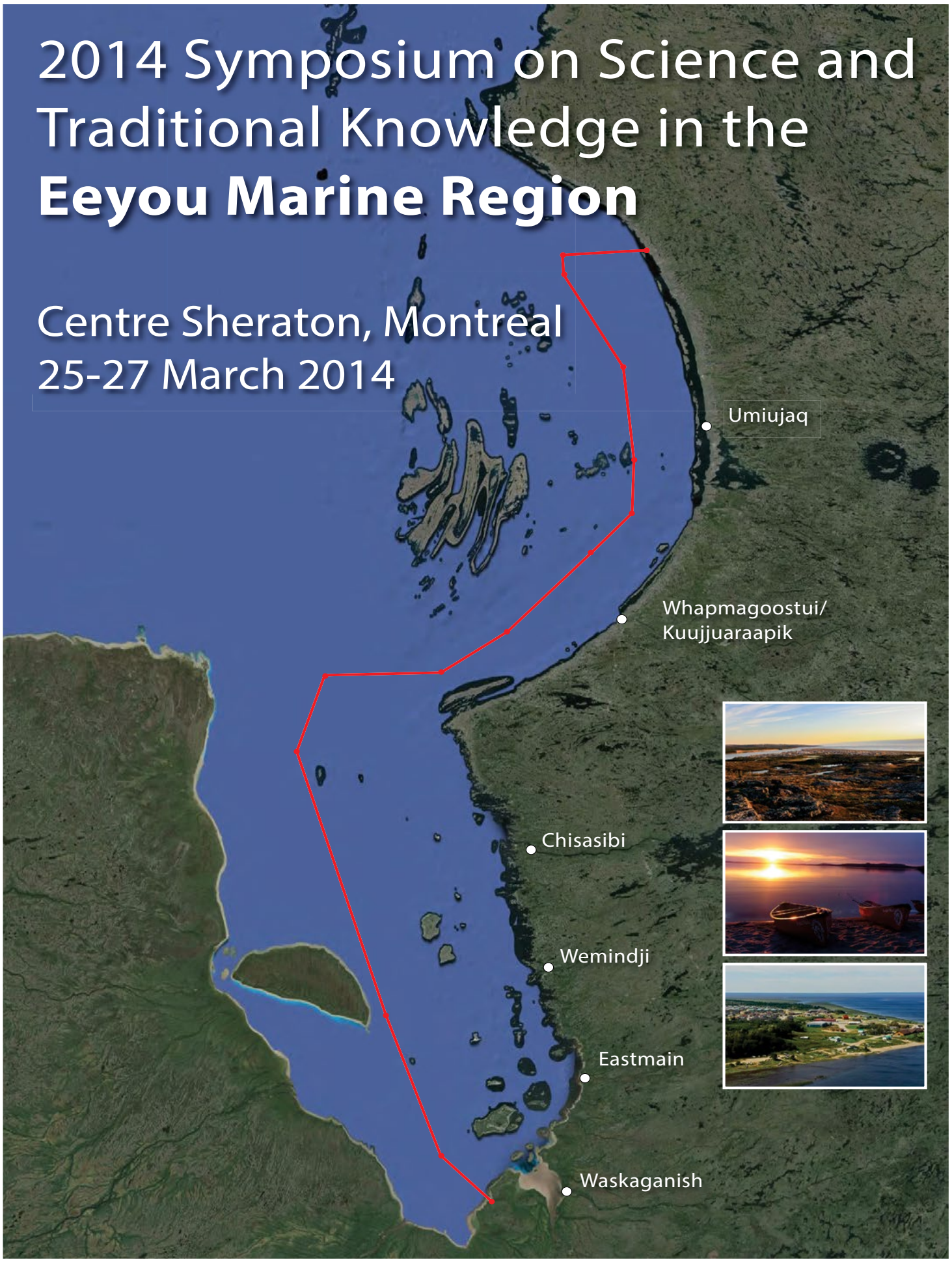
2014 Symposium on Science and Traditional Knowledge in the **Eeyou Marine Region**

Centre Sheraton, Montreal
25-27 March 2014



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WORD OF WELCOME

FROM THE CHAIR OF THE ORGANIZING COMMITTEE

Wachia, good morning, bonjour,

I am honored, proud and very happy to welcome you to the 2014 Symposium devoted to the analysis of the results of scientific research and examination of traditional environmental knowledge in the Eeyou marine region defined by an agreement between the Grand Council of the Crees (Eeyou Istchee) and the Government of Canada with the participation of the Government of Nunavut.

The Symposium is designed to present an overview of the knowledge on marine and coastal ecosystems of James Bay and eastern Hudson Bay as well as to identify fields of research that could be developed to fill the gaps in our understanding of the marine environment needed to ensure a sustainable development of resources (conservation and sustainable use).

I would like to address my most sincere thanks to the members of the Organizing Committee, Ms. Chantal Otter Tétreault, Ms. Aurélie Bourbeau-Lemieux, as well as Mr. Claude Saint-Charles for their valuable contribution to the preparation for this event. I would also like to thank Ms. Marina Kataquapit for her support of our work. In addition, I would like to thank Dr. Martin Fortier, Executive Director of ArcticNet, and his team, who have contributed their expertise and experience to the development of the program as well as the entire organization of our Symposium. Finally, I thank those who agreed to act as session chairs.

The Symposium themes relate to the bio-physical, ecological and socio-economic parameters of this vast region. In addition, a thematic focuses on scientific field sampling methods that could potentially be used as part of a long-term research program. The Symposium will conclude with a panel discussion, which will seek, among other things, to respond to the following three questions:

Whereas the various observations and recommendations made by speakers and poster presenters;

Whereas the knowledge already gained on the Eeyou Marine Region;

- What elements of the marine environment dynamics and resources should be the subject of a research program over the next five years?
- What means should be implemented to achieve this program?
- Which organizations and partners should be invited to participate in this program?

Jules Dufour, Ph.D., C.Q.
Member, Eeyou Marine Regional Wildlife Board

ORGANIZING COMMITTEE

Jules Dufour (Chair), Eeyou Marine Region Wildlife Board (EMRWB)
Claude Saint-Charles, Eeyou Marine Region Wildlife Board (EMRWB)
Aurélie Bourbeau-Lemieux, The Grand Council of the Crees (Eeyou Istchee)
Chantal Tétreault, The Grand Council of the Crees (Eeyou Istchee)
Martin Fortier, Executive Director, ArcticNet

ArcticNet
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GENERAL PROGRAM

- The Symposium will be held on Level B of Le Centre Sheraton Montreal Hotel (2 floors below the hotel lobby)
- Speaker sessions will be presented in Salon A & B
- Posters will be on display in the Foyer facing Salon A & B
- A Welcome Reception will be held on 25 March at 6pm in the Salon Club on the 37th Floor
- Coffee breaks will be held in the Foyer facing Salon A & B
- Lunch on 26 March will be served in Salon C

TUESDAY, 25 MARCH (13:30-15:00)		
SESSION 1: WELCOME AND OBJECTIVES **Chair: Bert Moar**		
13:30	**Robert Kanatewat** *(Former Chief of Chisasibi and Cree/Naskapi Commission)*	Opening Remarks / Prayer
13:35	**Jules Dufour** *(Eeyou Marine Region Wildlife Board)*	Welcome from the Chairman of the Symposium Organizing Committee
13:40	**Rodney Mark** *(Grand Council of the Crees)*	Welcome from the Deputy Grand Chief
13:50	**William MacKay** *(Government of Nunavut)*	Welcome from Nunavut
13:55	**Robbie Tookalak** *(Nunavik Marine Region Wildlife Board)*	Welcome from Nunavik
14:00	**Roderick Pachano** *(Eeyou Marine Region Wildlife Board)*	Symposium Objectives, Research Program and Description of EMR Committees
14:20	**Monique Lucie Sauriol** *(Aboriginal Affairs and Northern Development Canada)* **Alexandre-Guy Côté** *(Environnement Canada)*	The Eeyou Marine Region Agreement
14:45	**Question Period**	
15:00	**Refreshment Break**	

TUESDAY, 25 MARCH (15:30-18:00)		
SESSION 2: PEOPLE, HISTORY & TRADITIONAL KNOWLEDGE **Chair: Bert Moar**		
15:30	**Brian Craik** *(Eeyou Marine Region Impact Review Board / Grand Council of the Crees)*	People and the Environment of the EMR
15:50	**David Denton** *(Cree Nation Government)*	Archaeology and Culture of the EMR
16:10	**Alan Penn** *(Eeyou Marine Region Planning Commission / Cree Nation Government)*	A Short History of Research in the EMR
16:30	**Isaac Masty** *(Cree Trappers' Association)*	Traditional Knowledge in the EMR
16:50	**Roger Gallant** *(Commission on the Status of Endangered Wildlife in Canada - COSEWIC)*	Input of Traditional Knowledge in COSEWIC Species Assessment in the EMR
17:10	**Lucassie Arraagutainaq** *(Eeyou Marine Region Impact Review Board)*	Traditional Knowledge on Cumulative Impacts in the Hudson/ James Bay Marine Region
17:30	**Question Period**	
18:00	**Welcome Reception**	Salon Club (on the 37th floor)

WEDNESDAY, 26 MARCH (09:00-12:30)		
SESSION 3: DEVELOPMENT AND COOPERATION IN THE EMR **Chair: Claude Saint-Charles**		
09:00	**Robin McGinley** *(Cree Outfitting and Tourism Association)*	Development of Tourism in the EMR
09:20	**Pauline Gerrard** *(International Institute for Sustainable Development)*	The Hudson Bay Inland Sea Initiative
09:40	**Graeme Morin** *(James Bay Advisory Committee on the Environment -JBACE)*	JBACE Workshop on Acquisition and Dissemination of Environmental and Social Knowledge
10:00	**Alain Tremblay** *(Hydro-Québec)*	Hydro-Québec Integration of Traditional Knowledge and Science in the Follow-up of the Salt Intrusion in Rupert Bay
10:20	**Question Period**	
10:30	**Refreshment Break**	
SESSION 4: CLIMATE, ICE & OCEANOGRAPHY **Chair: Martin Fortier**		
11:00	**Ross Brown** *(Environment Canada / Ouranos Consortium)*	Overview of EMR Climatology and Climate Projections
11:20	**Nadia Saganash** *(Cree Nation Government)* **Thierry Rodon** *(Université Laval)*	Climate Change in Eeyou Istchee: Identification of Impacts and Adaptation Measures
11:40	**David Barber** *(CEOS / University of Manitoba)*	Ice and Ocean Dynamics in the Hudson Bay/James Bay Regions
12:00	**Zou Zou Kuzyk** *(CEOS / University of Manitoba)*	Freshwater Sources and Distribution in the Hudson Bay/James Bay Regions
12:20	**Question Period**	
12:30	**Lunch (provided)**	

WEDNESDAY, 26 MARCH (13:30-17:00)		
SESSION 5: THE MARINE ECOSYSTEM **Chair: Roderick Pachano**		
13:30	**Jean-Éric Tremblay** *(Québec-Océan / Université Laval)*	The Pelagic Marine Ecosystem of the Hudson Bay/James Bay Regions
13:50	**Monica Mulrennan & Kanwaljeet Dewan** *(Concordia University)*	Subsistence Coastal Fisheries: Use, Management and Monitoring at Wemindji
14:10	**Marc Dunn** *(Niskamoon Corporation)*	Ecology of the Anadromus Cisco of James Bay
14:30	**Colin Scott** *(McGill University)*	Proposed Tawich (Marine) Protected Area: An Update and Prospectus
14:50	**Question Period**	
15:00	**Refreshment Break**	
SESSION 6: HABITAT & WILDLIFE **Chair: Aurélie Bourbeau-Lemieux**		
15:30	**Jessica Labrecque** *(Cree Nation Government)*	Cree Concerns Regarding Coastal and Offshore Wildlife Management Issues in the Context of the New Wildlife Management Regime
15:50	**Roderick Pachano, George Lameboy & Louie Kanatewat** *(Cree Nation of Chisasibi)*	Wildlife Habitat and Traditional Knowledge
16:10	**Murray Humphries** *(McGill University)*	The Ecology of James Bay Coastal and Marine Flora and Fauna: What We Know and What We Need to Know
16:30	**Mike Hammill** *(Fisheries and Oceans Canada)*	The Ecology and Dynamics of Marine Mammals in the Hudson Bay/James Bay Regions
16:50	**Question Period**	

THURSDAY, 27 MARCH (09:00-12:30)		
SESSION 7: NEW RESEARCH OPPORTUNITIES IN THE EMR **Chair: Jules Dufour**		
09:00	**Katherine Scott** *(McGill University)*	100 Years of Science and Social Science in the EMR
09:20	**Martin Fortier** *(ArcticNet)*	The Canadian Research Icebreaker CCGS *Amundsen*: Extending the Research into James Bay?
09:40	**Kim Juniper** *(Ocean Networks Canada)*	Community Based Ocean Observatories - Towards a Smart Oceans North Network
10:00	**Joel Heath** *(Arctic Eider Society)*	Development of a Hudson Bay Community Based Research Network
10:20	**Question Period**	
10:30	**Refreshment Break**	
PANEL DISCUSSION **Moderator: Lorraine Brooke (Consultant)**		
11:00	**Brian Craik** *(Grand Council of the Crees)* **Roderick Pachano** *(Eeyou Marine Region Wildlife Board)* **Colin Scott** *(McGill University)* **Louis Fortier** *(ArcticNet / Université Laval)*	A Future EMR Research Program
12:15	**Roderick Pachano** *(Eeyou Marine Region Wildlife Board)*	Closing Remarks
12:30	**Meeting Adjourns**	

ABSTRACTS - ORAL PRESENTATIONS

DEVELOPMENT OF CLIMATE CHANGE SCENARIOS FOR THE EEYOU MARINE REGION

Brown, Ross[1] (ross.brown@ec.gc.ca), C. Barrette[2], D. Chaumont[3], P. Grenier[3] and A. Frigon[4]

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[4] Climate Simulation and Analysis Group, Ouranos, 550 Sherbrooke St. West, 19th Floor, Montreal, QC H3A 1B9

Climate change scenarios are essential inputs to the vulnerability and impact assessment process. Ouranos is currently working with ArcticNet to provide climate change scenarios for the Integrated Regional Impact Study (IRIS) regions via dynamical downscaling of Global Climate Model (GCM) simulations with the Canadian Regional Climate Model (CRCM). This talk will provide an overview of the climate change scenario production process including the definition of relevant climate indicators, the evaluation of CRCM runs and some of the challenges developing scenarios in coastal environments. The talk will also look at the potential to obtain additional climate scenario information from GCMs and RCMs contributing to the recent CMIP5 and CORDEX model intercomparisons.

TRACING THE "PEOPLE OF THE SEA": ARCHAEOLOGY AND HISTORY IN THE EEYOU MARINE REGION

Denton, David (ddenton@lino.com)

Cree Nation Government

The paper presents an overview of the archaeology and early history of the EMR with a focus on recent research carried out by the Cree Nation Government in collaboration with the Waskaganish First Nation. A new uplift curve based on core sampling of peat bogs near Waskaganish is presented, as is archaeological information from Sander's Pond site, dated to about 4,000 years ago, and from Nuutameshaanan / Smokey Hill, dated to the last 1500 years. These have important implications for understanding the early history of the EMR. Recent survey work to recover traces of the "People of the Sea" at their meeting place, Mistkoutenkashit, is also presented. The paper presents the available archaeological and early historical information from the EMR in the context of the changing configuration of the coastline. It concludes with recommendations for research aimed at furthering our understanding of early Eeyou history through archaeology and at supporting proper management of Eeyou, Inuit and European heritage sites within the EMR.

ECOLOGY OF THE RUPERT BAY ANADROMOUS CISCO POPULATIONS

Dion, René [1], M. Dunn[2] (mdunn@niskamoon.org) and C. Durocher[1]

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[2] Environment Niskamoon Corporation 2 Lakeshore Road, Nemaska, Qc, Canada J0Y 3B0

The fall spawning run of anadromous cisco and whitefish has for many generations been an important source of food for coastal Cree land users. Still today in Waskaganish, community members gather at the foot of the Nuutemessaanan (Smokey Hill) rapids of the Rupert River to harvest cisco that come in from James Bay. Within the framework of the Eastmain-1-A and Sarcelle Powerhouses and Rupert River Diversion Project, in-depth studies of cisco populations of the Rupert River and Rupert Bay sectors were initiated. Through the Boumhounan Agreement, a Monitoring Committee was established to ensure meaningful Cree participation in the feasibility and follow-up studies. Moreover, activities specifically designed to collect Cree traditional knowledge were organized. Contribution from Waskaganish land users resulted in a re-orientation of the cisco monitoring program towards a wider range of topics and resulted in a broader perspective of the ecology of this fish. This was particularly evident when genetic analyses confirmed different population types based on morphological differences well known to Crees. The knowledge gained on the Rupert River/Rupert Bay cisco populations gives us an indication of possible research directions on anadromous coregonids of James Bay, as well as possible issues related to the revitalization of traditional Cree fisheries in the Eastmain and La Grande River. Local and Traditional Knowledge associated with this activity together with the results of the Hydro-Québec monitoring program will be crucial for the long term preservation of this fishery under post-development conditions.

THE ECOLOGY AND DYNAMICS OF MARINE MAMMALS IN THE HUDSON BAY/JAMES BAY REGIONS

Hammill, Mike O. (Mike.Hammill@dfo-mpo.gc.ca)

Maurice Lamontagne Institute, Dept of Fisheries & Oceans Canada, Mont Joli, QC

The Department of Fisheries and Oceans is responsible for the management of marine resources in Canada. The marine mammal section in Mont Joli conducts research on marine mammals in the waters of the Eeyou/Nunavik marine regions and in the Gulf of St Lawrence. We provide advice to co-management boards and to the minister on a diverse range of subjects related to harvest management, industrial impact, and marine mammal health. We have a team of 10 full time researchers, based in Mont Joli with expertise in population dynamics, foraging ecology, acoustics, and marine mammal diseases. Research to date has focussed on beluga in Eastern Hudson Bay and in James Bay. An aerial survey program has provided information on whale abundance since the mid-1980s. A community sampling program, where hunters return a tooth and skin sample, has operated since the mid-1990s in collaboration with Makivik Corporation. This program has been used to monitor age composition of the harvest and to learn more about stock and kin relationships amongst beluga in Hudson Bay. Associated with this program ,weekly observations of marine mammals are recorded , and this information has been used to provide insights into possible impacts of climate change. A telemetry program earlier in the decade provided insights into habitat use, and migration patterns of EHB beluga and showed that at least some beluga in James Bay do not migrate. Transmitter equipped beluga also provide information on temperature at depth, making them useful as mobile oceanographic samplers, but this technique remains underutilized. More recently, a more formal approach to collecting Traditional Ecological knowledge has been undertaken in collaboration with Trent University (C. Furgal) to gain insights into beluga and walrus ecology. Less regularly, we have surveyed ringed seals in James Bay and in the EHB arc, and are hoping to build up community sampling of ringed seals, a potential sentinel for monitoring ecosystem changes. In the near future we hope to undertake more work on walrus, to improve information on abundance in the Eeyou/Nunavik marine region.

DEVELOPMENT OF A COMMUNITY BASED RESEARCH NETWORK TOWARDS ASSESSING CUMULATIVE IMPACTS ON THE MARINE ECOSYSTEM OF JAMES BAY AND HUDSON BAY

Heath, Joel P.[1] (info@arcticeider.com) and L. Arragutainaq[2]

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[2] Hunters and Trappers Association, General Delivery, Sanikiluaq, NU X0A 0W0

Establishing a network of community based research programs in south-east Hudson Bay and James Bay is a necessary step towards assessing cumulative impacts of environmental change and hydroelectric developments on the marine ecosystem. The Hudson Bay Program, Voices from the Bay, and more recently, community based programs developed during International Polar Year on the Belcher Islands have set a precedent for networking among communities, integrating Traditional and Scientific knowledge, and have provided local hunters with training, experience, and oceanographic equipment to document the changes they have been observing. A primary concern has been addressing cumulative impacts of hydroelectric developments on the dynamics of winter sea ice habitats and wildlife. Winter plumes of freshwater are being increasingly detected under sea ice, along with changes in sea ice dynamics, including rapid freeze-up and entrapment of wildlife (particularly eider ducks and beluga whales). In order to better understand the scale of these issues and formalize momentum towards addressing cumulative impacts on the marine ecosystem, we have received approval from many communities and partnered with a variety of government and non-government groups towards formalizing a Hudson Bay Network. This would involve development of Community Based Research and Monitoring Programs with communities in the Eeyou Marine Region, documenting traditional and local knowledge on an ongoing basis, providing hunters with oceanographic and ecological monitoring equipment along with training that will allow consistent and comparable results to be obtained across communities. To make data accessible across communities and to better integrate local Cree and Inuit knowledge with scientific approaches, we have also been developing a multi-media Interactive Web Platform that provides a novel way to archive, share and interact with results of community programs, strengthening knowledge integration and engagement in results. This program will catalyze a much needed long-term future for environmental stewardship in Hudson Bay and James Bay, facilitating knowledge sharing, consistent techniques and integration among communities in response to their long-standing unaddressed environmental concerns. It would provide essential research to governments, communities and aboriginal organizations necessary to assess cumulative impacts of environmental change in the region, including

impacts on wildlife and communities who depend on these resources for food security and ecological services. As many of the communities and our partner organizations will be present at the Eeyou Marine Region meeting, our goal is to share updates on research results, progress in establishing the network and interactive platform, to strengthen existing relationships, form relationships with new communities and partners, and discuss priorities for future research and momentum towards assessing cumulative impacts of environmental change on the marine ecosystem of Hudson Bay and James Bay.

THE INTER-ECOLOGY OF THE EEYOU MARINE REGION

Humphries, Murray[1,2] (murray.humphries@mcgill.ca) and M.L. Leblanc[1,2,3]

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The flora and fauna of the Eeyou Marine Region is a unique community assemblage created by a complex convergence of land and water, freshwater and saltwater, forests and tundra. Typical arctic marine mammal assemblages of belugas, seals, polar bears, and arctic foxes are found immediately adjacent to typical northern boreal assemblages of moose, beaver, hare, and marten. Sea run trout, whitefish, and cisco move between rivers and the coast, while migratory caribou move between tundra and taiga. Eeyou is an important stopover site for migratory waterfowl that feed on eelgrass beds growing in shallows and inter-tidal flats. Eelgrass also supports a diverse epifauna, attenuates wave action, and provides food and shelter for many other species including marine invertebrates and fish, fulfilling the definition of a foundation species that structures an entire community. Eeyou's many small offshore islands host rare plants and provide important breeding and denning habitat for polar bears. There is a long history of scientific research conducted in the region, but most has been short-lived, focused on one or only a few of the region's many physical and biological attributes, and published primarily in grey literature. Local Cree and Inuit knowledge of this vast and complex coastline is comprehensive, integrated, and nuanced, but has not often been meaningfully combined with scientific research. Similar to how the inter-ecology of Eeyou Marine Region creates a unique and valued landscape, there is unprecedented opportunity for inter-university, inter-disciplinary, and inter-cultural collaboration to achieve a unique and valued understanding of this remarkable region.

COMMUNITY BASED OCEAN OBSERVATORIES - TOWARDS A SMART OCEANS NORTH NETWORK

Juniper, S. Kim (kjuniper@uvic.ca), S. McLean, B. Pirenne, K. Moran, R. Flagg, A.O.V. Bui and R. Key

Ocean Networks Canada

Ocean Networks Canada (ONC) is keenly interested in participating in the 2014 Eeyou Marine Region Symposium, to explore possibilities for the installation of community-based, marine mini-observatories in James Bay and southeastern Hudson Bay. One or more mini-observatories would allow communities and independent scientists to continuously monitor the marine environment in the Eeyou region, as it is affected by climate warming, hydroelectric activity and the proposed massive industrial development in Ontario's "Ring of Fire" mineral belt, in the Attawapiskat River catchment. Other research program, including sensors, in the freshwater and marine environments of the James and Hudson Bay lowlands (Ontario Far North) are deployed, planned or being discussed with scientists at the Vale Living with Lakes Centre (Laurentian University) and the Canadian Network of Aquatic Ecosystem Services. ONC currently operates a mini-observatory in Cambridge Bay, Nunavut and another in Mill Bay, on southern Vancouver Island. In addition, ONC owns and operates much larger undersea, cabled observatories in the Salish Sea and the northeast Pacific Ocean. Our Cambridge Bay Observatory provides the best example of what could be undertaken the Eeyou region. The Cambridge Bay installation consists of an instrument platform on the seafloor at a depth of 6 metres, and a shore-based weather station and webcam. The underwater instrument platform is connected by cable to a junction box on the local wharf. The cable provides power and communications to water quality sensors, a current metre, an underwater camera, a hydrophone to monitor marine mammals and shipping noise, a sonar that measures ice thickness and an acoustic fish-tag receiver. Computers in a nearby building log data and transmit data via satellite to ONC's data facility at the University of Victoria. Data and imagery are also made available locally, in the Cambridge Bay community centre and high school. Our education team works directly with a local high school science teacher to develop learning packages for students who can directly access data from the underwater observatory. Scientists in Canada, the U.S. and Europe are using these unique data to study ice growth, water quality changes and marine ecology in Cambridge Bay. All data from the observatory are freely available to anyone with an Internet connection. Ocean Networks Canada is currently developing the Smart Oceans North program in collaboration with Canadian universities, government agencies and communities. This program would link community-based, mini-observatories in a larger network, together with data from other ocean observing systems.

CREE CONCERNS REGARDING COASTAL AND OFFSHORE WILDLIFE MANAGEMENT ISSUES IN THE CONTEXT OF THE NEW WILDLIFE MANAGEMENT REGIME

Labrecque, Jessica (jlabrecque@gcc.ca)

Cree Nation Government Environment and Remedial Works Department

In 2012, the Cree Nation Government produced a report funded by the Canadian Wildlife Service examining the new wildlife management regime applicable to the Eeyou Marine Region (EMR) by virtue of the Eeyou Marine Regional Land Claim Agreement (EMRLCA). The report touched on the social and environmental context of the Eeyou Marine Region (EMR), explored aspects of the implementation of the new wildlife management regime in the EMRLCA, and described the perspectives of members of coastal Cree communities regarding primarily wildlife, environmental, and governance issues in the offshore region. This presentation will describe the findings of this report, briefly touching on the context and implementation concerns and then turn mainly to the results of consultations. Crees have a long history of use and occupation of coastal and offshore regions primarily in eastern James Bay and southeastern Hudson Bay, involving the harvesting of numerous wildlife species including waterfowl as well as terrestrial and marine mammals. Rapid social, ecological, economic and demographic changes, as well as significant changes in the governance regime of the territory, have and are still transforming Cree society and traditional territory. Thus, to a set of environmental issues affecting the offshore ranging from climate change to changes in the migratory patterns of key species of waterfowl, one can add a number of real and potential development-related transformations stemming from hydroelectric development, mining, and other sectors. At the same time there are conservation initiatives underway, most notably the Tawich NMCA project that is seeking to protect at least the section of the EMR around Wemindji – and quite possibly more – from any further impacts of industrial development. It is in this dynamic context that the new wildlife management regime of the EMRLCA must be implemented. Consultations carried out in coastal Cree communities revealed a number of concerns regarding coastal and offshore wildlife and environments, as well as governance. The primary concerns expressed by participants in the consultations described changes in waterfowl migration patterns and habits and a resulting decline in Cree harvesting, the impact of climate change on wildlife and the accessibility of coastal and offshore hunting grounds, the disappearance of eelgrass and related impacts on waterfowl, and the impacts of hydroelectric development on coastal and offshore wildlife and environments. These issues are longstanding recurring themes described by members of Cree coastal communities, and are to a significant degree interrelated. These four changes revolve mainly around the waterfowl hunt, which was traditionally an extremely important harvesting activity from a nutritional perspective and remains an equally important activity from a Cree cultural standpoint, and the outcome of these changes have resulted in declining hunting opportunities and success. However, the concerns of participants in consultations also went beyond waterfowl and extended to changes in vegetation, challenges in navigating offshore travel routes, and changes in land use. Significantly, many participants also pointed to a lack of consultations soliciting Cree perspectives on wildlife issues, and indicated a need for those perspectives to weigh more heavily in wildlife management decisions.

TRADITIONAL KNOWLEDGE AND ACQUISITION OF THE EEYOU MARINE REGION

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The Cree have occupied the Eastern coasts of Hudson's and James Bay for many generations. They were a nomadic tribe that constantly moved around within this area, living off what the land, air and water provides. The Cree of coast region relied on the different species of wildlife for livelihood. To live within this region skill relevant to the area were required and knowledge that could have significant difference with living off the land away from the coastal region. This meant that the acquisition of this knowledge was different than the knowledge required to live- off the land, in the bush away from the coastal region. There are other factors that are different on coastal region and inland, one being, tolerance of the different taste of wildlife harvested in this region. The Power Point presentation will speak mostly about the acquisition of this knowledge in comparison with the Non Cree Education system.

DEVELOPMENT OF TOURISM IN THE EMR

McGinley, Robin (robin@creetourism.ca)

Cree Outfitting and Tourism Association (COTA)

Tourists today are looking for safe and authentic experiences. They want to learn about the destination and more importantly the people, the history and the culture of the destination. Cree tourism projects in Eeyou Istchee have the potential to meet these requirements and provide the guests with an unforgettable vacation. COTA's mission is to develop

and implement a collective vision for a world-class sustainable tourism industry in Eeyou-Istchee in harmony with Cree culture and values, and involving a partnership among Cree communities, institutions and businesses. Therefore, COTA has been working with the coastal communities to help them identify the tourism potential of the coast. In 2013, COTA hired PAR to produce a Strategic Business Plan for the Coastal Route Project and is now beginning the process of working with the communities to develop packages that could be offered to visitors. The James Bay coast has a rich history, diverse flora and fauna, and a fascinating cultural context. With the Eeyou Marine Region Land Claims Agreement protecting Cree rights and the potential creation of the Tawich Marine Protected Area, the opportunities for sustainable tourism development for the Cree communities are endless. The International Ecotourism Society defines ecotourism as "responsible travel to natural areas that helps to conserve the environment and the well-being of the local people". It is this type of development that is proposed. Sustainable community tourism development will also provide employment, strengthen our cultural heritage and help to diversify our economy.

WORKSHOP ON ACQUISITION AND DISSEMINATION OF ENVIRONMENTAL AND SOCIAL KNOWLEDGE

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The presentation will outline the following: The JBACE's Strategic Plan 2013-2018 stresses access to information and transparency as factors in public participation. Local communities that have access to environmental and social data will be in a better position to participate in debates on planned developments in their region. One of the objectives of the JBACE's action plan for implementing its Strategic Plan is to establish a coordinated environmental and social knowledge acquisition program. The JBACE intends to work with research centres and bodies in the James Bay territory to develop this tool with a view to strengthening acquisition, dissemination and communication of knowledge on northern regions. To do so, the JBACE organized a workshop on the subject on March 19th and 20th 2014 in Mistissini, QC. Participants at the workshop included university researchers, Local Environment Administrators of the Cree communities, and representatives from several local and regional organizations and governments (e.g. CHBSS, CMEB, CRDI, MRN, etc.). The discussions at the workshop included exchanges on the following items: 1. Constraints to the acquisition and dissemination of knowledge; 2.Transparency and confidentiality in the context of info-sharing and local and traditional knowledge; 3. Reinforcing analytical capacities within communities and organizations on the territory (tools budgets, human resources, training, etc.); 4. Establishment of an information management system (database) or other measures. The results or conclusions stemming from the workshop will be provided verbally.

SUBSISTENCE FISHERIES IN THE COASTAL CREE COMMUNITY OF WEMINDJI, JAMES BAY

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Historically the coast served as a seasonal gathering place for the Crees, providing opportunities for families to get together, relax and fish after a winter of separation spent inland. Subsistence or traditional fishing in the estuarine and coastal waters of James Bay continues today as a significant aspect of personal well-being, cultural identity and knowledge transmission, and as a locally valued source of healthy and preferred food. This presentation reports on current and on-going collaborative research we are undertaking with the Cree Nation of Wemindji. Drawing on participant observation and interviews with coastal fishing families, we document the importance of subsistence fishing as well as concerns about its maintenance. The contribution of the Wemindji Community Fisheries Program, subsidized by the Fishery Restoration and Development Program of the Niskamoon Corporation, is explored in relation to its support of summer fish camp operations and the provision of fish to community members. Harvesting data from an annual monitoring program established in 1989 to ensure the sustainability of the program are also examined. Harvesting trends as well as management interventions are discussed, informed by interviews with participants and local administrators of the program. Recommendations concerning further research on subsistence fisheries in the Eeyou Marine Region are presented.

CREE TRADITIONAL KNOWLEDGE AND WILDLIFE HABITAT

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Chisasibi

The most important principle to waterfowl management is habitat preservation. The Cree people have relied and continue

to rely on the harvesting of wildlife in Eeyou Istchee, which includes the Eeyou marine region, primarily for substance. The Cree of Chisasibi noted a major change in the migratory habits of the Canada geese and brant. The geese basically moved their flyway inland and the brant were no longer on the coast of James Bay. Also noted was the Eelgrass beds had been altered dramatically. Eelgrass is a major food source for the geese and brant. What is the connection? The Cree hold traditional knowledge in many areas and aspects of the different wildlife habitats in Eeyou Istchee. The Cree Nation of Chisasibi established a task force to investigate the causes of the decline of the Eelgrass in the Chisasibi traditional territory and make recommendations for the restoration of the eelgrass. As there is virtually no scientific base data, the task force had to rely on Cree traditional knowledge to carry out its mandate and this is complemented or confirmed by "western" investigations and findings. The presentation will deal with certain aspects of the work of the task force specifically eelgrass.

A SHORT HISTORY OF RESEARCH IN THE EEYOU MARINE REGION

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This talk aims to provide a brief review of the major issues which have served to guide the gathering of environmental data in the Eeyou Marine Region (EMR) since the James Bay Region Development Act in 1971 and the announcement by Québec of its intention to develop the hydro-electric potential of the rivers draining to James Bay and southeastern Hudson Bay. It is a history which runs parallel to successive stages in the evolution of the talks with Canada which eventually resulted in the Eeyou Marine Region Land Claim Agreement signed in 2010. It is necessarily a selective review, emphasising issues seen at various times as particularly relevant to Cree interests as they responded to the opening of the James Bay territory – Eeyou Istchee – as a new northern development frontier. Hydro-electricity has been the major driver of field investigations in James Bay, directly or indirectly, but significant information gaps remain. The period 1974-1980 witnessed a considerable investment in field surveys. These investigations have been reported in two symposia and two later syntheses, which are discussed briefly. They focussed on near shore and estuarine environments which would eventually be affected by the series of major river diversions and related river flow regulation which characterised the development of the hydro-electric potential of the Québec river systems. These were, for the most part, 'base-line' studies, aimed at the description of a region before the hydrological transformation brought about by hydro-electric development. There is also a complex history of boundaries and of uncertain territorial jurisdiction in this region. Field studies, with some notable exceptions, tended to focus on estuaries and near shore environments. James Bay as a marine ecosystem remained a largely unexplored and unexamined ecosystem, as a succession of researchers comment in the papers describing their work. Environmental impact assessment, and studies conducted to seek government approvals for successive design changes and expansions of the original La Grande Complex account for most of the field studies conducted since the early 1980's. One striking consequence of this situation is that we generally lack the kind of oceanographic data – physical, chemical and biological, which would be needed to track the evolution of the James Bay regional marine ecosystem in response to this recent history of development. The implementation of the EMRLCA therefore offers a much-need opportunity to assess the state of the relevant science and evaluate the issues which now need to be addressed.

CLIMATE CHANGE IN EEYOU ISTCHEE: CREE KNOWLEDGE AND ADAPTATION

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The realities of a changing climate and of the effects of this change are no longer scientifically in question. The trends towards a warmer and wetter climate in Northern Canada, including Eeyou Istchee, are clear. Some of the major trends and expected impacts in Eeyou Istchee include: the largest changes in climate are expected to occur in the northern portions of Quebec; an average increase in warming of 3.5 to 6.5°C is forecasted by 2050, with warming more pronounced in the winter than in the summer; shorter periods of snow cover and a reduction in the duration and thickness of ice cover on lakes and rivers; larger increases in precipitation is predicted for the more northern parts of the Territory by 2050; and, winter precipitation levels are expected to increase by 12-23% in central Quebec (JBACE 2007). Climate change will affect ecosystems, plants, animals, forests, and water resources and will therefore affect Cree subsistence activities, social organization, and development aspirations. The objective of the research was to record the Cree perspective on climate change. This is important because the Cree have very detailed knowledge of the land and are able to observe change at the local level that escapes the scientific observations that are more global in nature. More specifically, the research indented to identify locally observed climatic impacts in Eeyou Istchee, and defining local problems

and challenges; enable co-production of knowledge based on Cree and "Western" perspectives; examine several specific issues of concern including, among others: how travel for hunting, fishing and trapping is and will be affected (with a focus on ice); and, understanding the potential impacts of climate change on food security in Eeyou Istchee due to its consequences on subsistence harvesting; and finally identify climate change impacts and possible solutions.

MODERN TREATIES IN QUEBEC AND THE EEYOU MARINE REGION LAND CLAIMS AGREEMENT

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The presentation will start with an overview of the modern treaties in Quebec and then focus on the Eeyou Marine Region Land Claims Agreement and related prtection regime for the environment and wildlife management.

PROPOSED TAWICH (MARINE) PROTECTED AREA: AN UPDATE AND PROSPECTUS

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We review the development, over the past ten years, of ideas for a regional marine protected area in eastern James Bay. It has grown from modest beginnings at the community of Wemindji to an inter-community initiative involving at least three, and perhaps all five, coastal Cree communities of the Eeyou Marine Region. A partnership between local and regional Cree leadership and university researchers has identified a set of principles to guide this development: 1. environmental protection consistent with Cree knowledge and values; 2. Cree hunting, fishing and trapping as essential components of protected ecosystems; 3. protected area management according to customary tenure institutions; 4. priority protection for areas of high ecological and cultural value; 5. no high-impact industrial development activities in protected areas; 6. opportunities for Cree-operated low-impact economic development such as eco-tourism and cultural tourism; 7. connectivity between terrestrial and marine protected areas; 8. sustained knowledge co-production between holders of Cree knowledge, university researchers and government agency scientists for protection and enhancement of Cree lands and waters; and 9. overarching attention to 'miyuupimaatsiiun,' living well, within a total community of life, 'pimaatsiiun.' We review some unique and key ecological and cultural priorities for protection in eastern James Bay: waterfowl, fish, marine mammals and their habitats; and we review research accomplished to date toward the rationale and design of a marine protected area or areas. Finally, we consider the intergovernmental relations involved in establishing a Tawich protected area, together with the suitability of models for marine protection available in federal and provincial legislation as well as international rubrics.

100 YEARS (AND MORE) OF SCIENCE AND SOCIAL SCIENCE IN THE EMR

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This presentation traces a history of research in the EMR and its social and political contexts. It is a history that extends back to the earliest explorer-entrepreneurs. James Bay region was long seen as a "blank space" on the map of Canadian research, despite the numerous government sponsored expeditions had set out periodically to name, map, and report on it. As the land and sea became more accessible to southerner travelers and prospects for resource extraction became more immediate, earlier studies were deemed insufficient to meet the requirements of new proposals. More inventories and studies were therefore commissioned, a process that has occurred repeatedly: new data for new understandings are required each time the contexts change. A review of the literature on James Bay from many disciplines laid the groundwork for this presentation along with conversations about research with Crees and other scientists. The goal is an overview rather than a truly comprehensive review for there is surprising quantity of published material. The overview points not only to gaps in the research, but also to the impacts of research, and these too are worth considering today. The story of James Bay research offers insights into changing relationships between Crees and academic researchers, perspectives on changes in scientific approaches, and into broader ongoing Cree, Quebecois, Canadian, and international relations.

SALTWATER INTRUSION IN THE BAIE DE RUPERT

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Hydro-Québec commissioned the Rupert diversion, the Eastmain-1-A and Sarcelle powerhouses from 2009 to 2012. The purpose of this follow-up is to validate the changes anticipated during Environmental Impact Assessment (EIA) covering salinity in the Baie de Rupert and at the mouth of the Rivière Pontax and water levels in the bay and Rivière Rupert estuary. The follow-up of saltwater intrusion was carried out during winter and summer 2010. Fixed instruments were put in place to continuously record salinity, current on the bottom and at the surface at four locations in the east and west channels, between Île Stag and Stag Rock. Vertical profiles were also taken in the water column to measure temperature, salinity and current. Traditional Cree knowledge was collected through interviews with users of the Rivière Pontax and through discussions with Cree members of the survey team. Our 2010 results demonstrate that after diversion, limits of the freshwater-saltwater interface in open water moved about 5 km upstream, this change is estimated and predicted in the EIA. In the presence of ice cover, saltwater penetration is very limited and is similar to baseline conditions. At the mouth of the Rivière Pontax, saltwater intrusion events in open water were episodic and depended entirely on the interaction between spring tide and prevailing westerly winds. No saltwater was observed under the ice cover during baseline or post-diversion study years. These results adequately reflect the predictions presented in the EIS. Traditional knowledge collected in 2010 gave us indications on how the Crees of Waskaganish determined the salinity of the water and the activities they carried out at the mouth of the Rivière Pontax. In open water, levels in the Baie de Rupert were similar before and after diversion. The 2010 follow-up study found no evidence of the Rupert diversion having any effect on water levels in the bay, which is in keeping with the findings of the EIA. At Waskaganish, we observed a mean lower water level in the Rivière Rupert estuary of about 0.10 m to 0.15 m and about 0.30 m at low tide in comparison to the two baseline years. These results correspond to predictions made using the model developed for the EIA.

THE PELAGIC MARINE ECOSYSTEM OF THE HUDSON BAY / JAMES BAY REGION

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This presentation will provide a brief overview of published data and new information on the pelagic marine ecosystem of Hudson/James Bay marine region. It will focus on the small organisms that form the base of the planktonic food web and sustain the production of harvestable resources. Owing to their short lifespans and high growth rates, these organisms respond fast to variability, seasonality, perturbations or change in the physical environment, thus providing useful indicators of ecosystem state. Available observations imply that the James Bay/Hudson Bay marine region harbors strong north-south and longitudinal gradients in biological productivity. Images acquired by orbiting satellites indicate that the southeast sector of Hudson Bay and the eastern half of James Bay are hotspots of primary production that conspicuously stand out amidst the very low overall productivity of the Canadian Arctic. The productivity of these hotspots also seems to be increasing. Plausible drivers of spatial and temporal differences in marine productivity will be discussed. Beyond the first level of the food web, which is amenable to remote sensing, there is little published information on the structure and function of the lower food web, including the biodiversity of pelagic and benthic organisms as well as the carrying capacity of the region in terms of harvestable resources. The presentation will conclude with a consideration of possible research questions and approaches that would help narrowing the scientific knowledge gap and better anticipate the outcome of natural and man-made pressures on the marine environment.

ABSTRACTS - POSTER PRESENTATIONS

THE CEN NETWORK OF ARCTIC OBSERVING STATIONS AND A NEW JOURNAL FOR DATA DISSEMINATION: NORDICANA D

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The Centre for Northern Studies (CEN – Centre d'études nordiques) studies geosystems and ecosystems (terrestrial, freshwater and coastal) in the changing Arctic. The CEN Network is composed of 9 research stations and 80 automated climate stations, and extends across a 3500 km gradient of ecozones, from boreal forest to extreme polar desert environments in the Canadian High Arctic. Established over many years through close collaborations with aboriginals, government agencies, and universities, the Network has been a key element in developing formal accords with other nations for joint research activities. The CEN Network is a substantive and unique contribution by Canada to the pan-Arctic SAON initiative, particularly with its insertion into the circumpolar program INTERACT (http://www.eu-interact.org/), and collaborations via ADAPT (http://www.cen.ulaval.ca/adapt/) and PAGE21 (www.page21.org). To archive and disseminate environmental data from this network and from other Arctic research and monitoring activities, CEN has established Nordicana D (http://www.cen.ulaval.ca/nordicanad/), a formatted, peer-reviewed, online data journal series. Produced only in electronic form, the raw data and derived values (daily, month and annual means) are freely and openly accessible. Each issue is indexed via an assigned Digital Object Identifier (DOI), is cross-referenced in Polar Data Catalogue (www.polardata.ca), and contains extensive metadata, photographic documentation and citation details.

EELGRASS (ZOSTERA MARINA L.) AND ECOSYSTEM STATES: THE IMPORTANCE OF FACILITATION IN EELGRASS COMMUNITIES

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According to both Cree and scientific knowledge, eelgrass (Zostera marina L.; or shiikaapaashkw in Cree) beds along the northeastern coast of James Bay declined drastically in 1998 and areas affected by disturbance are slow to recover. Although dense eelgrass beds still occur in a few bays, many eelgrass beds are patchy and covered with epiphytes. The cause of this decline is still under discussion and many potential causes have been put forward. Concomitant with the observed eelgrass decline, Cree hunters have also witnessed a dramatic decrease in the abundance of Canada Goose (Branta Canadensis interior; in Cree, nisk) and Brant (B. Bernicla hrota; in Cree, iiwaapuwaau). Interactions between organisms play a pivotal role in structuring eelgrass communities. From the Crees' perspective, eelgrass relies on bird activity, notably Brant, to propagate and grow just as birds are dependent on eelgrass as a food resource during migration. This view closely parallels science's notion of facilitation. Facilitation has been defined as encounters between organisms that benefit at least one of the participants and cause harm to neither. Direct facilitation takes place when organisms modify a habitat in a manner that makes it more hospitable for other individuals or species. Indirect facilitation takes place when organisms remove predators or competitors of other individuals or species. This collaborative research aims to use scientific knowledge and Cree traditional ecological knowledge as distinctive, yet complementary sources of information to understand how food web in eelgrass communities affect ecosystem stability, including their potential to resist switches among habitat states. This collaborative research will generate scientific knowledge that has the potential to enhance coastal restoration, conservation and community-based resource management.

LANDSCAPE MODIFICATIONS BY WEMINDJI CREE HUNTERS IN RESPONSE TO RAPID COASTAL CHANGES

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Our study addresses human agency and adaptive capacity in the context of a James Bay Cree community's response to survival in a highly dynamic coastal environment over a timeframe of several hundred years. Land emergence related to isostatic rebound causes islands to merge with the mainland, wetland areas dry up and significant shifts to occur in the availability of subsistence resources within the lifetime of a Cree hunter. Using an ethnographic approach supplemented by field survey methods, we examine the adaptation of Wemindji Cree to such changes through shifts in local resource harvesting and customary management practices as well as landscape modifications. Our findings indicate that Crees can be highly opportunistic and innovative with respect to the maintenance or creation of suitable harvesting areas for key subsistence and cultural resources, such as geese and fish. This is reflected in major investments of time and energy in, for example, the maintenance of mud dykes to retain suitable wetland habitat or the creation of cut-ways through the trees to influence the flight path of geese and improve harvesting success. Adaptive decision-making is found to be influenced by a complex combination of technological, socio-cultural and environmental changes. In addition to contributing to studies on human impacts and responses to environmental change, our findings have implications for understanding human agency in the context of northern landscapes and as such for management approaches to northern protected areas.

THE GREAT WHALE RIVER ECOSYSTEM: ECOLOGY OF A SUBARCTIC RIVER AND ITS RECEIVING WATERS IN COASTAL HUDSON BAY

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The Great Whale River in subarctic Quebec, Canada, flows 724 km from Lake Saint-Luson through Lake Bienville to the sea at Manitounuk Sound. It is one of the largest rivers surrounding Hudson Bay and delivers large amounts of freshwater into it. Although its ecology has been studied over the last 40 years, there has been no synthesis of this research. The available information is reviewed and synthesized on the following aspects of the Great Whale River and the area of southeastern Hudson Bay influenced by its freshwater plume: (1) distribution of temperature and salinity, water masses, currents, freshwater discharge and ice cover; (2) distribution of oxygen, carbon and nutrients; (3) plankton abundance, biomass, production and assemblages; (4) abundance, production and diversity of the sea ice ecosystem; (5) benthic abundance and diversity; (6) fish abundance, diversity and population dynamics; (7) marine mammal biology and population dynamics; and (8) global warming impacts on freshwater and marine environments. This synthesis may provide an ecological basis for the integrated management of the Great Whale River ecosystem, and for other rivers in the subarctic region.

DYNAMICS AND FUNCTIONS OF SEAGRASSES COMMUNITIES IN THE EEYOU MARINE REGION - WHAT DO WE KNOW AND WHAT SHOULD BE DONE?

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Seagrasses are a unique group of flowering plants that grow in soft-sediments in shallow coastal waters and are key indicator species of coastal ecosystem vitality. Considered as foundation species, seagrasses are associated with areas of high regional resource productivity and provide shelter, protection, feeding and reproduction sites for a diversity of benthic species and fish. Furthermore, seagrasses are a habitat highly frequented by geese which are essential for their diet. This habitat also increases sediment deposition and have strong impact on nutrient cycling. The eastern coast of James Bay harbours extensive subtidal eelgrass (Zostera marina L.) meadows for which scientific knowledge is still poor. In this poster, we will integrate the available information on eelgrass beds in the Eeyou Marine Region, in order to define their current state as a baseline for ongoing observations, and to identify major gaps in current understanding. We will also present a program to assess the dynamics and functions of eelgrass beds as an important

habitat for many species. The creation of a program is needed to increase our understanding of human and climate change impacts on eelgrasses and help developing management and conservation options.

CLIMATE CHANGE IN THE SUB-ARCTIC: APPLYING A FRAMEWORK OF VULNERABILITY TO A JAMES BAY CREE COMMUNITY

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Concerns about the rapid pace of climate change in the Arctic have supported myriad scientific studies that document the human dimensions of that change. At the same time, comparatively less attention has been paid to the effects of climate change on the sub-Arctic. The relative neglect of the sub-Arctic is justified by an assumption that changes in the sub-Arctic differ only in degree from those occurring in the Arctic. By exploring to what extent the approaches and findings applied in the Arctic are appropriate to and relevant for the sub-Arctic, this paper seeks to bolster support for sub-Arctic research. Through a case-study approach, we apply an established Arctic-based framework for understanding human impact and response to climate change - the Community Adaptation and Vulnerability in Arctic Regions (CAVIAR) framework - to a sub-Arctic context. The Cree First Nation of Wemindji in mid-northern Québec has adapted to environmental stochasticity for millennia, but is now experiencing the effects of recent climate change. Using the CAVIAR framework, we identify the vulnerabilities of the Wemindji community to climate change and highlight observations of climate change made at a community level in the sub-Arctic. On the basis of our findings, we call for new directions and approaches to climate change research in the sub-Arctic, which we see as integral to the establishment of more effective policy responses to climate change across Canada's northern regions.

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