

Yukon



IP3 Can Contribute to the North

And Adapting to Working in Canada's "North" Might Teach
the Science Community Lessons that May Be Valuable in
the South!

Ian Church, Science Advisor
Yukon Government
November 10, 2007

A Question for this Group to Ponder

Does the “north’s” small population;
Northerners familiarity and dependence with their natural environments;
Tradition of Community Decision making in both aboriginal and non aboriginal societies;
Legal and governance frameworks;
And dependence on media and other communications;
Provide a researcher a unique opportunity to facilitate moving from discovery and development to “community knowledge” and understanding, adoption, and more rapid application than in the “south”?

What I Hope to Cover

- From the perspective of the Yukon and the North in general:
 - The growing Awareness to the need to prepare for a changing environment
 - Characteristics of the North
 - Expectations from Projects Such as IP3
 - Some Uses for IP3 Outputs
 - Challenges facing “managers”
 - Challenges IP3 needs to consider
- I am leaving the Question up to you.

Growing Appreciation of Environmental Change, Effects and Need for Action

- Yukon Premier Dennis Fentie in the Hill Times, August 20th, 2007

Yukon experiencing record high-water levels and flooding

By DENNIS FENTIE



Of all the issues affecting Canada's North, climate change has moved to the forefront in demanding our attention. From the melting sea-ice off Baffin Island to insect infestations of Yukon's boreal forest, global warming is changing the Northern landscape and challenging the people who inhabit it.

This summer, for example, the southern Yukon is experiencing record high water levels and flooding. At the same time, the Vuntut Gwitchin or "people of the lakes" of Old Crow, Yukon's most northerly community, are seeing some of their wetlands and lakes disappear, along with the wildlife, ducks and birds that inhabit them. Since the late 1980s, warming trends and other weather changes have had dramatic impacts on Northern communities and infrastructure.

The Arctic Climate Impact Assessment report, prepared for the Arctic Council in 2004, brought world-wide attention to the effects of climate change on northern peoples. It also sounded a warning on the widespread impacts and dangers of global warming to our planet.

In recent years, international scientists and political leaders have been visiting Canada's Arctic to study climate change effects and the implications for more southern regions. In 2005, a delegation of prominent U.S. Senators visited Yukon to meet with local residents and leaders. Senators Hillary Rodham Clinton and John McCain listened to First Nation members describe the effects on salmon runs in the traditional commu-

nity of Klukshu. They flew over retreating glaciers and the dying boreal forest nearby infested with the spruce bark beetle.

In the last two decades, average Arctic temperatures have risen at almost twice the rate as the rest of the world. This rate has been triple in Yukon and Alaska, at three to four degrees over the past 50 years.

Sea levels have risen 10 to 20 cm in the last 100 years with an additional increase of half a metre predicted for the next century.

Buildings, roads and other infrastructure is becoming unstable or more costly to build, as permafrost thaws. Ice-roads, which provide vital supplies and links for both industry and communities, are operating for much shorter seasons. Such effects impact not just today's way of life, but the remnants of life long ago. The late 19th century whaling era buildings of Herschel Island, just off Yukon's North Slope, are being washed into the Beaufort Sea. Old Inuvialuit (Inuit of the Western Arctic) gravesites on the island are collapsing into the melting permafrost.

Northern values and survival depend on the ancient and intrinsic relationship to the land: climate change is altering ways of life that have existed for millennia. Northern aboriginal leaders have spoken passionately and clearly about the impacts on wildlife and hunters, on the risks of thinning ice, and the changes that are caused by unpredictable weather, declining sea ice, storm surges and coastal erosion.

Long-established patterns of land use are changing. This uncertainty is creating one of the greatest challenges to security in the North today.

When northerners speak about sovereignty and security, we are speaking about our ability to thrive in the northern environment. We believe that climate change



Photograph courtesy of the Mars Institut

Climate change alarms: Sea ice at Resolute Bay, above. In the last two decades, average Arctic temperatures have risen at almost twice the rate as the rest of the world. This rate has been triple in Yukon and Alaska, at 3 to 4 degrees over the past 50 years, writes Dennis Fentie.

adaptation is essential to build healthy, safe and sustainable northern communities.

Northern governments are aware of their responsibility to respond to climate change, and are developing or implementing strategies and plans for all citizens to take action at home, at work and within their communities. The North is already a leader in northern building design.

Premiers Okalik, Handley and I have developed a framework for action, *A Northern Vision: A Stronger North and a Better Canada*, in which climate change is an identified priority.

Territorial governments are committed to supporting concrete and practical measures to address climate change adaptation, and to share information and best practices. As part of Yukon's Climate Change Strategy, our focus is increasingly on research and development opportunities, one of which is to make Yukon a leader in northern climate change research by establishing Yukon College as a Climate Change Research Centre of Excellence, including a Cold Climate Innovation Cluster specializing in cold climate technology.

The Yukon government has recently completed a forest management plan with local First Nations in areas impacted by

spruce bark beetle.

Co-operative research projects are under way in the North as part of International Polar Year, linking scientific and community resources. New partnerships and ways of understanding and working together are being strengthened as a result.

Northern governments are calling on Canada to work with them to make adaptation planning a priority. We need to complete regional climate change scenarios, build flexibility into infrastructure funding programs, and develop appropriate codes and standards that meet northern needs.

Comprehensive monitoring and supporting concrete and practical adaptation plans will help us strengthen communities, economies and ecosystems. They offer opportunities for new investments in knowledge, skills and innovation.

We believe that by working together with other Canadians we can meet the challenges ahead in ways that will make us all more resilient and stronger. The lessons of climate change in the North offer a way forward for Canada as a nation.

Dennis Fentie is Premier of the Yukon and a member of the Yukon legislature from Watson Lake.

The Hill Times

A New Focus on Environmental Change

- Flooding in Southern Lakes and lake draining in Old Crow Flats
- Average temperature increases
- Forest Insect Infestations
- Damage to modern and historic infrastructure as a result of permafrost “thaw”
- Impact on traditional activities and seasonal patterns

Focus on Need to Respond to Change to Strengthen Communities

- Need for Knowledge
 - Research
 - Monitoring and Research
 - Climate Change Centre Excellence
 - Leverage International Polar Year
 - Regional Climate Scenarios
 - Technological Innovation
 - Cold Climate Innovation Cluster
- Need for Adaptation Planning
 - Codes and Best Practices for Operations and Infrastructure
 - Forest Management Plans
 - High expectations for IPY

Characteristics of Northern Jurisdictions

- Where is the north anyways? Partially a State of Mind
 - Ecosystems and hydrological systems do not follow political jurisdictions
 - Provincial norths share many ecosystems, hydrological, cultural and economic characteristics of the southern territorial norths
 - Strength of IP3 is it understands the inter-relationship & linkages
- The Territories use new models of Governance
 - Federal, territorial, aboriginal governments
 - Extensive use of co-management Institutions of Public Government
- Responsibility for fresh water, lands, ecosystems etc.
 - Yukon Government
 - Canada in NWT & Nunavut
 - Parks Canada
 - Aboriginal Governments
- Large landscapes with small populations and few technical experts
 - Richard Janowicz is Yukon's hydrologist
- Relatively small jurisdictions with minimal resources where errors can be extremely costly
 - Faro Mine

Obvious Uses for IP3 Outputs

- Land Use & Community Planning
 - on the road to Sustainable Communities
- Infrastructure design, operation & decommissioning
 - Linear and non linear developments
 - Quartz and Placer Mining
 - Abandoned Mine Decommissioning
 - Code & standard development
- Renewable Resource Management
 - Fisheries
 - Wildlife and Forestry
- Surface and ground water qualitative and quantitative management
 - Domestic & Industrial Water Use
- Disaster planning, prediction and response
 - Flood
 - Ground & terrain effects (permafrost, sloughing, slides)
- Agriculture & irrigation
- Hydro Electric generation planning & forecasting
- Navigation planning and management

Major Yukon Issues- Is Yukon Unique?

- Uncertainty: Appreciation of natural variability and “induced variability” in Systems
 - Models need to be able to provide understandable confidence limits
 - Models need to illuminate possible extreme or “catastrophic events”
 - Management by the “Precautionary Principle”
- Appreciation for the complex interrelationships between terrain, ground water, surface water, permafrost, vegetation, climate etc.
- Models need to be user friendly
- Users need to know the geographic limits of models
- Models available for short term, medium term and long term
- Managers need “life cycle” projections for quantitative and qualitative planning, assessment and regulation of development
- Long term data sets need to be available to run “feed” models
- Models need to require application beyond “property boundaries”
 - Watershed & Ecosystem Management Applications

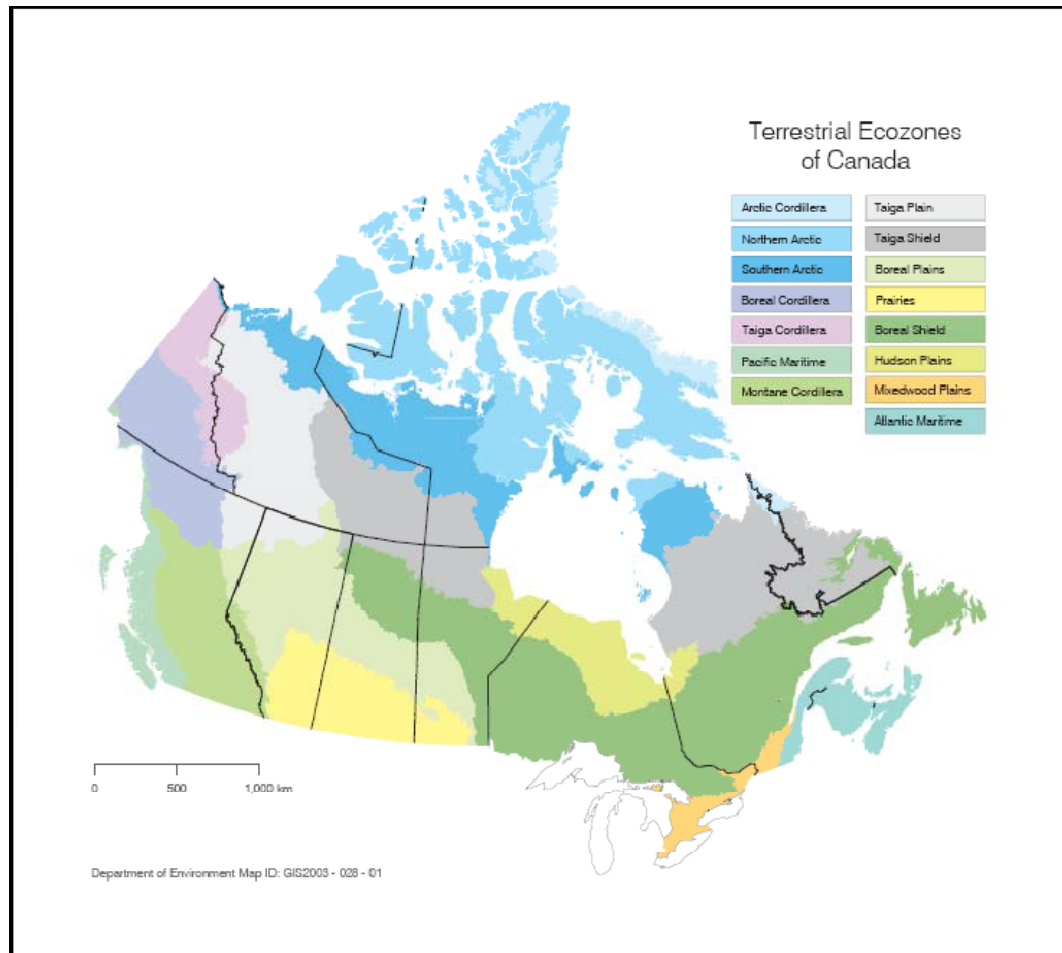
Less than Obvious Uses for IP3

- Contributions to understanding more widely applicable processes
 - Watershed, air-sheds, atmospheric systems and oceanic circulation systems
- Improve other forecasting systems such as weather forecasts
- Provide insight into what other systems must consider
 - Culvert designs, building codes
- Contribution to developing Science Capacity in the Canadian North
 - Watersheds host other interdisciplinary research
 - Human Capacity development
 - Education and Outreach- Work with Colleges
 - Development of Centres of Excellence

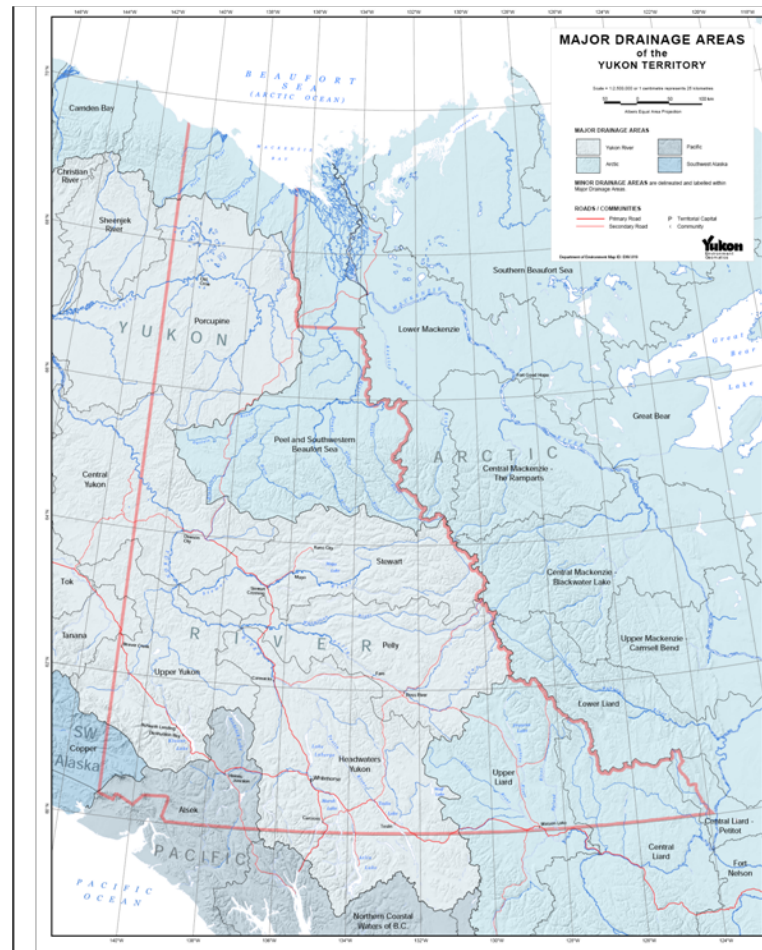
Managers in the North Have Unique Challenges

- Scale of the landscape
- Shared responsibilities
- Distance from material and informational resources

Diversity of Ecosystems Increases the Complexity for Managers



The North's Hydrology is Complex: Danger of Extrapolation from Mid- Latitudes by Southern “Decision Makers”



Challenges for IP3

- Research Basins
 - Long term security
 - land tenure and environmental setting- Wolf Creek is partially within City Boundaries
 - Financial Support
 - EMAN
 - SAON
 - Competing Research Agendas in Basin
 - Monitoring
 - Manipulative
 - Interdisciplinary research while desirable can lead to user conflicts
 - Data Archiving and Security
 - Ensuring Representative landscape diversity
 - Linking basins to gauging and other monitoring networks
 - Awareness of basins
- Hydrological Monitoring Networks
 - Ensuring ongoing support
 - Expansion of networks so baseline information is available when needed
 - Support for technological innovation – example satellite communications, remote sensing tools

Human Challenges for IP3

- Ongoing Capacity and Expertise
- Motivate the next generation
- The Need to Integrate Western Science with Traditional Knowledge
- Community input into the Development of Science Questions
- Communications, Outreach and Education
- Feeding back more than just Information or Data but Knowledge, Understanding and Appreciation
- Appreciation and Value of the Contribution made by IP3

In Summary

- Projects such as IP3 can greatly improve northerners ability to manage their activities in a changing environment if:
 - they can help us understand appreciate the complexity of the systems we live in
 - the products and the outputs can be understood and readily applied in the north by the people of the north
 - If they can assist develop a **resilient, sustainable** and **knowledgeable** northern society which is **globally integrated**.

A little classic northern wisdom:

“In the Delta Water is Boss”

Sal Martin- Embarras Portage