# Groundwork:

## Understanding User Assumptions and Bases for the *Adapt-action* Tool

July 2014

Prepared by Rachelle Haddock and Guy Greenaway

MIISTAKIS INSTITUTE

Prepared for:

**The Biodiversity Management and Climate Change Adaptation Project**

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## Executive Summary

*Adapt-action* is a web-based decision support tool being created under the *Resilience-based Adaptation for Local Communities* (RALC) sub-project. The intended outcome is municipalities that are more aware of the climate change implications for their community and the effective adaptation strategies available, and thus better able to participate in climate change adaptation planning.

The *Adapt-action* tool was structured after two years of research by the Miistakis Institute into municipal climate resiliency, but remains necessarily theoretical, requiring a conceptual structure being put before relevant stakeholders, in order to test the bases and assumptions with which the tool was framed.

The primary goal of the stakeholder engagement was to understand what information municipalities would most want and need in a climate change adaption decision-support tool. An on-line survey was created to seek input to inform a tool design which best meets the needs of Alberta municipalities seeking to adapt to a changing climate regime, as well as targeted interviews. Municipal stakeholders both with and without direct experience in climate change adaptation planning processes were consulted.

The information and data gathered in the stakeholder engagement process was reviewed with an eye to how it could inform and improve the *Adapt-action* tool. The analysis was divided into three types: Observations summarized feedback at a fairly literal level, Conclusions drew lessons from the Observations, and Moving Forward identified specific actions the Miistakis Institute will take to improve the *Adapt-action* tool.

## Biodiversity Management and Climate Change Adaptation Project

The Biodiversity and Climate Change Adaptation Project was conceived by the Alberta Biodiversity Monitoring Institute (ABMI) in response to the need to define the scope of change required to effectively manage biodiversity under a changing climatic regime, and to support Alberta's biodiversity management system with essential knowledge and tools for successful adaptation to a changing future climate.

The rationale for this initiative rests on the importance of biodiversity to Albertans, and the complex relationship between climate and biodiversity. Biodiversity, which includes species and their ecosystems, supports the delivery of numerous ecosystem services. These include provisioning services (e.g., food, fibre, fuel, water), regulating services (e.g., water and air filtration, flood regulation), cultural services (e.g., nature recreation, wildlife viewing) and supporting services such as soil formation and wildlife habitat. Because these biodiversity-related services are impacted by a changing climate, and because the relationship between climate and biodiversity is uncertain, knowledge gaps constrain effective adaptation. Proactive investments in the knowledge and tools for effective biodiversity management under a changing climate regime will deliver significant benefits to people and avoid crisis-driven interventions that are by their nature reactive, costly and often ineffective.

The goal of the *Biodiversity Management and Climate Change Adaptation* project is to develop essential knowledge and tools to support the management of Alberta's biodiversity and promote successful adaptation to a changing climate. The project is comprised of four objectives:

1. Predicting the impacts of climate change on Alberta's native species and ecosystems

2. Predicting invasive species responses to climate change

3. Assessing strategies to support climate sensitive species-at-risk

4. Developing and evaluating adaptation policy and tools to manage biodiversity in a changing climate

The *Resilience-based Adaptation for Local Communities* sub-project, led by the Miistakis Institute, directly supports objective 4. The goal of this sub-project is to support Alberta communities to better understand climate-related risks and adaptations in the context of ecosystem services and biodiversity.

# Table of Contents

# 1.0 INTRODUCTION

## The Resilience-based Adaptation for Local Communities project

*Adapt-action* is a web-based decision support tool being created under the *Resilience-based Adaptation for Local Communities* (RALC) sub-project. The intended outcome is that by engaging with the *Adapt-action* tool, southern Alberta municipalities will be more aware of the climate change implications for their community, more aware of the effective adaptation strategies available to them, and better able to participate in climate change adaptation planning. As well, participating municipalities will be able to integrate ecosystem-based and 'soft' adaptation strategies (longer-term, behaviour-based, system-oriented) with 'hard' adaptation strategies (near-term, hard engineered, targeted fix).

The output currently being created, the *Adapt-action* tool, is a web-based, climate change adaptation resource for southern Alberta municipalities. It allows the user to explore adaptation issues of critical concern, gather information that supports addressing that issue, and generate customized outputs for their community which shows each issue's implications, causal environmental changes, potential strategies, and existing resources.

## Engaging Potential Users

The *Adapt-action* tool was drafted after two years of research by the Miistakis Institute into:

- The potential processes and tools that municipalities can use to become more climate resilient;
- The gaps in the support and resources for engaged municipalities;
- The needs of municipalities regarding climate resiliency (what Alberta's municipalities need);
- The needs of climate resiliency with regard to municipalities (what Alberta's biodiversity needs); and
- How to integrate 'hard' and 'soft' approaches for municipal climate resiliency.[1]

*(For more details on this work, see Chernoff 2013, Chernoff 2014, Greenaway et al 2012, Greenaway et al 2013, Greenaway 2013a, Greenaway 2013b, Greenaway 2014, Lee and Sanderson 2014, Lee et al 2014, Sanderson 2013).*

A basic structure for the *Adapt-action* tool has been created. This structuring was based on this research, and involved numerous conversations with people involved in adaptation 'action planning,' municipal governance, and academia. However, those conversations and that research remained necessarily theoretical until we could put a conceptual structure before people with these perspectives, and test the bases and assumptions with which we framed the *Adapt-action* tool.

[1] Municipal 'climate resiliency' is an updated term, used in place of municipal 'climate change adaptation,' but with the same functional definition.

This report summarizes the results of the first stage of that testing, and can be considered a user needs assessment of the underlying assumptions of the tool. The structure of the tool will be revised based on this input. A second stage of testing will take place once the beta of the tool is complete; that stage will see the testing of the actual tool and its interface.

## 2.0 STAKEHOLDER ENGAGEMENT GOALS

The primary goal of the stakeholder engagement was to understand what information municipalities would most want and need in a climate change adaption decision-support tool. Associated goals for the stakeholder engagement included: i) understand which climate change adaptation issues are most compelling to municipalities (and by extension, which narratives we should start with); and ii) test the first *Adapt-action* narrative (Adapting to Water Scarcity) to see if the use of the narrative as a guidance device is intuitive, if the narrative guides users to the kind of information they are expecting, and if the information they get is useful for decision support (re: climate change adaptation or climate resiliency).

## 3.0 STAKEHOLDER ENGAGEMENT APPROACH

The concept testing was completed through a two-pronged approach: 1) an on-line survey and 2) interviews. The stakeholder engagement was completed during the months of June and July 2014.

### On-line Survey

#### *Survey Testing*

We created an on-line survey to seek input to design a tool which best meets the needs of Alberta municipalities seeking to adapt to a changing climate regime. We tested our draft survey instrument with a number of key municipal climate change adaptation contacts including Jeff Zukiwsky (Zumondo Community & Environmental Planning), Amy Nixon (ABMI), Laura De Carolis (Municipal Climate Change Action Centre or MCCAC), Grant Pearsell (City of Edmonton, Biodiversity Office) and several Miistakis staff members. The revised survey instrument went "live" on SurveyMonkey.com on June 4, 2014 and was open until July 7, 2014. A copy of the survey is provided in Appendix A.

#### *Target Survey Participant*

The profile of the target survey participant was a person within a municipality who plays a role that may be affected by climate change; they may be directly involved in planning for climate change, in charge of services impacted by climate change, in charge of policy at a more senior level, a community contact point, in charge of environmental or conservation issues for the municipality, or just a champion for municipal adaptation to climate change. Some possible roles might include:

- Agricultural services board or agricultural fieldman
- Councilor
- Long range planner or director of planning
- Infrastructure position (roads, water services, physical plant, etc.)
- Sustainability/biodiversity/conservation/natural areas position
- Other.

We also wished to engage with municipalities that have already undertaken a climate change adaptation action planning process, and with individuals or organizations who have been active in supporting municipal climate change adaptation planning processes. Stakeholders from both groups were represented in the survey testing, on-line survey participation, and *Adapt-action* interviews.

### *Survey Promotion*

The survey was promoted via individual email messages to a list of key municipal contacts generated by the Miistakis team, and a list of additional contacts provided by other key informants. The promotional email was sent to over 40 individuals and they were asked to forward the email on to any relevant contacts (i.e., snowball sampling). The email text read as follows:

> *"Miistakis is developing a web-based, climate change adaptation resource for use by Alberta municipalities called "Adapt-action." The Adapt-action tool is intended to help Alberta municipalities become more aware of climate change implications for their community, more aware of effective adaptation strategies available to them and better able to participate in climate change adaptation planning. This tool is being developed as part of the Biodiversity Management and Climate Change Adaptation project, which is led by the Alberta Biodiversity Monitoring Institute and funded by the Climate Change and Emissions Management Corporation.*
>
> *We have created an online survey to gather input from municipal stakeholders to design a tool which best meets the needs of Alberta municipalities seeking to adapt to a changing climate regime. Your name has been put forward as a relevant municipal contact that could provide us with useful feedback and ideas through our survey. Would you be willing and able to complete our survey? The survey will take between 15-25 minutes of your time, and I am hoping to receive your feedback by Friday, July 4, 2014. To access the survey, please visit:* https://www.surveymonkey.com/s/municipalclimatechange
>
> *Also, can you please forward this message on to your municipal contacts that play a role that may be affected by climate change? Whether they are an agricultural fieldman, a councillor, a planner, someone in a conservation/natural areas position, an infrastructure position or another relevant position, we want to hear from them too."*
> [end]

Laura de Carolis (MCCAC) forwarded the promotional message on to 50 people who had been participants in climate change adaptation workshops held in the spring of 2014. We also promoted the survey through a series of tweets from the Miistakis Twitter account. The tweets were retweeted seven times. ABMI also tweeted about the survey. Here is a sample tweet:


When the survey closed on July 7, we had 40 survey respondents. Given the small community which we were targeting, and that we did not need a statistically valid sample, this served our needs well.

### *Survey Results*

The survey results are presented by question. Please note that the responses provided through the open-ended questions within the survey are raw data. They have not been edited for style or grammar in order to best reflect respondents' input.

Question 1: **Who do you represent? Please select one response.**

| Answer Options | Response Percent | Response Count |
|---|---|---|
| Large urban municipality | 22.5% | 9 |
| Small urban municipality | 17.5% | 7 |
| County or municipal district | 60.0% | 24 |
| Other - please specify below. | | 3 |
| ***answered question*** | | **40** |
| ***skipped question*** | | **2** |

Other responses provided by respondents:

- Special Area
- Specialized municipality
- NGO that works with First Nation communities on climate change issues

Question 2: **What role do you play? Please select one response.**

| Answer Options | Response Percent | Response Count |
|---|---|---|
| Councilor | 5.0% | 2 |
| Municipal staff - planning | 7.5% | 3 |
| Municipal staff - infrastructure | 0.0% | 0 |
| Municipal staff - agriculture | 45.0% | 18 |
| Municipal staff - environment | 22.5% | 9 |
| Municipal staff - other | 17.5% | 7 |
| Consultant | 0.0% | 0 |
| Academic | 0.0% | 0 |
| Municipal association | 0.0% | 0 |
| Government of Alberta | 0.0% | 0 |
| Non-governmental organization | 2.5% | 1 |
| Other - please specify below. | | 5 |
| ***answered question*** | | **40** |
| ***skipped question*** | | **2** |

Other responses provided by respondents:

- Office of Sustainability
- Resident, landowner
- Sustainability
- Strategic/technical  Economic Growth , Town
- Municipal staff – regulatory

Question 3: **On a scale from strongly disagree to strongly agree, please select the response that best represents your opinion for the following statements about climate change:**

| Answer Options | Strongly disagree | Disagree | Neither agree nor disagree | Agree | Strongly agree | Uncertain | Rating Average | Response Count |
|---|---|---|---|---|---|---|---|---|
| Climate change is occurring, and it is caused mostly by human activities. | 1 | 3 | 10 | 10 | 15 | 0 | 3.90 | 39 |
| There is not sufficient evidence to know with certainty whether climate change is occurring. | 16 | 18 | 1 | 3 | 1 | 0 | 1.85 | 39 |
| Extreme weather events will happen more frequently in the future as a result of climate change. | 1 | 3 | 7 | 9 | 19 | 1 | 3.98 | 40 |
| ***answered question*** | | | | | | | | **40** |
| ***skipped question*** | | | | | | | | **2** |

Question 4: **Assuming it's happening, if nothing is done to reduce climate change in the future, how serious of a problem do you think it would be for your municipality? Please select one response that best describes your opinion.**

| Answer Options | Response Percent | Response Count |
|---|---|---|
| Very serious | 37.5% | 15 |
| Somewhat serious | 40.0% | 16 |
| Not so serious | 10.0% | 4 |
| Not serious at all | 0.0% | 0 |
| I am uncertain | 12.5% | 5 |
| ***answered question*** | | **40** |
| ***skipped question*** | | **2** |

Question 5: **Please rank your level of concern about the following climate change effects for your community, with 1 being the climate change effect you are most concerned about for your community and 4 being the climate change effect you are least concerned about for your community. If you are not concerned about a climate change effect, please select the N/A box on the right-hand side.**

| Answer Options | 1 | 2 | 3 | 4 | N/A | Rating Average | Response Count |
|---|---|---|---|---|---|---|---|
| Increased frequency or severity of water scarcity | 19 | 14 | 6 | 0 | 1 | 1.67 | 40 |
| Increased frequency or severity of flooding | 11 | 10 | 13 | 5 | 1 | 2.31 | 40 |
| Increased frequency or size of wildfires | 5 | 7 | 5 | 21 | 2 | 3.11 | 40 |
| Biodiversity loss | 4 | 8 | 15 | 10 | 3 | 2.84 | 40 |
| ***answered question*** | | | | | | | **40** |
| ***skipped question*** | | | | | | | **2** |

Question 6: **Aside from the climate change effects listed above in question five, are there any other climate change effects that you are concerned about for your community? If so, please list them below.**

- Curtailment of food supplies, natural aesthetic degradation, loss of business economic support, unemployment, Health degradation - disease proliferation, Climate zone shifting north - more invasive natural species, crop failure
- From an agricultural stand point there could be a concern of different climates bringing different diseases in that we are not used to/capable of dealing with efficiently
- Increased frequency or severity of storms (both summer and winter storms)
- Food security - from extreme weather events in areas that export food to Alberta.
- Crop development
- Our top 3 municipal concerns/predicted impacts are more frequent/severe storms (all seasons), flooding, and drought.
- Extreme cold (-40) for longer than 2 weeks.
- We rely on another municipality for our water so with increasing water scarcity in a fast growing region then we'll see dramatic cost increases for a water supply
- Invasive species, air quality, agricultural changes
- Increased frequency or severity of extreme weather events.
- Food
- Tornado factor elevated intensity, Hail intensity in Central Alberta, wind shear bursts.

- Late season snow accumulation. Heavy rain on snow events causing rapid run-off in our mountain creeks. This is a very particular problem to the Bow Valley at the front-ranges of the Canadian Rockies. Spring storms are increasing in rainfall. A warming climate will hold more moisture. When these moisture laden clouds collide with the front-ranges and release large rains, they fall on our dwindling snowpack. Timing of these storms in conjunction with the late-season snowfalls and snowpack can have a very severe impact, specifically in our ecosystem and infrastructure, bridges, underground utilities, wastewater treatment plants, housing subdivisions.
- Cost of implementing possible solutions
- Extreme storms that result in serious property damage (such as severe hail storms). I'm also concerned about higher average temperature disrupting food production and general biodiversity.
- Loss of tree inventory (linked but not necessarily the same as biodiversity loss), Increased freeze & thaw cycles impact on road infrastructure (pot holes)"
- Introduction of invasive species
- Effects of pollution effects of over-fishing effects of chemical pesticides
- Human health impacts (e.g., Lyme disease etc.) and strain this may cause on community services
- Economic impacts
- Increase storm severity either snow, tornado, rain
- Severe weather events in general (e.g. severe cold, severe heat, severe storms)

Question 7: **Climate change will have implications on many aspects of your community. Please rank your level of concern for each climate change implication in your community on a scale from "not at all concerned" to "extremely concerned."**

| Answer Options | Not at all concerned | Slightly concerned | Somewhat concerned | Moderately concerned | Extremely concerned | Uncertain | Rating Average | Response Count |
|---|---|---|---|---|---|---|---|---|
| Human health | 1 | 8 | 8 | 9 | 13 | 1 | 3.55 | 40 |
| Agriculture | 1 | 4 | 6 | 9 | 18 | 2 | 3.83 | 40 |
| Recreation/tourism | 7 | 12 | 8 | 10 | 2 | 1 | 2.63 | 40 |
| Biodiversity/ecosystems | 1 | 3 | 5 | 9 | 21 | 1 | 4.08 | 40 |
| Transportation infrastructure | 6 | 9 | 4 | 13 | 6 | 2 | 2.95 | 40 |
| Utility infrastructure | 5 | 7 | 5 | 12 | 8 | 3 | 3.05 | 40 |
| Buildings/built environment | 4 | 9 | 6 | 14 | 5 | 1 | 3.10 | 39 |
| Quality of life | 1 | 6 | 3 | 12 | 16 | 1 | 3.85 | 39 |
| Other implications you are concerned about? If yes, please specify. | | | | | | | | 3 |
| ***answered question*** | | | | | | | | **40** |
| ***skipped question*** | | | | | | | | **2** |

Other responses provided by respondents:

- Rec/Tourism - only slightly worried because there will be MUCH bigger problems to address
- Insurance rate increases will be borne by all, not just those affected. This will add to our already high cost of living, and providing services to the community.
- The interaction between emission/chemical/garbage/radioactive pollution and the above

Question 8: **Climate change adaptation includes any initiatives or actions in response to actual or projected climate change impacts which reduce the effects of climate change on built, natural and social systems (ICLEI Canada 2012). In your opinion, which municipal services/departments in your community are in need of support (e.g., information, expert advice, financial resources, etc.) for climate change adaptation? Please rate each of the following on a scale from "not a priority" to "essential."**

| Answer Options | Not a priority | Low priority | Medium priority | High priority | Essential | Uncertain/not applicable | Rating Average | Response Count |
|---|---|---|---|---|---|---|---|---|
| Planning | 0 | 1 | 11 | 6 | 19 | 1 | 4.05 | 38 |
| Economic Development | 2 | 5 | 15 | 9 | 5 | 1 | 3.19 | 37 |
| Recreation/Parks/Biodiversity | 0 | 6 | 13 | 12 | 6 | 1 | 3.39 | 38 |
| Roads | 2 | 4 | 12 | 12 | 7 | 1 | 3.39 | 38 |
| Water and Waste Services | 0 | 0 | 7 | 15 | 15 | 2 | 4.00 | 39 |
| Corporate Services | 4 | 6 | 15 | 6 | 3 | 3 | 2.70 | 37 |
| Agricultural Services | 1 | 3 | 7 | 13 | 9 | 6 | 3.21 | 39 |
| Council | 2 | 4 | 11 | 8 | 13 | 1 | 3.59 | 39 |
| Emergency Services | 0 | 3 | 5 | 11 | 17 | 1 | 4.05 | 37 |
| Community Services | 1 | 7 | 10 | 9 | 7 | 2 | 3.22 | 36 |
| Other services/departments? If yes, please specify. | | | | | | | | 8 |
| ***answered question*** | | | | | | | | **39** |
| ***skipped question*** | | | | | | | | **3** |

Other responses provided by respondents:

- Development of community structure must be priority to survive crisis events
- Senior management teams
- Environment
- For the communities I work with recreation would not be in the same department as biodiversity
- Engineering design information instability
- FCSS handling people in crisis, mentally, emotionally, fiscally.
- Storm water/Drainage - essential
- Really not sure of where the greatest cost or need for planning and resiliency is?

Question 9: **Which municipal plans do you, or might you, consider relying on to further climate change adaptation in your community? Please select all responses that apply.**

| Answer Options | Response Percent | Response Count |
|---|---|---|
| Municipal Development Plan | 75.7% | 28 |
| Area Structure Plans | 64.9% | 24 |
| Sustainability Plans | 70.3% | 26 |
| Infrastructure Plans | 56.8% | 21 |
| Regional Plans | 70.3% | 26 |
| Growth Management Plans | 56.8% | 21 |
| Area Concept Plans | 29.7% | 11 |
| None of the above plans are important | 0.0% | 0 |
| I am uncertain which plans are important | 10.8% | 4 |
| Other municipal plans relevant to climate change? If yes, please specify. | | 8 |
| ***answered question*** | | **37** |
| ***skipped question*** | | **5** |

Other responses provided by respondents:

- There is a lot of attention on adaptation, much less on mitigation.
- We have a climate change adaptation plan adopted in March 2014
- Water management strategy
- Municipal policies, Land Use Bylaw
- Unsure if climate change will occur at a pace that will impact medium term plans
- ESAP document regarding sustainability, Natural Step document.
- Corporate Strategic Plan; Integrated Community Sustainability Plan (ICSP)
- We are considering a Climate Adaptation Plan in 2015; and climate adaptation also has to be including in strategic planning, business planning and budgeting

Question 10: **What are your main concerns about pursuing climate change adaptation activity in your municipality? Please select all responses that apply.**

| Answer Options | Response Percent | Response Count |
|---|---|---|
| Costs of implementing climate change adaptation strategies | 63.2% | 24 |
| Knowledge of effective climate change adaptation strategies | 73.7% | 28 |
| Capacity to undertake a new program | 57.9% | 22 |
| Available funding | 71.1% | 27 |
| Uncertainty or debate regarding the existence of climate change | 47.4% | 18 |
| I am uncertain/not applicable | 5.3% | 2 |
| Other concerns? If yes, please specify. | | 7 |
| ***answered question*** | | **38** |
| ***skipped question*** | | **4** |

Other responses provided by respondents:

- Uncertainty on behalf of decision makers (business and council)
- All resources in one area: flood adaptation
- Uncertain about the pace of climate change
- Using engineering strategies to "protect", rather than land-use strategies to adapt.
- I'm concerned that adaptation programs will take precedence over mitigation programs. Adaptation programs MUST include a discussion about why mitigation programs are still essential.
- Issues: capacity, ability to plan, recognize the most important things and move towards at least best management practices, this is complex and hard to make people care about it and spend money on it
- Landowner education and "buy-in"

Question 11: **Do you engage in any of the following activities (which may support climate change adaptation)? Please select all responses that apply.**

| Answer Options | Response Percent | Response Count |
|---|---|---|
| Zoning for environmentally significant areas | 51.4% | 19 |
| Increases in water storage infrastructure capacity | 29.7% | 11 |
| Support for low tillage agriculture | 40.5% | 15 |
| Re-design of infrastructure for extreme weather | 24.3% | 9 |
| Community education regarding climate change | 37.8% | 14 |
| Habitat conservation | 59.5% | 22 |
| Disaster/emergency response planning & testing | 64.9% | 24 |
| Firesmarting | 35.1% | 13 |
| Property taxation incentives for conservation | 2.7% | 1 |
| I am uncertain/not applicable | 5.4% | 2 |
| Other activities (please specify)? | | 5 |
| ***answered question*** | | **37** |
| ***skipped question*** | | **5** |

Other responses provided by respondents:

- We are trying, but only in baby step fashion. It's all we can afford to do. Some bylaws and design practices are being overridden by developers.
- In my role, that is. The City is engaged in all of these.
- Infrastructure upgrades, flood prep, parks planning - many activities
- Recycling
- Some of these may be undertaken and  some are na wish list due to cost and property rights, lack of clarity on the offset and TDCs, land trusts not having enough capacity, people not being aware of need, people not being aware of or interested in natural capital values, highest and best use battle on land-use...

Question 12: **Do you engage in any of the following watershed stewardship activities (which may support climate change adaptation)? Please select all responses that apply.**

| Answer Options | Response Percent | Response Count |
|---|---|---|
| Wetland protection, creation or restoration | 67.6% | 25 |
| Riparian protection or enhancement | 81.1% | 30 |
| Water conservation initiatives | 67.6% | 25 |
| Buffer creation within flood zones | 43.2% | 16 |
| Beaver reintroduction | 2.7% | 1 |
| I am uncertain/not applicable | 10.8% | 4 |
| Other activities (please specify)? | | 3 |
| ***answered question*** | | **37** |
| ***skipped question*** | | **5** |

Other responses provided by respondents:

- We have little control over many areas described, because the lands are in private hands.
- The City, that is. In my role, minimal engagement.
- Beaver reintroduction - I call it beaver transfer of density program is in its infancy here and is mildly tolerated - long story, looking at flood-mapping overlay for information on making planning decisions

Question 13: **Has your municipality undertaken any formal climate change adaptation planning and activities?**

| Has your municipality undertaken any formal climate change adaptation planning and activities? | | |
|---|---|---|
| **Answer Options** | **Response Percent** | **Response Count** |
| Yes | 28.9% | 11 |
| No | 55.3% | 21 |
| I am uncertain/not applicable | 15.8% | 6 |
| ***answered question*** | | **38** |
| ***skipped question*** | | **4** |

Question 14: **Are you currently using any resources in your climate change adaptation planning and activities? If yes, please list them.**

| Answer Options | Response Count |
|---|---|
| | 6 |
| *answered question* | **6** |
| *skipped question* | **36** |

Responses provided by respondents:

- Education. trying to implement incentives to reduce energy use, improve drainage structure for City, implement low impact development strategies for developers (voluntary), reduce operational greenhouse gas emissions, drive to more recycling of waste
- ICLEI's BARC program
- Water irrigation, conservation , infiltration reduction waste water
- I am not involved in the adaptation strategy, so I am uncertain what resources they are using. I believe they are following ICLEI protocol.
- I think our planning & activities are not officially labelled as climate change, since one would have to defend the expense of them without having the information and dollars to get into the realm of scientific debate over managing finite tax dollars for important services which municipalities are bound to provide. So, what I think is important is to label the tasks/goals as related to changing practices which we can see have a detrimental outcome and, where possible, to implement planning policies and practices which we can support with information, scientific backup and further connect residents to experts. Planning staff (and hopefully councils) have to be up to date on the latest advances and information but then the public has to be somewhat ready to accept the ideas and the cost. So, consultation and public opinion are vital to advancing any cause that their tax dollars are going to support. People rely on their representatives to educate themselves and make decisions on their behalf, but there is a fine line of overstepping into areas where there is not going to be support. The result of that could be the whole council getting voted out and starting over (with the result of going back to old behaviours, etc.)... So, you have to be in touch with the public but also provide education and opportunity for which they have a say and a vote when it includes spending their money (when developing the municipal plans, etc.). And, some people are interested and some just want the lowest possible taxes. Obviously a long conversation on this one...
- Not sure what you mean by resources? but I attended MCCACs climate adaptation workshop earlier this year and we've been using CIPs Climate Change Adaptation Planning: Handbook for Small Canadian Communities as a bit of a guide for planning our stab at this in 2015

Question 15: **In order to support your climate change adaptation planning and activities, would descriptions of how adaptation strategies could connect to your existing municipal plans be useful to you?**

| Answer Options | Response Percent | Response Count |
|---|---|---|
| Yes | 70.3% | 26 |
| No | 0.0% | 0 |
| I am uncertain/not applicable | 29.7% | 11 |
| ***answered question*** | | **37** |
| ***skipped question*** | | **5** |

Question 16: **In order to support climate change adaptation planning and activities, which of the following types of information would be helpful to you? Please select all that apply.**

| Answer Options | Response Percent | Response Count |
|---|---|---|
| Visualizations of the potential impacts of climate change in your area on ecosystems & biodiversity, infrastructure, human health, etc. | 78.4% | 29 |
| Maps of the projected changes due to climate change for your area (e.g., temperature, growing degree days, precipitation, etc.) | 86.5% | 32 |
| Summary tables of data (e.g., temperature, growing degree days, precipitation, etc.) | 54.1% | 20 |
| Plain language descriptions about climate trends & projections in my region | 78.4% | 29 |
| None of the above | 0.0% | 0 |
| I am uncertain/not applicable | 5.4% | 2 |
| Other types of information? If yes, please specify. | | 6 |
| ***answered question*** | | **37** |
| ***skipped question*** | | **5** |

Other responses provided by respondents:

- From reputable sources - need success stories as well, Boston CC plan...
- Cost projections and funding for adaptation implementation
- How warming affects water retention in the atmosphere and what that means to us when it interfaces with our snowpack and spring run-off.

- Plain language is key to information and education!
- Potential impacts should be time dependent e.g. 30, 50, 100 years recognizing that the further out the greater uncertainty
- I am not sure if climate change is a predictable state, therefore not sure what weather measurements would do other than show you there is variation; important to plan to save on the costs which are a consequence of poor-planning; be prepared; reduce impacts of human footprint - perhaps measuring agriculture land fragmentation or things we can see will produce an outcome that we/residents are more likely to understand; information about impacts of behaviours is important, etc.

Question 17: **Would videos to support climate change adaptation planning and activities be useful to you?**

| Answer Options | Response Percent | Response Count |
|---|---|---|
| Yes | 72.2% | 26 |
| No | 5.6% | 2 |
| I am uncertain/not applicable | 22.2% | 8 |
| ***answered question*** | | **36** |
| ***skipped question*** | | **6** |

Question 18: **In supporting your climate change adaptation planning and activities, what types of videos would be useful to you? Please select all responses that apply.**

| Answer Options | Response Percent | Response Count |
|---|---|---|
| Videos of local people describing their experiences with climate change | 53.8% | 14 |
| Videos of scientists describing projected environmental changes | 57.7% | 15 |
| Videos of people describing their experiences with potential adaptations to climate change | 69.2% | 18 |
| Other videos? If yes, please specify. | | 3 |
| ***answered question*** | | **26** |
| ***skipped question*** | | **16** |

Other responses provided by respondents:

- "What if" risk scenario assessments - existing standard designs only cover x/y% of the risk - insurance cost link!!!
- The third especially
- Videos describing the what if scenarios with maps to display impacted areas

Question 19: **In order to support your climate change adaptation planning and activities, would case studies of how others have approached climate change adaptation be useful to you?**

| Answer Options | Response Percent | Response Count |
|---|---|---|
| Yes | 89.2% | 33 |
| No | 5.4% | 2 |
| I am uncertain/not applicable | 5.4% | 2 |
| ***answered question*** | | **37** |
| ***skipped question*** | | **5** |

Question 20: **Are you aware of any case studies on climate change adaptation that we could share? If yes, please describe below.**

| Answer Options | Response Count |
|---|---|
| | 10 |
| ***answered question*** | **10** |
| ***skipped question*** | **32** |

Other responses provided by respondents:

- Boston situation, optional scenario planning for hurricane Katrina. Edmonton appears to have low risk for water supply. Only storms are a potential problem but the link is not being made to the effect of climate change on our food supply. We need to highlight this, as well as infrastructure degradation due to changing weather patterns.
- No
- New York - Resilience Plan, Boston, Red Deer, Alberta
- Federal Ag department fore sighting project
- Any you do share will need to be relatable for an Alberta audience/climate (ex. avoid coastal examples)
- TSAG Lessons learned document on climate change vulnerability assessment and adaptation planning
- Edmonton Drainage Services - regarding changing rainfall amounts and patterns
- Not sure at this point, since the title is so broad. An important point to consider, if possible, is to share the cost and cost benefit - including natural capital, the cost of not doing the change, etc. This relates to planning and preservation of important lands and also building resilient infrastructure that is more likely to survive extreme weather events. Post flood 2013, our municipalities are looking at scenarios from Canada, the states and other flood prone areas in the world or just being smart

about preventing the same losses if similar circumstances were to occur – if there is money, time and ability to make the changes. Looking at doing things smarter can be sold on cost-benefit analysis and not necessarily under the title of "climate change". So, I am not sure if a change in "title" to help with more clarity/practicality may make this project more likely to be welcomed.

- Leduc just did one, so did Red Deer. I know many communities in BC have done them, but access to Alberta examples would be helpful
- City of Copenhagen, City of New York

Question 21: **On a scale from "not at all useful" to "extremely useful," please rate how useful you would find the following resources to support your climate change adaptation planning and activities.**

| Answer Options | Not at all useful | Slightly useful | Somewhat useful | Moderately useful | Extremely useful | Uncertain/not applicable | Rating Average | Response Count |
|---|---|---|---|---|---|---|---|---|
| Expert support in climate change adaptation planning | 0 | 2 | 4 | 9 | 18 | 3 | 4.44 | 36 |
| Expert support in climate change projections | 0 | 2 | 4 | 7 | 21 | 2 | 4.47 | 36 |
| Sample policies, plans and processes | 0 | 3 | 3 | 12 | 15 | 3 | 4.33 | 36 |
| Local municipal contacts with adaptation experience | 0 | 3 | 4 | 8 | 17 | 3 | 4.37 | 35 |
| Data on regional climate change | 0 | 1 | 4 | 11 | 18 | 2 | 4.44 | 36 |
| Climate change adaptation planning tools | 0 | 1 | 2 | 12 | 16 | 4 | 4.57 | 35 |
| Plain language information about climate trends & projections in my region | 0 | 2 | 1 | 10 | 20 | 2 | 4.54 | 35 |
| ***answered question*** | | | | | | | | **36** |
| ***skipped question*** | | | | | | | | **6** |

Question 22: **Where do you think support (e.g., financial, in-kind resources, information, etc.) for climate change adaptation at the municipal level should come from? Please select all responses that apply.**

| Answer Options | Response Percent | Response Count |
|---|---|---|
| The provincial government | 91.7% | 33 |
| The municipality | 58.3% | 21 |
| Academia | 33.3% | 12 |
| The federal government | 77.8% | 28 |
| Agricultural operators | 16.7% | 6 |
| Businesses | 38.9% | 14 |
| Community members | 22.2% | 8 |
| I am uncertain | 11.1% | 4 |
| Other sources of support? If yes, please specify. | | 2 |
| *answered question* | | 36 |
| *skipped question* | | 6 |

Other responses provided by respondents:

- If tax dollars, there has to be political and social will. It seems there is the will to do things smarter and be more environmentally consciously, which means people are expecting support from the federal and provincial governments and offsets from industry. So much of these plans and initiatives get downloaded to municipalities, I don't know how we would manage to administer or support too many more committees or plans. It is a difficult question because there are some many agencies after the tax dollars in these areas, and some important ones, example land trusts are under-funded. Also, a lot of volunteers are working in so many committees already, there is questionable capacity. However, if the topic of climate change or rather "planning for adaptation to adverse climate events and creating resiliency" continues to be a socially supported, then the municipalities will likely get this into their repertoire. But I think you have to be careful when you roll this out. So many smaller municipalities don't have the capacity, etc., so it might be a regional information-sharing cooperative partnership of information that may be needed???
- CCEMC funds could be used to support municipalities doing this work, after all emissions are one of the primary reasons we're having to deal with climate change impacts

Question 23: **Are you likely to approach the following sources for information on municipal climate change adaptation?**

| Answer Options | Yes | No | Uncertain/not applicable | Response Count |
|---|---|---|---|---|
| Alberta Association of Municipal Districts & Counties (AAMDC) | 17 | 9 | 8 | 34 |
| Alberta Urban Municipalities Association (AUMA) | 16 | 12 | 3 | 31 |
| Municipal Climate Change Action Centre (MCCAC) | 17 | 4 | 8 | 29 |
| Local Governments for Sustainability - ICLEI | 13 | 5 | 10 | 28 |
| Other information sources (please specify)? | | | | 5 |
| ***answered question*** | | | | **36** |
| ***skipped question*** | | | | **6** |

Other responses provided by respondents:

- Federation of Canadian Municipalities, Carbon Disclosure Project, World Covenant on Climate Change, C40 (Big City Mayor's covenant for Climate Change?), Climate Change Central (C3?)
- Consulting engineers
- http://act-adapt.org/wp-content/uploads/2011/06/09-11-Water-Briefing-Paper-WEB1.pdf
- FCM (partnership with ICLEI) & Urban Sustainability Directors Network (USDN)
- Not sure. As you know there are so many competing interests for municipalities to focus on. Plus, many of us are not going to be done with recovery from 2013 for some time.

Question 24: **Where would you seek/have you sought funding to support climate change adaptation? Please select all responses that apply.**

| Answer Options | Response Percent | Response Count |
|---|---|---|
| Alberta Municipal Infrastructure Program | 31.4% | 11 |
| Alberta Municipal Water/Wastewater Partnership (AMWWP) | 25.7% | 9 |
| Federal Gas Tax Fund (FGTF) | 28.6% | 10 |
| Municipal Sustainability Initiative | 42.9% | 15 |
| General Revenues | 28.6% | 10 |
| None of the above | 20.0% | 7 |
| I am uncertain/not applicable | 28.6% | 10 |
| Other sources of funding? If yes, please specify. | | 6 |
| *answered question* | | 35 |
| *skipped question* | | 7 |

Other responses provided by respondents:

- Paying for Green energy from Operating expenses, assigned money for energy efficiency home projects
- Climate change adaptation planning fund through AANDC
- Climate change center
- Municipal Levy for land use and infrastructure.  Private foundations that support climate initiatives. RBC etc.
- I am not certain because these other funds are marked for projects.  To start with we would need to bring in more awareness to smart adaptations, then planning, then go to modifications of projects or new projects...
- I've been told recently that there are currently no funds available to municipalities to do this work or develop a plan

Question 25: **In your opinion, what is the role of the Government of Alberta in addressing climate change adaptation? Please select all responses that apply.**

| Answer Options | Response Percent | Response Count |
|---|---|---|
| Funding | 86.1% | 31 |
| Information support | 83.3% | 30 |
| Policy direction | 77.8% | 28 |
| None of the above | 0.0% | 0 |
| I am uncertain | 8.3% | 3 |
| Other roles? If yes, please specify. | | 5 |
| ***answered question*** | | **36** |
| ***skipped question*** | | **6** |

Other responses provided by respondents:

- Lead by example. Confirm the provincial position
- Recognize that our economic model of developing the oil sands is in direct opposition to reducing and adapting to climate change. If we continue down this path, we must off-set the costs with support for the rest of the province that will feel the impacts. Flooding, environmental degradation, economic disparity, emotional crises that accompany disasters and displacement, shrinking municipal resources and limited resources of taxpayers.
- Not sure... example - if guidelines/specs change to projects which make them incrementally more expensive and there is no funding to match (or incentives), you may not get any forward movement or at least, it will be over a long period...
- LEADERSHIP WOULD BE NICE!
- They also need to "buy in"

## *Adapt-action* Interviews

To achieve our stated goals for testing the *Adapt-action* Tool we created a YouTube video with the singular purpose of guiding interviewees through the proposed structure of the *Adapt-action* Tool. The video can be viewed at: https://www.youtube.com/watch?v=9iYVIt3H8lA

We created an interview guide to lead interviewees through the video and collect their input at specific points in the video. The interview guide is included as Appendix B. The interview was designed to be 30 minutes to an hour-long in duration.

We targeted nine people for the *Adapt-action* interviews through individual email requests. These contacts had been identified as ideal interview candidates for *Adapt-action* given their background, experience and skills with municipal climate change adaptation planning. We were able to complete interviews with six of these individuals. The individuals who completed interviews included:

- Frank Liszczak – Matrix Planning
- Grant Pearsell – City of Edmonton
- Harry Harker – City Spaces Consulting Ltd.
- Jeff Zukiwsky - Zumundo Community and Environmental Planning
- Lori Rissling Wynn – Town of Canmore
- Steven de Keijzer – Matrix Planning

One interview was completed in person and the remaining five interviews were completed over the phone. The interviews were transcribed and compiled. Each interviewee's input was provided to the interviewee for content review and approval. Please note that the responses provided through the interviews are raw data. They have not been edited for style or grammar in order to best reflect respondents' input.

### *ADAPT-ACTION INTERVIEW RESULTS*

| Timing | Question |
|---|---|
| 1:49 | **NARRATIVES - Does the concept of using narratives (i.e., telling the story of adapting to water scarcity, adapting to floods and adapting to biodiversity loss) to discuss climate change adaptation & your community work? If so, are there other climate change adaptation narratives that we should tell? If not, what are your ideas for discussing climate change adaptation in our communities?**<br><br>• Each community will have different challenges but broadly those categories capture a lot of communities. In Canmore we know we are experiencing a changing climate and we can expect more extreme storms, drought, flooding, forest fires, etc. Forest fire is something that Canmore continues to think about with regard to how to adapt to risk and this is not captured in your three categories. It will be community-specific but speaking broadly communities will have to consider the three narratives. You should include a message that this is not all they need to consider |

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| | (i.e., there are more than three narratives to tell). - Lori<br><br>• Tell it as a story of what it means to you and here is how we are going to explain it in terms of what it means to you in your daily life. Perhaps find a better word than narrative or give a definition up front. The approach is right on and it creates an immediacy that is relevant to people. When I talk to people about an MDP people want to know: what does it mean for my land? What does it mean for my pond or cherry tree? Then I am going to think. Adapting to infrastructure (houses hotter, more insulation, winds higher so plant trees to break the wind or house will blow down) is another potential narrative. These three seem pretty reasonable and pretty broad. Water scarcity is the number one thing. Biodiversity loss is critical but we don't have a natural affinity for it. Infrastructure is the sinews of society, so I would suggest water scarcity or infrastructure as the narrative. - Frank<br><br>• This approach demonstrates an understanding about who you are writing for. It is important that elected and senior officials get a handle on this. It shows them what they need and then could be supplemented with a more thorough technical set of sessions (e.g., urban ag professional development series (U of A) – lots of opportunities to go deeper into the topic). I like having a narrator for the tool. Having that narrator can help transfer the information from what is on screen. You could also include adapting to severe weather patterns (both summer and winter) as a narrative. Hail and tornado is a key additional one. - Harry<br><br>• I think so. Stories are important to communities and there is a lot of power in storytelling conceptually. People can make the links between what is changing, what they can do about it and what will result. Perhaps you could have a narrative about extreme weather (wind, hailstorms, freezing rain), maybe tourism & recreation? I am working to create indicators of climate change adaptation and trying to sort out these issues. You can lump them in different categories. How you slice and dice these things is complicated as there are primary impacts/secondary impacts and there are different ways of looking at things & how things change (primary or secondary impacts). – Jeff<br><br>• It really does work for me and a narrative approach helps frame it a lot better. I got thinking about this: we talk so much about global warming that it is hard to switch to climate change which is not the right conception to take us long-term. Those three narratives represent where we are at, but why not call it biodiversity change instead of loss? We are in early days and I don't know if there will be loss but it will be different. I have landed on those same three narratives. Storm patterns have changed and our engineers claim we have the best data in the country. For the first time engineers went to city council and talked about our changing climate. We have to adapt to floods as it is costing you money. Water scarcity is not an issue here. Tree species and insects are a concern. We are moving to more of a grassland eco- |

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| | region and what will that mean? Will we be a refugia? - Grant<br><br>• Absolutely – this is a perfect way to do it. It can work for laypeople (councillors) and for staff. A narrative approach is a good way to go. Even as a planner we need to learn how to influence municipalities and narratives are a positive and friendly way to go. - Steve |
| 3:12 | **LANDING PAGE - Does having three points of entry for the tool (i.e., How do we know this is an issue (environmental changes/effects)? How is this an issue for your community (implications)? What strategies can your municipality use (strategies)?) work for you or is it confusing in any way?**<br><br>• It isn't confusing. We have been looking at CCA planning and the six steps of CCA planning as a framework. It is kind of a similar framework although the language is different. I wonder if you want to map language in case people have done research on their own or mirror the language. You don't want to reinvent process as that could be confusing for people (e.g., Why are they telling me something different than CCA planning handbook for small communities?). There is a U of A professor (Eleanor Mohammed) who facilitates a course designed for planners and uses the CIP handbook. Make sure there is a common language approach – don't scare people off as there are a lot of similarities. - Lori<br><br>• The questions help as they interpret the headings. Use bigger font for questions. In some places water scarcity may not be an issue or they may not think that this is an issue. Some people might live in fantasy world and think we are fine (e.g., Okotoks – tried limiting growth potential to the capacity of the Sheep River and didn't achieve the objective). What to do about people who don't realize it is an issue? And then there are some people who don't want to realize it. – Frank<br><br>• I think that the topics are important. The way the topics are presented doesn't come across as linear. There needs to be clarity as to where you start. If I don't know where to start which one should come first? - Harry<br><br>• I like it. We are doing the same thing but we did it in four steps: 1) climate and weather changes 2) environmental impacts 3) community impacts 4) strategies. It is about changes/impacts and strategies. I am thinking about aligning our indicators product with how you have broken it down. - Jeff<br><br>• It works but it depends on what is behind it. How do we know this is an issue? I think if you look at changes in the bioclimatic envelope the issues become clearer. There are different levels of technical information and information helps viewer to get up to speed. It is really place-based and bioclimatic bands are so |

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|---|---|
| | narrow. Changes on the biodiversity side will be quite specific to a place. Edmonton has the same bioregion as Kazakhstan or Ukraine. It is hard to find information elsewhere and you might not know what you don't know. This is where the tool can help by bringing these things home. - Grant<br><br>• I think it is useful. Moving from the lower left to upper right – visually is helpful. The landing page makes me think: gee is this (water scarcity) an issue? - Steve |
| 4:51 | **CLIMATE MOISTURE INDEX – Are the maps helpful in understanding the effects of climate change? Is this a useful way to show change? What other ways could we show this change? What other types of information would be helpful to understand how climate change will affect climate moisture index?**<br><br>• I think the map tool is great but it doesn't cover Canmore. This is frustrating for people along the slopes. With regard to the map in upper left-hand corner – have a geographic marking to provide people with spatial orientation. The maps are a useful way to show change. It needs to be really clear that the slider can be manipulated. It would be great to provide access for staff reports and communications needs if I need to build a case around doing that – pull out the map and put in staff report to council. Is there some way that people could download the data and map, or at least contact Miistakis if want copies of climate predictions? If staff have to go to council to make a big case it would be useful to be able to create that story separate from that tool.<br><br>There are different ways that other organizations and professionals have chosen to express data but it needs to be clear and legible. Dave Sawchyn gave a great presentation – MCCAC/FCM – partners in climate protection program a year ago. His work in describing local climate change impacts is really effective. – Lori<br><br>• It would be good to have a legend to accompany the colour scale. The slider is good. You could also separate the maps into two pages. You could look at moisture seasonally - stream flow reductions in September as this is a critical time when fish flop around in the mud and that is when glaciers have spent their fuel over the summer. This is when residual stream flows are important for spawning fish and streams are most at risk. You could have green, yellow and red lines depicting streams (first-, second-, third-order streams) or maybe just major tributaries. That has implications on water licenses as 70% of water resources are controlled by irrigation districts. This is a huge bank account and province is not changing anything. These guys have a vested interest but we don't know what they are doing. You could overlay stream reduction with water licenses and discuss having other economic development (besides irrigation). - Frank |

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|---|---|
| | • I think it shows the science and that is one of the questions out there. Well, why do you say that is going to happen? In particular, how do you address that we are in one of the wettest periods for a long time? Water scarcity is not going to ring true to people. You may need to do something graphically that shows changes to the dry/wet patterns (historically over a longer time frame ) so that empirically we know we are in a wetter cycle. You could also include a map that goes the other direction and roll back to 1900s so that the user could explore the dry/wet/dry/wet. The fact that our climate is changing doesn't surprise me – it is about adapting and resiliency (huge word). – Harry<br><br>• These are really useful maps. You could also use a graph or numbers to convey the information. You could have the values (change in temperature or precipitation for example) when you hover a mouse over the map.<br><br>Graphs showing actual trends of recorded temperature, precipitation, CMI, snowpack, stream flows, etc. could be useful for people work on the ground. Future projection stuff doesn't make sense to all people, but here is the trend for your community- really personalize the data for people's community. Here is the best possible information for a community in an effective way to convey that information.– Jeff<br><br>• Really helpful. I like the slider bar as it conveys the idea. It is a lot more sophisticated than three maps. On the biodiversity side, I like the bioclimatic envelope idea as it brings in natural regions (moisture – what is the response). If dealing with drought CMI is good although I am not certain if it is more accessible or not? It integrates more information but is that too much? It makes sense to me but what are people's building blocks of knowledge?<br><br>CMI points to drought but it doesn't point to intense storms. We are experiencing the phenomenon where intense weather events are hitting really small areas– one neighborhood floods but not the next. How do we get that impact across?<br>- Grant<br><br>• I think the maps are useful. Staff can read maps well but councillors and other laypeople have a hard time knowing where they are, so have another inset map showing context if this map is to be used outside of SE Alberta. As a planner I can't think that maps are ineffective however it ends at the SK and MT border. Layers outside of the province provide context. I think that time steps are useful and maybe an easier way to show it would be to pick one point on the map and create a bar graph to depict where we are now and here is 20 or 50 years later. It can be hard for some people to relate to something that isn't a pin-pointed |

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|---|---|
| | location or town.<br><br>You could describe the evaporation, water supply, etc. to provide context on variables driving that change (CMI). - Steve |
| 6:52 | **IMPLICATIONS – Is the level of detail sufficient? Is the level of detail necessary? Would it be helpful to also develop for recreation, infrastructure, human health & biodiversity?**<br><br>• The tool does a good job of saying what effects will be and then what the options are about how to mitigate. It would be helpful to then dive deeper. Also it would be helpful to develop implications for infrastructure, etc. All of them are key however I wonder if recreation might be too narrowly focused. Perhaps it could be recreation/economic development? There are references to prairies – can you change the language around that (note: didn't give Lori the prairie eco-region context in advance of the call)? – Lori<br><br>• This builds on previous slides and is getting into more detail in a step-wise approach. The detail is necessary. You could include images or icons instead of text as this feels text-heavy. You could change it into bullets or pictures as pullouts. You are dealing with people with a variety of understandings so develop for all sectors as this sets the context and people have the opportunity to skip this (given the landing page idea). – Frank<br><br>• I think that this level of detail is appropriate. – Harry<br><br>• The answer to both is yes. The information is concise, clear, and reads well. It depends on how deep you want to drill. Present good information and don't inundate people– keep it simple. You could also share this with others. - Jeff<br><br>• Where I am now, yes. But a month ago I would've needed more. For instance what do some of the expressions mean? What does timing of water mean? Why does it have to come at the right time (e.g., life cycle of waterfowl and so forth). It is a similar thing with crop yield – maybe provide a bit more content and option for more information. Bring it home to peoples' experiences – makes it real and connected. - Grant<br><br>• It seems both sufficient and necessary. Discussing the short-term effects, giving the range of opportunities and providing a toolbox of things to do is helpful. - Steve |
| 8:37 | **STRATEGIES – Is the level of detail appropriate?** |

| | |
|---|---|
| | • I think so, yeah. Some people will want to dive deeper into each of those and will want to know where to go for more information. It shouldn't be the end-stop for people. Some things are straight forward yet other people will need more information. – Lori<br><br>• If I was a farmer, I would say I know all of that. These things are in the minds of farmers who care but how to get into the mind of farmers who are too old to care? Are you dealing with early adopters or old guys? Maybe this isn't an issue? In rural municipalities a lot of councillors are farmers so this could be a good refresher for them or they may want to drill down another level – what is the technology that would mitigate effects of climate change? What resources exist? Is it cost-effective? What organizations are out there that could take it to the next step? Who is going to help me make the transition? How to finance the transition? Is there seed money to make the transition?<br><br>I think about climate-proofing municipal plans as municipalities don't have many legislative tools with which they can use to force taxpayers to comply. The province controls water licenses and water retention capability (through small wetlands) - that is a provincial responsibility under AESRD. Most of these things are provincial responsibilities and municipalities can't do a lot of that unless through the Ag Fieldman. There has to be a strategy to work the system. How do you get the ear of the province to change? Do we need more advocacy? This is a strategy that can work if councils make it a priority. Maybe that is getting into the political realm but this is what it is going to take.<br><br>We could build a lot of understanding and get into more detail with regard to the hydrological regime.<br><br>Show me the technology – so I can check it out and try it. I would want to enable a councillor to be the white knight around the counsel table, with allied activist organizations and to senior levels of government. – Frank<br><br>• From a planner's perspective, yes. You should talk to someone at an Ag Services Board (e.g., Art Prechuk at Red Deer County) to test content. It would be helpful to be able to click on the strategies and take it down another level. I am not sure a lot of the farming community understands what a shift to drought tolerant species looks like. There needs to be (certainly for someone going to use this) Ag Services people to take it into community and they will need a deep level of understanding. - Harry<br><br>• It would be useful to provide information on each specific. Consider: at a high level what want to do with this tool? If it is simply to introduce folks to climate |

change adaptation, the level of detail is sufficient. However, if I was using it I would want to drill down one stage further. - Jeff

- You need to consider what is the effect you are trying to counter? Low water agriculture could be reframed differently. Are you countering effects of drought on agriculture? Why do I want to improve water retention? This speaks to policy development at a municipal level. You don't know the thing that people want to work on as it is all about politics of the place and how that lines up at the time that people want to accomplish something. The Municipal Government Act allows municipalities to do what they think is important – look at how Calgary and Edmonton built their biodiversity programs. They are different. The things we emphasize are different and community–based politics are different. – Grant

- I would think for a video like this (aimed at municipal staff and politicians), it shows that there are a variety of options. You are just letting people know that there are a range of options. If I want more information, there are other sources. No video is going to produce policy for municipalities to carry forward. The point is to inform things that municipalities can do. - Steve

**STRATEGIES – Are you aware of any case studies of communities applying climate change adaptation strategies? If so, please describe.**

- C3 has done a bunch of work in southern BC (e.g., Rossland and Sparwood) but I don't have good Alberta examples. BC is a lot further ahead as it is a legislative requirement in BC. Leduc and Red Deer have done some work though. – Lori

- Dave Brown (CIP) - Adapting to Climate Change – CIP Policy on Climate Change – http://www.cip-icu.ca/Files/Resources/CIP-STANDARD-OF-PRACTICE-ENGLISH.aspx - Frank

- No, that is the hardest thing that people are thinking about. – Harry

- See the list that I emailed to Rachelle (Oldman River Basin, Calgary, Edmonton, Leduc, Red Deer, RM of Wood Buffalo). – Jeff

- ICLEI Canada is doing a big project. They are creating guides. – Grant

- I don't know of any communities specifically doing that. I will go into our professional website and see. They are trying to encourage professional planners to do that in municipalities. The Town of Canmore has indirect conservation strategies but doesn't have a climate change strategy yet. – Steve

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| 9:12 | **SUMMARY – Would a summary report be useful to you?**<br><br>• Yes, I think so. People could have a take-away and something to use in additional presentations instead of taking notes or doing screen captures. It could be efficient because there are multiple different pieces and threads with each of the effects/implications/strategies. If a user could do that for each relevant area for their community that would be helpful. - Lori<br><br>• I understand this so I don't need to look at it again unless for certain topic areas that could relate to policy. Can you break topic areas into policy? You might need the Ag Fieldmen to be the frontman promoting this. I was working on an ESA for Red Deer County and Ken Lewis (conservation staffer) was the perfect person to explain & I translated that into policy. Tap into the guys who are bureaucrats but have specialized knowledge that relates to these things. They need to be plugged in more closely and need more resources. Provide resources that people like Ken need and expand on those ideas. – Frank<br><br>• I think it would be helpful. You should look at Metroquest as a good municipal engagement tool. It lets you set the values that relate to planning that you want to see down the road and creates scenarios to show consequences for planning stuff. If this report lets you select what you want to do (strategies) and shows you what it does for municipality (more drought tolerant or less drought tolerant), that would be interesting. Give people a chance to play with answers & decisions made and see how it modifies scenarios. The Metroquest tool gives instant feedback to users/viewers about consequences of decisions. You could take it to school kids, seniors, etc. - Harry<br><br>• I think so – seems like a good idea. You can create your own adaptation plan for your community with it. It would be good to know in advance that I can create report to document my journey (i.e., website introduction) – Jeff<br><br>• It would be helpful to get information quickly and easily. We can evaluate what we can do given the highly political environment as opposed to doing a whole climate change adaptation plan. Sometimes it is "deal with this thing right now" which can be part of a bigger strategy. We are going to lose 3000 trees and we can really hone in on that especially if politicians assume that their city is not measuring up. If some other city is doing it better, we need to step up. This is chronic and it goes on all the time. Politicians have confidence when they look at other precedents because it becomes real to them. – Grant<br><br>• Yes, it would. You can pick various pieces and the system would summarize that and customize. - Steve |

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| | **SUMMARY – If so, what format (e.g., .pdf, downloadable web file) would be useful to you?**<br><br>• It depends how people like to work so a couple of options would be good. I like a paper copy but other people want interactive capability. However, we don't always have presentation technology. – Lori<br><br>• Could you do both? Some councillors are older but some planners have all fingers in the digital world. - Frank<br><br>• .pdf seems logical but the interactive web file sounds interesting. You can also make interactive .pdfs. – Jeff<br><br>• It depends on who you are talking to and what is their orientation. .pdfs are good for ipads but we don't always have to be connected. – Grant<br><br>• For me I am used to .pdf but I suppose if it would allow Town of Canmore to put it on their website and that would have value for sharing information with the public. - Steve |
| | |
| | **Does the approach for the *Adapt-action* tool make sense?**<br><br>• Yes, it definitely makes sense as it follows other frameworks trying to accomplish same thing. However, I can imagine it depends on where a person is coming into the process. If you have familiarity it makes sense, but I am not sure about people with fresh, new eyes. Their feedback will be important. - Lori<br><br>• Yes, I like the concept and approach/format. The more interactive, the better (again, references Metroquest). - Harry<br><br>• Yes, it really does. I feel like this takes a positive approach. It is a very simple thing to go through and I am glad you are taking a positive approach. So, I really like that no regrets strategy statement and it is an approach I have taken. These are good things to do anyway and if you do these things it will be good for your municipality or community. The whole video seems to take that positive approach. - Steve |
| | **Do you foresee this tool being useful for Alberta municipalities? Why or why not?**<br><br>• I think so but it needs to be clear that it is an Alberta context. There is nothing more frustrating than when you hear about something but you can't access it. It needs to be accessible for communities. It would be helpful for the tool to |

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| | provide access to resources that are available in the province and where do we go for additional help. We don't know if there is support yet from province. We wrote a letter to the Minister of Municipal Affairs to fund CCAP. Communities need financial support. How can we lobby the province to do that? We are not sure where the province is at. Who will pay for climate change adaptation? - Lori<br><br>• I see it being useful as an introduction to more detailed implementation. Awareness is good, but action is the real litmus test. From a policy viewpoint (i.e., gathering point for opinion of what we need to do) the tool has to recognize that the province is the key player (especially in terms of water scarcity). Municipalities are constantly battling against the province especially urban municipalities. - Frank<br><br>• Yes, very much so. Whether reading newspapers or whatever it is easy to throw up hands and ask what can I do to help or minimize impact? Municipalities have been the level of government that has been taking steps and I absolutely think that municipalities would welcome it. - Steve |
| | **In your opinion, which is the most important narrative to tell**?<br><br>• So, this will be community-specific and there is a financial costs hierarchy. Biodiversity is tough to express in dollars and cents. All of the narratives need to be there. Alternately, tell people this is an example of one impact, there will be more, and you work through the same process for each one. – Lori<br><br>• You will get more people if you use flood mitigation/flood resilience planning. Choose flood mitigation as the narrative to focus on. No one is paying attention to biodiversity. Not all people understand drought but right now everyone understands flooding. Think about your audience. – Harry<br><br>• I think biodiversity. A biodiversity narrative brings in drought. It is the piece that is really hard for people to understand but it depends on the municipality. - Grant<br><br>• Sure there are other narratives but the ones you offer cover a broad range. I don't have any others at top of mind and those are broad enough. Water scarcity really hits southern Alberta. Water is a limited resource and scarce in some areas now and it does affect everyone in a big way – water boiling advisory, glaciers diminishing, etc. Water scarcity is closest to home for most people. |

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| | **Do you have anything else to share about the *Adapt-action* Tool?**<br><br>• Access to climate data is key and knowing where to go to get it. The impacts and strategies will be different in each municipality. Climate stuff and climate modelling is important as we don't have that expertise. This tool really builds a case for it and demonstrates need. Some councillors are climate change deniers and we need to convince them. - Lori<br><br>• You could add something about next steps. This is act one, now where do we go for acts two and three? Also, it would be good to share tools/approaches that have worked elsewhere especially for headwaters management (for water scarcity narrative). - Frank<br><br>• Go to the survey feedback I provided and consider your use of terminology. Climate change adaptation is an old-school academic term. I wouldn't ever walk into a community and say that. You are not going to get anywhere. It is all about resilience and risk management and that is the new way of thinking around this issue. No one is talking about climate change adaptation. It is about being resilient and not about adapting to climate change – this speaks to your audience. - Jeff<br><br>• I would really emphasize the positive. It assumes that everyone is accepting that climate change is happening and kicking around the idea of making it more explicit… that we don't know at what rate or where it is going. What to do about deniers? This is something to softly address that without throwing about a bunch of scientific evidence. There is a lot of uncertainty and predictions run thirty years out. This is a way to recognize that there is uncertainty but these are the kinds of things that are good for community regardless of when climate change happens – no regrets strategies. I like the lack of threatening language/save the world rhetoric which turns people off. - Steve |
| | **Are you using any resources to do with climate change and climate change adaptation?**<br><br>• We are referencing CIP handbook for small communities. We have done the MCCAC workshop in March in partnership with C3 – Nancy Hackett in Red Deer – Helen at C3. We will likely do municipal climate change adaptation planning through a consultant. I work with an environmental advisory review committee made up of community members. They are strongly supportive of having an expert do it and see value in having a specialist write the plan. I will be managing this contract/process on behalf of the Town of Canmore. - Lori |

# 4.0 STAKEHOLDER ENGAGEMENT ANALYSIS

The information and data gathered in the stakeholder engagement process was reviewed with an eye to how it could inform and improve the *Adapt-action* tool. As this was a test of the assumptions and bases underlying the conceptual tool structure, the analysis needs to be smoothed at three stages to produce concrete direction for improvements to the tool. The analysis is therefore divided into three sections: Observations, Conclusions, and Moving Forward.

The Observations summarize feedback at a fairly literal level, the Conclusions draw lessons from the Observations, and Moving Forward identifies the specific actions the Miistakis Institute will take to improve the *Adapt-action* tool based on the stakeholder feedback.

## Observations

Viewing the survey and interview respondents' input for both municipal and action planning stakeholders, several overarching observations can be made.

- Concern remains over the climate change deniers
    - There continues to be concern over climate change deniers at the municipal level, and stakeholders are seeking resources to help engage in these debates.
- Greater detail on strategies desired
    - Respondents were looking for greater detail in the strategies to aid in understanding what application would look like (*NB: only higher level strategies were included in the sample narrative due to the conceptual nature of it, and more detailed strategies had already been developed*).
- Details around implications are desired
    - The level of detail around 'local community implications' was seen as valuable, and respondents were seeking similar information for all sectors (health, infrastructure, recreation, and biodiversity).
- Detail around figures desired
    - Sample visualizations of climate change effects were well-received, with respondents looking for more detail in the figures, and more locally-specific representations.
- More 'up front' detail desired
    - Respondents indicated more information needed to be included 'up front' (i.e., on the home or landing page) that indicated that the tool would have multiple narratives, that there was a focus at this stage on grasslands communities, and that the tool would allow them to output summary information.
- A summary report is valued
    - Respondents indicated there was value in having the ability to output summary information to be taken away from a session with the tool and used in other contexts.
- Visual information is valued

    - The more visual representations of information were more specifically identified as useful, in particular video presentations (*NB: although it was not tested, it appeared that interview respondents made a tacit assumption that, because they were being guided through a video representation, that all users would have similar guidance*).
- Level of sophistication (keep it simple) valued
    - Respondents indicated the need to keep complex information 'simple', and in addition indicated that the level at which information was presented in the sample narrative was appropriate.
- Case studies were valued
    - Case studies were seen as an especially useful way to represent the efficacy of climate resiliency strategies, and provide inspirational examples of how these could be undertaken.
- Narrative approach is valued
    - Respondents indicated that both they and the constituencies with whom they interacted would respond well to the climate resiliency issues being presented in the narrative structure.
- Desired narratives include: flood, extreme weather events
    - Preferences around the most desirable narratives to add to the tool centred on adapting to flood, and adapting to extreme weather.
- There was strong consensus on certain positive aspects in the conceptual approach
    - The strongest consensus on the positives in the conceptual approach focused on the relevance of the issues, the immediacy of the information presented, the use of narratives, and the categorization of information as changes, implications, and strategies.

## Conclusions

Though there are several conclusions that can be drawn from the stakeholder engagement feedback, the following are vital to informing how the *Adapt-action* tool will be operationalized.

- There is a need to integrate with other tools/resources
    - The *Adapt-action* tool will 'add wheels to existing carts', not re-invent the wheel; respondents identified several existing processes, individuals, resources, lexicons, etc. to which they defer, and the *Adapt-action* will need to efficiently and capably connect to them.
- The target audience is often a 'local champion'
    - Much of the feedback centred around how this information would be used to take a case forward to Council or to the community, emphasizing the need for the tool to "arm" local champions with information they can take forward.
- Information should be as community specific as possible

    - Much of the feedback indicated the desirability of information (changes, implications or strategies) that was specific to the community, and not generalized for the province or a region.
- Connecting from changes through implications to strategies is the right approach
    - There were both explicit and implicit statements of appreciation for the approach that took users from the environmental changes, through to the local community implications, and finally to the issue-specific strategies that could be employed.
- No one tool can plot the all municipal changes-implications-strategies journeys
    - The examples cited by respondents as instances where they needed more specific information highlighted that a single, summary tool cannot provide all possible scenarios of specific action that supports climate resiliency.
- Narrative structure does work to engage users
    - Several questions were aimed directly at getting a sense of whether the use of the 'narrative' structure would be effective in engaging and guiding users of the tool, and there was a strong consensus that it would be.
- Though case studies are desired, examples are rare
    - Though respondents indicated they would derive significant value from real-world case studies, they were challenged to identify usable cases, especially in number and variety capable of covering every possible implication, sector, and meta-strategy (the issue-specific summary strategy). This aligned with our own research.
- Accommodating the desire for detail will be challenging
    - With regard to the sample narrative, respondents indicated a large and wide-ranging desire for detail related to environmental changes, community implications and strategies; accommodating this will be challenging.
- Lots of strategies are provincial in scope
    - Many of the sample strategies raised concerns amongst respondents in that implementation resided heavily with the provincial government rather than the local government.
- There is a need to accommodate a range of knowledge over users and over time
    - Several respondents noted that they interacted with people at a different levels of knowledge regarding climate resiliency, and that they themselves were at a different stage even a short time ago, meaning the tool will need to be useful to users with different levels of knowledge sophistication.
- Going beyond floods will be a challenge
    - The 2013 floods provide an excellent 'hook' to bringing municipal stakeholders into both discussions and action regarding climate resiliency, but stakeholder responses indicated it will be challenging in some cases to move into other climate change issue areas.

## Moving Forward

The stakeholder engagement yielded a tremendous amount of information, and 'food for thought' in terms of modifying our approach to the *Adapt-action* tool. This report, and the raw feedback, will continue to be a resource on which the Miistakis Institute team members will ruminate as the *Adapt-action* tool is finalized.

However, there are a number of concrete modifications which can be identified at this point. Some of these modifications will be points to keep top of mind as we create information to populate the tool, while others are more explicit course corrections. These include the following:

- Need to emphasize that this is a tool to support other processes
    - It was not clear enough that this tool is intended to support existing climate change adaptation planning processes, rather than constitute an approach unto itself. This is critical both to ensuring the information is interpreted in the same way, and to ensuring the tool users actively seek out these processes.
- Need to emphasize other tools and resources
    - Although this was a principle going in, it was underscored that there needs to be explicit links to other information. This goes even as far as synchronizing language with other initiatives so as to reduce confusion amongst users of the various climate change adaptation tools.
- Need to highlight the municipal role in provincial strategies
    - Many of the Ecosystem-based Adaptation (EbA) strategies require provincial involvement ranging from policy change to tacit support. However, those that were identified were chosen because they reflect a vital municipal role. It will therefore be important to highlight the municipal role and opportunities in these strategies.
- Will emphasize two narratives instead of three, and populate them both more fully
    - The original intent was to create three complete narratives in order to launch the tool. However, the level of information (and detail) being sought by the users indicates each narrative will require more than originally anticipated to populate them, and within the resources and time frame of the project we will be able to complete only two. We will also need to carefully scope the level of implications detail by each sector (agriculture, infrastructure, recreation, biodiversity, and health) to ensure the right balance between comprehensiveness and do-ability. Finally, we will need to actively seek out mechanisms that will allow additional narratives to be created and populated.
- Next narrative will likely be adapting to flood or extreme weather
    - Based on the feedback from respondents it makes the most sense for the second narrative to be 'Adapting to Floods' or 'Adapting to Extreme Weather.'
- Will provide more specific details in the strategies
    - The strategies will require more specific information, especially the municipal policy connections, available cost estimates (though those are few), and specific support resources.
- Will use global case studies

    - The paucity of applicable and inspirational case studies of EbA approaches has already been identified in the literature (Lee and Sanderson 2014), and then confirmed by our solicitation to climate change adaptation practioners in this engagement work. To address this, we will focus on case studies which have more global application, rather than trying to link cases to specific implications or strategies.
- May focus on summary output at various stages rather than summary report
    - Requests for 'take away' information indicated a desire for summary materials at different points. As well, the complexity of the tool and its component information may mean users will not want to wait until the end of their session to select output information. For this reason, we may explore making summary information downloadable at various points throughout the site, rather than one summary report available at the end.
- Will explore feasibility of using video navigation
    - The success of the *Adapt-action* instruction video for the key informant interviews indicated that simple video-based navigation instructions may be useful. We know that we have a complex site, with information that takes the user much deeper than the recommended 'two to three clicks to home' design standard. Video navigation may be one way that we mitigate this issue.
- Will maintain detail on implications
    - We had questions about whether we should include all of the 'sectors' (e.g., health, recreation, etc.) in the implications section, and again about how much information was necessary or desired. We will be seeking to trim that information as much as is practicable, but recognize we will need to maintain a significant amount of content.
- May place resources more context specifically
    - Although there was support for having resources, and strong direction to coordinate with other information, it may be that having one 'Resources' section will not accomplish the goal of providing direction to users on how to access related information. Similarly, the need to position the *Adapt-action* tool as a support resource in and of itself may not be supported by that approach. Instead, we may seek to include resources, related information, and associated tools in a more context-specific way, including that material in side-bars throughout the *Adapt-action* site.
- Will explore how to expedite access to information for return users
    - Respondents indicated that when they return to the *Adapt-action* site for different issues or deeper information, they may be looking to access the information in a more direct fashion. We will explore efficient ways for them to do so, without losing the guidance value of the narrative structure.

## 5.0 REFERENCES


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# APPENDICES

## Appendix A – Stakeholder Engagement Survey

## Introduction

Welcome to the Municipal Climate Change Adaptation Survey. The Miistakis Institute is developing a web-based, climate change adaptation resource for use by Alberta municipalities called "Adapt-action." The Adapt-action tool is intended to help Alberta municipalities become more aware of climate change implications for their community, more aware of effective adaptation strategies available to them and better able to participate in climate change adaptation planning.

This tool is being developed as part of the Biodiversity Management and Climate Change Adaptation project, which is led by the Alberta Biodiversity Monitoring Institute and funded by the Climate Change and Emissions Management Corporation. Your responses to the survey will help Miistakis design a tool which best meets the needs of Alberta municipalities seeking to adapt to a changing climate regime. The Adapt-action tool will be publicly available in January 2015.

The survey will take 15-35 minutes of your time, and your responses will remain anonymous. The deadline to complete the survey is July 4, 2014. If you have questions about the survey, please contact Rachelle (403-440-8444 or rachelle@rockies.ca).

## About You

### 1. Who do you represent? Please select one response.

- ◯ Large urban municipality
- ◯ Small urban municipality
- ◯ County or municipal district

Other - please specify below.

### 2. What role do you play? Please select one response.

- ◯ Councilor
- ◯ Municipal staff - planning
- ◯ Municipal staff - infrastructure
- ◯ Municipal staff - agriculture
- ◯ Municipal staff - environment
- ◯ Municipal staff - other
- ◯ Consultant
- ◯ Academic
- ◯ Municipal association
- ◯ Government of Alberta
- ◯ Non-governmental organization

Other - please specify below.

## Climate Change

**3. On a scale from strongly disagree to strongly agree, please select the response that best represents your opinion for the following statements about climate change:**

| | Strongly disagree | Disagree | Neither agree nor disagree | Agree | Strongly agree | Uncertain |
|---|---|---|---|---|---|---|
| Climate change is occurring, and it is caused mostly by human activities. | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ |
| There is not sufficient evidence to know with certainty whether climate change is occurring. | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ |
| Extreme weather events will happen more frequently in the future as a result of climate change. | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ |

**4. Assuming it's happening, if nothing is done to reduce climate change in the future, how serious of a problem do you think it would be for your municipality? Please select one response that best describes your opinion.**

- ◯ Very serious
- ◯ Somewhat serious
- ◯ Not so serious
- ◯ Not serious at all
- ◯ I am uncertain

## Climate Change Issues

**5. Please rank your level of concern about the following climate change effects for your community, with 1 being the climate change effect you are most concerned about for your community and 4 being the climate change effect you are least concerned about for your community. If you are not concerned about a climate change effect, please select the N/A box on the right-hand side.**

| | | |
|---|---|---|
| ☐ | Increased frequency or severity of water scarcity | ☐ N/A |
| ☐ | Increased frequency or severity of flooding | ☐ N/A |
| ☐ | Increased frequency or size of wildfires | ☐ N/A |
| ☐ | Biodiversity loss | ☐ N/A |

**6. Aside from the climate change effects listed above in question five, are there any other climate change effects that you are concerned about for your community? If so, please list them below.**

**7. Climate change will have implications on many aspects of your community. Please rank your level of concern for each climate change implication in your community on a scale from "not at all concerned" to "extremely concerned."**

| | Not at all concerned | Slightly concerned | Somewhat concerned | Moderately concerned | Extremely concerned | Uncertain |
|---|---|---|---|---|---|---|
| Human health | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ |
| Agriculture | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ |
| Recreation/tourism | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ |
| Biodiversity/ecosystems | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ |
| Transportation infrastructure | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ |
| Utility infrastructure | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ |
| Buildings/built environment | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ |
| Quality of life | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ |

Other implications you are concerned about? If yes, please specify.

## Your Community

**8. Climate change adaptation includes any initiatives or actions in response to actual or projected climate change impacts which reduce the effects of climate change on built, natural and social systems (ICLEI Canada 2012).**

**In your opinion, which municipal services/departments in your community are in need of support (e.g., information, expert advice, financial resources, etc.) for climate change adaptation? Please rate each of the following on a scale from "not a priority" to "essential."**

| | Not a priority | Low priority | Medium priority | High priority | Essential | Uncertain/not applicable |
|---|---|---|---|---|---|---|
| Planning | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ |
| Economic Development | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ |
| Recreation/Parks/Biodiversity | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ |
| Roads | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ |
| Water and Waste Services | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ |
| Corporate Services | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ |
| Agricultural Services | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ |
| Council | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ |
| Emergency Services | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ |
| Community Services | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ |

Other services/departments? If yes, please specify.

## Your Community

**9. Which municipal plans do you, or might you, consider relying on to further climate change adaptation in your community? Please select all responses that apply.**

- [ ] Municipal Development Plan
- [ ] Area Structure Plans
- [ ] Sustainability Plans
- [ ] Infrastructure Plans
- [ ] Regional Plans
- [ ] Growth Management Plans
- [ ] Area Concept Plans
- [ ] None of the above plans are important
- [ ] I am uncertain which plans are important

Other municipal plans relevant to climate change? If yes, please specify.

**10. What are your main concerns about pursuing climate change adaptation activity in your municipality? Please select all responses that apply.**

- [ ] Costs of implementing climate change adaptation strategies
- [ ] Knowledge of effective climate change adaptation strategies
- [ ] Capacity to undertake a new program
- [ ] Available funding
- [ ] Uncertainty or debate regarding the existence of climate change
- [ ] I am uncertain/not applicable

Other concerns? If yes, please specify.

## Your Community

**11. Do you engage in any of the following activities (which may support climate change adaptation)? Please select all responses that apply.**

- [ ] Zoning for environmentally significant areas
- [ ] Increases in water storage infrastructure capacity
- [ ] Support for low tillage agriculture
- [ ] Re-design of infrastructure for extreme weather
- [ ] Community education regarding climate change
- [ ] Habitat conservation
- [ ] Disaster/emergency response planning & testing
- [ ] Firesmarting
- [ ] Property taxation incentives for conservation
- [ ] I am uncertain/not applicable

Other activities (please specify)?

**12. Do you engage in any of the following watershed stewardship activities (which may support climate change adaptation)? Please select all responses that apply.**

- [ ] Wetland protection, creation or restoration
- [ ] Riparian protection or enhancement
- [ ] Water conservation initiatives
- [ ] Buffer creation within flood zones
- [ ] Beaver reintroduction
- [ ] I am uncertain/not applicable

Other activities (please specify)?

## Your Community

**13. Has your municipality undertaken any formal climate change adaptation planning and activities?**

- ◯ Yes
- ◯ No
- ◯ I am uncertain/not applicable

**14. Are you currently using any resources in your climate change adaptation planning and activities? If yes, please list them.**

**15. In order to support your climate change adaptation planning and activities, would descriptions of how adaptation strategies could connect to your existing municipal plans be useful to you?**

- ◯ Yes
- ◯ No
- ◯ I am uncertain/not applicable

**16. In order to support climate change adaptation planning and activities, which of the following types of information would be helpful to you? Please select all that apply.**

- [ ] Visualizations of the potential impacts of climate change in your area on ecosystems & biodiversity, infrastructure, human health, etc.
- [ ] Maps of the projected changes due to climate change for your area (e.g., temperature, growing degree days, precipitation, etc.)
- [ ] Summary tables of data (e.g., temperature, growing degree days, precipitation, etc.)
- [ ] Plain language descriptions about climate trends & projections in my region
- [ ] None of the above
- [ ] I am uncertain/not applicable

Other types of information? If yes, please specify.

**17. Would videos to support climate change adaptation planning and activities be useful to you?**

- ◯ Yes
- ◯ No
- ◯ I am uncertain/not applicable

**18. In supporting your climate change adaptation planning and activities, what types of videos would be useful to you? Please select all responses that apply.**

- [ ] Videos of local people describing their experiences with climate change
- [ ] Videos of scientists describing projected environmental changes
- [ ] Videos of people describing their experiences with potential adaptations to climate change

Other videos? If yes, please specify.

**19. In order to support your climate change adaptation planning and activities, would case studies of how others have approached climate change adaptation be useful to you?**

- ◯ Yes
- ◯ No
- ◯ I am uncertain/not applicable

**20. Are you aware of any case studies on climate change adaptation that we could share? If yes, please describe below.**

**21. On a scale from "not at all useful" to "extremely useful," please rate how useful you would find the following resources to support your climate change adaptation planning and activities.**

| | Not at all useful | Slightly useful | Somewhat useful | Moderately useful | Extremely useful | Uncertain/not applicable |
|---|---|---|---|---|---|---|
| Expert support in climate change adaptation planning | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ |
| Expert support in climate change projections | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ |
| Sample policies, plans and processes | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ |
| Local municipal contacts with adaptation experience | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ |
| Data on regional climate change | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ |
| Climate change adaptation planning tools | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ |
| Plain language information about climate trends & projections in my region | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ |

## Support for Climate Change Adaptation

**22. Where do you think support (e.g., financial, in-kind resources, information, etc.) for climate change adaptation at the municipal level should come from? Please select all responses that apply.**

- [ ] The provincial government
- [ ] The municipality
- [ ] Academia
- [ ] The federal government
- [ ] Agricultural operators
- [ ] Businesses
- [ ] Community members
- [ ] I am uncertain

Other sources of support? If yes, please specify.

## Support for Climate Change Adaptation

**23. Are you likely to approach the following sources for information on municipal climate change adaptation?**

| | Yes | No | Uncertain/not applicable |
|---|---|---|---|
| Alberta Association of Municipal Districts & Counties (AAMDC) | ◯ | ◯ | ◯ |
| Alberta Urban Municipalities Association (AUMA) | ◯ | ◯ | ◯ |
| Municipal Climate Change Action Centre (MCCAC) | ◯ | ◯ | ◯ |
| Local Governments for Sustainability - ICLEI | ◯ | ◯ | ◯ |

Other information sources (please specify)?

**24. Where would you seek/have you sought funding to support climate change adaptation? Please select all responses that apply.**

- ☐ Alberta Municipal Infrastructure Program
- ☐ Alberta Municipal Water/Wastewater Partnership (AMWWP)
- ☐ Federal Gas Tax Fund (FGTF)
- ☐ Municipal Sustainability Initiative
- ☐ General Revenues
- ☐ None of the above
- ☐ I am uncertain/not applicable

Other sources of funding? If yes, please specify.

## Support for Climate Change Adaptation

**25. In your opinion, what is the role of the Government of Alberta in addressing climate change adaptation? Please select all responses that apply.**

- [ ] Funding
- [ ] Information support
- [ ] Policy direction
- [ ] None of the above
- [ ] I am uncertain

Other roles? If yes, please specify.

## Thank you!

Thank you for completing the Municipal Climate Change Adaptation Survey! Your responses will be used to guide the design of the Adapt-action tool. The tool will be released in January 2015. For additional information on the Adapt-action tool, please contact Guy (403-440-8444 or guy@rockies.ca)

## Appendix B - *Adapt-action* Tool Interview Guide

Thank you for taking the time to participate in our *Adapt-action* Tool testing. The *Adapt-action* tool is meant to help Alberta municipalities become more aware of climate change implications for their community, more aware of the effective adaptation strategies available to them, and better able to participate in climate change adaptation planning. I will engage you in a 30- to 45-minute phone conversation to understand what information municipalities would most want and need in a climate change adaptation support tool.

We have created a short video to guide you through the draft *Adapt-action* Tool. I will work through the video with you and I will record your feedback on several key questions embedded in the video and transcribed below for your reference. I wish to stress that we are looking for your input on the concept and content of the tool, **not** the appearance of the visuals (which are simply a vehicle for exploring this concept with you).

The *Adapt-action* tool will be made publicly available in January 2015. This tool is being developed as part of the Biodiversity Management and Climate Change Adaptation project, which is led by the Alberta Biodiversity Monitoring Institute and funded by the Climate Change and Emissions Management Corporation.

Link to video: https://www.youtube.com/watch?v=9iYVIt3H8lA

**Question guide:**
We will hit pause at the following points in the video and I will ask you these questions:

| Timing | Question |
|---|---|
| 1:49 | 1) NARRATIVES - Does the concept of using narratives (i.e., telling the story of adapting to water scarcity, adapting to floods and adapting to biodiversity loss) to discuss climate change adaptation & your community work? If so, are there other climate change adaptation narratives that we should tell? If not, what are your ideas for discussing climate change adaptation in our communities? |
| 2:42 | We will come back to these questions later. |
| 3:12 | 2) LANDING PAGE - Does having three points of entry for the tool (i.e., How do we know this is an issue (environmental changes/effects)? How is this an issue for your community (implications)? What strategies can your municipality use (strategies)?) work for you or is it confusing in any way? |
| 4:51 | 3) CLIMATE MOISTURE INDEX – Are the maps helpful in understanding the effects of climate change? Is this a useful way to show change? What other ways could we show this change?<br>4) CLIMATE MOISTURE INDEX – What other types of information would be helpful to understand how climate change will affect climate moisture index? |
| 6:52 | 5) IMPLICATIONS – Is the level of detail sufficient? Is the level of detail |

| | |
|---|---|
| | necessary? |
| 8:37 | 6) STRATEGIES – Is the level of detail appropriate?<br>7) STRATEGIES – Are you aware of any case studies of communities applying climate change adaptation strategies? If so, please describe. |
| 9:12 | 8) SUMMARY – Would a summary report be useful to you?<br>9) SUMMARY – If so, what format (e.g., .pdf, downloadable web file) would be useful to you? |
| | |
| | 10) Does the approach for the *Adapt-action* tool make sense? |
| | 11) Do you foresee this tool being useful for Alberta municipalities? Why or why not? |
| | 12) In your opinion, which is the most important narrative to tell? |
| | 13) Do you have anything else to share about the *Adapt-action* Tool? |

**Additional questions for climate change adaptation action planning stakeholders:**

1) Can you see value in the *Adapt-action* tool in working through a climate change adaptation action planning process?
2) From where have municipalities typically sought funding for climate change adaptation actions?
3) What information did you wish you had when you started, or do you wish you had now?
4) What tools were most useful? Why? How did you use them?
5) Which policies are most likely to need adapting?
6) What was/would be the role of the Province?