



Dempster Highway

Photo from Northwest Territories Industry, Tourism and Investment Website

Resource Binder on Climate Change

**Prepared by Michael Fleischmann – Intern, Arctic Athabaskan Council
July 25, 2006**

Table of Contents

1.0 - INTRODUCTION TO CLIMATE CHANGE	p. 4
2.0 - INTRODUCTION TO THIS BINDER	p. 5
3.0 - EFFECTS OF CLIMATE CHANGE	p. 6
3.1 – <i>Introduction</i>	p. 6
3.2 - <i>Marine Ecosystems</i>	p.6
3.2.1 – <u>Sea Level Rise and Melting Glaciers</u>	p. 6
3.2.2 – <u>Fisheries</u>	p. 7
3.2.3 – <u>Thawing Permafrost</u>	p. 8
3.3 - <i>Terrestrial Ecosystems</i>	p. 8
3.3.1 – <u>Displacement of Tundra</u>	p. 8
3.3.2 - <u>Health of the Boreal Forests</u>	p. 9
3.3.3 – <u>Caribou</u>	p. 9
3.4 - <i>Direct Threats to communities</i>	p. 10
3.4.1 – <u>Coastal Erosion</u>	p. 10
3.4.2 - <u>UV Radiation</u>	p. 11
3.5 – <i>Conclusions</i>	p. 11
4.0 GOVERNMENT PROGRAMS	p. 12
4.1 – <i>Introduction</i>	p. 12
4.2 – <i>Kyoto</i>	p. 12
4.3 – <i>Mitigation Programs</i>	p. 12
4.4 – <i>Adaptation Programs</i>	p. 13
4.5 – <i>Existing Federal Programs</i>	p. 13
4.5.1 – <u>ANCAP</u>	p. 13
4.5.2 - <u>Commercial Building Incentive Program (CBIP)</u>	p. 14
4.5.3 - <u>EcoAction Community Funding Program</u>	p. 14
4.5.4 - <u>Northern Ecosystem Initiative (NEI)</u>	p. 14
4.6 – <i>Other Programs</i>	p. 14
4.6.1 - <u>Walter and Duncan Gordon Foundation</u>	p. 14
4.6.2 - <u>Environmental Awareness Fund</u>	p. 15
4.6.3 - <u>Municipal Rural Infrastructure Fund</u>	p. 15
4.6.4 - <u>Community Development Fund</u>	p. 15
4.6.5 - <u>Northern Strategy</u>	p. 15
4.7 – <i>YTG Department of Environment Programs</i>	p. 16
4.8 - <i>Analysis of Conservative Thinking on Climate Change</i>	p. 16
4.9 - <i>Mitigation and Adaptation</i>	p. 17

5.0 – THE ELEMENTS OF RISK ANALYSIS	p. 19
5.1 - <i>Risk Identification</i>	p. 19
5.2 - <i>Risk Assessment</i>	p. 19
5.3 - <i>Risk Management</i>	p. 20
5.4 - <i>Risk Communication</i>	p. 21
5.5 - <i>New Ideas in Risk Analysis</i>	p. 21
6.0 – CLIMATE CHANGE LITIGATION	p. 23
6.1 – <i>Climate Change Liability</i>	p. 23
6.2 - <i>Application to Yukon First Nations</i>	p. 23
6.3 – <i>Human Rights Challenge</i>	p. 23
7.0 – GLOBAL WARMING AND LAND CLAIM AGREEMENTS	p. 25
8.0 – FINDINGS	p. 32
9.0 – REFERENCES	p. 33
APPENDIX A – Funding Sources	p. 35
APPENDIX B – Environment Yukon Climate Change Activities	p. 45
APPENDIX C – Speeches by Minister Ambrose	p. 49
APPENDIX D – AAC Background Information	p. 70

1.0 - INTRODUCTION TO CLIMATE CHANGE

This introduction, on the human activities that are causing climate change, is taken from Environment Canada: http://www.climatechange.gc.ca/english/climate_change/earth.asp

“Gases in our atmosphere, including water vapour, carbon dioxide, methane, and nitrous oxide, act like a greenhouse to keep the sun's heat in and help make our planet livable. Without this natural insulation, the Earth's surface would be much colder than it is now. In fact, the average temperature on Earth would be -18° Celsius, too cold to support the diversity of life that now exists.

Countries have produced increasing quantities of greenhouse gases, due to the burning of fossil fuels such as coal, oil, and natural gas to drive our vehicles, power our industries, and heat and cool our homes. Other human activities, such as the clearing of land for agriculture and urban development, and landfilling and other waste disposal methods, are also adding to the concentrations of greenhouse gases in our atmosphere.”

Good books to read for more information on the subject of climate change include the “Arctic Climate Impact Assessment” which is discussed later in the binder and “Weather Makers” by Tim Flannery.

2.0 - INTRODUCTION TO THIS BINDER

For the most part, those face the greatest risk and harm associated with climate change, have the least ability to cope with these effects. Through use of the Umbrella Final Agreement, advocacy, and effective climate change adaptation policies, this state of affairs can be corrected. Hopefully this resource binder will empower and convince you to play a role.

This binder begins with a discussion of the harm that climate change will likely cause in the Arctic. Following this is an analysis of the Canadian government's response to this danger. You will find that up to this point the response has been insufficient. This "clean slate" presents an opportunity to advocate for the programs and resources required to address climate change. The rest of the binder is devoted to introducing some tools to support this advocacy. In doing so, there is an introduction to risk analysis. Also included are some ideas about the potential for legal recourse through the tort system. Last but not least is an outline of how the guarantees in the Umbrella Final Agreement will be affected by climate change.

Appendices A and B include information on government funded climate change research, mitigation and adaptation programs. Appendix C is a copy of all the speeches that Rona Ambrose has made since becoming Canada's Environment Minister. Appendix D provides some information on the Arctic Athabaskan Council.

3.0 - EFFECTS OF CLIMATE CHANGE

3.1 - *Introduction*

The Arctic Climate Impact Assessment (ACIA) is the definitive source for information on the effects of climate change. This report is a four year international assessment of climate change in the Arctic, and is a "...comprehensively researched, fully referenced, and independently reviewed evaluation of arctic climate change and its impacts for the region..." (ACIA, Preface). The assessment was requested by the Arctic Council and includes the involvement and observations of Yukon First Nations and the Arctic Athabaskan Council.

ACIA has surveyed a range of the scientific literature and indigenous knowledge related to climate change in the Arctic region. It has found evidence from a variety of sources that the global temperature is warming, will continue to do so at an increasing rate, and that the temperature in the Arctic will warm at twice the pace of the rest of the Earth (ACIA, 10). There is strong evidence that most of the warming from the past 50 years is attributable to human activities. ACIA has surveyed the impacts, both potential and realized, of a warming Arctic. This part of the binder will outline these impacts,

The impacts of climate change will be divided into effects on marine ecosystems, terrestrial ecosystems, and communities. References to the "ACIA Full Report" refer to the large, scientific report. References to "ACIA" refer to the synthesis of the scientific report. Both reports are available online.

3.2 - *Marine Ecosystems*

3.2.1 – Sea Level Rise and Melting Glaciers

Global warming will cause the sea level to rise for two major reasons. Firstly, water expands as it warms and less dense water takes up more space. Secondly, melting of glaciers adds to the amount of water flowing into the oceans. The rising sea level will submerge coastal communities and northern tundra habitats. The global average sea level is projected to rise between 10-90 centimetres this century (ACIA, 42). Note that a 50 centimetre rise will typically flood land that is 50 metres inland (ACIA, 49).

Observations over the past 50 years show a decline in the extent and thickness of sea ice, with the biggest changes occurring in the summer. Over the past few decades there has been 5-10% reductions in extent and 10-15% in thickness. Measures from the central Arctic Ocean show a 40% decline in the ice thickness. Satellite data shows that lake and river ice cover has been reduced by two weeks in annual duration (ACIA, 82).

Melting of sea ice has a direct effect on the food chain. In a study of the Beaufort Sea, there was evidence that ice algae, a crucial source of nutrients at the bottom of the food chain, is being replaced by less productive algae usually associated with freshwater. This is because a 30 metre thick layer of relatively freshwater below the melting ice has been formed. This layer has increased in depth by a third since twenty years ago (ACIA, 66).

Another effect of melting sea ice is that it will increase the opportunity for blooms of phytoplankton. This will change the distribution of fish and sea mammals, and whale migration routes, which all depend on phytoplankton at the bottom of the food chain (ACIA Full Report, 195).

Glaciers provide a source of freshwater, irrigation, and hydroelectric power to adjacent communities. Their more rapid melting will draw down this source of amenities and increase the chance of flooding and avalanches associated with swiftly melting glaciers. As glaciers diminish, trees and other vegetation will be able to invade the area and harm glacial ecosystems and the wildlife it supports. One benefit is that melting glaciers uncover previously hidden First Nations artifacts.

3.2.2 - Fisheries

As lakes and rivers warm, the metabolic rate of fish increases and they require more food for growth. For example, a rise in water temperature could cause lake trout to require eight times the amount of food they currently consume just to maintain adequate body condition (ACIA Full Report, 373). If the trout adapt to the warmer surface water by staying in the deep water they will confront a lack of oxygen. This is because the warmer temperatures will increase the production of small aquatic life that consumes oxygen. This will reduce oxygen concentration in deeper water where it is needed by lake trout.

Arctic Char, which respire at a greater rate in warmer water, will face increased exposure to, and accumulation of, heavy metal. Another effect is the potential for char to grow more quickly if the increasing temperature parallels with increasing food chain productivity. This is in contrast with the Arctic Grayling adults who respond to warming by losing weight. The projected warming will likely eliminate the population of Arctic Grayling in Toolik Lake (ACIA Full Report, 378). The spawning ground for cold water species such as char, whitefish, and cisco will also diminish.

Migrating fish, such as salmon, may adapt to global warming by moving northward into Arctic rivers. A difficulty with this adaptation is that the salmon accumulate and magnify contaminants from the Pacific Ocean and will transport them to the Arctic rivers. These rivers and lakes will already face increased heavy metal contamination because the warmer and wetter climate will increase deposition in the Arctic. Also, the melting of permafrost, sea ice, and glaciers will further contaminant release (ACIA Full Report, 437).

Southerly fish that can expand their range northwards because of the warmer temperatures will introduce new parasites and diseases. The northern, traditionally fished species, will face competition from these new fish and be particularly vulnerable to the diseases that these fish carry (ACIA Full Report, 413).

In summary, traditional fish will face the new challenges of changes to the food chain, new competitors, introduced parasites and diseases, increased contamination by heavy

metals and persistent organic pollutants, and increased metabolic rates. The ability of traditional fish to tolerate global warming depends on their ability to adapt or move. Adaptation will depend on hydrology, precipitation, future temperature, and vegetation and nutrient patterns. The ability of fish to move depends on habitat suitability, food supply, predators, pathogens, niche boundaries, and physical barriers such as salinity and waterfalls. Due to the existence of all these variables, planning and studies at the community level, that incorporates scientific expertise and local knowledge, is crucial to determine whether the fisheries will remain viable. The ACIA also notes the need for more controlled experiments involving marine ecosystems.

3.2.3 – Thawing Permafrost

Permafrost is essential to the existence and functioning of Arctic wetlands. The increasing, seasonally thawed layer of permafrost, is an indicator and product of climate change. The depth of this layer has been increasing. There has also been more oscillation and variability in thickness of the bottom layer of permafrost. Over the next 100 years, the southern limit of permafrost is expected to shift northward by several hundred kilometers, with permafrost degradation to occur over 10-20% of the permafrost area (ACIA, 87).

The effect of melting permafrost on marine ecosystems is that it will allow the previously frozen soil to hold more water. As this water drains into the soil, rivers, swamps, bogs and the ecosystem that they support will be threatened or eliminated.

3.3 - *Terrestrial Ecosystems*

3.3.1 – Displacement of Tundra

As mentioned above, sea level rising will displace tundra in the north. Tundra will also be displaced in the south as the boreal forest treeline moves northward. In northeast Canada, for example, the summer climate is too cold for frequent seed production. The temperature increases that are projected will be sufficient to provide the required summer warmth at the northerly treeline. Species that live in the boreal forest will correspondingly extend their northerly range. Scientific models predict that 60% of global tundra will be replaced if atmospheric concentrations of carbon dioxide double (ACIA Full Report, 851).

During the last global warming period, the tundra zone was able to persist because of a relatively low sea level. This time around, global warming is causing a high sea level. The tundra ecosystem is being displaced by the Arctic Ocean from the north and by the boreal forest from the south.

Not only is the Arctic sea moving south and the boreal forest moving north, but human development will further threaten the tundra. This development is projected to increase in the Arctic as navigation routes improve, the climate becomes more hospitable for southerners, and there is an increase in exploitation of natural resources. Research shows

that these developments will have impacts that extend 4-10 km from the site, which is a much wider zone of influence than for other ecosystems. The end result is smaller, fragmented tundra environments.

3.3.2 - Health of the Boreal Forests

Boreal forests are particularly vulnerable when the ecosystem is supported by low biodiversity. Low biodiversity is a major characteristic of the Arctic in general. Systems with few species are normally less stable against major population swings of a keystone species and other stressors. One such stress, as noticed by the Dene First Nation, is the increased prevalence of parasites and diseases that are afflicting pine and spruce trees.

The spruce beetle infestation, which usually inflicts pine trees in the Yukon for four years at a time, was in its 15th year in 2005 due to favourable climatic conditions for the beetle. These beetles are more successful in sustained warm and dry periods. Prior to the current outbreak, only two other outbreaks in the Yukon have been recorded, both as a result of industrial activity. A road construction project resulted in an infestation of 50,000 hectares, and a power installation resulted in an infestation of 100 hectares. The current infestation is 350,000 hectares in size (YTG Energy, Mines and Resources available at www.emr.gov.yk.ca/forestry/sprucebeetle.html).

As with the beetle, weather is a critical factor in the growth and distribution of the spruce budworm. Other stressors on the boreal forest are increased periods of drought, thaw/freeze events on the soil, and unusually light late winter snow. These stressors are a concern for the health and productivity of aspen forests.

In summary, climate change will result in greater frequency of insect outbreaks, more extensive areas of tree mortality during outbreaks, and greater intensity of insect attack resulting in higher average levels of tree death within outbreak area. One effect that will balance the greater prevalence of insect outbreaks is that adaptation and resilience by trees will improve because of the more favourable environment for growth. Overall, the scientific record strongly suggest overall negative effects on boreal forest health from sustained temperature increases.

Fire is another serious concern. Boreal forests are more flammable than deciduous forests. The fire regime is controlled by warmth, precipitation, humidity, and wind. The total area burned in Canada has more than doubled since the 1970s (ACIA Full Report, 837). This trend is explained by higher temperatures. Also, through ecological mechanisms, boreal forest zones increase the density and amount of lightning strikes, a major cause of fires.

3.3.3 – Caribou

The caribou depend on abundant tundra vegetation. If caribou move northward to follow the shrinking tundra area, the First Nations people that depend on caribou will not easily be able to follow them. This is because the more settled way of life reduce the ability of people to leave their permanent community and follow the caribou northward.

Another problem facing the caribou is the increasing incidence of freeze-thaw events over the soil. The layer of ice that results makes it more difficult for caribou to forage during the winter. For example, the decline of Peary Caribou on Canada's Arctic islands appears to be explained by autumn rains that iced the winter food supply and crusted the snow cover. Also, the mosses and lichens upon which caribou forage are particularly vulnerable to warming and freeze-thaw events (ACIA, 70). The Inuit note that there are less caribou when there are many freeze-thaw cycles.

Besides increasing freeze-thaw events, lakes and rivers are freezing over later in the year. When the ice does not support the weight of the animals, they must stay on less productive ranges for more time. As well, this increases their vulnerability to predators. Another issue is the variable and less predictable weather. This produces a variable and less predictable behavioural response in the caribou and makes it difficult to plan hunting.

A final issue facing the Porcupine Caribou Herd in particular is that the Porcupine River is thawing earlier in the spring. The result is that some cows have already calved on the south-side of the river, and have to cross the rushing water with their newborn calves. Thousands of calves have been washed down the river, leaving their mothers to proceed without them to the calving ground (ACIA, 72).

If the size of the caribou herd decreases, the caribou will contract their range. Communities situated on the margin of the current range will be left without easy access to the remaining caribou. As mentioned above, the range of the caribou will also shift northward to remain in the tundra habitat that supports them.

3.4 - *Direct Threats to communities*

3.4.1 – Coastal Erosion

All of the above impacts have an impact on northern communities through degradation of land and habitats. The impacts outlined in this section will have a *direct* impact on communities.

Along with the sea level rise, coastal communities must cope with an increasing violence of storms and waves along the shore. The reason for stronger waves is that the thinner and less extensive sea ice allows stronger wave generation by wind. The sea ice also used to act as a buffer zone between the breakwalls and the waves. This buffer zone is diminishing. Furthermore, the storms are becoming stronger because as the layer of sea ice melts to a greater extent, more sea water is available for evaporation. Increased evaporation leads to increased storms (ACIA, 79).

The storms and waves will increase the chance of flooding. This will result in threats to infrastructure such as sanitation and drinking water installations. The storms and waves will also exacerbate the problem of soil erosion. As the permafrost warms, it loses its strength and is more susceptible to erosion by the waves.

The increased precipitation and rising temperature that is associated with global warming will increase contaminant deposition in the Arctic. Also, contaminants that were previously immobile in permafrost will be released as the permafrost melts.

3.4.2 - UV Radiation

Ozone depletion over the Arctic is amplified by the greenhouse gases that cause climate change. This is because global warming will encourage the formation of polar stratospheric clouds. “The icy particles of these clouds are sites on which ozone-destroying chemical reactions occur” (ACIA, 100).

The result of ozone destruction is that more harmful UV rays reach the Arctic. Vulnerable young plants and animals will be more exposed to elevated UV levels. The increased exposure will have varying affects on different plants and animals. Generally, increased UV will reduce nutrient cycling and decrease ecosystem productivity. Also, as snow and ice melt earlier in the spring, these plants and animals will lose the protective snow cover and be more threatened by UV rays for longer periods of the year.

A more serious problem is the exposure of UV rays on Arctic children. They already receive a 30% greater lifetime dose of UV than any previous generation (ACIA, 102). As ozone is further depleted, people in the Arctic will face greater risks of skin cancer, eye damage, and immune system suppression. Immune suppression makes people less able to fight off disease and infection.

3.5 - *Conclusions*

Since the late 19th century, average temperature has risen 0.6 degrees Celsius. The temperature rise in the Arctic has been greater than this, with the Yukon, Alaska and Siberia warming at the fastest rate (ACIA Full Report, 909). Climate change will have such wide ranging and direct effects as exposure to an increased dose of UV radiation, degradation of sanitary, transportation and housing infrastructure, and coastal flooding/erosion. The effects will be more pronounced on the First Nations who continue to live in close connection to the land. The traditional knowledge base from which they forecast animal and weather characteristics is changing, plants and animals are moving, and ecosystems are facing new challenges. For example, a review of 143 studies involving nearly 1500 species has shown that 80% have shifted their range towards the poles (ACIA Full Report, 879). This northward movement of species is all the more alarming due to the fact that adaptations to the harsh Arctic environment have made these organisms more vulnerable to new species. These new species bring new pests, parasites, and competition for resources.

Climate change threatens the lifestyle and very life of First Nations people who continue to live in a traditional manner. The rest of this binder provides some ideas for a response to this threat.

4.0 GOVERNMENT PROGRAMS

4.1 - *Introduction*

The new Conservative government has eliminated almost all the programs that the Liberals designed to address climate change. Although Canada is no longer taking a leading international role in climate change mitigation policy, this “clean slate” presents an opportunity for Yukon First Nations to advocate for climate change programs that acknowledge the constitutionally guaranteed rights. The following information describes existing domestic and international programs that relate to climate change. The list of domestic programs is short. In the fall of 2006 it is anticipated that the Conservatives will introduce some new programs. Section 4.8 of this binder analyzes the perspective that this government has on climate change in order to predict what type of programs they will introduce. The time to influence their perspective is now.

4.2 - *Kyoto*

The Kyoto Protocol is an international treaty, ratified by 163 countries, whereby developed nations agree to reduce the greenhouse gases released by their countries. This agreement is not expected to impede the progress of global warming by very much, but it is seen as an important first step in international cooperation and capacity building. Canada, under the Liberal government, ratified the Kyoto Protocol. However, little progress was made under the Liberals towards reducing greenhouse gases. The new Conservative government has used this as an excuse to continue along the path of not meeting the targets. Instead, this government is adopting a “Made in Canada” solution. This solution is a work in progress, but essentially there will be two elements to their plan: programs that work towards mitigation, that is, reduction of greenhouse gases; programs that work towards adaptation, that is, increasing the ability of communities to meet the challenges of climate change. The text of the Kyoto Protocol is available at unfccc.int/resource/docs/convkp/kpeng.html.

An advantage of Kyoto that has been partially lost is the possibility that Yukon First Nations could undertake projects, funded by the government or corporations, which reduce greenhouse gas emissions or “capture” greenhouse gases from the atmosphere. Projects that met such goals, such as setting aside land so that it could capture carbon dioxide, would provide government or corporate partners with carbon credits. These partners would be involved in funding the project. They could put the credits that the project provides towards meeting their own greenhouse gas reduction targets. If Canada is pulling out of Kyoto, however, the government and businesses do not have any Kyoto targets to meet, and so they have less reason to fund these types of projects. Other countries that are maintaining their Kyoto commitments may still fund this type of work in Canada.

4.3 – *Mitigation Programs*

Thus far, the Conservatives have introduced two initiatives to reduce greenhouse gas release in Canada. They are going to provide users of public transit with an income tax

credit to encourage people to leave their cars at home. Details of the program are available at www.cra-arc.gc.ca/whatsnew/items/transit-e.html. Also, they are going to increase the average renewable fuel content in gasoline and diesel fuel to 5% by 2010 (See p. 56 for more information). In order to do so, they will support the farmers that provide this renewable fuel. The advantage of increasing the renewable fuel content is that it less greenhouse gas will be released when the fuel is consumed.

What these two initiatives have in common is that they are using the market and voluntary agreements to achieve the reduction in greenhouse gas emissions. This is the approach used by the Asia Pacific Partnership, which is a group of countries, including the USA, that have not ratified the Kyoto Protocol. The disadvantage of this partnership is that it does not have the legal “teeth” of Kyoto, if countries do not meet their greenhouse gas emission targets. Rona Ambrose, Canada’s Minister of the Environment, has expressed an interest in this partnership and the means they are using to reduce greenhouse gases.

4.4 – Adaptation Programs

No new programs have been introduced, as of yet, that address the adaptation of communities to global warming threats. However, such programs may be forthcoming for the Arctic, judging by Rona Ambrose’s statement that changes in the Arctic “...such as melting permafrost, changes in our sea ice and the arrival of new migratory animal species, have raised the need to address adaptation measures.”

A description of existing programs is provided below. The status of some of these programs is unknown and so it is best to contact the funding agency before developing a proposal.

4.5 – Existing Federal Programs

4.5.1 - Aboriginal and Northern Community Action Program (ANCAP)

This 30.7 million dollar program is designed to make the First Nations an active partner in climate change mitigation strategies. Besides mitigation, the ANCAP program is focused on sustainable communities and improved energy planning. More information about ANCAP is available at www.ainc-inac.gc.ca/clc/index_e.html.

A recent program launched by ANCAP will fund adaptation initiatives. The program is considering all those projects that integrate risk management, Elder’s knowledge, and science, in order to implement adaptive responses to climate change in First Nation’s communities. \$375,000 is available under this program and proposals are due on August 31, 2006. More information about this program is available from Marie-Eve Neron, ANCAP policy analyst, at (819) 994-6423.

4.5.2 - Commercial Building Incentive Program (CBIP)

This program provides funds for energy efficient buildings. To qualify for the program, the building must require 25% less energy than a building of the same design without energy efficiency improvements. This program provides recipients with twice the difference in energy bills between the building and a similar building without the improvements. So for example, if an energy efficient building must pay \$30,000/year in energy costs, and a hypothetical building without the energy efficient improvements would cost \$40,000/year, CBIP will pay $(40,000-30,000) * 2 = \$20,000$. This \$20,000 is paid over and above the savings from the lower energy bill. The maximum available payment may decrease over time. The ANCAP program provides an additional one time payment of \$10,000 for buildings that meet the CBIP energy efficiency requirement. More information is available at: <http://oee.nrcan.gc.ca/commercial/financial-assistance/new-buildings/index.cfm>

4.5.3 - Environment Canada's EcoAction Community Funding Program

This fund provides support to community groups for projects that have measurable, positive impacts on the environment. Funding support can be requested for projects that have a focus on action, community capacity building, or a combination of both objectives. The deadlines are February 1st, and October 1st, every year. More information is available at www.on.ec.gc.ca/ecoaction/intro_e.html.

4.5.4 - Northern Ecosystem Initiative (NEI)

This initiative is designed to build partnerships rather than make calls for proposals. Individuals and organizations are encouraged to contact NEI to find out if they can become involved with funding the work or providing support. NEI focuses on scientific research and building capacity. Climate change, contaminants, and resource use activities are amongst the specific activities being funded. More information is available at: www.pnr-rpn.ec.gc.ca/nature/ecosystems/nei-ien/index.en.html.

4.6 – Other Federal, Territorial, and Non-Governmental Programs

I have printed off a comprehensive list of programs that are funded by Environment Canada, the Yukon Territorial Government or NGOs that have an environmental and/or climate change focus. This list is re-printed in Appendix A. This is also available in electronic form at:

www.environmentyukon.gov.yk.ca/pdf/FundingSourcesMarch2005.pdf

The following are some highlights from the list of programs in Appendix A:

4.6.1 - Walter and Duncan Gordon Foundation

This foundation focuses on building capacity and sustainable living amongst people in the north, for a richer and stronger democracy. The foundation provides funding through

proposals that address capacity building and sustainable northern communities. More information is available at www.gordonfn.org.

4.6.2 - Environmental Awareness Fund

Funding of \$30,000 is available through this program for 2006-2007 to assist organizations with efforts to inform and educate the public by promoting environmental education or awareness, resource planning and sustainable development in the Yukon. The maximum available for any single project is \$5,000. More information is available from Vicki McCollum, Manager of Client Services, Department of Environment, at (867)667-5797. Funding has closed for this year.

4.6.3 - Municipal Rural Infrastructure Fund

This program targets rural and municipal infrastructure that improves the quality of life and infrastructure of communities. The costs are shared between First Nations or municipal applicants and the federal/territorial government. The latter are providing \$32 million in funding. More information is available at www.infrastructure.gov.yk.ca.

4.6.4 - Community Development Fund

Three levels of funding, from below \$25,000 to above \$75,000, is provided through this fund depending on the needs of the project. The criteria for funding includes projects that promote community health and well-being, strengthen the economy, or invite community participation. More information is available at www.economicdevelopment.gov.yk.ca/general/cdfindex.html.

4.6.5 - Northern Strategy

While the transfer of new powers to the Yukon has contributed to effective program and service delivery, the cost is greater than anticipated. This partnership, between the federal government and territorial governments, is designed to provide 120 million dollars to the territories.

The Council of Yukon First Nations and the Yukon Territorial Government are working together to use this money. These governments can champion a proposal on behalf of a non-governmental organization. Some priorities:

- Have governments design changes to governance in the Yukon to reflect the changes brought about through the UFA. This requires capacity building, collaboration, and YTG support services for CYFN.
- Continue to support the Northern Climate Exchange Program
- Develop a set of sustainable development indicators for the north
- Develop knowledge and data in relation to Yukon lands and resources, including fish and wildlife habitats

- There is recognition of the threat of climate change. For example, they note that the spruce beetle, which was previously checked by lengthy period of cold, is now rapidly destroying the boreal forest in southwest Yukon

More information is available at www.northernstrategy.ca/index_e.html.

4.7 – YTG Department of Environment Programs

Appendix B provides a summary of the ongoing research programs and climate change activities that Environment Yukon is involved with.

4.8 - Analysis of Conservative Thinking on Climate Change

Since the bulk of the Conservative response to climate change is expected in October of 2006, it is important to understand their current mindset in order to predict the type of initiatives they will support in the future. This analysis is based on reading the speeches of Rona Ambrose, given to Parliament, the UN, and in scrums with the media. The text of these speeches is available online at www.ec.gc.ca/speech_e.html and is re-printed in Appendix C.

The following are some themes from her remarks:

- The Conservatives wish to address greenhouse gas emissions in conjunction with other air pollution. For example, at an address in Vancouver, Minister Ambrose said “no longer can we separate the issues of greenhouse gas reductions and pollution. Every solution we propose must address both challenges...to ensure that we protect the health of Canadians and fight global warming.” The problem with this approach is that greenhouse gases, and the global warming that these gases cause, pose different challenges than other types of air pollution. The emissions are released from a multitude of sources and cause different harms than other air pollutants. Also, the effects of greenhouse gases are global, cumulative, and long-lasting in nature. The measures for mitigation and adaptation are not the same. A strategy that lumps together greenhouse gases with other pollutants risks trivializing the unique threat posed by these gases. Having “every solution we propose” address all air pollutants at the same time is a poor strategy.
- The Conservatives are interested in investing in programs that provide tangible results. This proves that they are being responsible with taxpayer dollars. Having a tangible measure of results is a way of illustrating accountability. A difficulty with this idea is that tangible benefits may not adequately represent programs that focus on capacity building, adaptation, participation, and long-term institutional and organizational benefits. If “tangible” only means measuring a reduction in tonnes of greenhouse gases emitted, many valuable initiatives may be excluded from the Conservative plan.
- In terms of adaptation strategies, this quote may provide an indication of their plans: “the Dialogue [on long-term cooperative action] should address action on adaptation. It should address realizing the full potential of technology and realizing the full potential of market-based opportunities.” A problem here is that

- technology and market-based opportunities are only a small segment of possible adaptation responses to climate change. Tangible, technological, and market instruments can only take us so far.
- The parties to the UN Convention on Climate Change should remain open to options outside of the UN process. The role of NGOs, the private sector, and communities should be recognized. This is a positive statement. Hopefully, this type of statement can open the door to giving Yukon First Nations a greater voice in domestic and international climate change policy.
 - Definitely interested in an “inclusive” approach to international climate change policy. This means that Greenhouse gas reduction targets should take account of the economy and resource base of each country. Also, Minister Ambrose believes that developing countries should take on voluntary reduction targets. Under the existing Kyoto Protocol, developing countries do not have any targets.
 - Minister Ambrose believes that it is courageous of Canada to be the first country to acknowledge we will not meet the Kyoto targets.
 - The Conservatives have not been clear on the main reason that we will not meet the Kyoto targets. One reason they give is that the targets are not feasible given Canada’s resource-based economy. Another reason is that the Conservatives inherited a state of affairs from the Liberals where our greenhouse gas emissions have increased dramatically and it is now impossible to get Canada back on course to meet the Kyoto targets. I think that in order to set achievable yet ambitious targets, the Conservatives should be clear about whether they are blaming the Liberals for the current situation or whether Kyoto type targets are simply not feasible for Canada.
 - There are some negative messages coming from Jim Flaherty, Minister of Finance. The Conservative budget committed \$300 million to address off-reserve native housing. The Kelowna agreement, under the Liberals, gave \$1 billion over five years for housing, with only \$150 million over these five years to go to off-reserve housing. The message here is that the Conservatives would like First Nations people to leave reserves and integrate. The application to climate change is that the Conservatives may not be very interested in traditional First Nations culture and communities. These communities, be it reserves or land under settlement agreements, are most at risk of climate change. Flaherty’s preference appears to be that First Nations leave their communities and “get on with their lives.” This type of thinking does not bode well when it is time to provide climate change adaptation funding to communities.

4.9 - Mitigation and Adaptation

As of yet, it is unclear whether the Conservatives will focus most of their climate change energy on policies that reduce greenhouse gases (mitigation) or policies that prepare communities for the effects of global warming (adaptation).

The advantage of mitigation is that it gives Canada credibility on the international stage from which Canada can influence the mitigation policies of other countries. Why? Greenhouse gases, whether they are released in Canada or Hong Kong, contributes

equally to global warming. The international community will look favourably on Canada for pursuing mitigation because this will benefit everyone.

Adaptation is a nationalistic strategy, in that the benefits will only be felt by Canadian communities. The disadvantage in this case is that Canada will lose credibility on the international stage, and be less able to influence mitigation policies in other countries. Why? Because the whole world will feel the negative impacts of Canada's status quo release of greenhouse gases and receive none of the benefits of the domestic adaptation programs. It is outrageous that Minister Ambrose believes her statement that Canada will not meet the Kyoto mitigation targets will be viewed as "courageous." The advantage of adaptation is that all the benefits will be felt at home, rather than "shared" amongst all countries (as is the case with mitigation).

Adaptation can only take us so far. Mitigation can only take us so far. We need to pursue both types of policies. We need to pursue tangible benefits but we also need the courage to pursue benefits that are less easily measured. We need to use technology, market solutions, *and* invest in "people" and capacity based solutions. The culture of Yukon First Nations communities, the unique geography, and the vulnerable ecosystems of the Arctic show that Yukon First Nations have the most at stake as the Conservatives design their new mitigation and adaptation policies.

5.0 – THE ELEMENTS OF RISK ANALYSIS

INAC, other government departments, and academics use the term “risk management” to describe their policy response to environmental threats. A risk is any potential event, that will cause harm should the event occur. Risk management entails assessing the risk and then developing strategies to adapt or mitigate the risk that is posed. Expressing funding proposals and community initiatives in “risk” terms may be a valuable technique to communicate proposals and plans. Although “risk management” is often used to describe the entire process, there are four distinct elements to a risk analysis: risk identification, risk assessment, risk management and risk communication. Each element will be described in turn.

For a more detailed discussion on risk analysis please see “Risk Governance: Towards an Integrative Approach” published by the International Risk Governance Council, available under the heading “White Papers” at www.irgc.org/irgc/knowledge_centre/irgcpublications.

5.1 - Risk Identification

The language of risk starts off with identifying the hazard. The hazard in our context is climate change. In order to identify the risk that this hazard poses, we consider how climate change may interact with people in a negative manner. Climate change is somewhat different from other types of hazards, such as hurricanes or floods, because it is clear when the hazard strikes. The risks associated with climate change accumulate and magnify slowly, expressing harm in a myriad of ways, over a long period of time.

Recognizing this issue, identifying the risk associated with climate change requires a great deal of input from a variety of people. Different individuals with different concerns will view the potential risks in different ways. All the views should be judged as worthy of inclusion so long as the threat that is identified is within the timeframe and land area under study. Harms can be compiled under general headings. These headings may include harm to culture, wildlife, health and infrastructure. Under these general headings, the specific threats should be listed. All the other elements of a risk analysis will flow from this list of threats.

To create a finalized and complete list of threats, the characteristics of the hazard require consideration. So with climate change, we need to predict the magnitude and type of changes in the weather and climate. This analysis need to be specific to the area of land being studied. Thus, a statement such as “the Arctic is warming at a rate of 0.09 degrees Celsius every year” is less helpful than a statement such as “Old Crow is expected to warm at 0.1 degrees Celsius each year.” The characteristics of the hazard help us to make a complete list of the specific threats.

5.2 - Risk Assessment

Risk assessment is the most technical element of a risk analysis. It involves analyzing the list of threats that people have associated with climate change. The analysis proceeds in

two stages: estimating the probability that this threat will actually come to pass, and identifying the magnitude of harm that would be caused.

An example will help to clarify this concept. If one is considering the threat of extirpation or migration of a local salmon run, due to the warming of a creek in which the salmon spawns, first we consider the probability of this extirpation or migration. To do so, one examines the trend in salmon numbers, the changes to the creek, and the scientific and community knowledge of how salmon in the area may respond to a warming creek. Accordingly, one may find that there is 30% chance that within the next 50 years there will be no salmon left in the creek. This assumes that the risk analysis study is limited to 50 years.

Next, one considers the impact of the loss of salmon to the community. This includes threat to nutrition, culture, and community life. One may be able to use a dollar figure or words to describe this loss. Likely, it will be difficult to describe the loss in monetary terms. “Discount” this loss to take account of the fact that there is a 30% chance that this will happen in the next 50 years.

Note all the difficulties: there are difficulties in arriving at the 30% figure and difficulties in describing the amount of harm this will cause. There are also difficulties in accounting for the fact that even if not all the salmon leave the stream or perish, their numbers may diminish. Clearly this would also create harm. To address these issues, try and frame the risk assessment in such a way as it will be possible to address the threat during the risk management phase. These difficulties can also be addressed during the risk communication phase of the study. In the section “New Ideas in Risk Analysis” there is a discussion on how these difficulties can be turned into advantage for community based risk analysis studies.

5.3 - Risk Management

The probability that the harm will occur, and the amount of harm this will cause to people is the basis for our response. Returning to the example, if one identifies that the threat of salmon migration or extirpation will be extremely harmful, and that there is a 30% chance that this will occur, the risk management response will be very substantial. It will be substantial in the sense that a large commitment on behalf of the community and government may be necessary to adequately manage this risk. It is possible that an insubstantial response can address the risk, but when the risk is large, that is justification for a greater response, when necessary.

Possible responses may include stocking the creek with fish that will be well suited to the warmer water, dredging the creek of sediment to improve river health, or moving to alternative food sources. The risk management decision that is chosen depends on how the risk assessment is framed. For example, if the loss of culture is the most severe harm associated with this risk, then improving river health may be the priority. If loss of a nutritional source is the most severe harm, populating the creek with other fish may

provide the solution. A combination of management options, reflecting the severity of the different harms and probability of loss, would likely provide the optimal solution.

5.4 - Risk Communication

Communication of the risk is sometimes seen as a factor in all sections of the risk analysis, but I have separated this section out for clarity. The risks must be communicated to all those that face the threat, and to the people that can provide resources for managing the risk. Communicating to these two groups has two different justifications, so they are dealt with separately.

At all stages of the risk analysis, communication is necessary to those facing the risks. There are several reasons for this communication. Firstly, it improves the quality of the analysis. The more uncertain the threat, the more important it is to include the input of a variety of people. This will provide a more accurate picture of the risk. Secondly, it is important to keep people involved for reasons of equity: they are exposed to the danger, they should have a say in the solution. Thirdly, transparent communication improves trust and builds relationships between those conducting the study and those subjected to the threat.

It is crucial to communicate the results of the study and the methods used to come up with the results to those who make funding decisions. Funding is necessary to implement the risk management decisions. One way of communicating the results is in the context of how the risk threatens the rights in the Final Agreements. For more information on this, see section 7 of this binder. In order to uphold the agreements, the risk of climate change must be managed appropriately.

5.5 - New Ideas in Risk Analysis

Climate change, and its associated hazards, is a modern day risk that is characterized by uncertainty. The potential magnitude of harm is massive, and the probability of harm has a wide margin of error, which means that insurance companies, experts, and government alike face difficulties in managing modern-day threats. Due to the uncertainty involved, academics and other specialists advocate for a devolution of risk assessment and management resources to small non-governmental organizations and local communities. The advantages of doing this include the opportunity to incorporate the risk perception of those individuals and communities actually facing the risk, to build trust and capacity amongst local people, and to measure risk in terms of equity and fairness. Studies show that the risk assessment and perception of “laypeople” depends on factors such as whether the risk is voluntary, whether the distribution of the risk is uniform, whether the hazard has been newly introduced, and what type of people are most affected by the risk. By incorporating the perception of “laypeople,” the equity, accuracy and accountability characteristics of risk assessment are improved.

The need to include the risk perception of the individuals and communities facing the risks bears some further explanation. Some risk analysis experts, in attempting to predict

people's perception of the magnitude of harm associated with certain risks, have grouped people according to their worldview. Based on participants' answers to a survey, people were classed into either egalitarian, hierarchic, individualistic, or solidaristic categories. Experts attempt to draw correlations between how people judge certain risks and their worldview. The objective of such studies is to better design risk management and communication programs. First Nations persons have a worldview that cannot be described by merely answering such survey questions. Carrying out a risk assessment project will require their participation and decision-making throughout the entire process. Their worldview cannot be predicted or managed, it must be engaged.

6.0 – CLIMATE CHANGE LITIGATION

Where governments and corporations have failed to initiate responsible climate change policies, legal recourse may be taken by those that are most affected. Currently, no legal action on climate change has been taken in Canada, and there have only been a handful of cases worldwide. This section of the binder reviews some of the academic literature and lessons learned from the first “test” cases to see if such an action may be feasible in Canada.

Much of the information that is summarized here comes from the information compiled by National Association of Environmental Law Societies, and associated web links. This resource is available at: www.naels.org/projects/ccn/research.htm.

The risk of climate change liability to corporations responsible for greenhouse gas emissions is real. For example, Swiss Re, the world’s second largest reinsurance company treats climate change as an emerging liability risk. They ask directors whether their corporation has developed a climate change policy when they consider their liability risk. Another example, is a letter by investment companies with a combined \$31 trillion in assets, written to 1,933 of the world’s largest companies. The letter asks for a disclosure by the companies of their annual greenhouse gas emissions. The reason for this is that the larger the emissions, the greater likelihood that the company will become a target of climate change litigation.

6.1 – *Climate Change Liability*

“Warming Up To A Not So Radical Idea: Tort-Based Climate Change Litigation” outlines the hurdles that a potential plaintiff will have in bringing a lawsuit based on the effects of global warming. The steps involve convincing the court that it should hear the case, choosing who to sue, proving that they wrongfully contributed to climate change, proving that climate change has damaged property, and choosing a remedy.

The US case of *Open Space Institute v. American Electric Power* is an example of a tort case based on the damage resulting from climate change. The Plaintiffs in this case include three land trusts and eight states that own and operate ecologically sensitive land. They sought a judicial order that requires these companies to reduce their greenhouse gas emissions. The Defendants are large American power companies, which together produce 650 million tonnes of carbon dioxide/year.

The eight states that are involved in this case have launched the action on behalf of their residents, and to protect the natural resources located in the state. Similarly, Yukon First Nations could pursue an action on behalf of its citizens, and to protect the natural resources located in the Nation.

6.2 - *Application to Yukon First Nations*

In comparing this case to a possible action launched by Yukon First Nations, there are two points that will resonate more strongly in favour of the First Nations. Firstly, in the

complaint that initiated this American lawsuit, the Plaintiffs make note of the ecologically sensitive and significant properties they own. They purchased these properties to preserve the very ecological value that will be destroyed by climate change. The Yukon First Nations own land that is not only ecologically significant, but crucial to preserve traditional culture. Yukon First Nations own the land not only to preserve the land, but to preserve culture that is at risk from climate change.

Another similarity is that in the Plaintiffs in the American case note that injuries to their property will increase the rate and magnitude of global warming. This is true of Yukon First Nation's land: as the permafrost melts because of global warming, large amounts of methane and carbon dioxide will be released.

This case was dismissed because the court ruled that climate change policy should be set by the legislature rather than the judiciary. This is because the policy involved in balancing health and environmental issues against economic concerns is a domain of the legislature. The court found that it had no jurisdiction to hear the case. This judgment is currently on appeal to the United States Court of Appeal.

Jurisdiction is a very complicated legal issue, and the reasoning here may not apply in Canada. For example, in a recent healthcare policy case that was decided at the Supreme Court of Canada, jurisdiction was a major issue (*Chaoulli v. Quebec*). The court found that the case *could* be heard and decided by the judiciary. The majority of the court reasoned that they should not be afraid to hear cases with uncertain scientific and political elements.

In another American case, *Massachusetts v. EPA* eight states are arguing that the Environmental Protection Agency must regulate greenhouse gas emissions because of its mandate to regulate *all* air pollutants. At the appeals level, the majority of the court sided with the EPA. However, the United States Supreme Court has agreed to hear the case. According to the June 26, 2006 edition of the New York Times, this "could be one of the court's most important decisions on the environment." It will be worthwhile to pay close attention to the outcome of this case when the court makes its ruling.

6.3 – Human Rights Challenge

Another legal instrument that could be employed to address climate change is the human rights challenge. An example of this is the petition organized by the Inuit Circumpolar Conference that makes a complaint to the Inter American Commission on Human Rights seeking an investigation, relief, and a declaration from the commission that the United States has breached the fundamental rights of the Inuit by abstaining from a commitment to climate change mitigation. The petition relies heavily on the Arctic Climate Impact Assessment. Besides seeking this resolution, the petition has the advantage of increasing public awareness of the issues. A drawback is that the findings and rulings of the commission cannot coerce action on the part of the United States. The petition is available at <http://www.inuitcircumpolar.com/index.php?ID=316&Lang=En>.

7.0 – GLOBAL WARMING AND LAND CLAIM AGREEMENTS

The issue of effectively meeting the obligations and objectives of the land claims agreements is contentious across the Yukon and elsewhere in Canada. The harm associated with climate change is another challenge to effective land claims implementation. The analysis below pinpoints the specific challenges that need to be addressed.

It is unclear whether the objectives in the agreement are legally binding, or whether it is only the specific clauses. When the agreements were signed, climate change was not contemplated so there are no specific clauses that address climate change. However, the general nature of the objectives could be useful with regard to securing climate change adaptation funding. The use of the objectives depends on their legal force. At the Conference “Achieving Objectives: A New Approach to Land Claims Agreements in Canada,” lawyer Thomas Berger made the argument that due to the fiduciary relationship that the Crown has with the First Nations, the objectives may create actual legal obligations. A legal determination in the courts has not yet been made on the nature of the objectives.

Note: the application of climate change to the outlined clause is in italics.

Preamble

“The parties to the Umbrella Final Agreement wish to recognize and protect a way of life that is based on an economic and spiritual relationship between Yukon First Nation People and the land.”

“The parties to the Umbrella Final Agreement wish to recognize and protect a way of life that is based on an economic and spiritual relationship between Yukon First Nation People and the land.”

“The parties recognize the contributions of Yukon First Nation People to the history and culture of the Yukon and Canada.”

*Global warming offers a unique opportunity to illustrate the importance of First Nation’s knowledge as a **contribution to the scientific and political process.***

Further contributions of Yukon First Nation People is threatened by climate change.

“The parties wish to achieve certainty with respect to their relationships with each other.”
In order to achieve certainty, this document must plan and make allowances for all contingencies. Global warming is one such contingency.

Chapter 8 –Surface Rights Board

Clause 8.2.1.1: the board has jurisdiction to hear and determine “any matter referred to the Board by a Settlement Agreement.”

It is ambiguous whether the Surface Rights Board could hear the global warming cause of action. However, 8.4.0 considers compensation for an impact on fish and wildlife harvesting, but only where this harvesting is affected by “access to, use of, or

expropriation of settlement land” from 3rd party actions. Global warming does not fall under one of these categories.

Chapter 9 – Settlement Land Amount

Objective 9.1.1: “objective of this chapter is to recognize the fundamental importance of land in protecting and enhancing a Yukon First Nation’s cultural identity, traditional values and life style, and in providing a foundation for a Yukon First Nation’s self-government arrangements.”

This statement is in the context of the amount, quality, and location of settlement land, but it is a good illustration of the government recognizing the importance of land for First Nations.

Chapter 10 – Special Management Areas

Objective 10.1.1: “objective of this chapter is to maintain important features of the Yukon’s natural or cultural environment for the benefit of Yukon residents and all Canadians while respecting the rights of Yukon First Nation People and Yukon First Nations.”

Clause 10.7.1: “Fish and Wildlife within Special Management Areas shall be managed in accordance with Chapter 16...” – *this illustrates that the government owes the same duty to First Nations with regards to fish and wildlife rights for settlement land and special management areas.*

Chapter 11 – Land Use Planning

Objective 11.1.1.4: “to utilize the knowledge and experience of Yukon Indian People in order to achieve effective land use planning.”

Clause 11.4.5 outlines how a regional land use plan is developed. To develop this plan:

- experts may be engaged
- data collection may be used to identify regional land use planning issues
- ensure adequate opportunity for public participation
- use traditional Yukon First Nation knowledge
- account for oral forms of communication and traditional land management practices
- promote the well-being of Yukon First Nation People
- account for fish, wildlife, and their habitats
- promote sustainable development

One could argue that global warming has an impact on all of these elements of the land use management plan. The objectives of the chapter (11.1.1) include “recognize and promote the cultural values of Yukon First Nation People,” as well as to utilize their knowledge and experience, and to ensure sustainable development.

*I think this chapter is most relevant to resilience/adaptation to global warming issues. **In order to develop a land use plan in the face of climate change, the communities must***

be given the capacity to understand the threat against them, and the resources to develop adaptation strategies.

Chapter 12 – Development Assessment

Objective 12.1.1.1: “recognizes and enhances, to the extent practicable, the traditional economy of Yukon Indian People and their special relationship with the wilderness environment.”

Clause 12.4: scope for development assessments includes “a proposed enterprise or activity located outside the Yukon with significant adverse environmental or socio-economic effects in the Yukon.”

Maybe this clause could serve as the basis for a challenge to tar sands development because this is Canada’s largest source of greenhouse gases. Furthermore, by allowing the development of tar sands to continue, our Kyoto commitments are jeopardized, and this hampers Canada’s ability to dictate international climate change policy in the future. If Canada does not have a voice on the world stage, neither will First Nations.

Also within the scope of the development assessments are studies of environmental or socio-economic effects that are cumulative regionally or over time. This is relevant because of the cumulative effects of global warming. Thus, these studies may be subject to development assessments.

Clause 12.4.2: in undertaking a development assessment, the following must be considered:

- relationship between First Nations People and the Yukon wilderness Environment
- need to protect culture
- **measures for mitigation of and compensation for significant adverse environmental and socio-economic effects**
- any significant adverse effect on heritage resources.”

All these considerations are affected by climate change.

Clause 12.16.1: when there are transboundary impacts, “the government must make best efforts to negotiate with other relevant jurisdictions, in Consultation with affected Yukon First Nations, agreements or cooperative arrangements that provide for development assessments equivalent to the screening and review requirements in the Yukon for enterprises or activities located outside the Yukon that may have significant adverse environmental or socio-economic effects on the Yukon.”

The greenhouse gases that cause climate change are transboundary by nature.

The Yukon Environmental and Socio-Economic Assessment Act (YESAA) has been established in order to implement Chapter 12. An issue arises as to whether YESAA has the jurisdiction and/or obligation to assess Canadian development projects that produce large amounts of greenhouse gases and harm Yukon First Nations. One such development is the Alberta Tar Sands and their continued expansion.