

## **GWICHYA GWICH'IN CLIMATE CHANGE ADAPTATION IMPLEMENTATION PLAN:**

The Community of Tsiigehtchic began work on climate change adaptation in the fall of 2009 in partnership with Ecology North, with funding from Indian and Northern Affairs. Concerns about permafrost degradation and the landmark church on the hill prompted the work. Climate change adaptation workshops held in Tsiigehtchic in 2009 and 2010 highlighted a host of other issues that may affect the community in the next forty years. These impacts and potential solutions were developed more fully in the Draft Gwichya Gwich'in Climate Change Adaptation Plan presented to the community in February 2010.

Tsiigehtchic now is in the advanced position (in the NWT) to start work on climate change adaptation projects with implementation funding from INAC for the 2010/2011 fiscal year. This includes funding for a community implementation coordinator, and funding for projects related to key impacts as outlined in the plan. In order to move forward on this work the Community Council must approve the Draft Gwichya Gwich'in Climate Change Plan and decide on its priorities and where it wants to focus its adaptation efforts.



This implementation plan outlines the recommended adaptations in more detail, and attempts to provide a schedule and timeline for implementation of adaptation activities. It is not anticipated or recommended that all 34 recommendations be attempted in 2010-2011, but it is recommended that key recommendations should be attempted when capacity and outside funding are more readily available (2010/2011). Therefore, the timing of work is critical.

Ecology North will be working with Tsiigehtchic in 2010/2011 to finalize this implementation plan, and start work on some of the key recommendations. Much of the work will need buy-in from the community council, staff and the community as a whole. The community adaptation coordinator will be the liaison and organizer in the community to help ensure many of the recommendations are completed. Ecology North staff and consultants will make several visits to Tsiigehtchic in 2010-2011 to help direct activities.

This plan has a set of recommendations that range from extremely easy to very difficult to implement, some will cost nothing, while others will have a substantial cost associated with them. A three-year window of time is being used to complete the majority of the work, but some work will be ongoing. It is also recommended to refresh the Adaptation Plan in five years as climate change is happening faster than many have anticipated, and new and different impacts and opportunities are being discovered all the time.

## **How to Read This Implementation Plan:**

There were 34 recommended adaptations in the Adaptation Plan. They are each highlighted in this document, with additional detail than found in the plan. The recommended adaptations are just recommendations and it is up to the community to determine the extent of its response to climate change.

The recommended adaptations are numbered and written as they were in the Draft Adaptation Plan, but they also have a brief description of the potential best course of action. Four headings highlight very generally, the cost, the amount of work, who should do it, and when. These should be used as a rough guide, and are subjective, and should be scrutinized and agreed on by the community decision makers.

**Cost:** This is subjective and hard to quantify. Should be viewed as a very rough guide

**Effort:** A general rating of difficulty of starting and completing an adaptation

**Lead:** Who should take the lead to get things started.

**When:** An attempt to try to schedule adaptations to ensure work is completed

The last page has a summarized timeline which outlines the anticipated timing of the adaptations.

## **34 Recommended Adaptations:**

The first four adaptations are broad cross-community initiatives, which are very difficult to accomplish and measure success. It is somewhat outside the scope of a climate change adaptation plan to build relations and develop a more healthy community, but is viewed as a crucial first step in adapting to climate change. Several specific recommendations that were mentioned in the workshop would help to achieve better communication and relations that the community could work towards are:

1. Work within the community to develop community resilience by promoting;
  - traditional values; and
  - community ties and social networks / relations.

Have bi-monthly community feasts or gatherings. It was mentioned that in the past it was common for the whole village to gather to celebrate important milestones, or changing of seasons etc. These events would help to build relations, communicate the vision of the community, share the harvest of the land, have fun, and pass on knowledge to the youth.

**Cost:** Less than \$500 per event

**Effort:** Once established and scheduled should be volunteer driven and centered around food

**Lead:** Interested community staff members could be given lead and small budget to organize

**When:** First event should be this Fall at significant date

2. Encourage elders to work with youth to pass on traditional knowledge including;
  - harvesting skills; and
  - safe travel on the land.

The community could continue to work with the Gwich'in Social and Cultural Institute and the

school to preserve the knowledge of the elders and pass it on to the next generation. Several government programs exist to help facilitate this, such as Take a Kid Harvesting, which should be promoted within the community.

**Cost:** Funding available through government programming

**Effort:** Considerable effort needed to expand education and mentoring programs

**Lead:** Led by GSCI or elders council

**When:** Start in Fall 2010 and continuing

3. Promote the role of the Gwich'in Renewable Resources Board through;
  - Education and monitoring of caribou numbers; and
  - Encouraging and educating people about good hunting practices.

The Gwich'in Renewable Resource Board should be asked to work more closely with hunters to ensure that sustainable hunting practices and more sharing of the harvest are promoted. This is a sensitive issue currently with the caribou herds in decline and a proactive approach towards the caribou harvest should be promoted.

**Cost:** Promotional costs, workshops, monitoring?

**Effort:** Considerable effort

**Lead:** Led by Gwich'in Renewable Resource Board

**When:** start with Fall hunt and continuing

4. Encourage more healthy lifestyles and eating habits for community members.

There are considerable efforts underway to achieve healthier diets and levels of exercise, particularly among youth. The community should continue to work towards the goal of a healthier population.

**Cost:** Funding through existing government programming

**Effort:** Considerable effort

**Lead:** Health and Social Services, and Education, Culture and Employment and Community

**When:** Continuing

5. Mainstream climate change issues and adaptation into other planning processes and community development activities.

This recommendation is very important, but is fairly vague. There is a need to ensure that all decision making by the community and different agencies, should take into account the fact that the climate is changing, and the conditions that we have today will not be what we will see tomorrow or next year. Climate projections must be thought about in regard to every major decision, particularly any future planning or building decisions.

**Cost:** Little to no cost

**Effort:** Continuous effort

**Lead:** Community staff and Council(s)

**When:** Immediately and continuing

6. Train Tsiigehtchic community staff on the basics of climate change.

An attempt was made to provide some basic climate change training in Ecology North's February community visit. It would be beneficial to have a greater audience of community staff to ensure that all are trained in at least the basics to help ensure climate change adaptation is mainstreamed.

Cost: No cost

Effort: Call a meeting and ensure participation

Lead: SAO and Ecology North

When: Summer 2010

7. Maintain the Local Advisory Committee for three more years with quarterly meetings to help guide adaptation implementation activities.

The Local Advisory Committee (LAC) is a group of Tsiigehtchic citizens who represent the diversity of the community. The LAC met several times to help direct Ecology North in the development of this plan. It is recommended that they meet 4 times a year to help the community coordinator, the community and Ecology North direct implementation activities.

Cost: Honorariums for LAC (paid by INAC funding in 2010/2011)

Effort: Moderate (some planning)

Lead: Community Coordinator

When: Starting in summer 2010 and continuing

8. Hire a part-time Climate Change Coordinator to direct the implementation phase of this project.

Ecology North hired a Community Coordinator (Itai Katz) in 2009-2010 season. It is recommended to hire a community member to act as Community Coordinator in 2010/2011.

Cost: Cost covered by INAC funding (2010/2011)

Effort: Very little, some direction by Community Staff

Lead: Ecology North and INAC

When: Spring 2010 till March 2011

9. Link to a sister community such as Mayo (Yukon) or Fort McPherson that is at a similar stage in the adaptation planning process. Have a liaison member from that community on the adaptation committee, this could be a member of the LAC or the Community coordinator themselves.

Cost: Little, honorariums and travel costs for the liaison

Effort: Some planning, moderate effort

Lead: LAC and community coordinator

When: Starting Fall 2010 and continuing

10. Document and publicize successes and failures on the community website or bulletin board.  
Cost: Post materials, no cost to community  
Effort: Little  
Lead: SAO and community coordinator  
When: Winter 2010/2011
11. Revisit this adaptation plan in 2015, and maintain it as a living plan. Climate projections used in this plan were not very detailed. It is anticipated that advances in climate modelling will allow for more accurate planning. Changes are happening so quickly that the plan will need to be updated at least every 5 years.  
Cost: There will be some unknown cost to revisit the plan in 2015(may be government funding available at the time)  
Effort: Moderate effort  
Lead: Community  
When: 2015
12. Develop a public bulletin system and use radio station to promote safe travel and highlight dangerous areas. Ideas regarding this include the printing of a large map to be placed somewhere readily accessible (potentially the large topographic map in the GSCI might be possible). A gathering of elders and harvesters could highlight potentially dangerous areas, and travel routes. This information would then be taken to the schools and promoted. A bulletin system on radio and in the band office would highlight changing dangers when people notice them.  
Cost: Workshop, printed materials. \$1000?  
Effort: Moderate – needs planning  
Lead: Community coordinator  
When: Late 2010 – winter 2011
13. Revisit the Tsiigehtchic Emergency Response Plan taking into account climate change and new projections for extreme weather events and forest fires.  
Cost: Unknown  
Effort: Moderate effort  
Lead: MACA and SAO  
When: 2010-2011
14. Develop a drainage plan (as per Tsiigehtchic Land Use Plan) to deal with drainage issues taking into consideration future climate change predictions.  
  
Drainage was a major concern in the community, from Georgetown, to water build-up under houses, culvert and road erosion, and minor flooding in the spring. There needs to be a well thought out plan to reduce drainage issues. This was a recommendation of the Land Use Plan, and should be done with community funding.

Cost: Considerable

Effort: Consultant?

Lead: Chartered Community

When: 2010-2011

15. Work with Housing Corporation to monitor and prevent mould in houses.

Cost: Unknown

Effort: Considerable effort

Lead: Housing Corporation and Chartered Community

When: Continuing

16. Inventory and replace rigid fuel line connections with flexible connections in all heating oil tanks. Water quality is an important concern for the community, and fuel spills are a leading cause of water pollution. There is a considerable risk of fuel spills from old tanks and rigid fuel tank connections. The community, housing corporation and individuals must determine how seriously they take this issue. An inventory of tank age and connections and workshop on how to maintain tanks is recommended in order to reduce the risk of spills. The community could help subsidize the cost of replacing the connections and bring in an expert or tradesperson, or use community staff to do the work. Government funding could be used.

Cost: Considerable

Effort: Considerable effort

Lead: Chartered Community and Housing Corporation

When: Summer 2010

17. Inventory water tank overflow lights and install or repair lights on all buildings. This is an easily solved issue, which is currently contributing considerably to rotting pilings and permafrost melt. Water tank overflow is building up under houses and buildings throughout the winter and melting in the spring creating pooling, rot and melting of permafrost (wet soil conducts heat into the soil better than dry soil). The solution is to install overflow lights on water tanks to reduce overflow. This may be subsidized by the community or government funding for a pilot project may be investigated.

Cost: Considerable

Effort: Considerable effort

Lead: Chartered Community and Housing Corporation

When: Summer 2011

18. Work with Department of Transportation (DOT) to ensure fuel is stored safely at the helipad.

Cost: Little to none

Effort: Minimal effort

Lead: DOT and Chartered Community

When: 2010

19. Work with Department of Transportation on a ferry landing study. This is a continuing concern in regard to fisheries. A study was previously commissioned, but the results are unknown. The community should try to work with the DOT to reduce gravel additions at the ferry dock.

Cost: Unknown

Effort: Moderate effort

Lead: Chartered Community and DOT

When: Continuing

20. Fence off snowmobile access to Church Hill to reduce vegetation loss. Snowmobile traffic up and down the church hill in times of low snow causes erosion, and harms the vegetation. This doesn't appear to be a main snowmobile route, and wouldn't negatively effect traffic. Fencing should be a kind that does not trap snow behind it, and thus insulate the permafrost in the winter.

Cost: Low

Effort: Low

Lead: Chartered Community

When: Fall 2010

21. Develop a desktop-level Community Permafrost Map. Use it to inform future land-use and development.

The permafrost map would be developed by a consultant based on information gathered by interviews with community members, past geotextile building reports, air photos, vegetation types and potentially on the ground investigations. Minor drilling may be required to verify conditions. This report would be used by the community to determine which are the best areas to build, and to monitor for large scale changes in the permafrost and indicators of melt.

Cost: Considerable, INAC funding available

Effort: Moderate effort

Lead: Ecology North and Chartered Community

When: Early September 2010

22. Work with INAC to establish a permafrost monitoring station in the community of Tsiigehtchic. If possible use the data to monitor permafrost changes in Vik'ooyendik (Church Hill). Ecology North has purchased a permafrost monitoring thermistor for installation in Tsiigehtchic in September of 2010. INAC staff will visit the community in August to install the thermistor and will continue to monitor it into the future. The thermistor will be located on Vik'ooyendik, the exact location will be determined in the summer of 2010.

Cost: Minimal (INAC funded)

Effort: Low effort

Lead: INAC and Ecology North

When: September 2010



23. Further study of permafrost maintenance, skirting and drainage issues regarding foundations of houses and community buildings (with an emphasis on preventative maintenance).

This study may take the form of a best practices guide to permafrost maintenance. It will be aimed at Tsiigehtchic but be broadly representative to other communities. The focus will be on housing. The main goal of this is to teach people simple ways to maintain the permafrost under their houses. Topics covered will include skirting types, foundation types, wind direction and sun exposure, vegetation effects, water and snow effects on permafrost. By generalizing the effects of all these factors on permafrost under houses it will hopefully help people make decisions that maintain permafrost. The guide would be in an attractive plain language form with pictures of good and bad practices. This will be informed with the help of NWT experts in permafrost and design. This kind of guidebook currently is not available in the NWT.

Cost: High (outside funding required)

Effort: Considerable effort

Lead: Ecology North

When: 2011

24. Arrange a permafrost and housing foundation assessment with permafrost experts in the community.

This assessment will occur in Early September 2010 with permafrost experts being invited to Tsiigehtchic. One-day will be used to do a walking tour of the community housing stock. Local homeowners will be invited to join the tour and to ask questions about their own houses, pilings and foundation issues. This assessment will point out general problems that seem to be widespread, and the potential best solutions for the most common problems. Time constraints will not allow every issue to be analyzed thoroughly, but this assessment will provide expert opinions to homeowners at no cost to them.

Cost: High (paid by INAC)

Effort: Considerable effort

Lead: Ecology North

When: September 2010

25. Commission an engineering study of options for Cemetery and Church Hill remediation or stabilization.

A more in depth study of Church Hill and permafrost degradation will follow up on Robert Johnson's 2007 report. This report will look more thoroughly at the hill itself and the danger to the church and cemetery of sliding downhill. Potential remediation options will be determined with Class D estimates of cost. Options may include moving the cemetery and church, reinforcing the hill, or trying to maintain the permafrost actively (ie. thermasiphons) or passively (ie snow and vegetation modification).

Permafrost experts will be brought in to Tsiigehtchic in September at the same time that the permafrost thermistor is installed. Minor drilling may be included to determine permafrost conditions and substrate conditions.



Cost: High (paid by INAC)

Effort: Considerable effort

Lead: Ecology North

When: September 2010 – Report due by March 31, 2011

26. Engage Indian and Northern Affairs Canada (INAC) officials about the potential to locate a Cumulative Impact Monitoring Program (CIMP) site in the community of Tsiigehtchic. <http://www.nwtcimp.ca/>. The preliminary date for CIMP applications is passed, but Tsiigehtchic should continue to pursue a CIMP site within the community by starting a dialogue with INAC officials in charge of CIMP. The new permafrost monitoring station (recommendation 22) will bring INAC officials to the community.

Cost: Unknown

Effort: Moderate effort

Lead: Chartered Community

When: September 2010 and continuing

27. Encourage the Gwich'in Tribal Council (GTC) and INAC to map and monitor landslides in the GSA. Landslides are being more closely monitored in the Inuvialuit region, but little is being monitored in the GSA. INAC officials have stated their interest in doing more work in the Gwich'in region regarding landslides.

The number and size of landslides in the GSA is growing at an alarming rate and little is known (except by local people) about where these are located. A potential danger also exists with landslides damming the Arctic Red River and releasing a floodwave when the dam is finally breached (as occurred in the 1970s). With the increase in the number of landslides the potential of this occurring again is increasing.

Cost: Moderate

Effort: Moderate effort

Lead: INAC and GSA

When: Winter 2011 and continuing

28. Develop linkages with scientists, Department of Fisheries and Oceans and local harvesters to monitor breeding times, invasive species, population trends and water quality. Ensure this information is available broadly.

Cost: Unknown

Effort: Moderate effort

Lead: Tsiigehtchic Renewable Resources Council and DFO

When: Continuing

29. Develop closer links with Aurora Research Institute to bring scientific study results back to the community. Currently there is still some mistrust among community members and scientists. It would help to see more scientists back in the communities to report their findings. Community members and interested parties meanwhile must make efforts to engage scientists as well.
- Cost: Unknown
- Effort: Moderate effort
- Lead: Aurora Research Institute and Gwich'in Renewable Resources Council
- When: Continuing
30. Work with GTC and INAC on an industrial sump management plan in the Gwich'in Settlement Area, to ensure sumps are not polluting waters. It is currently not known outside of community elders, and obscure documents where industrial sumps are located in the GSA. This will become more important information as permafrost melts and wastes in sumps potentially enter the water cycle. Sump wastes are unknown in general, and although many are benign, some may not be. A sump management plan should be demanded by the Gwich'in to determine where the sumps are, determine which ones hold deleterious substances and potentially manage them (passively or actively) to maintain permafrost.
- Cost: Considerable
- Effort: Considerable effort
- Lead: INAC, Industry and GSA
- When: Winter 2010 and continuing
31. Develop closer ties with Arctic Energy Alliance (AEA). AEA has an office in Inuvik and are trying to reach out to communities. There are substantial cost and energy savings potential within the community to be realized. AEA has the expertise to identify options, and the Government of the NWT's Environment and Natural Resources has funding to pay for energy savings
- Cost: AEA and ENR would fund options and much of work
- Effort: There needs to be clear direction and interest by Community staff.
- Lead: Chartered Community and AEA
- When: Continuing
32. Work with Environment and Natural Resources Forestry Management Division to complete a forest resource assessment for Tsiigehtchic. A forest resource assessment will provide information on forest types and where accessible lumber and in particular firewood are located. This will help to manage and increase firewood use and reduce fossil fuel reliance.
- Cost: Paid by ENR
- Effort: Some effort to work with ENR
- Lead: ENR and Chartered Community
- When: Continuing

33. Investigate the potential of using willows and forests as a biomass fuel source. There is potential that willows or forests could provide both electricity or a greater portion of heating for Tsiigehtchic. This potential should be investigated with the help of ENR and AEA.

Cost: None

Effort: Moderate effort

Lead: Chartered Community, ENR and AEA

When: Continuing

34. Investigate using wood pellets and in-stream hydro as options to reduce dependence on fossil fuels. Again, these options could help reduce fossil fuel use and keep more money in the community.

Cost: None

Effort: Moderate effort

Lead: Chartered Community, ENR and AEA

When: Continuing

