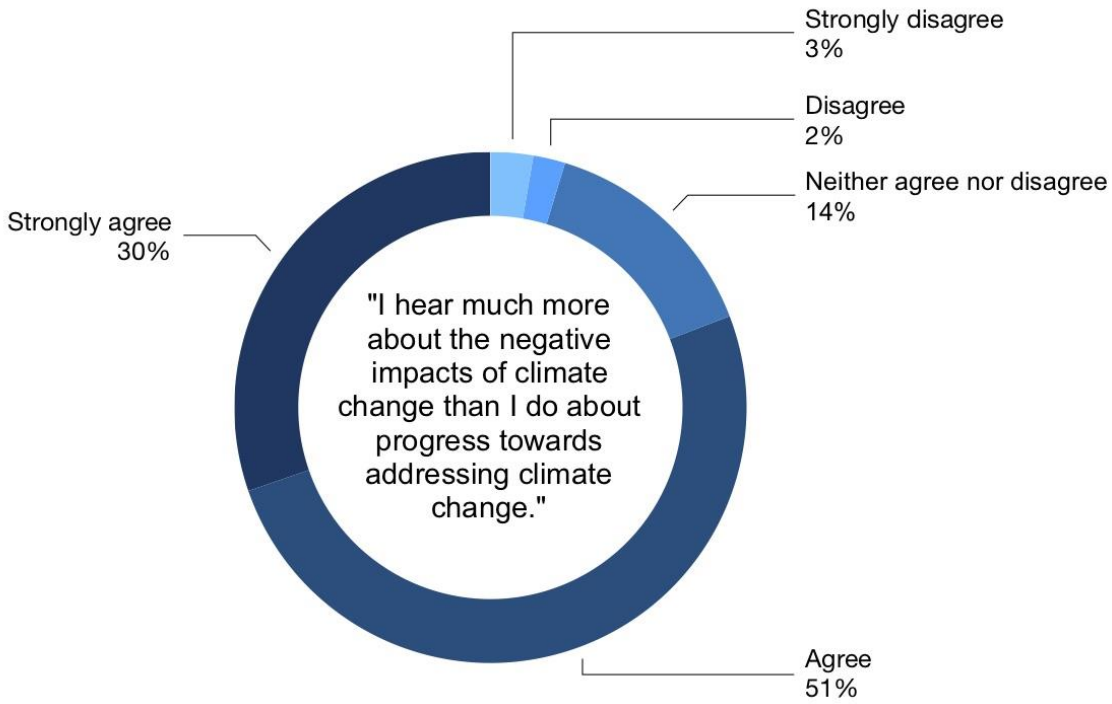
A.7. People do not talk about climate change as often as they think about it

Over 70% of residents say they discuss climate change with friends and family “occasionally” or “very often”. Almost three in ten community members “never” or “rarely” discuss the issue with friends and family. Approximately 38% think about climate change “very often” while just 11% speak about it “very often”. The findings indicate there is a gap between the extent to which people think about climate change and talk about climate change. This may hold additional implications for translating people’s concern over climate change into tangible action(s).



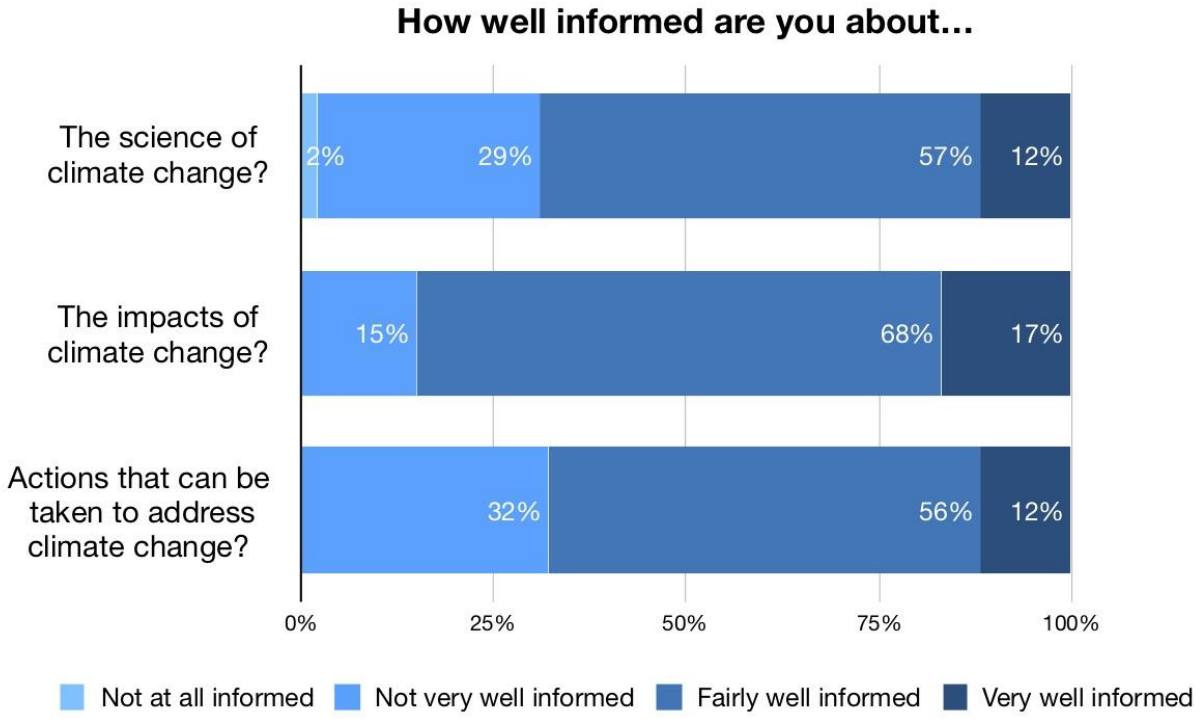
A.8. People hear more about the negative impacts of climate change than about progress toward addressing the issue

The majority (81%) of respondents 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 Prince George are fairly well informed about climate science, impacts, and action

A majority of community members feel “fairly well informed” or “very well informed” about climate change science (69%), impacts (85%), and action (68%). Additional 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 almost a third of community members are “not very well informed” in these areas.

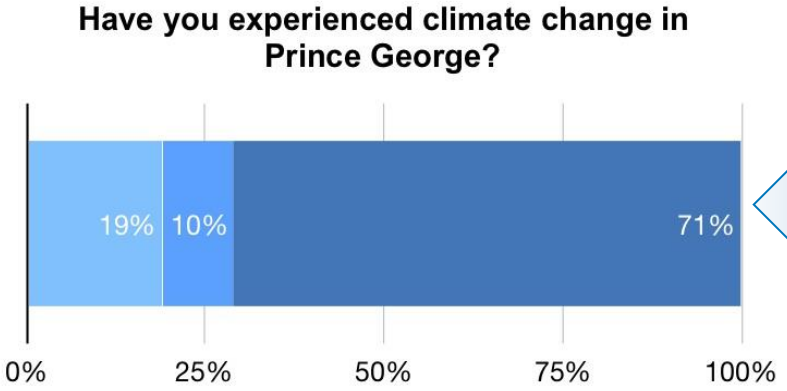


B. LOCAL EXPERIENCES, IMPACTS, AND RISKS

B.1. More than seven in ten residents have experienced personal level impacts of climate change

Seventy-one percent of community members of Prince George have personally experienced the effects of climate change in their community. Almost three in ten are either unsure or have not personally experienced the effects of climate change in Prince George. 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. Seasonal changes and shifts (i.e. warmer winters) and fire are the main climate change-related impacts people in Prince George reported, with obvious connections to recent 2017 and 2018 fire years that saw smoke blanket the city. The eight main themes that emerged from a thematic analysis of the examples reported are summarized in the table below.



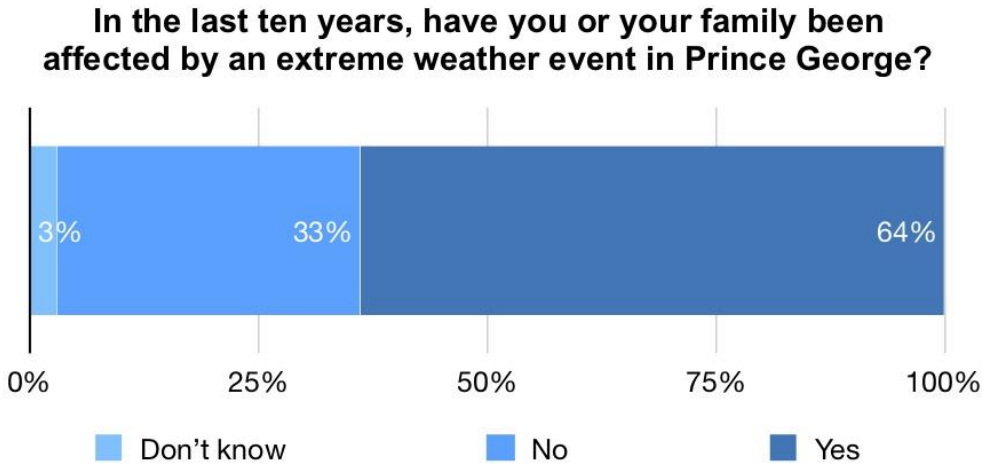
Word cloud of climate change-related impacts among those who have personally experienced the effects of climate change

Thematic analysis of first extreme events experienced

Theme	Frequency	Example responses
Seasonal changes and shifts	143	Winters have been shorter and milder; Hotter, drier summers; Wetter, icier winters; Seasonal temperature changes
Fire	106	More severe forest fires; Forest fire smoke; Road closures from forest fires; Longer wildfire seasons
Precipitation	94	Less snowpack; Hot, dry summers; Reduced snowfall; We get freezing rain more often; No rain
Forests and gardens	45	Changes in the way I garden; Forests are often dryer; Pine beetle epidemic; Difficulty gardening due to disease
Human health and/or activity	42	Population dislocation; Family camping was eliminated last summer; Respiratory effects
Extremes and unpredictability	37	More frequent freeze/thaw cycles; Extreme weather; Fickle predictability; Rise and drop in water levels
Water and waterways	30	Rivers are shallower; Water problems; Low water tables; Higher lake temps affecting fishing
Wildlife and plants	19	Fewer bugs, birds, sick wildlife; Change in hunting opportunities

B.2. Extreme weather events have affected 64% of Prince George families over the last decade

Six out of ten respondents report that they or 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 fire, smoke, and air quality impacts. Examples of longer and more intense forest fire seasons in the province of BC and interior regions around Prince George more specifically were commonly described. Health effects related to forest fire smoke, road closures and evacuations were highlighted by some participants as secondary impacts of forest fires. Respondents also referred to other events in relation to forest fires such as drought and mountain pine beetle infestations.



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

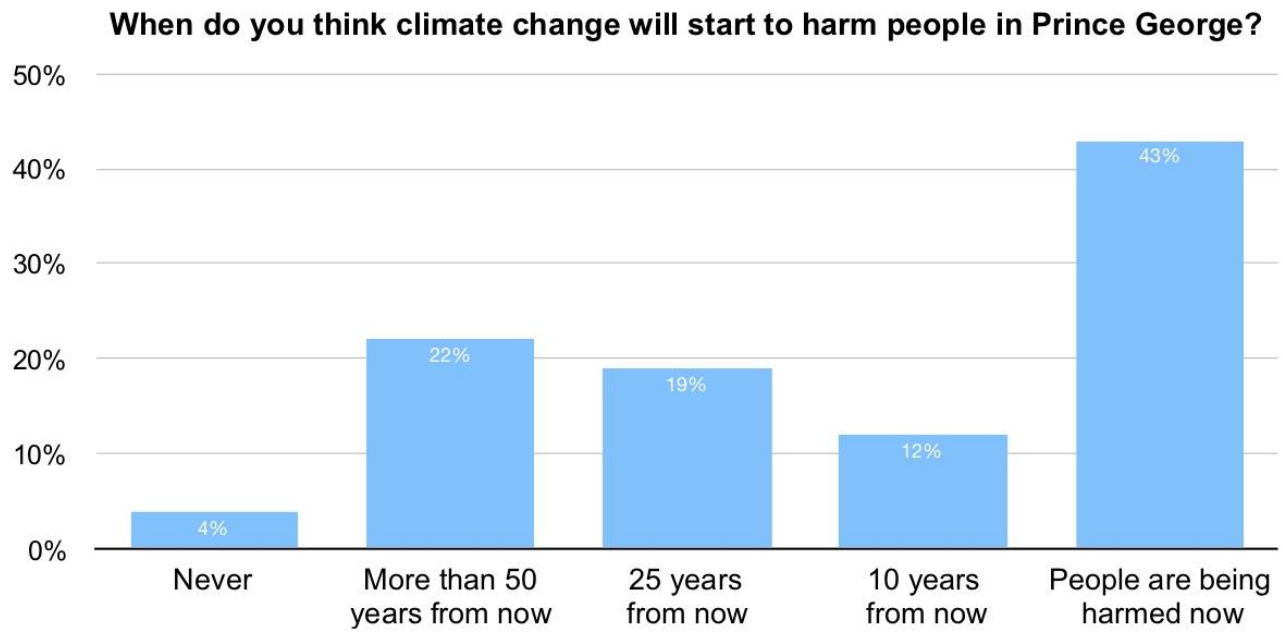
B.3. Climate change is affecting our weather

The large majority (91%) of respondents think that climate change is affecting weather in Prince George. Forty-four percent of the community thinks that climate change is affecting weather “a lot” while 9% either “don’t know” or think that “climate change is not affecting weather in Prince George”.

How much do you think climate change is affecting weather in Prince George?	**Percent**
A little	9%
Somewhat	38%
A lot	44%
I don't know if climate change is affecting weather	7%
Climate change is not affecting weather in Prince George	2%

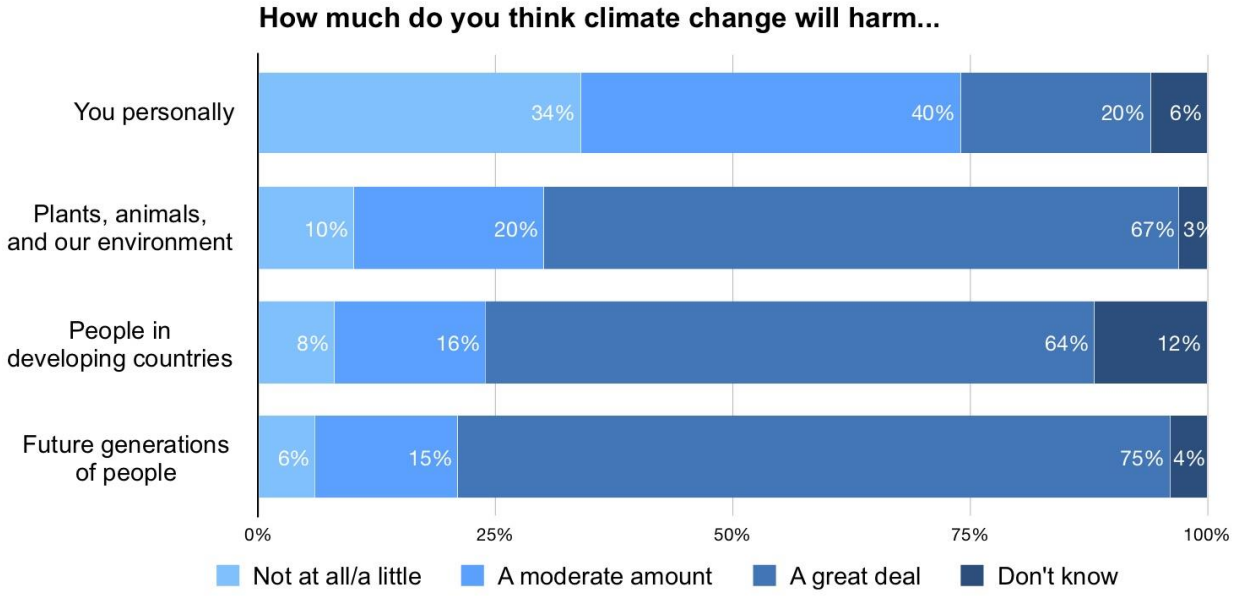
B.4. Climate change is not yet considered an urgent issue

A majority (53%) of community members see climate change as a concern of the future as opposed to an urgent issue causing harm now. That said, 43% believe that climate change is causing harm now, recognizing the urgency of the issue.



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 future generations (75%), to plants, animals, and our environments (67%), and people in developing countries (64%) much more than it will harm them personally.



B.6. Climate impacts on waterways, the Boreal forest, and hunting and fishing are key concerns

With respect to local and regional impacts, residents of Prince George are most concerned about climate change related consequences for lakes and other bodies of water, hunting and fishing opportunities in the region, and the Boreal forest. Local agriculture and food production are areas where some residents (20%) see potential for opportunities arising in the context of climate change.

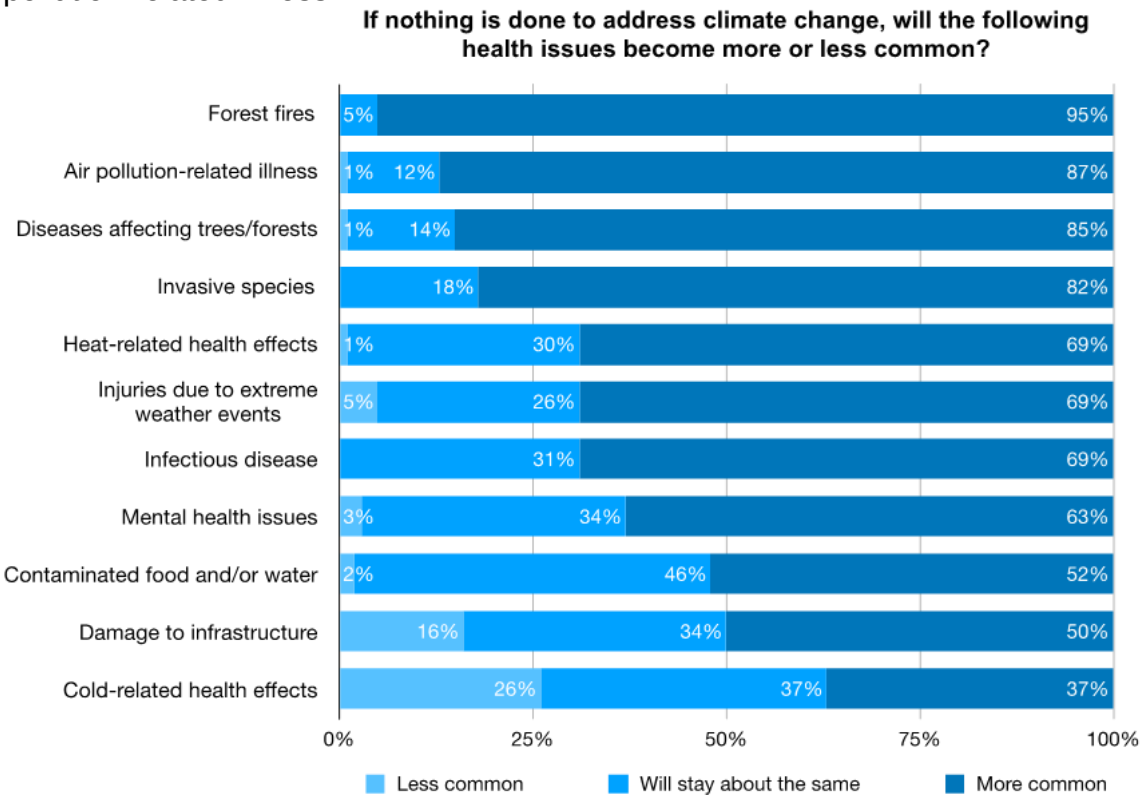
Consequences or opportunities for…	Negative consequences	No effect	Possible opportunities
Lakes and other bodies of water	88%	8%	4%
Hunting and fishing opportunities in the region	87%	9%	4%
The Boreal forest ecosystem	86%	7%	7%
Agriculture and local food production	74%	6%	20%

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

C. HEALTH CONSEQUENCES OF CLIMATE CHANGE

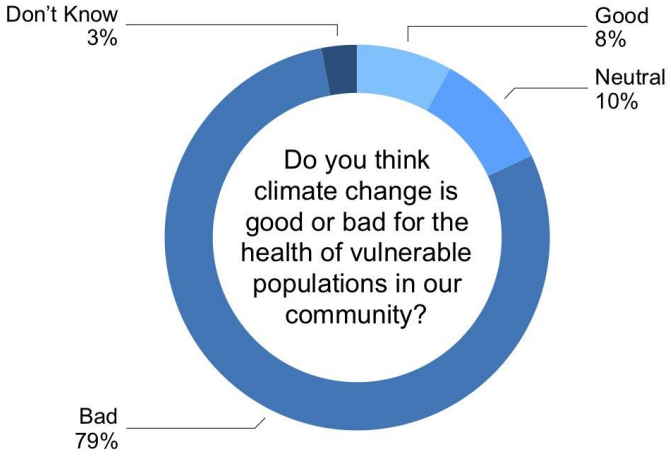
C.1. Community members identify a range of health impacts associated with climate change

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 in Prince George are most concerned about the health consequences of forest fires, diseases affecting trees/forests, and air pollution-related illness.



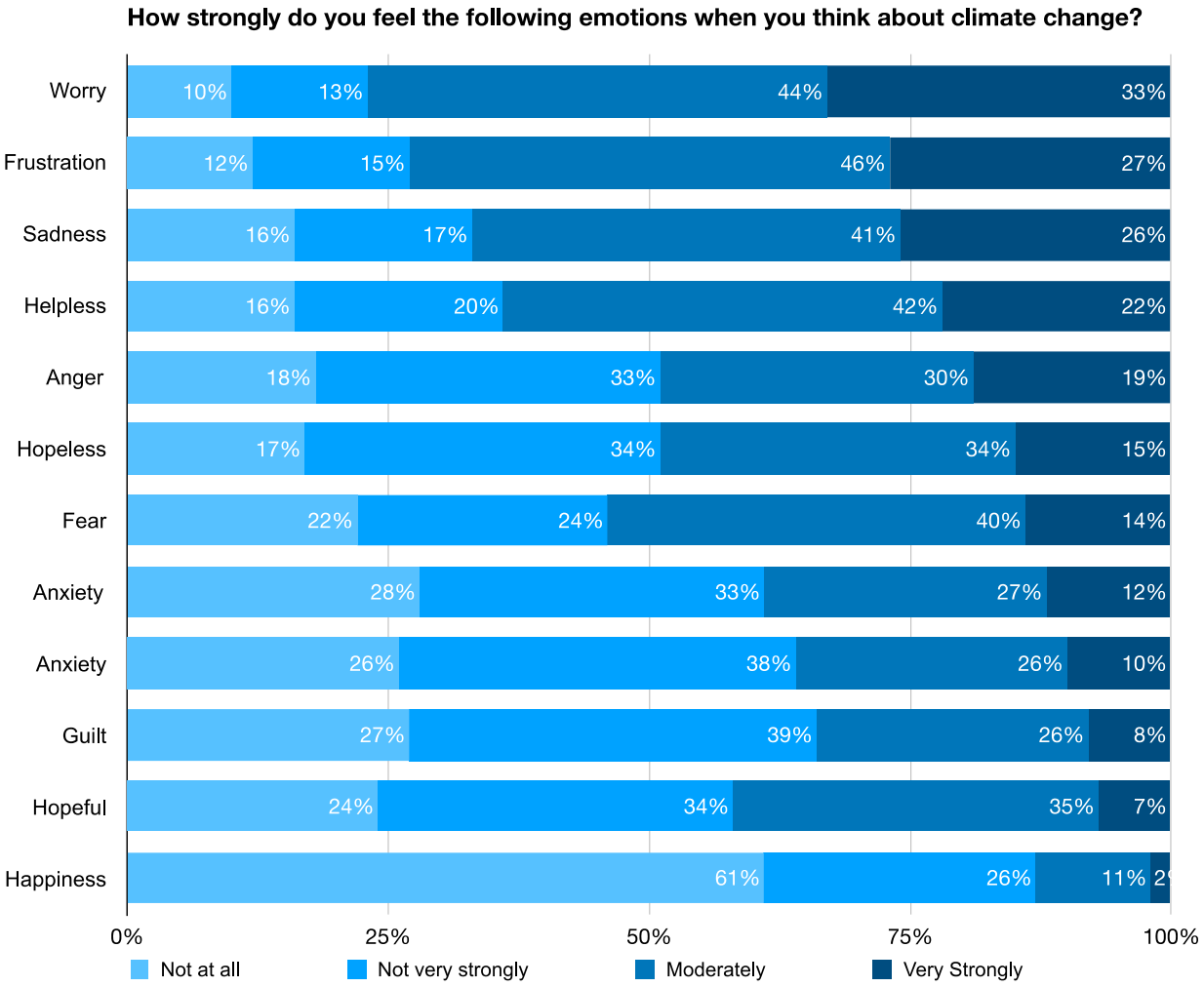
C.2. The health of vulnerable populations will be impacted the most by climate change

Almost eight in ten people recognize that 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 Prince George

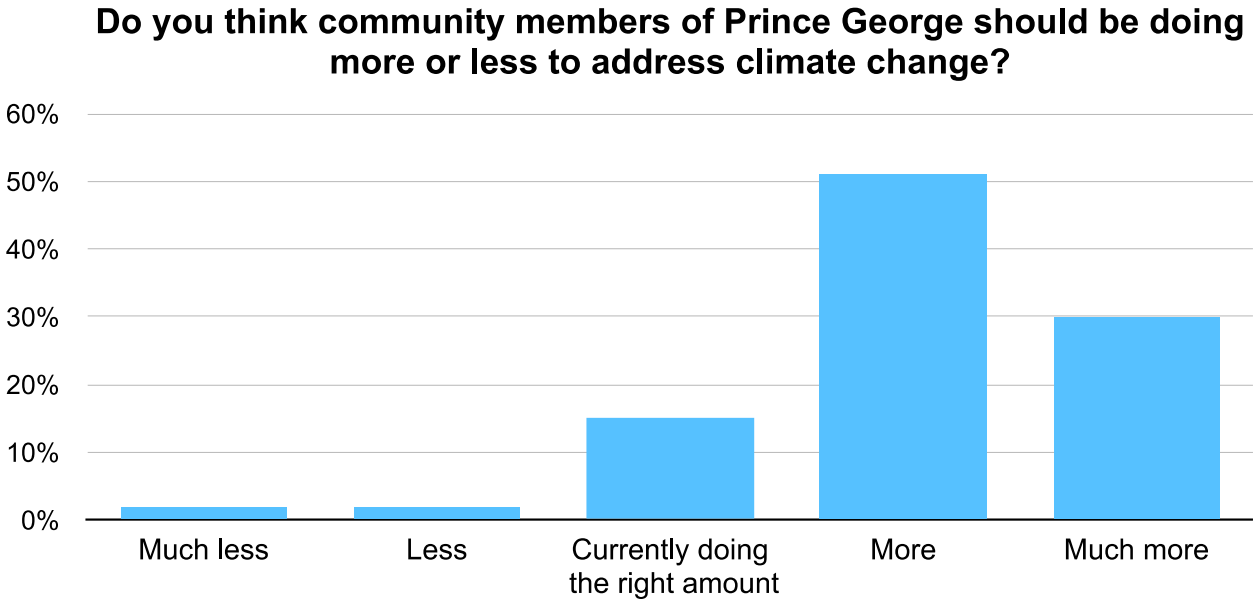
Negative emotions are a common response to climate change among community members, highlighting the emotional health consequences. Approximately 75% feel at least “moderately” concerned/worried and frustrated**,** 65% feel at least “moderately” sad, and 55% feel at least “moderately” fearful. Over 60% reported feeling not at all happy. In contrast, 35% reported feeling at least “moderately” confident/resilient. Although 35% of respondents report “moderately” hopeful, only 7% report feeling “very” hopeful.



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 (81%) of respondents think that individual community members of Prince George should be doing “more” (51%) or “much more” (30%) to address climate change. In contrast, only 2% think that we should be doing “less” and another 2% think we should be doing “much less”.



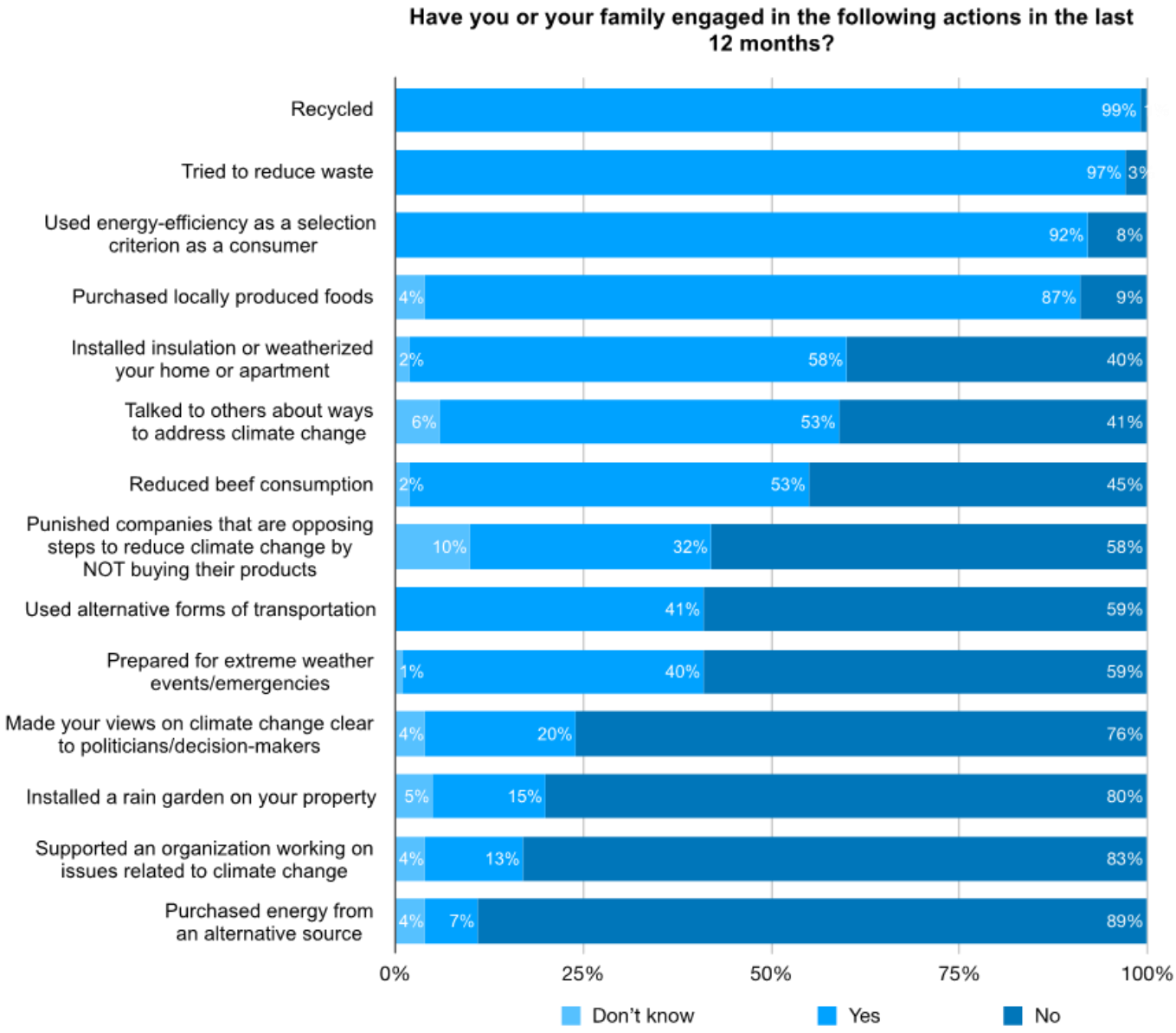
D.2. Climate change should be considered as a high priority by the local government

Over 60% of Prince George voters want climate change to be a “high” (33%) or “very high” (30%) priority issue for municipal government.

Do you think climate change should be a low, medium, high, or very high priority for our municipal government?	Percent
Low	10%
Medium	27%
High	33%
Very High	30%

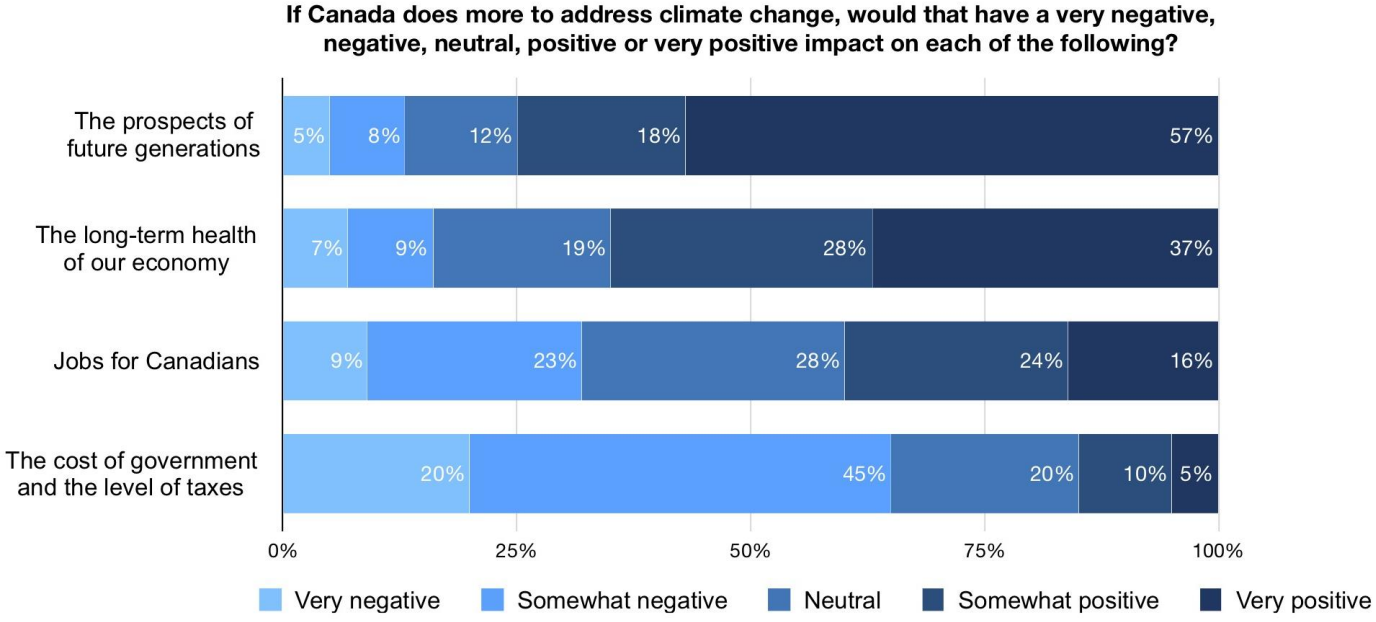
D.3. Individual level climate action is limited overall

Findings illustrate that waste-reduction, recycling, food purchasing choices, and energy efficiency improvements are the primary forms of climate action currently being taken. Incentives and support for higher levels of climate action in other areas is needed in Prince George. For example, involvement with organizations working on climate change issues and alternative energy sourcing are far less common (13% and 6%, respectively) as is personal rain garden installation (15%) and political and advocacy-related climate action (20%).



D.4. Overall, more people see the upside when asked about national level climate action.

The majority of respondents think that more climate action would have positive impacts for future generations of Canadians (75%) and the long-term economy (65%). However, well over half (66%) also believe that climate action in this country will come at a cost. Specifically, 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 vary: 33% believe there will be negative impacts, 28% neutral, and another 40% see potential for positive impacts. 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 Canada wide recent survey conducted in 2017[2] which also found that more Canadians see more upsides than downsides when it comes to the actions that might be taken to tackle this issue.



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 humanity's ability and will to act appropriately and in time to address climate change. Six 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. Less than 10% are confident that humanity can address climate change successfully, the majority (61%) think that we could but don't know if we will adequately address climate change, while 23% believe that we are not willing to change our behaviour and therefore will not adequately address climate change.

[2] https://abacusdata.ca/political-risk-climate-action/

Which of the following statements comes closest to your view?	Percent
Humans can't address climate change, even if it is happening	5%
Humans could address climate change, but people aren't willing to change their behaviour, so we're not going to	23%
Humans could address climate change, but it's unclear whether we will do what's needed	61%
Humans can address climate change, and we will do so successfully	10%
Climate change is not happening	1%

D.6. We should address climate change because we have a moral responsibility to future generations

One-third 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 third 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	27%
We have a moral responsibility to those who will live on the planet after us	31%
We have a moral responsibility to protect plants, animals and the environment	31%
Dealing with weather-related disasters is becoming a financial disaster we must avoid	6%
The process of addressing climate change will open up new economic opportunity	4%
Climate action is not needed because the climate is not changing	1%

D.7. The majority of Prince George residents are not aware of examples of climate action being taken

A majority of Prince George residents are not aware of climate action being taken (45%) while another 20% don't know if they are aware of action underway.

When asked to provide examples of climate action (among those who are aware of action being taken), the main emergent theme was "Energy and emissions, reductions and infrastructure". Waste reduction such as recycling and composting was also key theme. Another common theme that emerged from the thematic analysis of climate action examples was "Community action, research, education" (these examples were generally vague). 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 Prince George

Theme	Frequency	Example responses
Energy and emissions, reductions and infrastructure	57	Upgrades to utility infrastructure; Bioenergy plants; Downtown energy project; Carbon tax
Waste, compost, 3Rs	42	Recycling; Composting; Waste reduction program
Community action, research, education	28	REAPS; Ongoing research at UNBC; Education around air quality
Transportation	25	Free bus when air is bad; Electric cars; Bike lanes
Local food and business	10	Farmers market; Reduce plastic bags; Consumption of local products
Policies and plans	8	City of Prince George Carbon Neutral Plan; Guiding document produced regarding forest management

APPENDIX 1: SURVEY METHODS

The *Perspectives on Climate Change in Prince George* 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 Prince George. 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 Prince George; iii) Climate action; iv) Connectedness to nature; and v) Demographic questions. The instrument is available on request.

***Data collection*:** The survey was distributed by Canada Post mail to 2,000 random households in Prince George (using the census metropolitan area as a sampling frame, a population of 86,622) 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[3] 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 4th 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 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 18th a first reminder postcard was sent. On January 25th 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.

[3] Dillman DA, Smyth JD, Christian LM (2014) Internet, phone, mail, and mixed-mode surveys: the tailored design method, 4th edn. Wiley, Hoboken

A total of 50 surveys did not reach respondents and were returned to sender and 308 responses were completed (30 were completed electronically). Upon initial review, 12 responses were excluded as a result of being incomplete (more than 50% of response left blank) or duplicate entries. The final sample was based on 297 completed surveys, adjusted response rate of 15% (this is similar to climate change survey literature).

***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 Prince George 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, %	Prince George Census Population, %
Age category			
18-34	12.8	27.3	27.4
35-54	25.9	35.7	35.7
55-69	40.4	25.3	25.3
Over 70	20.9	11.8	11.6
Sex			
Male	40.7	50.2	50.2
Female	59.3	49.8	49.8
Education			
Primary and/or secondary level education	20.9	51.85	52.0
Above secondary and below Bachelors level education	46.8	33.00	33.0
Bachelors or above	32.3	15.15	15.0

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 (90% confidence interval). This means that in 90 out of every 100 samples drawn using the same methodology, estimated proportions based on the entire sample will be no more than 10 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 two decimal places therefore percentages in a given table may total slightly above or below than 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 analysis will be conducted (using t-tests and the chi-square test for independence) to identify statistically significant differences between sub-groups.

APPENDIX 2: PLACE ATTACHMENT SCALE

We included a section to measure respondents' place attachment (relationships to nature and the natural environment) to Prince George and the surrounding region (not reported on above). These five items make up a scale that is used to measure subjective place attachment[4]. We adapted this scale to the context of Prince George and will use it to measure and assess associations between place attachment and perspective of climate change.

Please indicate your level of agreement with the following statements:	**Strongly disagree**	**Disagree**	**Neither agree nor disagree**	**Agree**	**Strongly agree**
I am very attached to the natural environment in Prince George and the surrounding region	1.37%	1.71%	9.90%	42.32%	44.71%
I would feel less attached to Prince George and the surrounding region if the native plants and animals that live here disappear	2.80%	8.04%	12.94%	40.91%	35.31%
I learn a lot about myself when spending time in the natural environment in Prince George and the surrounding region	0.34%	2.41%	25.52%	47.24%	24.48%
When I spend time in the natural environment in Prince George and the surrounding region, I feel at peace with myself	0.34%	2.41%	12.03%	47.77%	37.46%
When I spend time in the natural environment in Prince George and the surrounding region, I feel a deep sense of oneness (i.e., connectedness) with the natural environment	1.71%	2.73%	26.62%	32.76%	36.18%

[4] 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.