

Climate Change Vulnerability and Adaptation Planning Framework

Climate Change Adaptation Planning Within the Chippewas of Georgina
Island First Nation Reserve

2015

The Chippewas of Georgina Island First Nation is located both on and off the east shore of Lake Simcoe and is approximately 100 km north of the GTA, within the Township of Georgina. The First Nation Reserve No.33 consists of three separate Islands (Georgina 1,416 hectares, Snake 135 hectares, and Fox 20 hectares) and two mainland access points (Virginia Beach Marina and Island Grove Marina). The main population of the reserve resides on Georgina Island with approximately 80 households whom are member residents and 225 cottages, some of which are accessed year round.

www.georginaisland.com

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Climate Change Adaptation Planning within the Chippewas of Georgina Island First Nation Reserve is a three year project made possible by the support of Aboriginal Affairs and Northern Development Canada.

For more information about this project, please contact:

Jacqueline Richard

Coordinator
Ontario Centre for Climate
Impacts and Adaptation
Resources (OCCIAR)
705-675-1151 ext 2014
jrichard@mirarco.org
MIRARCO/Laurentian
University
935 Ramsey Lake Road
Sudbury, Ontario P3E 2C6

Allan Douglas
Director, OCCIAR
705-675-1151 ext 1506
adouglas@mirarco.org

Leanne Echum

Community Adaptation Liaison
Phone: 705.437.1337 ext 2242
leann.echum@georginaisland.com
Georgina Island First Nation
Georgina Island Administration
Office
RR#2, Box N-13
Sutton, Ontario L0E 1R0

Kerry-Ann Charles
Environmental/By-Law Coordinator
Phone: 705-437-1337 ext 2233
Kerry.charles@georginaisland.com

Climate Change Vulnerability and Adaptation Planning Framework

This document outlines the Climate Change Vulnerability and Adaptation Planning Framework for Climate Change Adaptation Planning within the Chippewas of Georgina Island First Nation Reserve. It is a seven step (Figure 1) process that will:

- Define the methodology used to collect Traditional Ecological Knowledge (TEK) and other pertinent information to help identify climate risks and vulnerabilities (Step 2)
- Explain how vulnerabilities will be compared to western science assessments of watershed vulnerability (Step 2)
- Outline how to prioritize climate risks perceived by the community (Step 4)
- Outline how the results will be shared with the community (Step 1)
- Build a process to collect and prioritize adaptation recommendations and how the adaptation recommendations will be implemented (Step 5 and 6)

It is very important to keep very good notes, and records of meetings, meeting and workshop results, decisions, etc through every step of the process. Good record-keeping makes it easy to revisit a decision in the future (Black, Bruce, & Egener, 2009).

1. Let's Get Started

Why:

It is important to establish in writing, why the Project Team (PT) is undertaking this adaptation planning process. What are the main drivers behind the project (e.g. extreme weather event, pressure from the community, etc.)?

Led by the Community Adaptation Liaison (CAL), the PT will discuss what they would like to see at the end of the process, and set goals and objectives to help that happen.

This information will be included in a 'terms of reference, for the project.

Project Scope:

The PT will define scope of project. For example, what are the geographic limits of the process, what themes will be assessed (e.g. wildlife, water, infrastructure, etc.), how far into the future does the PT want to plan for (e.g. 2020s, 2050s).

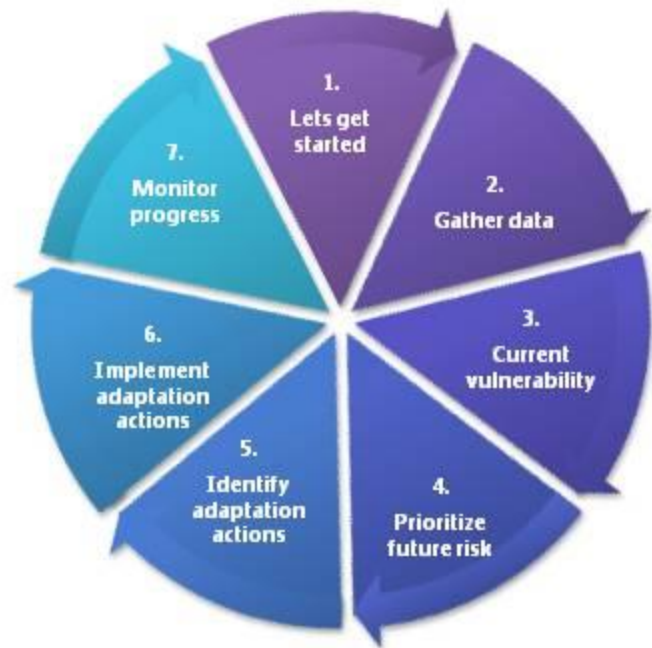


Figure 1: Climate Change Vulnerability and Adaptation Planning Framework

Communication:

Keeping all PT members and the community up-to-date is a very important component of the adaptation planning process. In order to do this, the CAL will develop a communication plan that includes who, what, where, when and how to communicate to the community, including the youth, community members, Elders, Chief and Council. A pamphlet outlining this phase of the project, the steps in the climate change vulnerability and adaptation planning process, background on climate change, why the community is undertaking the adaptation planning process including why it is important could be developed and circulated throughout the community. Other communication material could be developed such as posters, presentations and handouts for use at community meetings. The communication plan could also include a schedule of communities meetings required to introduce the vulnerability assessment and adaptation planning process, gather additional information needed for the process, and provide periodic updates.

Community Advisory Committee (CAC):

Establishing a Community Advisory Committee (CAC) (or Adaptation Planning Team) made up of community members is an excellent way to engage the community in the planning process. Community support for the process will be important as the community considers implementing the adaptation actions.

The CAL and the PT will establish criteria for selecting community advisory committee (e.g. ability to meet time requirement). A 'terms of reference' for the CAC could be developed and should include the roles and responsibilities of each member, and time requirements (e.g. how many times they will meet, activities, etc). The CAL will advertise for potential committee members, choose successful applicants, and establish the CAC. The CAL will remember to keep in mind the time requirement for this process and to choose committee members who have the time required to complete the planning process.

Once the CAC is in place, the CAL will assess level of knowledge of climate change among committee members through a survey. The PT will conduct a training session to bring everyone to the same awareness level, if necessary.

2. Gather Data

Traditional Ecological Knowledge (TEK)

TEK from the community provides invaluable insight into community experiences and changes over the years. Although traditionally passed down through storytelling (Bell, Wheatley, & Johnson, 2012), the CAL will capture the knowledge of the Georgina Island First Nation through a community survey. The Traditional Knowledge Survey, created by Dr. David Pearson (Laurentian University), will be used to collect TEK from Georgina Island First Nation community members (Appendix A). The CAL will modify the survey to reflect the values of the Georgina Island First



Nation, then will administer the survey to a broad range of community members (e.g. Elders, residents, Councilors, Chief, Chief of Police, youth) through one-on-one interviews. The survey results will be compiled and be used to assess current vulnerability step. The CAL will also summarize the results into a report.

Historical Data

Centre for Indigenous Environmental Resources (CIER (2006) uses the medicine wheel to understand community sustainability (i.e. Environmental, Cultural, Social, and Economic). Climate change will have a positive and/or negative impact on all of these areas. In this step, the CAL and PT will gather background or historical information or data in all these areas. The combination of TEK and historical data will show how both the community and climate have changed over the years. The PT will also collect future climate projections which will show how the climate and weather may change into the future. All of this information will help inform the remaining steps in the process.

Social and Economic information could include:

- Age of population
 - Population growth or decline
 - Housing
 - Community groups
 - Local economy (types of employment, unemployment levels, seasonal employment)
 - Health
 - Human resources (what skills exist in the community)
- Current and past settlements
- Subsistence
- Community plans
- Community Maps
- Commercial and traditional uses of land, water, wildlife, and plants
- Infrastructure

Cultural information could include:

- Cultural activities important to the community (e.g. fishing, hunting)
- Recreational activities and events important to the community (e.g. ice fishing, snowmobiling)

Environmental information could include:

*Indigenous knowledge presents a rich fabric of knowledge and wisdom that relates directly to environmental stewardship, preservation, and the enhancement of biological diversity by the First Peoples of Turtle Island (North America). There is an inseparable relationship between people, land, and water. This unique relationship is fundamental to cultural and spiritual beliefs held by First Nations people. **Traditional Knowledge**, passed down from our ancestors, teaches us how to live in harmony with nature, thereby ensuring the same opportunity for future generations.*

(Bell, Wheatley, & Johnson, 2012)

- Water quality and quantity data
- Wildlife, plant, and/or fish studies
- Previously conducted studies
- Historical climate data (e.g. temperature, precipitation, etc) for the area from Environment Canada

Future climate data

Future climate information and data important to the process includes:

- Climate projections – the PT will obtain projections from the Canadian Climate Change Scenarios Network, Ontario Ministry of Natural Resources, downscaled data developed for Ontario Ministry of the Environment (Huang, 2012), and downscaled projections for the Great Lakes Basin (Gula and Peltier, 2012)
- A list of climate impacts already being experienced by the community. This information can come from the community TEK survey, community meetings, and brainstorming sessions with the CAC.

<p>Sensitivity is defined as the degree to which a system is affected, either adversely or beneficially, by <i>climate variability</i> or change (IPCC, 2007).</p>
<p>Exposure is defined as the condition of being unprotected especially from severe weather (Merriam-Webster)</p>
<p>Adaptive capacity is defined as “the ability or potential of a system to respond successfully to climate variability and change (IPCC, 2007)</p>

It may also be helpful to ask the community how it sees itself into the future in terms of economic, cultural, environmental, and social aspects.

3. Identify current vulnerability

The IPCC (2007) defines vulnerability as the degree to which a system is susceptible to, or unable to cope with, adverse effects of climate change, including climate variability and extremes. It is a function of how sensitive and exposed the community is to current climate and how well the community has coped in the past. Using the impacts identified in each category of the TEK survey and comparison exercise, the CAL and PT will identify current vulnerability.

Using the data collected in the previous step, the CAL and PT will develop a list of impacts within the community (Table 1).

In order to provide a visual image of the impacts of climate change identified through the TEK survey, the PT and CAL will develop vulnerability impact trees. CIER (2006) used diagrams of influence to show the potential changes from predicted climate change in the community (Figure 2). To gain insight on which vulnerabilities might be priorities for the community the CAL will ask the Advisory Committee for guidance. Once prioritized by the Advisory Committee, current vulnerabilities will be moved to the risk portion of the assessment.

Table 1: List of vulnerabilities

Category (from TEK survey and/or western scientific study)	Description of existing vulnerability

4. Prioritize future risk

Starting with the highest ranked vulnerabilities the CAL, PT, CAC and the community will prioritize the risks associated with future climate change.

Future climate

The CAL and PT will use climate projections to develop a list of possible future weather and climatic conditions – future climate. For example, increased summer temperature; decreased frequency of precipitation; warmer winter temperature; etc. In a workshop, or brainstorming session, the CAL and PT will think about how the existing vulnerabilities will be impacted by future climate.

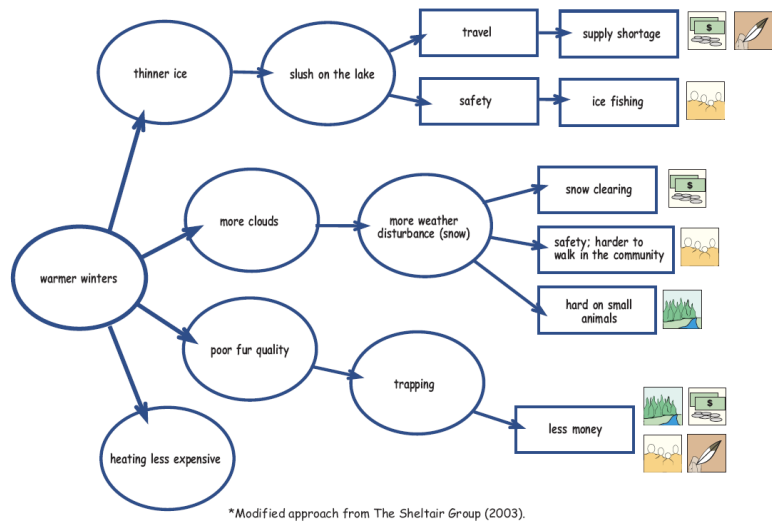


Figure 2: Influence diagram developed by the Working Group in Deschambault Lake (CIER, 2006)

Risk Estimation

Risk is defined by the likelihood (or frequency) and consequences (or severity) of impacts associated with climate change on vulnerable systems (Black, Bruce, & Egener, 2009).

Likelihood

Risk is defined by the likelihood (or frequency) and consequences (or severity) of impacts associated with climate change on vulnerable systems (Black, Bruce, & Egener, 2009). To estimate the likelihood, the team will create a ranking scale. Black, Bruce, & Egener (2009) suggest a four or five tier system. Estimates of likelihood should also consider the time horizon chosen in step 1 (e.g. 2050s). A worksheet similar to the one developed by Black, Bruce & Egener (2009) will be developed to display the results of this exercise (Table 2).

Consequences

The next task is to estimate consequence. As with likelihood, the team will develop a ranking scale and worksheet similar to Black, Bruce and Egener (2009) to display the results (Table 3).

Risk Evaluation

Once, the team will prioritize each of the risks using a risk evaluation matrix similar to the one developed by Black, Bruce & Egener (2009) (Table 4). The CAL will populate the matrix with the results of the estimate of likelihood and consequences.

Table 2: Estimate of likelihood

Vulnerability:					
Time Horizon (planning period):					
Future Climate Event	Very Unlikely to happen	Occasional Occurrence	Moderately Frequent	Occurs Often	Virtually Certain to Occur
(e.g. warmer winter temperatures)	Not likely to occur during the planning period	May occur sometime but not often during the planning period	Likely to occur at least once during the planning period	Likely to occur several times during the planning period	Happens often and will happen again during the planning period

Table 3: Estimate of Consequence

Vulnerability:													
Time Horizon (planning period):													
Consequence	Social			Economic			Environmental				Cultural		
	Health & Safety	Displacement	Loss of Livelihood	Property Damage	Financial Impact	Impact on Community Finance	Air	Water	Land	Ecosystem	Traditional Food	Traditional Medicine	Traditional Lifestyle
Very Low													
Low													
Moderate													
High													
Very High													

Communicate results

Once the risks have been prioritized, the CAL will schedule a meeting with the CAC to discuss the results. Next, the CAL will organize a meeting to communicate the results to the community. The CAL, with assistance from the PT and CAC, will organize the community meeting, including developing communication material (e.g. posters, handouts, presentations). The community will be asked to provide their opinions on the vulnerabilities, future climate, perceived risks and prioritized risks.

Table 4: Risk evaluation matrix

Consequence	Very High					
	High					
	Moderate					
	Low					
	Very Low					
		Very Unlikely to happen	Occasional Occurrence	Moderately Frequent	Occurs Often	Virtually Uncertain to Occur
Likelihood						

	Very high risk: immediate controls required
	High risk: high priority control measure required
	Moderate risk: some controls required to reduce risk to lower levels
	Low risk: controls not likely
	Very low risk: does not require further consideration

5. Develop adaptation actions

In the previous step, risks were estimated and prioritized, and results were communicated to the community. In this step the team will identify what actions are needed to reduce the risks identified in the previous step. Starting with the highest priority risks, the team will use their experience and best judgment, and suggestions from the CAC and community to come up with a list of adaptation actions. This can be done in a workshop or brainstorming session. The team can look at the diagram of influence developed in step 3 to help visualize the process (Centre for Indigenous Environmental Resources Inc, 2006). Often one action is effective at reducing the risk in multiple areas. The team should also look for win-win or no regrets options which are usually low-cost and easy to implement. Once complete, the CAL will compile the results of the brainstorming session (Table 5).

Table 5: List of adaptation actions

Risk	Adaptation Action

Once the list of adaptation options has been created, the team will evaluate each action in terms of timeframe to implement, effectiveness at reducing risk, cost to implement and maintain, and community acceptability (Black, Bruce, & Egener, 2009) (Centre for Indigenous Environmental Resources Inc, 2006). A worksheet similar to Table 6 developed by Black, Bruce and Egener (2009) could be used to record results. The project team will develop criteria for each category to help evaluate each risk (e.g. \$ = low cost, \$\$\$ = high cost). Black, Bruce and Egener (2009) also suggest accessing technical experts if necessary to help evaluation adaptation options.

Table 6: Evaluation of adaptation actions

Risk	Adaptation Action	Past coping measures	Capacity Requirements (current and future)		
			Technical	Staff	Cost

Since it is almost impossible to eliminate all risks associated with climate change, Bruce, Black and Egener (2009) suggest creating a plan to communicate residual risk to the community. They state that this may encourage private adaptation among community members (e.g. removing valuables from basement floors).

6. Implement adaptation actions

Using the results of the risk prioritization and evaluation of adaptation options, the team will develop a list of all the adaptation actions identified, starting with those identified as the highest priority. Next, the team will develop an implementation plan/matrix outlining when and how the actions will be implemented, who will implement them, and what resources (e.g. human and financial resources) will be required (Table 7). Again, win-win and no-regrets options should be implemented first as they are low-cost and easy to implement. The implementation plan will also consider where actions can be incorporated into other community plans (e.g. subwatershed plan). The CAL and PT will present this list of adaptation solutions, and implementation plan to Chief and Council.

The CAL will also schedule a community meeting to discuss the adaptation options and the implementation plan, and to ask community members for their opinion on the plan. The CAL will incorporate suggestions from the community into the final plan.

7. Monitor and evaluate

Monitoring the implementation of adaptation actions is important to ensure all actions are implemented according to schedule, and evaluating the actions helps determine if the actions are achieving the intended results and reducing risks associated with climate change (Black, Bruce, & Egener, 2009) (Centre for Indigenous Environmental Resources Inc, 2006). The CAL will develop a monitoring and evaluation plan. The plan should outline requirements for reporting on progress, and evaluating success. It should allow the team to revisit the adaptation actions if they are not achieving the intended result and if new information is presented. The plan should also include how often the adaptation plan is to be reviewed (e.g. every 2 years, ever 5 years).

Table 7: Implementation matrix

Risk		
Description		
Potential Adaptive Measure (action) (future)		
Funding and Support Organizations (e.g. First Nation, MOECC)		
Implementation and Evaluation Review Criteria	Effectiveness	Low (L) = will have a minor effect on risk Moderate (M) = will have a moderate effect on risk High (H) = will virtually overcome risk
	Cost	\$ = can be completed within existing or planned budget allocation \$\$ = will require additional funding \$\$\$ = will require major additional funding/major capital program
	Political Support	Low (L) = significant resistance Moderate (M) = moderate resistance High (H) = little or no resistance
	Community Support	Low (L) = significant resistance Moderate (M) = moderate resistance High (H) = little or no resistance
	Policy Support	Name policy
First Nation Policy (action/page number)		
Other climate change adaptation strategy (e.g. Lake Simcoe Climate Change Adaptation Strategy (action/page number))		
Implementer	Organization / Department (e.g. First Nation public works, other)	
Timeframe	Short term (S) = 1 year Medium-term (M) = 1-5 years Long-term (L) = 5 - 10 years	

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Appendix 1 – Traditional Ecological Knowledge Survey

Traditional Knowledge Survey Questions

This questionnaire was created by Dr. David Pearson, Laurentian University, Sudbury for the collection of Traditional Ecological Knowledge for Adaptation Planning in the Far North

Recipient name: _____ Interview #: _____

Interviewed by: _____ Date: _____

Changes in the “bush” – Trees and plants in your

1. Have you noticed any changes in the plants or the trees in the bush such as:

- Areas of dead or dying trees or shrubs
- New species or
- Anything that has disappeared or appeared

If so, how have they changed?

2. Is finding medicinal and edible plants harder or easier than it used to be? Why/how?

3. Do you think any of the changes in the bush have caused a problem for people in your community? Or have they been good for people? **How** has these changes affected the people in the community?

Changes in lakes and rivers

4. Have you noticed any changes in the lakes, rivers and creeks in your area, such as unusual water levels, temperature or colour? (pressure cracks, water quality)

5. If there is a large river in the community, have you noticed any changes in its flow or when it freezes and breaks up? (or lake)

6. Have you noticed any changes in the water plants found in lakes, rivers and creeks? If so, how?

7. Have you noticed unusual growth of green scum (algae) in any lakes or creeks? If so, where?

8. Do you think any of the changes in lakes and rivers have been good for people in the community? Have any changes been bad for people? How?

Changes in swamps and wet areas

9. Have you noticed swamps and wet areas changing in size or looking different in any way?

Changes in fish

10. Has the fishing changed in the community? For example, have you noticed any change in the kinds of fish or their number or size or do any of them seem to be unhealthy?

11. Have you noticed any changes in the places and dates when fish spawn?

12. Do people in your family eat the same kinds of fish and as much fish as they used to?

Other comments/concerns about changes in fish

Changes in birds, animals and insects

13. Have you noticed any kinds of birds or insects or animals you haven't seen before?
14. Have you noticed greater numbers of some kinds of birds or insects or animals? Have any of them begun to behave differently?
15. Have any changes in birds or insects or animals affected you or other people in some way?
16. Has there been any decrease of insects?

Changes in air and clouds

17. Have you noticed any changes in the air at any time during the year?
18. Have cloud shapes and patterns changed at some times of the year?

Changes in winter and spring

19. Have you noticed any change in winter temperatures? Spring temperatures? Compared with when?
20. Has there been any rain during the winter in recent years? Has it been a problem?
21. Has the date of first and last snowfall changed? From when to when?
22. How has your community been affected by changes in winter roads? (pressure cracks etc)
23. Have animals been affected by changes in winter weather and ice on lakes and rivers in your ?
24. Have you noticed changes in the date of freeze up of lakes and when the ice breaks up in the spring? Has that affected you or anyone you know?
25. Is the Spring run-off different from the past in any way?

Changes in weather during the rest of the year

26. Have you noticed changes in summer temperatures and rainfall? Compared to when?
27. Are long periods of dry or hot summer weather affecting your community more than in the past? Compared to when?
28. Have you noticed any changes in the number of windstorms and rainstorms and how severe they are? Perhaps thunder and lightning at different times of the year?
29. Has the community been affected by wildfires?

Effects of changing weather on buildings, roads and utilities

30. Do rainstorms cause flooding in your community? More than in the past? At what time of year?
31. How has changes in weather affected :
 - homes and other buildings
 - power lines
 - drinking water

32. What have people done about these changes?

Weather emergencies

33. Have you noticed changes in flooding in your community?

34. Does the spring break-up cause problems in your community? Are any of those problems different from the past?

Health

35. Have any changes in weather led to health problems in your community? Including problems like diseases carried by insects?

Other Climate Change Concerns within the Community:

