MCGILL CHAIR IN NORTHERN RESEARCH: WILDLIFE CONSERVATION AND TRADITIONAL FOOD SECURITY

CHAIRE DE RECHERCHE NORDIQUE SUR LA CONSERVATION DE LA FAUNE ET LA SÉCURITÉ ALIMENTAIRE TRADITIONNELLE

People, land, and wildlife:

resource use compatible with conservation

Peuple, territoire et faune:

utilisation des ressources compatible avec la conservation



THE MCGILL CHAIR IN NORTHERN RESEARCH: WILDLIFE CONSERVATION AND TRADITIONAL FOOD SECURITY

October 2019 - September 2020

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PROGRESS REPORT: YEAR 4

THE MCGILL CHAIR IN NORTHERN RESEARCH: WILDLIFE CONSERVATION AND TRADITIONAL FOOD SECURITY

1. GENERAL OBJECTIVES OF THE CHAIR RESEARCH PROGRAM

Three general objectives of the McGill INQ Chair in Northern Research are to:

- Capitalize on new technologies in wildlife biologging and remote sensing to assess the impacts of resource development and environmental change on northern wildlife and traditional food security.
- 2. Locate and characterize northern research conducted at McGill to foster cross-faculty and inter-disciplinary collaborations within McGill's northern research community and to provide northern exposure to McGill's excellence in sustainability science.
- 3. Enhance McGill's contributions to Institut Nordique du Quebec (INQ).

2. PROGRESS MADE TOWARDS THESE OBJECTIVES FOR THE PERIOD COVERED BY THE REPORT

Objective 1. Capitalize on new technologies in wildlife biologging and remote sensing to assess the impacts of resource development and environmental change on northern wildlife and traditional food security.

In partnership with federal, territorial, provincial, and regional governments, as well as comanagement and Indigenous organizations from across northern Canada, we have continued to conduct a wide variety of document-, data-, and field-based research oriented around key northern wildlife species, which are important to local communities as furbearers and local food sources. In Quebec, the integration of the wildlife and traditional foods research axes is occurring through our research program, entitled *Wildlife, Environmental Change, and Local Indigenous Food Systems (WECLIFS) in Northern Quebec*, focusing on the impacts of climate change on traditional food security in Eeyou Istchee and Nunavik.

Since our last report:

 Through the work of undergraduate, graduate, and postdoctoral studentss, we have initiated, continued, and completed various document-, data-, and field-based research (Table 1).

Table 1. Recent, on-going, and completed student research projects (1 denotes projects initiated since our last report, $^{\circ}$ denotes field work ongoing in this reporting period, $^{\circ}$ indicates projects completed prior to this reporting period).

Research Focus	Region	Collaborating Organization & Community
° Cree Youth traditional food literacy	Eeyou Istchee	CNG, Whapmagoostui
^c Collaborative governance and	Eeyou Istchee	JBACE
cumulative impact assessment		
 Social ecological drivers of wild food systems 	Eeyou Istchee & Nunavik	Ouranos, MFFP
 Lake sturgeon case study of local food system governance 	Eeyou Istchee	CNG, CTA, Ouranos, Nemaska
^c Social-ecological determinants of dietary overlap and distinctiveness	Northern Canada	Ouranos, MFFP
c Northern agriculture knowledge and technology transfer	Northern Canada	Many
° Culturally important plants, climate change, and traditional phenological knowledge	Eeyou Istchee	CNG, CBHSS, Ouranos
^c Economic valuation of local food systems	Nunavut	Ouranos, MFFP
° Economic valuation of local food systems	Eeyou Istchee & Nunavik	Ouranos, MFFP
^c Muskox and caribou habitat interactions	Yukon-NWT North Slope	Many
 Northern furbearer ecology and biologging 	Yukon, NWT	Many
° Beaver expansion and impacts in Nunavik	Nunavik	MFFP, Makivik, LNUK, RNUK, Tasiujaq, Aupaluk, Kuujjuaq
° Remote sensing of beaver activity in Nunavik	Nunavik	Makivik, Ouranos
° Comprehensive coastal habitat research	Eeyou Marine Region	Niskamoon, UQTR, UBC, UNB
ⁱ Moose habitat quality under the	Eeyou Istchee	MFFP, CNG, CTA, CQFB, Oujé-
adapted forestry regime		Bougoumou, Waswanipi, Mistissini
^c Anticipated climate change impacts on key wildlife species	Eeyou Istchee & Nunavik	MFFP, Ouranos
ⁱ Polar bear ecology and monitoring	Eeyou Marine Region	EMRWB

2) We have continued to actively engage and collaborate with organizations with mandates related to health and food security, wildlife and environment, harvest and subsistence economies, and regional governance, environmental protection, and sustainable development to co-develop the research agenda in Eeyou Itschee and Nunavik territories (Figure 1).



Figure 1. Funding and partner organizations involved in the WECLIFS program.

- 3) A major achievement has been the establishment of our WECLIFS research project and McGill-based research team as a centralized and well-connected key resource, initiative, and collaborative opportunity. Evidence of this establishment success includes invited contributions to and support in:
 - Nunavik CIHR project, Understanding the impacts of climate change on Nunavik Inuit Country Food security: An Inuit-led initiative to ensure that the influences of climate change on traditional foods are considered in efforts to address the food security of Nunavik Inuit, funded and ongoing since Jan 2019
 - Polar Knowledge application, New wildlife in Nunavik and their impacts on key country food species, food security and wellness, submitted in May 2019 and decision still pending
 - Nunavik Climate Change workshop, Nov 2019
 - RNUK annual meeting, Nov 2019

- Continued collaboration and renewed funding opportunities with MFFP focused on acquiring and enhancing knowledge of key northern wildlife in local Indigenous food systems in northern Quebec
- New research partnership with MFFP, CQFB, CNG, CTA, and Cree First Nations focused on moose habitat quality under the adapted forest regime in Eeyou Istchee

Objective 2. Locate and characterize northern research conducted at McGill to foster cross-faculty and inter-disciplinary collaborations within McGill's northern research community and to provide northern exposure to McGill's excellence in sustainability science

The McGill Chair in Northern Research has initiated an institution-wide northern research network called McGill North, with the objective to promote, mobilize, and interdisciplinize northern, arctic, and circumpolar research at McGill by organizing networking and training events involving northern researchers across McGill faculties.

Since our last report, we have:

- 1) Maintained the McGill North website and Student Facebook page (121 members) for McGill students and researchers working in northern and Arctic environments to share news, events, ideas, questions, funding resources, and training opportunities.
- 2) Organized and hosted the Fourth Northern Research Day (Jan 2020) attended by around 50 McGill-based and invited researchers, focusing on early career researchers and their leadership in redefining how northern research is conceived, conducted, and communicated. Presentations highlighted new research results generated by early career researchers as well as the training, research, and community engagement initiatives and innovations that advance, challenge, or reject conventional approaches to northern research.
- 3) Allocated McGill North Engagement Grants, in the value of \$13,000, to four McGill researchers to conduct engagement and outreach activities in the North.
- 4) Contributed to large-scale funding opportunities and research initiatives, including an ongoing NSERC ResNet-funded project led by Elena Bennett (Natural Resource Sciences and School of Environment) on applications of ecosystem services to Canadian landscape, including northern environments and an NFRF Transformations proposal with coapplicants Mariam Wallet Aboubakrine (Permanent Forum on Indigenous Issues), Danika Billie Littlechild (Carleton University), and Brenda Parlee (University of Alberta) on Biodiversity Conservation and the Health and Well-being of Indigenous Peoples, which has been selected for full application.
- 5) Contributed, <u>as co-Research director</u>, to the NCE-funded Canadian Mountain Network, a research, training, and knowledge mobilization initiative supporting the resilience and health of Canada's mountain peoples and places through partnerships based on Indigenous and Western ways of knowing that inform decision-making and action.

Objective 3. Enhance McGill's contributions to Institut Nordique du Quebec (INQ)

As McGill Chair in Northern Research, we have been very active at McGill, the *Institut Nordique* du Québec (INQ), and the broader northern Quebec, northern Canadian, and circumpolar research communities to ensure McGill is well represented at INQ and conversely that INQ is well represented at McGill.

Since our last report, we have:

- 1. Continued to serve, with the other INQ chairs, in the implementation committee and in a working group on sustainable development, ensuring INQ research is relevant and applicable to sustainable development priorities and that there are synergies between the three chairs. Up to now, the group has created a virtual library that contains sustainable development documents (academic articles, chapters, books, strategies) relevant to INQ and its members. In addition, the working group has started an analysis to understand how the INQ research axis address the United Nations Sustainable Development Goals.
- 2. Engaged McGill researchers in calls for funding application and research events led by INQ and Sentinel Nord.
- 3. Promoted McGill student involvement and leadership in INQ training activites, such as webinars, Northern Days, the MOOC Northern Quebec: Issues, Spaces And Cultures, and the Summer School Introduction to Northern Research and Issues.
- 4. Contributed as collaborator on a successful Sentinel Nord 2020-2023 proposal led by Frédéric Maps and Mélanie Lemire (ULaval), with a transdisciplinary team of five co-investigators, 10 collaborators, and 10 research partners, entitled Sustainable and resilient country food systems for future generations of Nunavimmiut promoting food security while adapting to changing northern environments.

3. RESEARCH TEAM

Through our new research program, Wildlife, environmental change, and local Indigenous food systems (WECLIFS), co-led by Murray Humphries, Treena Wasonti:io Delormier, and Gordon Hickey, we have actively engaged and collaborated with many research partners (Table 1 and Figure 1).

As in the previous year, coordination of research activities conducted by the McGill Chair in Northern Research has been led by Ms. Manuelle Landry-Cuerrier, who also serves as the coordinator of the *WECLIFS* project and has coordinated outreach activities conducted by the McGill Chair in Northern Research, including McGill North activities.

Other central members of the research team are the students, post-doctoral fellows (PDF), technicians, research professionals indicated in Section 4 (Table 2) and the organizations indicated in Table 1 and Figure 1.

4. RECRUITMENT AND TRAINING

Through out the duration of the McGill Chair, we have recruited, trained, and worked with 14 undergraduate students, 2 MSc students, 8 PhD students, 4 post-doctoral fellows (PDF), 6 field technicians, and 4 research professionals (Table 2).

Table 2. List of students, post-doctoral fellows (PDF), technicians, research professionals supervised by the McGill Chair in Northern Research

Name	Status	Period	
Gwyneth MacMillan	PDF	Sep 2019-present	
Eleanor Stern	MSc	Sep 2020-present	
Alexandra Langwieder	MSc	Sep 2020-present	
Richard Boivin	BSc	Jan 2020-present	
Kaitlyn Courchesne	BSc	Oct 2019-present	
Lisa Wang	BSc	Jul 2020-present	
Pascale Ropars	PDF	Jan 2019-Mar 2020	
Mikhaela Neelin	MSc	Sep 2018-present	
Allison Ford	PhD	Sep 2018-present	
Tian Qi Che	MSc	Sep 2018-Sep 2020	
Christine Ha	PhD	Sep 2018-present	
Rose Séguin	MSc	Sep 2018-Sep 2020	
John Godfrey	BSc visiting	May 2019-Aug 2019	
Vanessa Caron	MSc visiting	May 2019-present	
Filip Rakic	BSc	Sep 2018-Jan 2020	
Kata Kuhnert	BSc	Sep 2018-Apr 2019	
Nathan Badry	PhD	Jun 2018-present	
Nathalie Chéhab	BSc	Mar 2018-Aug 2018	
Emily Charry Tissier	Professional	Mar 2018-Mar 2019	
Hekia Bodwitch	PDF	Feb 2018-Sep 2019	
Anne Kirsten Bowser	Professional	Jan 2018-present	
Laurence Carter	MSc	Jan 2018-Sep 2020	
Noah Israel	Technician	Jan 2018-Apr 2018	
Heather Sterling	Technician	Jan 2018-Apr 2018	
Roxanne Tremblay	BSc	Jun 2017-present	
Sereena Moore	BSc	Oct 2016-Jan2020	
Joanna Griffin	BSc	Nov 2016-Aug 2018	
Katelyn Depot	BSc	Sep 2017-Aug 2018	
Alec Robitaille	BSc	May 2016-Jul 2017	
Juliana Balluffi-Fry	BSc	Oct 2015-Aug 2017	
Gabrielle Rimok	BSc	Oct 2016-Apr 2017	
Dylan Yaffy	BSc	May 2015-Aug 2016	
Shannon Whelan	Technician	Nov 2016-Jan 2017	
Claire Hoffmann	Technician	Nov 2016-Mar 2017	
Hannes Schraft	Technician	Nov 2016-Jan 2017	
Joël Potié	MSc	Sep 2015-Sep 2019	

Bertrand Charry	MSc	Jan 2015-May 2018
Duncan Warltier	PhD	Sep 2016-present
Jeremy Brammer	PDF	Jul 2016-Dec 2017
Emily Studd	PhD	Jan 2014-Jan 2020
Allyson Menzies	PhD	Sep 2014-present
Melanie Leblanc	PhD	Jan 2014-present
Xavier Giroux-Bougard	PhD	Jan 2015-present
Manuelle Landry-Cuerrier	Professional	Nov 2008-present
Beatriz Osorio	Professional	Jul 2018-Mar 2019

5. COLLABORATION WITH PARTNERS

As indicated in Table 1 and in Figure 1, the McGill Chair has teamed up and collaborated actively with numerous research partners in northern Quebec, including organizations involved in health and food security (e.g. Cree Board of Health and Social Services, Nunavik Regional Board of Health and Social Services, Crown-Indigenous Relations and Northern Affairs Canada), wildlife harvest and subsistence economies (e.g., Cree Trappers Association, Nunavik Hunters, Fishermen and Trappers Association (R/LNUKs), Ministère des Forêts, de la Faune et des Parcs du Québec), and regional governance, environmental protection, and sustainable development (e.g., Cree Nation Government, Makivik, Kativik Regional Government, Eeyou Marine Region Wildlife Board, Nunavik Marine Region Wildlife Board, Société du Plan Nord, JBACE).

Furthermore, the alignment of the McGill Chair with the NSERC ResNet *Network for Monitoring, Modeling, and Managing Canada's Ecosystem Services for Sustainability and Resilience* and the NCE Canadian Mountain Network broadens the McGill Chair collaborative network to multiple organizations, which are serving as collaborators, steering committee members, and internship hosts of the graduate students being trained through these networks.

6. THE ADDED VALUE IN THE CONTEXT OF THE CREATION OF THE INQ

The creation of INQ has added value to the research program of the McGill Chair in Northern Research and, more broadly, to northern research at McGill, by providing a platform for transdisciplinary and intersectoral collaborations oriented around northern research and its contributions to sustainable development. The profile offered by INQ's funding and promotion of the McGill Chair in Northern Research has created opportunities for the Chair to engage with various organizations and research partners. From this engagement, the WECLIFS project has emerged as an unprecedented, large scale, and well-funded opportunity for truly interdisciplinary and community co-developed research on traditional food systems in Northern Quebec. The INQ has helped to ensure that McGill's excellence in sustainability science will contribute to the sustainable development of northern Quebec and that the substantial northern

research expertise offered by ULaval and INRS is better synergized with McGill researchers and organizations.

Through INQ supported engagement and knowledge exchange activities, the Chair has identified an interest and need for training specifically designed for professionals and representatives of indigenous organizations with mandates related to wildlife, environment, and land management in Eeyou Istchee. The Chair has partnered with Cree Trappers' Association (CTA) and Eeyou Marine Region Wildlife Board (EMRWB), with funding support from Apatisiiwin Skills Development, to provide training in Fish and Wildlife Science to one Liaison officer and five Eeyou Marine Region officers, representing the coastal Cree communities of Waskaganish, Eastmain, Wemindji, Chisasibi, and Whapmagoostui. This 120-hour training program consisting of a series of five training modules developed for community fish, wildlife, and environmental professionals with lived experience on the land and inter-generational local knowledge, seeking to enhance their scientific competencies related to fish, wildlife, and environmental research. Last winter, for Module 1, trainees came to Montreal and visited laboratories and museums, while for Module 2 in Val-d'Or, they learned about applied techniques for population monitoring and modelling using different computer-based programs. We are hoping to deliver Module 3 and 4 in Eeyou Marine Region in Waskaganish and Module 5 at McGill (Covid delayed).

7. DISSEMINATION OF RESULTS AND KNOWLEDGE OR TECHNOLOGY TRANSFER

Peer-reviewed Publications (since last report)

- Brammer, J.R., A.K. Menzies, L. Carter, X. Giroux-Bougard, M. Landry-Cuerrier, M.-L. Leblanc, M.N. Neelin, S. Perillat-Amedee, E.K. Studd, D. Warltier, M.M. Humphries. In Review. Weighing the importance of animal body size in traditional food security. *FACETS*.
- Warltier D.W., M. Landry-Cuerrier, M.M. Humphries. In Review. Valuation of country food in Nunavut based on energy and protein replacement. *Arctic*.
- Menzies, A.K., E.K. Studd, Y.N. Majchrzak, M.J.L. Peers, S. Boutin, B. Dantzer, J.E. Lane, A.G. McAdam, M.M. Humphries. 2020. Body temperature, heart rate, and activity patterns of two boreal homeotherms in winter: homeostasis, allostasis, and ecological coexistence. *Functional Ecology* 34(11), 2292-2301.
- Charry, B., M. Marcoux, J.A. Cardille, X. Giroux-Bougard, M.M. Humphries. 2020. Hierarchical classification of narwhal subpopulations using social distance. *Journal of Wildlife Management* 84(2):311-319.
- Tremblay, R., M. Landry-Cuerrier, M.M. Humphries. 2020. Culture and the social-ecology of local food use by Indigenous communities. *Ecology and Society* 25(2):8 doi.org/10.5751/ES-11542-250208.
- Studd, E.K., A.K. Menzies, E.R. Siracusa, B. Dantzer, J.E. Lane, A.G. McAdam, S. Boutin, M.M. Humphries. 2020. Optimisation of energetic and reproductive gains explains behavioural responses to environmental variation across seasons and years. *Ecology Letters* 23(5):841-850.

- Humphries, M.M., H.E. Milligan, J. Samson. 2020. Wemindji mammals in ecological space and time. *In* The Science and Politics of Protected Area Creation: Striking the Balance. M. Mulrennan, C. Scott, K. Scott (eds.). UBC Press.
- Cooley, D., H. Clarke, S. Graupe, M. Landry-Cuerrier, T. Lantz, H. Milligan, T. Pretzlaw, G. Larocque, M. Humphries. 2019. The seasonality of a migratory moose population in northern Yukon. *Alces* 55:105-130.

Conference Presentations (since last report)

- Humphries, M., M. Landry-Cuerrier, and R. Tremblay. Culture and the social-ecology of local food use by Indigenous communities. ArcticNet Annual Scientific Meeting. Halifax, Nova Scotia. December 2-5, 2019.
- Warltier, D., M. Landry-Cuerrier, and M. Humphries. A novel wild food valuation framework using local retail replacement costs in Nunavut. ArcticNet Annual Scientific Meeting. Halifax, Nova Scotia. December 2-5, 2019.
- Neelin, M.N.. Communication strategies for effective adaptation to new wildlife in Nunavik. ArcticNet Annual Scientific Meeting. Halifax, Nova Scotia. December 2-5, 2019.
- Neelin, M.N.. Impacts of beaver expansion in Nunavik. ArcticNet Annual Scientific Meeting. Halifax, Nova Scotia. December 2-5, 2019.
- Neelin, M.N.. Impacts of beaver expansion in Nunavik. QCBS Symposium. Montreal, Quebec. December 18-20, 2019.
- Neelin, M.N.. Impacts of beaver expansion in Nunavik. McGill North 4th Northern Research Day. Montreal, Quebec. January 24, 2020.
- Warltier, D., M. Landry-Cuerrier, and M. Humphries. A novel wild food valuation framework using local retail replacement costs in Nunavut. McGill North 4th Northern Research Day. Montreal, Quebec. January 24, 2020.

Invited Presentations (*since last report)

- Humphries, M.. Wildlife, Environmental Change, & Local Indigenous Food Systems in northern Quebec. Nunavik Climate Change workshop, Kuujjuuaq, Quebec. November, 2020.
- Ropars, P.. Impacts of climate change on traditional food system and food security. Nunavik Climate Change workshop, Kuujjuuaq, Quebec. November, 2020.

8. FINANCIAL INFORMATION

As indicated in the third progress report, in the third year of the Chair (July, 2018 – June, 2019), expenses totaled \$35,985 for **research** activities, \$50,328 for **outreach**, **networking**, **and knowledge mobilization** activities, \$9,915.92 for **salary stipend**, and \$22,802.18 for **teaching release**. There was no balance carried over into the fourth year.

For the period of October 1, 2019 to September 30, 2020, which was extended to September 30, 2021, the total funding available to the McGill Chair in Northern Research is \$66,666, divided into 3 components:

- 1. \$35,000 for the Chair **research** activities
- 2. \$21,666 for outreach, networking, and knowledge mobilization activities
- 3. \$10,000 for salary stipend related to the Chair appointment

In the fourth year (Oct. 1, 2019-Sep. 30, 2020), expenses related to the Chair **research** activities included only graduate and undergraduate research assistant salaries and benefits (\$11,013.67) and graduate student stipends (\$4,500), while expenses related to the Chair **outreach**, **networking**, **and knowledge mobilization** activities included only research assistant salary and benefits (\$3,765.07). The Chair received \$9,459.01 in **salary stipend** related to the Chair appointment. Expenses incurred over the fourth year of the Chair and balance carry-over into the fifth year are summarized in Table 3.

Table 3. Summary of expenditure related to research activities in the fourth year (October 1, 2019 to September 30, 2020) of the Chair and balance carry-over into the fifth year (October 1, 2020 to September 30, 2021)

	Outreach, networking, and knowledge mobilization	Salary stipend	Research activities	Total
TOTAL FUNDS AVAILABLE	\$21,666.00	\$10,000.00	\$35,000.00	\$66,666.00
Expenditures				
Salaries and benefits - Master's	\$0.00	\$0.00	\$0.00	\$0.00
Salaries and benefits - Postdoc	\$0.00	\$0.00	\$0.00	\$0.00
Salaries and benefits - Research Assistants/Project Coordinators	\$3,704.07	\$9,459.01	\$11,013.67	\$24,176.75
Student bursary	\$0.00	\$0.00	\$4,500.00	\$4,500.00
Materials and Supplies	\$0.00	\$0.00	\$0.00	\$0.00
Professional and technical services/contracts	\$0.00	\$0.00	\$0.00	\$0.00
Repairs and maintenance	\$0.00	\$0.00	\$0.00	\$0.00
Honorarium/guest lecturers	\$0.00	\$0.00	\$0.00	\$0.00
Travel	\$61.00	\$0.00	\$0.00	\$61.00
Telecommunication	\$0.00	\$0.00	\$5.10	\$5.10
TOTAL EXPENDITURES	\$3,765.07	\$9,459.01	\$15,518.77	\$28,742.85
Closing Totals				
UNEXPENDED BALANCE @ September 30, 2020	\$17,900.93	\$540.99	\$19,481.2 3	\$37,923.15

Unexpended balances are high due to the Covid situation and to McGill delays in getting these funds accessible to the Chair. We expect all carried over balances to be spent in the fifth year, mainly through student stipends and northern engagement grants.

9. DEMONSTRATED SYNERGY, NETWORKING AND STRUCTURING EFFECT BETWEEN THE THREE INQ CHAIRS

The three INQ chairs (Humphries-McGill, Rodon-Laval, Raymond-INRS) are all members of the INQ sustainable development working group and of the INQ implementation committee. Examining how research can best contribute to sustainable development, and the priorities of local communities, provides an important conceptual and practical intersection for the diverse research programs pursued by the three chairs (centred in wildlife biology, political ecology, and renewable energy).

Beyond these collective efforts, the McGill Chair has promoted student involvement and leadership in training activities, conferences, and other networking opportunities, serving as point of contact between INQ chair students.