

**Full Transcript of
C-CIARN North's Online Workshop:
Climate Change
and Environmental Assessment**

January 24-28, 2005

Organized by the Canadian Climate Impacts and Adaptation Research Network
North Region

Hosted by the Canadian Polar Commission's CPIN web service

PREPARED BY

Claire Eamer, Yukon Coordinator, C-CIARN North
Tel. (867) 668-8862 or ceamer@yukoncollege.yk.ca
Northern Climate ExChange
Yukon College, P.O. Box 2799, 500 College Drive
Whitehorse, Yukon, Canada Y1A 5K4

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Introduction

From Monday, January 24, to Friday, January 28, 2005, the North Office of the Canadian Climate Impacts and Adaptation Research Network (C-CIARN North) presided over an online workshop on the subject of Climate Change and Environmental Assessment. This was C-CIARN North's fourth such online workshop. As in previous exercises, the web forum where discussion took place was provided by the web service of the Canadian Polar Commission.

Seventy participants registered in the workshop. The majority were Canadian, located in all parts of the country but with significant representation from all three territories. International participants were located in Denmark, Norway, Russia, England, the United States, and Australia. A complete list of participants is included in this report.

The discussion focused on the problems associated with environmental assessment in the North and how climate change impacts can be incorporated into that process. We talked about how to accommodate both current and future impacts in environmental assessment, some of the major areas of vulnerability, and some of the impediments to effective assessment. We also exchanged information on tools and resources, both available and needed.

This edited transcript is one of the products of the workshop. For other products, resources mentioned in the discussion, and attachments noted in the transcript, please go to www.taiga.net/c-ciarn-north/online4.

Participants
C-CIARN North Online Workshop:
Climate Change and Environmental Assessment
Jan. 24-28, 2005

Nigel Allan
Editorial Assistant
World Wildlife Fund International Arctic Programme
Oslo, Norway

Tracy Arsenault
Nunavut, Canada

Louie Azzolini
Terra Firma Consultants
Yellowknife, Northwest Territories, Canada

Alexander Baklanov
Senior Scientist, Meteorological Research Department
Danish Meteorological Institute (DMI)
Denmark

Jean-Marie Beaulieu
Science Manager
Canadian Polar Commission
Ottawa, Ontario, Canada

Pierre-Yves Boisvert
Geomatics for Northern Development Program
Natural Resources Canada
Sherbrooke, Québec, Canada

Jackie Bourgeois
Department of Environment
Government of Nunavut
Nunavut, Canada

Michelle Boyle
Graduate Student
Resource Management and Environmental Studies
University of British Columbia
Vancouver, British Columbia, Canada

Beverley Brown
North Yukon Renewable Resources Council
Old Crow, Yukon, Canada

Kate Buckeridge
Department of Biology
Queen's University
Kingston, Ontario, Canada

Monika P. Calef
University of Alaska Fairbanks
Fairbanks, Alaska, USA

Karin Clark
Ecology North
Yellowknife, Northwest Territories, Canada

Marilyn Cook
Educator
Texas, USA

Ryan Danby
Graduate Student
Biological Sciences
University of Alberta
Edmonton, Alberta, Canada

Jack T. Dennett
EBA Engineering Consultants Ltd.
Whitehorse, Yukon, Canada

Jane Devlin
Nunavut Field Unit
Parks Canada
Iqaluit, Nunavut, Canada

Doris Dreyer
Ross River, Yukon, Canada

Claire Eamer
Coordinator, C-CIARN - North (Yukon)
Northern Climate ExChange, Yukon College
Whitehorse, Yukon, Canada

Joan Eamer
Environment Canada / GRID-Arendal
Whitehorse, Yukon, Canada

Brad Finnon
Environment Programs Branch
Yukon Government
Whitehorse, Yukon, Canada

Ellen Francis
Pembina Institute, Energy Watch
Calgary, Alberta, Canada

Konrad Gajewski
Laboratory for Paleoclimatology and Climatology
University of Ottawa
Ottawa, Ontario, Canada

Gene Hanson
Moderator
The Inuit and Indian Art Group
Canada

John Hazenberg
Government of Northwest Territories
Fort Simpson, Northwest Territories, Canada

Scott Herron
Canadian Wildlife Service, Environment Canada
Whitehorse, Yukon, Canada

Tracy Hillis
Climate Change Biologist
Government of the Northwest Territories
Yellowknife, Northwest Territories, Canada

Peggy Holroyd
Pembina Institute, Energy Watch
Calgary, Alberta, Canada

Bill Horne
EBA Engineering Consultants Ltd.
Edmonton, Alberta, Canada

Vita Hoyles
Aurora Research Institute
Inuvik, Northwest Territories, Canada

Bernie Hughes
Indian and Northern Affairs Canada
Yellowknife, Northwest Territories, Canada

Fred Hutter
Yukon Science Institute
Marsh Lake, Yukon, Canada

Ken Johnson
Earth Tech Canada
Edmonton, Alberta, Canada

Peter Johnson
Department of Geography
University of Ottawa
Ottawa, Ontario, Canada

Sarah Kalff
Environmental Policies and Studies Division
Indian and Northern Affairs Canada
Gatineau, Québec, Canada

Kevin Kennedy
Raven Consulting Ltd.
Yellowknife, Northwest Territories, Canada

Timo Koivurova
Northern Institute for Environmental and Minority Law
Arctic Centre, University of Lapland
Rovaniemi, Finland

Tanuja Kulkarni
Coordinator, C-CIARN - Landscape Hazards
Ottawa, Ontario, Canada

Lars Kullerud
Director, University of the Arctic
Arendal, Norway

Randy Lamb
Department of Environment, Yukon Government
Whitehorse, Yukon, Canada

Kim Lisgo
Department of Renewable Resources
University of Alberta
Edmonton, Alberta, Canada

Kate Maddigan
Yukon Environmental Network
Whitehorse, Yukon, Canada

Keith Maguire
Circumpolar Relations Department
Council of Yukon First Nations
Whitehorse, Yukon, Canada

Barney Masazumi
Tuktoyaktuk, Northwest Territories, Canada

Kristi McBride
National Research Council
Industrial Research Assistance Program (NRC-IRAP)
St. John's, Newfoundland & Labrador, Canada

Kyle McKenzie
Coordinator, C-CIARN – Atlantic
Halifax, Nova Scotia, Canada

Charlotte Mougeot
Senior Project Scientist
Gartner Lee Limited
Calgary, Alberta, Canada

Fritz Mueller
Environment Canada
Whitehorse, Yukon, Canada

Magdalena Muir
Arctic Institute of North America
University of Calgary
Calgary, Alberta, Canada

Trevor Murdock
Canadian Institute for Climate Studies
Victoria, British Columbia, Canada

Sonia Nobrega
Department of Biology
Queen's University
Kingston, Ontario, Canada

Aynslie Ogden
Graduate Student
Resource Management and Environmental Studies
University of British Columbia
Vancouver, British Columbia, Canada

Kathryn Parlee
Coordinator, C-CIARN - Coastal Zone
Dartmouth, Nova Scotia, Canada

Ryan Parry
Yukon Environmental and Socio-economic Assessment Board
Whitehorse, Yukon, Canada

Tiffany Paul
Nunavut Impact Review Board
Iqaluit, Nunavut, Canada

Will Perrie
Department of Fisheries and Oceans
Dartmouth, Nova Scotia, Canada

Doug Ritchie
Coordinator, C-CIARN - North (NWT)
Yellowknife, Northwest Territories, Canada

Travis Ritchie
Yukon Environmental and Socio-economic Assessment Board
Whitehorse, Yukon, Canada

Ian Rose
Department of Fisheries and Wildlife
Oregon State University
Corvallis, Oregon, USA

Rod Seppelt
Australian Antarctic Division
Tasmania, Australia

Dmitri Sergueev
Institute of Environmental Geoscience
Russian Academy of Sciences (IEG RAS)
Russia

Mary Shields
Fairbanks, Alaska, USA

Jamal Shirley
Coordinator, C-CIARN - North (Nunavut)
Nunavut Research Institute
Iqaluit, Nunavut, Canada

Sharon Smith
Permafrost Research Scientist
Natural Resources Canada
Ottawa, Ontario, Canada

Testloa Smith
Canada

Tasha Stephenson
Government of the Northwest Territories
Resources, Wildlife & Economic Development Department
Environmental Protection
Yellowknife, Northwest Territories, Canada

Raphaela Stimmelmayer
Alaska Native Technology and Development Group
Alaska, USA

John Streicker
Northern Climate ExChange / C-CIARN North
Yukon College
Whitehorse, Yukon, Canada

Tuula Thomlinson
University of the Arctic
Canada

Janice Traynor
Indian and Northern Affairs Canada
Iqaluit, Nunavut, Canada

Jen Turner
Environmental Coordinator
City of Whitehorse
Whitehorse, Yukon, Canada

Bob Van Dijken
Northern Climate ExChange
Yukon College
Whitehorse, Yukon, Canada

Sonia Wesche
Wilfrid Laurier University
Waterloo, Ontario, Canada

Kathryn Yusoff
The Surrey Institute of Art & Design
University College
Farnham, Surrey, United Kingdom

Edited Transcript of Full Workshop

Introduction and Administration

Introduction and Admin

John Streicker, Northern Climate ExChange

2005/01/21 23:01

The effects of global climate change are increasingly apparent in the North. How can we accommodate those and future effects when assessing the impacts of development projects? What tools are available to help us? Can we help each other?

This forum will remain open from January 24 to 28, 2005, to discuss issues related to climate change and environmental assessment. As with C-CIARN North's previous online workshops, you are part of a wide group discussing across diverse regions and time zones. For this reason I would ask that you provide background information for any regional references, spell out local acronyms and in general attempt to use plain and direct language.

Thanks,
John

Re: Introduction and Admin - Participants

Attachment: Participants to Jan. 23 (See final list, above)

Claire Eamer

2005/01/23 19:48

Welcome to C-CIARN North's online workshop on climate change and environmental assessment. We are now online and active!

Want to know who you're talking to? Attached is a list of the 59 participants registered in the workshop as of Sunday, Jan. 23, 2005 - Yukon time.

As you'll see, we are distributed across many time zones, from Russia to Alaska, and a number of different languages. Participants also come from a variety of backgrounds, including environmental assessment professionals, government, private industry, universities, and non-government organizations.

If you have any questions or problems with the forum site, please contact me - Claire Eamer at ceamer@yukoncollege.yk.ca. I will continue to take registrations through the week.

You'll note that there has been a change in moderator for the workshop. John Streicker, C-CIARN North manager, had intended to moderate but has been called out of town unexpectedly for the first part of the week. He will join us again later in the week.

Greetings to all,
Claire

Re: Introduction and Admin - Online Workshop acronyms and participants

Attachment: Acronyms

Attachment: Participants to Jan. 24 (See final list, above)

Claire Eamer

2005/01/24 19:25

Attached is a list of acronyms that might crop up in the discussion or have already cropped up. I'll update it through the week, so if you have contributions to make, send them to me.

Also attached is an updated participants' list.

Claire
ceamer@yukoncollege.yk.ca

Re: Introduction and Admin - problem with replies

Claire Eamer

2005/01/24 19:47

Just a warning - at least one participant has had problems with posting by replying to an email notification.

To make sure your message gets onto the forum, the best approach is to log in - using the link at the bottom of the email notification message - and post a comment or reply directly on the forum.

Also, attachments to postings reside on the forum, rather than cluttering up your in-box. To see them, just log on via the link at the bottom of the notification.

Claire

Re: Introduction and Admin

Claire Eamer

2005/01/28 14:28

Today is the final day of the online workshop - but we're going to cheat!

The workshop forum will remain open through the weekend in case people have final thoughts, last-minute additions to the resources that have already been identified here, or other messages such as notices of upcoming events and publications.

On Monday we'll close down the workshop to postings, open it up for a broader audience to read, and start compiling products.

Products will include:

- * an edited transcript of the discussion
- * final list of participants
- * summary report, noting particularly recommendations and identified needs
- * a set of EA-related resources and links on the C-CIARN North website.

If there are other things you think might be useful, let me know. Ongoing web forum for discussion? Some kind of follow-up I haven't thought of?

Thanks for all the interesting ideas,

Claire Eamer

ceamer@yukoncollege.yk.ca

Re: Introduction and Admin

Attachment: ParticipantsJan28 (See final list, above)

Claire Eamer

2005/01/28 18:52

I've just uploaded the final list of participants for the workshop, including those who have joined in the past couple of days. You'll find it attached to this message on the forum site.

The final total is 70 - and while only a fraction of those registered posted information and comments, I've heard from a number of other participants who said they were watching the conversation and finding it useful. So - thanks to all who took part!

Claire

Discussion Theme 1 Climate change impacts and how we deal with them

Discussion Theme 1 - Climate change impacts and how we deal with them
Claire Eamer, C-CIARN North
2005/01/23 19:30

Climate change is affecting many northern systems from permafrost to flood levels, from winter roads to the summer forest fire hazard.

What impacts are most likely to be considerations in assessing the environmental impact on projects?

What influences the importance of climate change in the assessment? Nature of project? Scale of project? Location?

How do we incorporate climate change into consideration of cumulative impacts?

Please join the conversation.

Discussion

Re: Discussion Theme 1 - Climate change impacts and how we deal with them
Ken Johnson
2005/01/24 14:36

Climate change has been part of the design criteria for both of the diamond mines in NWT. Ekati incorporated climate change scenarios in the design of the permafrost dams that retain the process tailings.

A number of factors may influence the use of climate change scenarios in EA. The long-term stability of structures that incorporate permafrost in their construction is near the top of the list.

Re: Discussion Theme 1 - Climate change impacts and how we deal with them

Dmitri Sergueev
2005/01/25 11:32

I would like to present some preliminary results of investigation that has been conducted in the Laboratory of Geocryology, Institute of Environmental Geosciences Russian Academy of Sciences (IEG RAS) – www.geoenv.ru. Chief of Lab. – Prof. Georgy Perlshtein.

Our primary focus is the permafrost reaction on climate change and human disturbances. We developed in 2004:

1. The generalized assessment of climate parameters' variation in different cold regions of Russia.
2. The numerical modeling of the permafrost thermal state under natural conditions of Central Yakutia and under pile foundation according to three scenarios of the climate warming.
3. The hallmarks for comparative assessment of geocryological hazards in connection with climate change. In particular we apply the GIS-methods to consider three basic information layers: land use, climate tendencies and permafrost properties.
4. Some general and concrete technical recommendations for preventing and reducing the negative consequences of permafrost evolution (foundation constructions, operational rules, heat pump using, etc.).

We recommend to use these results in:

- Environmental decision support making practice;
- Constructions' design;
- Outreach activity for education.

The quantitative environmental risk assessment of permafrost hazards using geocryological forecast results is planned as next step of investigation.

Climate change impacts and how we deal with them - forest management

Aynslie Ogden
2005/01/25 18:29

I'd like to throw out an example of the forest industry in the Yukon. All forest development projects are required to undergo environmental assessments under CEAA/YESAA [Canadian Environmental Assessment Act/Yukon Environmental and Socio-economic Assessment Act]. Arguably, this industry may be experiencing the impacts of climate change already.

In the Haines Junction area, for example, in the past ten or so years, a severe spruce bark beetle infestation has killed a large number of white spruce trees. There is good reason to believe that the beetles have been able to thrive because of recent warmer winters and

drier summers, in addition to suitable forest conditions -- continuous stands of mature white spruce (essentially a natural monoculture). The scale and intensity of this outbreak are leading people to conclude that it may be linked to climate change. Recently, the ACIA [Arctic Climate Impacts Assessment] report concluded increased frequency and magnitude of disturbances (fire, insect outbreaks) are expected for northern boreal forests in a warming climate. How should changing natural disturbance regimes be taken into account in an environmental assessment process for forest development projects?

I'm not sure I have the answers to this, just a few thoughts that I'd be curious to get your feedback on. Firstly, natural disturbances are important to healthy functioning of ecosystems in the boreal forest, and are an important consideration in forest management planning regardless of what impacts climate change may have. Forest management planning in the Yukon is tiered -- there are strategic level plans, landscape level plans, and operational plans. I think it makes sense to think about and consider climate change impacts on natural disturbance patterns at a broader context -- such as the higher level (strategic and landscape level) plans. Natural disturbances can be incorporated into various areas of forest management -- such as timber supply, harvest design, retention strategies, prescribed burning, wildfire zonations, etc. In such exercises, we can no longer rely on past disturbance regimes as a estimate for the future.

Secondly, strategies to increase the resiliency of forest ecosystems to climate change (such as increasing the diversity of tree species to reduce the risk of catastrophic outbreaks). Such strategies would need to be socially acceptable -- and perhaps could be a consideration in a higher level planning process.

Lastly -- but perhaps a discussion point for the thread under mitigating emissions -- forest operations may provide an opportunity to reduce ghgs by sequestering carbon. However, climate change will have an impact on the carbon balance of northern boreal forests because of changing natural disturbance regimes. Perhaps there is an opportunity to define "best practices" for carbon management in a forestry context? Would such guidelines make it easier to review climate change considerations in an EA of a forest development project?

Aynslie

Re: Climate change impacts and how we deal with them - forest management

Claire Eamer

2005/01/25 19:12

One part of Aynslie's very useful posting on the example of forest management in the Yukon touches on an idea that particularly interests me.

She mentions "strategies to increase the resiliency of forest ecosystems to climate change (such as increasing the diversity of tree species to reduce the risk of catastrophic outbreaks). Such strategies would need to be socially acceptable...."

Social acceptability of engineered changes like this - where the nature of the boreal forest, at least in a limited area, would be different from the past - strikes me as an issue we will have to deal with, both within the EA community and beyond. The methods we choose to mitigate or limit the effects of climate change may well result in changes themselves. And that may be a hard social pill to swallow.

Many people see environmental assessment and regulation, I think, as ways of ensuring that development will not have a permanent impact on the land - that after the project ends, things will be the way they were. In the meantime, however, climate change is changing the ground rules. In the Yukon, British Columbia, and parts of Alaska, insect outbreaks and forest fires have damaged or destroyed large tracts of forest in the past few years. Even without development impacts, the forest that grows back may be quite different from what was there before.

I suppose it's an issue related to living in times of accelerating change. We have to manage for the future, and the past is no longer a sure guide to that future. Environmental assessment is a process with high public expectations attached to it. Convincing people that one kind of change is an acceptable buffer against another kind of change, or that at the end of even the best-managed project change will have happened, may be difficult for a while.

Re: Climate change impacts and how we deal with them - forest management

Fritz Mueller

2005/01/25 19:16

Hello Aynslie,

I like the way you are linking climate change and cumulative effects and landscape change in your discussions. I think some very productive discussions and perhaps even innovative research and new management tools could develop with increased linkages and interaction between the disciplines of climate change and cumulative effects. I agree that climate change is a cumulative effect – a global cumulative effect. Perhaps these two research groups are even beginning to arrive at similar recommendations for methods to manage these challenging issues?

Along this line, I recently became aware that Dr. Brad Stelfox is working to expand his ALCES Cumulative Effects Landscape Model so that it can look at the combined effects of climate change and unfolding human activity on ecological and social systems. I am excited to see the outcome of this work as it progresses. Perhaps modeling that integrates research disciplines like this can help with a number of the strategic level challenges you raise?

Regards, Fritz

Re:Re: Climate change impacts and how we deal with them - forest management

Jamal Shirley

2005/01/26 11:27

Excellent points by Aynslie, Claire and Fritz. EA, as I understand it, has entailed assessing the impacts of a project against some baseline with clear benchmarks that indicate when an impact has exceeded some tolerable threshold in the VEC [Valued Ecological Components] or VSCs [Valued Socio-economic Components]. Reclamation and decommissioning efforts usually involve efforts to restore environmental conditions that existed prior to a project, and may have been damaged by project impacts. Establishing the proper baselines and benchmarks against which impacts are measured is extremely problematic when the natural environment is itself in a state of flux due to climate variability and change, and due to the cumulative impacts of other projects, societal change, and/or non-point stressors like long-range transport of contaminants. How do we go about defining the specific conditions and states that should be restored and/or protected against impact? We need cumulative effects assessment models for the Arctic that look at interactions of multiple stressors and really address the issue of changing VECs and VSCs. There's an interesting article by Michelle Boyle et. al in the Fall/Winter 2004 issue of Meridian discussing socio-economic dimensions of cumulative effects assessment in the Arctic.

Re:Re:Re: Climate change impacts and how we deal with them - forest management

Claire Eamer

2005/01/26 11:52

Regarding the article Jamal mentioned, by Michelle Boyle, et al: it can be downloaded in PDF format from the main page of the Canadian Polar Commission's site: www.polarcom.gc.ca/english/

Re: Discussion Theme 1 - Climate change impacts and how we deal with them

Sharon Smith

2005/01/27 08:51

I haven't had much time to participate so far but will pass on a few comments based mainly on my experience as a permafrost scientist and also an occasional federal government expert reviewer of EAs for northern projects. My comments may fall into a number of themes. Consideration of climate change has been mentioned explicitly in the terms of reference of all the projects I have reviewed over the last few years. One of the difficulties is often deciding what rate of change is appropriate to use when evaluating

whether climate change will have an effect on the magnitude of the environmental impacts of a project and also the impacts of the environment on the project. The IPCC scenarios are often referred to and I suppose for northern projects, the scenarios used in the ACIA should be considered. There is a large range in the projections from these scenarios. Given this and the coarse resolution (2-3 degrees - much larger than most projects) of most models and the fact that they do not tend to provide the best representation of the North (including also coastal areas, the mountains in western Arctic), there is no right scenario to use. (In many cases we can't even adequately describe the current climatic conditions due to a lack of data in the project area.) The best we can probably do is use the outputs from the models to come up with a reasonable set of conditions under which the project will operate, and assess the environmental impacts based on that.

Climate variability is often not considered when the effect of climate change is assessed in EA. We need to consider that we are not dealing with "straight line" trends - there is a fair amount of inter-annual variability. Extreme events and changes to their magnitude also need to be considered. Extreme warm years, for example, may have implications for performance of frozen core dams that are used for tailings containment. Extreme wet (or dry) years may have implications for assessment of impacts related to hydrological/aquatic systems.

That's a few of my initial thoughts.

Sharon

Re:Re: Discussion Theme 1 - Climate change impacts and how we deal with them

Aynslie Ogden

2005/01/27 09:40

A few years ago, Chris Burn and DIAND [Department of Indian and Northern Affairs Canada] Water Resources in Yellowknife brought a group together to discuss the very issue Sharon rightly raises in her email -- and this is deciding what scenarios to use. They focused their discussions on the Mackenzie Valley.

A bit of background...Computer models, called Global Circulation Models (GCMs), mathematically simulate the interactions of the land, sea, and air, which together determine the Earth's climate. GCMs are able to project long-term average conditions over broad climate regions. Seven GCMs are in common use. Different GCMs mathematically represent the global climate differently, and therefore do not always produce the same results. GCMs that do a better job of reproducing observed climate (the baseline is usually 1961-1990) are more highly regarded.

To project future climates – climate scenarios – models need scenarios of future greenhouse gas emissions, and an understanding of how the climate system will respond to an enhanced greenhouse effect. GCMs are run with a number of different greenhouse

gas emissions scenarios since we are not able predict precisely what greenhouse gas emissions will be in the future. As Sharon noted, there is no one right scenario. Therefore, researchers commonly use a range of climate scenarios when projecting the impacts of climate change to reduce potential for surprises.

The paper I mentioned earlier by Chris Burn and colleagues used the methodology of gathering together all of the available scenarios (there are 31 or so for this region). They then ranked them from lowest to highest according to the change in annual temperature. To represent the range of possible future conditions, the lower and upper estimates of future change are based on the 4th and 28th ranking respectively (essentially removing the top 3 and the bottom 3). They also noted the median value. I have just done this exercise for the southern Yukon if anyone wants this information.

One note on the ACIA climate scenarios is that they are a subset of the scenarios used by the IPCC [Intergovernmental Panel on Climate Change]. They considered five climate models and two GHG emissions scenarios (whereas the IPCC considers a few more models and many more emissions scenarios).

Aynslie

Re:Re:Re: Discussion Theme 1 - Climate change impacts and how we deal with them

Janice Traynor

2005/01/27 10:08

Thanks for the information, Aynslie. Sharon also brought up a good point about how we deal with climate variability in EA. We are often more concerned about what the temperatures is going to be in 100 years so that we know things like permafrost encapsulation of tailings and frozen core dams will not fail and create impacts, than we are about climate variability.

Many communities in Nunavut have been noticing increased variability in climate. When we are assessing impacts from climate change we should think beyond long-term median conditions and try to think about how an increase in variability may affect, for instance, the water balance and water management at a project site. As was pointed out in the course of one recent assessment, median values for precipitation may not give a very accurate picture of water management at site - variability and extremes must be considered.

But what about future climate change scenarios with respect to variability. Aynslie, do you know if/how the GCMs deal with this?

Janice

Re:Re:Re:Re: Discussion Theme 1 - Climate change impacts and how we deal with them

Aynsle Ogden
2005/01/27 10:31

Yes, as far as I understand this is one of the limitations in what information GCMs can provide at this time. The output of the GCMs' climate scenarios only provides the "straight line" trends that Sharon mentioned -- they represent the change in average conditions and don't provide projections about change in extreme events or variability. I think there are people who are working on trying to extract finer-scale resolution from the climate models to provide this sort of information, but this isn't yet widely available. However, there is broad agreement that extreme events will increase in frequency and magnitude in a warmer world. Perhaps this would be a good question for the modeller expert that Claire mentioned could perhaps join us?

Another way this understanding can be gained is through monitoring programs. As Janice mentioned, many observations of climate and environmental change and variability are being made. These observations provide insights into how people and environments are responding to extreme events. If we understand what these relationships are in the present, we will be able to better project what to expect in the future. For example, 1998 was a very warm year, and may be an analogue for future conditions.

Aynsle

Re: Discussion Theme 1 - Climate change impacts and how we deal with them

Sharon Smith
2005/01/27 13:08

My feeling is that we should not prescribe scenarios for the proponent to use in their impact analysis. When I review EAs, I am checking to see if the proponent presents a rationale for the scenarios they use and if they are reasonable for the particular situation. Given the large amount of uncertainty, etc. with GCMs, this is probably the best that can be done (In addition, when we are dealing with rainfall, snowfall and snow depth, there are even more uncertainties than with temperature.) As I mentioned earlier, we often even have difficulty describing the current baseline climatic conditions at individual project sites given the lack of on-site data (and very short records even if you do have the data) and the sparse network of northern climate stations.

Monitoring is very important, given the uncertainty of impacts related to climate change. This is really the only way that we can ensure that project components such as tailing containment facilities are operating as predicted. The one problem I see is with respect to environmental impacts following closure. In the case of mine waste, for example, it must be contained (e.g. sub aqueous or encapsulated in permafrost) for a long period following

mine closure. It is important to maintain monitoring programs/site inspections over the longer term to ensure that there are no unexpected impacts that may be related to climate change.

Regarding climate variability – I have downloaded output from the CCCma [Canadian Centre for Climate Modeling and Analysis] website (rather than the scenarios web site which others have referred to) and there is interannual variability in the output. [Note: CCCma website is at www.cccma.bc.ec.gc.ca.] From what I understand from colleagues that are meteorologists and climatologists, variability is inherent in the fluid dynamics models that are used. I think the results that are provided on the Climate Change Scenarios Project website [www.cics.uvic.ca/scenarios] that has been referred to are somewhat simplified in that they are presented for 30-year normal periods.

Even if you do use the straight-line trends, you could superimpose the interannual variability that has been observed in the past 30 years.

Regarding 1998 as an analogue – you may be interested in an interdisciplinary study I was involved in a few years ago funded by CCAF [Canadian Climate Action Fund] (science) which investigated the impact of the extreme warm year in 1998 on the Canadian Arctic cryosphere (including, snow, glaciers, sea ice, freshwater ice, and permafrost). A summary paper is currently in press and a number of individual papers have been published. The project report is also available on the CRYSYS website [www.msc.ec.gc.ca/crysys].

Sharon

Re: Discussion Theme 1 - Climate change impacts and how we deal with them

Claire Eamer

2005/01/27 14:28

Aynslie mentioned a study by Chris Burn and Water Resources people in Yellowknife about the use of climate change scenarios in the Mackenzie Valley impact study.

Here's the reference for the summary paper arising from that study:

Burn, C.R.; Barrow, Elaine; Bonsal, Barry. 2004. Climate change scenarios for Mackenzie River valley. 57th Canadian Geotechnical Conference, Session 7A. 24-26 October 2004, Quebec City.

The paper will be appearing in the Proceedings from that conference - but I don't currently have publication information. I'll try get that information before the end of the workshop.

Claire

Re: Discussion Theme 1 - Climate change impacts and how we deal with them

Aynsle Ogden

2005/01/27 15:30

Thanks Sharon -- I wasn't aware of the CCCma website, so that is really useful info!

Regarding your point on being prescriptive, it does seem as there are different methods out there for selecting scenarios, and I'm not sure if there is an ideal way, although I'm sure there probably are non-ideal ways! I was talking a while ago with a professor at UBC who expressed some dismay with the methods used in the paper by Chris Burn et al. because this methodology doesn't explicitly remove those scenarios from models that don't do a good job of representing observed climates. The IPCC recommends using a range of scenarios, but there seems to be more than one perspective (as you mentioned) on how to do this. I think the focus of the efforts by Burn et al was to get a group of diverse stakeholders to agree on how to select the scenarios in a sound and defensible manner.

I just did a quick check of the ACIA overview report to see how they selected what scenarios they used. They mostly used the B2 emissions scenario-- slightly below the middle of the range of future emissions -- and sometimes refer to the A2 emissions scenario-- above the middle of the range. Something to keep in mind in interpreting these results, is that B2 is on the conservative side of projections. There is a good explanation in Appendix 1 of the overview report. They didn't note the reasons for choosing the 5 models they used.

Aynsle

Re: Discussion Theme 1 - Climate change impacts and how we deal with them

Claire Eamer

2005/01/27 16:33

We have been joined (or are about to be joined, as soon as he finishes his lunch) by Trevor Murdock, Associate Director, Canadian Institute for Climate Studies (www.cics.uvic.ca) who has volunteered to look through today's discussion and see if he can clarify some of the issues surrounding scenarios.

Claire

Re: Discussion Theme 1 - Climate change impacts and how we deal with them
Trevor Murdock
2005/01/27 16:54

Thanks, I am here and skimming the messages on the forum. Will these be accessible afterwards? Seems like some great discussion has gone on. Does anyone have any specific questions for me?

Re: Discussion Theme 1 - Climate change impacts and how we deal with them
Aynslie Ogden
2005/01/27 17:05

Hi Trevor!

Thanks for joining us! We have been discussing variability and extremes in GCM outputs. Sharon mentioned that there is interannual variability in the information on the CCCma website but not in the scenarios on the CICS website. Is there any finer-temporal scale resolution information available (i.e., to assist with projecting how the frequency and magnitude of extreme events may change, per Janice's earlier question)? Or are the models just not this sophisticated yet?

Aynslie

Re: Discussion Theme 1 - Climate change impacts and how we deal with them
Trevor Murdock
2005/01/27 17:06

Ok, I see a couple things I can jump in and comment on:

Choice of models - I agree with Sharon that in general, scenarios should not be prescribed. The reason for this is that for any given project there may be legitimate reasons for including different ranges of models and emissions scenarios. The key is that there is a range, and that if some are excluded then it's in a statistically defensible manner like taking a "percentile" (as was done by Burns et al).

Monthly time series vs. 30-year means - A lot of care is required with monthly time series. We actually do have them on the CCIS website but we don't highlight them because we prefer people to focus on the 30-year means. The reason is that the amount of model uncertainty skyrockets when you go to finer timescales. You can download daily data from the CCCma website as well, but you cannot use them as daily data. In other words, you can't just plug daily scenarios into an impacts model because they are not physically realistic as "day to day" weather. It's the statistics of the daily values that are robust - you avoid this problem if you stick with 30-year means.

However, if you have an application that requires monthly or daily (or even hourly) time series, then what is often recommended is to use the _observations_ and add the 30-year mean difference to the observation in order to create "synthetic climate scenarios" for the future time period that are appropriate to use in impacts models. There are also techniques for smoothing because the 30-year means are reported only for each month and rather than have a jump in the anomaly being applied at the start of each new month, some studies require smooth transitions from day to day.

Re: Discussion Theme 1 - Climate change impacts and how we deal with them

Trevor Murdock

2005/01/27 20:02

We were writing at the same time so I answered some of this above, but to address your question directly, Aynslie:

The interannual variability is present in all of the runs that conform to IPCC standards (as all of the ones on the CCIS site do), but it is just not made available. In other words, we don't make the finer-temporal scale resolution information available because it should not be used directly in impacts assessments.

Implementing new tools to display how the models are projecting the frequency and magnitude of extreme events may change is definitely on our priority list. I gather this is a high priority for this group?

Discussion Theme 2 - Projects and examples

Discussion Theme 2 - Projects and examples
Claire Eamer, C-CIARN North
2005/01/23 19:35

How is climate change being incorporated into specific projects or types of projects?

For example: Environmental assessments are an ever-increasing part of the wastewater treatment and solid waste management (Water Licence) compliance demands for northern communities.

Basic environmental assessment work is a challenge from a financial, administrative and technical perspective for most northern communities. What tools or portals have been developed, or could be developed, to assist communities with this increasing challenge, and the implications associated with climate change?

Please join the conversation.

Discussion

Re: Discussion Theme 2 - Projects and examples
Jamal Shirley
2005/01/24 19:16

Good points Claire. Thanks for starting this thread.

Long-term changes in climate will be especially important for projects whose lifetimes are long enough to experience the effects of climate change. But given the inherent variability of climate and the spatial/temporal generality (and uncertainty) of most climate change scenarios, how can climate change impacts be incorporated in project specific EAs in a meaningful way? A review of six major projects subject to the Canadian Environmental Assessment Act (CEAA) found that a gap exists between the needs and expectations of the EA community on the one hand, and climate change science on the other (see www.ceaa-acee.gc.ca/015/0002/0005/print-version_e.htm). Climate change science can provide ranges of future climate conditions, but not, as yet, in

a form that is useful for proponents. No immediate “climate tools” are available to allow for incorporation of climate futures into EAs for projects whose lifetimes are greater than 100 years. Instead, EA practitioners usually infer future climate conditions from historic climate data covering time periods equivalent to the life of the project. The CEAA report suggests that this type of extrapolation may indeed be the only way, at present, to estimate the future range of climate conditions that may be experienced at the location of specific projects - given the space/time imprecision of GCM outputs. Yet despite concern that knowledge about the future climate is too imprecise and uncertain to act upon in the EA process with any confidence, the CEAA study found that climate change considerations were explicitly addressed in the design of 5 of the 6 projects evaluated. A neat example of how climate scenarios are used in the EA process can be found in the recently released EIS for the Meadowbank Gold project in Kivalliq region, proposed by Cumberland Resources. This assessment uses an IPCC scenario of an average Arctic warming of 4C over the next 50 years to forecast that the Meadowbank property would remain within the zone of continuous permafrost and that, despite a deeper active layer, warming will not compromise permafrost encapsulation (containment) of the tailing facility.

The CEAA study recommends increased communication and interaction between climate change scientists and EA practitioners. Climate scientists need to develop information more relevant to EA practitioners (e.g., address more climate/weather variables in GAM outputs), while EA practitioners, normally used to dealing with historic data sets, need to consider new ways to account for non-traditional information provided by climate change scientists. Any thoughts or comments?

Re:Re: Discussion Theme 2 - Projects and examples

Claire Eamer 2005/01/24 11:40

Jamal - you wrote:

"The CEAA study recommends increased communication and interaction between climate change scientists and EA practitioners...."

It occurs to me that one way we might be able to increase that communication is through this workshop. We have people with a variety of skills in both environmental assessment and climate change science already registered. However, I also could try to get a climate modeller to join us for a day later this week for a shorter-term specific discussion on models.

What does the group think? Or is there someone already in the workshop who feels comfortable with the modellers' side of the discussion?

Claire

Re:Re: Discussion Theme 2 - Projects and examples

Ken Johnson

2005/01/24 12:42

The communities of the north must be brought into the EA picture as a separate and distinct body. Their interests and abilities are much different than the project proponents. One of the most significant differences has been the resources available to the communities to respond to the demands of EAs. Most of the communities are having tremendous difficulties responding to just the demands of an "ordinary" EA - the resources to respond to EAs in the context of climate change are currently beyond their reach.

The regulatory community and the communities must somehow work toward an understanding of each other's demands and needs so that some sort of "incremental" approach to EAs and the subsequent responses may be achieved.

Re:Re: Discussion Theme 2 - Projects and examples

Ian Rose

2005/01/25 14:00

An excellent point was brought up about the difference in evaluating relatively short-term projects versus projects that extend forward far enough in time to be in the temporal scale of modelled climate change. The problem, especially for relatively small but locally important projects, seems to be a lack of any dose-response sort of thinking, even speculation. This summer, wind power stations are being built outside of several villages in Alaska, a project that has the potential to provide the villages with emissions-free power, as well as remove or reduce the threat of oil spillage from transportation barges. There are, of course, downsides for local wildlife, mostly in terms of the risk of seabird and sea duck loss in the turbines. My point is that something like turbine crashes can be observed and estimated relatively easily, as can, to a certain extent, the risk of oil spill. But how do we have any way of quantifying the dose-dependent risk of climate change by any one project?

Ian Rose

Department of Fisheries and Wildlife

Oregon State University

Re:Re:Re: Discussion Theme 2 - Projects and examples

Claire Eamer

2005/01/25 16:54

Ian wrote:

"But how do we have any way of quantifying the dose-dependent risk of climate change by any one project?"

Sorry to be a bit dim, Ian - but I'm not entirely clear what dose-dependent risk means in this context. It's probably one of those things that's blatantly obvious to EA practitioner.

Claire - not an EA practitioner!

Re: Discussion Theme 2 - Projects and examples

Claire Eamer

2005/01/25 12:17

Here's a coming event, just arrived in my email, that might interest anyone within reach of Edmonton on Feb. 3. This is one of the highest-impact projects you're likely to find, at least on the mitigation side of the coin:

The Environmental Conservation Students Association Presents:

ENVIRONMENTAL IMPACTS OF THE OIL SANDS DEVELOPMENT

WHO: Raj Pannu (MLA), Dr. David Schindler (U of A), Gordon Laird (Author), Dan Woynillowicz (Pembina), Darrell Martindale (Albian Sands), and a Suncor representative.

WHEN: 6:00 p.m. February 3rd

WHERE: University of Alberta, (ETLC 1001)

WHAT: The above speakers will participate in a round table discussion on the evening of February 3rd. The discussion session will give the speakers an opportunity to introduce themselves and their areas of expertise. A discussion on the environmental impacts of the oil sands industry will ensue followed by a question and answer period from the audience.

For more information please contact the Environmental Conservation Students association (ECSA) by e-mail: ecsa@ualberta.ca or by phone: 492-9925.

Discussion Theme 3 - Emissions & Mitigation

Discussion Theme 3 - Emissions & Mitigation
Claire Eamer, C-CIARN North
2005/01/23 19:36

In some cases, major development projects can also be major contributors to the greenhouse gases that are hastening global warming. With Kyoto coming into force now, accountability requirements for GHG emissions will be on the rise.

As well, economic forces will come to bear through emissions trading. The environmental assessment professional will need to be informed.

What are the greenhouse gas (GHG) emission considerations? How do we respond to these emissions (e.g. monitoring, mitigation, emission trading)?

Please join the conversation.

Discussion

Re: Discussion Theme 3 - Emissions & Mitigation
Ken Johnson
2005/01/24 12:54

Major projects may be a source of emissions, but they may also be an alternative to reduce current emissions. Case in point is the Inuvik gas development, which is providing the Town of Inuvik with an alternative lower emission fuel for power generation and heating. The Mackenzie Valley gas pipeline may offer this same opportunity to all of the communities along the route.

Re:Re: Discussion Theme 3 - Emissions & Mitigation

Claire Eamer

2005/01/24 14:07

Does the current environmental assessment process in the Mackenzie Valley look at the balance between greenhouse gas generation and reduction when it considers climate change?

Re:Re:Re: Discussion Theme 3 - Emissions & Mitigation

Louie Azzolini

2005/01/24 22:18

Good question but the short answer is no. Environmental Assessments do not prepare balance sheets of greenhouse gases associated with projects.

Re:Re:Re:Re: Discussion Theme 3 - Emissions & Mitigation

Claire Eamer

2005/01/25 01:29

Are assessments likely to expand to include a sort of environmental balance sheet? Or is that more likely to come up in some sort of emissions trading scenario?

It seems to me this is another place where it's hard to draw the line. Every time you draw a circle around impacts and say, that's what we consider in an environmental assessment, you notice something outside the circle that ought to be thought about. On the other hand, as Ken has pointed out in another thread, what is included inside the circle now is already more than communities and jurisdictions with modest resources can easily deal with.

Perhaps the emission/impact balance is something that comes under a broader concept of environmental accounting rather than environmental assessment.

Sorry - rather formless musings, late in a Yukon evening. Those of you for whom it is already tomorrow morning (or even later in Australia) can probably bring more intelligence to bear :-)

Claire

Re:Re:Re:Re:Re: Discussion Theme 3 - Emissions & Mitigation

Louie Azzolini

2005/01/25 01:57

I find that environmental impact assessment strives to 'evaluate' the impact of a project component (in this case greenhouse gas emissions) on valued socio-economic components (VEC) (say caribou). Unfortunately, the temporal scope of impacts limits

serious consideration of global warming directly because EISs just have not seriously grappled with the issue of global warming. So, from an EA standpoint one can:

- evaluate the impact of the project on global warming (not done very well)
- evaluate the impact of global warming on the project (Ken can say more on this, but it's done well)

Do we just design projects for global warming and assume the EA has done its job, or should EA strive for more? If so, what? And how? This is where the GHG balance sheet comes in handy. By assuming projects should have a zero (0) net addition of GHG, anything more than that becomes significant, likely and adverse. If we are to meet Kyoto targets, zero is not enough. New projects must actually result in a net reduction in GHG. This could mean that the evaluation of a project could entail some other evaluation mechanism, such as its contribution to a reduction in total GHG.

Short answer to your question: I don't know, but I doubt it.

Rambling thoughts.

LA

Re:Re:Re:Re:Re:Re: Discussion Theme 3 - Emissions & Mitigation

Aynslie Ogden

2005/01/25 10:46

Morning everyone,

Claire -- my thoughts on your question about whether EAs are likely to expand to include a sort of environmental balance sheet? Or is that more likely to come up in some sort of emissions trading scenario? I'd say the answer to these questions at this point in time (policies may evolve) depends on the type of development project and on the jurisdiction.

I would expect that one of the considerations regulators think about is whether or not imposing new requirements -- such as restrictions on emissions or requirements for projects to purchase credits to offset their emissions -- is how this compares to the rest of the industry. If the industry is one that will be subject to the Domestic Emissions Trading System, then such requirements would be fair. If not, then such requirements would be placing restrictions on new projects that are not on existing developments, which could affect the competitiveness of the new developments.

I think the EA and Climate Change guidance document www.ceaa-acee.gc.ca/012/014/2_e.htm attempts to deal with this question by suggesting that the preliminary scoping of a project include a comparison of the project to the industry profile. An industry profile can help to determine to what extent a proposed project is likely to contribute to GHG emissions, and how the project specifics compare to the "norm" within the industry. If I remember correctly, the document includes a list of low, medium, and high emission intensity industries. My understanding is that at this time, for

an industry or project that is a 'low' intensity emitter, GHG considerations do not need to be addressed. But this may change depending on how policies evolve and perhaps by jurisdiction.

Of course, this raises questions of whether or not EAs are the appropriate mechanism to achieve GHG reductions. If new projects are compared to the "norm" or are evaluated on the basis of "emissions intensity" does this lead to meaningful reductions in actual emissions?

My early morning rambling thoughts...
Aynslie

Re:Re:Re:Re:Re:Re: Discussion Theme 3 - Emissions & Mitigation

Janice Traynor
2005/01/25 11:05

Louie, I think you are right when you say that it is easier to consider the impacts of climate change on a project's components (and ultimately to the environment) than to consider the impacts of a project on climate change. However, if I recall correctly I think the latter was attempted in the Ekati and Diavik diamond mine assessments. Of course, the spatial scales set for those parts of the assessments were so large (global, or at least national) that despite the large amounts of fuel these projects consume it is a drop in the emissions bucket.

Part of what is required is a policy mindset on the part of our national and territorial governments, in cooperation with our international partners, to set direction and standards that will aid proponents in considering alternative forms of power supply to their projects. Under most impact assessment jurisdictions in Canada, consideration of alternative means of carrying out the project, including how power is generated, is considered because different means of power generation create different impacts. Goodness knows hauling all that diesel to remote sites costs the companies a fortune, and the company and regulators have to deal with access roads, spills, waste fuel and the impacts these create. However, only those means that are technically and economically feasible need to be considered. Most proponents, probably justifiably, are quick to dismiss all alternatives other than burning fossil fuels.

If we were to get to a point where more feasible and economical alternatives to power generation were available to consider in the impact assessment, we would be approaching Claire's scenario where we would be meaningfully considering the emissions contributions of a project and the impacts these create to climate change. So maybe we could start to reduce the drops in the bucket.

Janice

Re:Re:Re:Re:Re:Re:Re: Discussion Theme 3 - Emissions & Mitigation

Aynslie Ogden

2005/01/25 17:56

Hi everyone,

I'm really enjoying the discussions so far -- thanks for sharing your thoughts and providing a good learning opportunity for a non-EA practitioner such as myself.

Janice, I like the solution you proposed -- striving to make feasible and economical alternatives to power generation available to make it easier to incorporate into a development project, and to consider in the impact assessment.

For example, this solution would address one of the issues I think many have had with the focus on emissions intensity in the guidance for practitioners document -- and this is the question of cumulative effects. A large number of low-intensity emissions projects may have the same ghg impact as a few of the high-intensity projects. But high-intensity and low-intensity projects may not be treated the same in the EA process. Climate change is a cumulative effect in itself, so seeking solutions that consider the broader development context as well as for individual projects makes sense to me.

Aynslie

Re: Discussion Theme 3 - Emissions & Mitigation

John Streicker

2005/01/28 03:07

Hi All,

Just to add a thought about emissions - the ideal time to consider and implement low emission or zero emission solutions is with new projects. Retrofits are notoriously messy/difficult jobs. The time to think about these things is during the design phase. I think this must be very close in time to the environmental assessment - since the assessment needs to refine design considerations? Janice commented that alternatives are likely considered and then rejected for economic reasons.

So even though emissions may fall outside the formal terms of the environmental assessment it feels like there's opportunity.

Maybe we will see more here once the federal government makes (further) decisions on how it is going to respond to the ratification of Kyoto next month. If it includes a more full cost accounting and brings cumulative environmental impacts into the economic equation there may be the incentive to go with a greener solution.

John

Discussion Theme 4 - Tools, Resources, Barriers

Discussion Theme 4 - Tools, Resources, Barriers
Claire Eamer, C-CIARN North
2005/01/23 19:38

What do we have? What do we need? How do we go about creating the tools and resources we need? How do we overcome the barriers?

As a start, maybe we should attempt to collect (digital) resources through this forum or pinpoint the locations and sources of other resources. Any other ideas?

Please join the conversation.

Discussion

Re: Discussion Theme 4 - Tools, Resources, Barriers
Ken Johnson
2005/01/24 15:00

Some of the tools for analysing climate change are proprietary products of consulting companies. To use the product you have to retain the consultant.

This is a reasonable step if the proponent to the analysis is at an advanced stage in their needs; however, this does not serve a proponent in their initial stages. How does a proponent start the "process" with limited or, in fact, no resources?

Re:Re: Discussion Theme 4 - Tools, Resources, Barriers
Claire Eamer
2005/01/24 16:59

There are quite a few publicly available resources too - but their usefulness in a local or regional context isn't always obvious, especially to the non-expert (speaking as a non-expert!).

For example, there are resources on the website of the Canadian Climate Impacts Scenarios Project at www.cics.uvic.ca/scenarios/. However, it's not intuitively obvious how you would apply those resources to an impact assessment in the central Yukon. At least, not to me.

Any suggestions about what would be useful or practical - which is not always the same thing - for communities, other interveners, and EA practitioners?

Re:Re:Re: Discussion Theme 4 - Tools, Resources, Barriers

Jamal Shirley

2005/01/25 10:16

While I fully agree that northern community groups often lack access to participate fairly in the EA process, new and very useful climate change tools are at least now available to begin empowering EA practitioners and northern community groups. For example, CCIS offers free scatter plots as a tool to help impact assessment practitioners and researchers weed through the bewildering array of scenarios and identify those most appropriate for use in assessments. The CCIS scatter plots express a range of GCM outputs and help identify the most appropriate scenarios to describe the range of possible future temp and precip regimes that might be experienced seasonally and annually within a particular GCM grid box at various periods in the future (e.g. the 2020s or 2050s). I've used the scatter plots to engage municipal planners in discussions about future climate scenarios for south Baffin and the implications for development in Iqaluit.

CCIS also provides access to tools (statistical downscaling software) to help derive finer resolution (i.e., station-specific) scenarios of climate change from the coarser GCM outputs.

Finally one of the most useful functions of CCIS is that, much like this workshop, it networks people interested and involved in scenario construction and/or application via an email discussion group. A doctoral student from Tehran can post to the CCIS list serve a question about downscaling methods and receive an answer from a climate modeler in Sweden. I'm sure there are other examples of tools equivalent to the CCIS. But how widely used are they by Northern EA practitioners and local stakeholders? Thoughts, comments?

Jamal Shirley

C-CIARN North, Nunavut

Re:Re: Discussion Theme 4 - Tools, Resources, Barriers

John Streicker

2005/01/28 02:45

Hi All,

Earlier in Thread 1 on climate change impacts both Sharon and Trevor mentioned that specific scenarios should not be prescribed, given the range of the situations. Still I wonder if it wouldn't be possible to provide guidelines with respect to models and scenarios for impact assessments?

I am especially concerned with how climate change variability is handled. I thought Sharon's idea of superimposing observed variability on predicted trends was a good suggestion and a possible example of a guideline. Carrying out this exercise might show that even when there is no discernable trend being predicted (e.g., precipitation), the variability may still be significant.

Guidelines can be revised as models are revised and they still provide flexibility on the part of the practitioner when it can be justified.

Sorry for arriving so late - I was called away just before the conference began, and Claire (ably) stepped in to cover for me.

John

Re: Discussion Theme 4 - Tools, Resources, Barriers

Dmitri Sergueev

2005/01/25 10:17

Now we thrash out the frame document "Incorporating Climate Change Considerations in Environmental Assessment: General Guidance for Practitioners" that is practically unknown in Russia where companies follow the new standards GOST-R-ISO-14000 (in particular, "GOST-R-ISO-14001-98, Environmental management systems. Specification with guidance for use" and "GOST-R-ISO-14004-98, Environmental management systems. General guidelines on principles systems and supporting techniques"). The Canadian document shows the way of environmental decision support process developing under climate change. The more useful for practitioners is the table A.3 "Ranking Project Sensitivities to Climate and Related Environmental Parameters (rank: Nil, Low, Medium, High)".

One of the ways to improve this document is distinguishing the direct and mediated environmental risks induced by climate change. For example, the building thaw settlement can be the direct consequence of the climate warming. On the other hand, the permafrost degradation affects the active-layer water content. This can support the intensification of negative processes in adjacent places of the territory. We can see now

the dust-storms in Norilsk region due the combined action of climate warming and mine roads construction; that has influences on the health of workers.

Also we propose to separate medico-social, resource, and ecosystem consequences of climate change.

Dmitri Sergueev
sergueevdo@mail.ru

Re: Discussion Theme 4 - Tools, Resources, Barriers

Attachment: CEEA Report_Boyle [see www.taiga.net/c-ciarn-north/online4]

Claire Eamer

2005/01/26 19:39

Hi group,

I've just loaded onto the forum a new publication (in PDF format) contributed by Michelle Boyle of the University of British Columbia.

It's "Bridging the Gap Between Project-level Assessments and Regional Development Dynamics: A Methodology for Estimating Cumulative Effects". Submitted to: Canadian Environmental Assessment Agency, December 1, 2004. Authors are Hadi Dowlatabadi (Project Leader), Michelle Boyle (Research Assistant), Susan Rowley, Milind Kandlikar.

Michelle's comment: "Maybe of interest to the discussion (certainly constructive criticism is welcome)."

Re: Discussion Theme 4 - Tools, Resources, Barriers

Claire Eamer

2005/01/26 19:44

Any tools or resources on offer?

Having just added a very interesting report to the forum, I thought I'd ask everyone - do you have links to useful materials, or pdf versions of documents you can share, or other resources that we could add to the forum?

Dmitri - are the materials you mentioned earlier in English? If so, could you send me links, copies, or information on how to get hold of them?

One product that could come out of this exercise is a webpage on the C-CIARN North website with resources for EA professionals.

Claire

Re:Re: Discussion Theme 4 - Tools, Resources, Barriers

Dmitri Sergueev

2005/01/28 06:23

I have above-mentioned standards only in Russian. If I will find the translation I will send it to you.

Our results will partially published in "Permafrost and periglacial processes" and in Russian "Geoecology" and "Earth's cryosphere". The two last journals have English abstracts.

Re:Re:Re: Discussion Theme 4 - Tools, Resources, Barriers

John Streicker

2005/01/28 14:04

Thanks Dmitri,

If you find the translation, it would be interesting to have these as an alternate approach.

If you do send the abstracts you mention, we could forward them. There are a few participants to the workshop who are involved / interested in permafrost and glaciology.

John

Re: Discussion Theme 4 - Tools, Resources, Barriers

Claire Eamer

2005/01/28 12:01

I just received notice that the deadline has been extended to Feb. 11 for submission of abstracts to the following conference:

Adapting to Climate Change in Canada 2005: Understanding Risks and Building Capacity, a conference to be held at Le Centre Sheraton Montréal Hotel, Montréal, Québec, May 4-7, 2005.

Several of the suggested themes for the conference touch on managed environments, adaptive capacity, and other things linked with environmental assessment and climate change.

In case anyone is interested, or has a topic in mind as a result of the discussion, full information is at: adaptation2005.ca/