The ***Boreal Bulletin***
Ducks Unlimited Canada – Quebec region

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Ducks Unlimited Canada
Conserving Canada's Wetlands

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Summary

Introduction

A communication tool: the *Boreal Bulletin* of Ducks Unlimited Canada (DUC) – Quebec region, of which you are reading the third issue, has been created to inform all partners and collaborators about the progress of DUC-Q R&D and conservation projects in forest-dominated landscapes. Feel free to walk around the *Boreal Bulletin* to your colleagues. Enjoy the reading!

Members of the **Boreal team** for Ducks Unlimited - Quebec region are: Marcel Darveau, RPF, Ph.D. biol. (head); Geneviève Meunier, geogr., M. ATDR; Geneviève Courchesne, biol., M.Sc. student, Université Laval (UL)-DUC; Natalie James, M.Sc. student, McGill University-DUC; Julie Labbé, biol., M.Sc. student, Université du Québec, Abitibi-Témiscamingue region (UQAT)-DUC; Marie-Hélène Ouellet d'Amours, biol., M.Sc. student, UQAT-DUC; Christian Roy, biol., M.Sc., Ph.D student, Université Laval-DUC; Michelle Addy, B.Sc. honours, UL.

The Boreal team also relies on many collaborators and partners from academic, governmental, and private sectors. We do not list their names here, but they are systematically underlined and acknowledged in all our oral and written publications.

Main ongoing projects

Axis 1 : Academic Research

Wetland habitats regionalization in Quebec forest landscapes – Sylvain Ménard has completed his master's thesis at UQAT in December 2007. In January 2008 he has submitted a manuscript to the scientific journal *Wetlands:* Ménard, S., M. Darveau & L. Imbeau (UQAT). Identification of wetland landscape types in forested regions: the case of boreal Quebec, Canada. A revised version of this manuscript has been submitted in September 2008 and then the Editor asked us to provide further explanations in the beginning of 2009.

Waterfowl breeding habitat in Quebec forested landscapes – Louis-Vincent Lemelin has completed his master's degree at UQAT in November 2007. His thesis mainly consists of two scientific paper manuscripts. One has been published in December 2007: Lemelin, L.V., L. Imbeau, M. Darveau & D. Bordage. 2007. Local, Short-term Effects of Forest Harvesting on Breeding Waterfowl and Common Loon in Forest-Dominated Landscapes of Quebec. Avian Conservation and Ecology 2(2): article 10 (online). The other one has been submitted to Wetlands on December 27th, 2008. Following

a first review, the Editor suggested some changes and we just sent a revised version of the manuscript (Lemelin, L.V., M. Darveau, L. Imbeau [UQAT] & D. Bordage [Canadian Wildlife Service, CWS]. Wetland use and selection by breeding waterbirds in the boreal forest of Quebec, Canada).

Composition, structure, and productivity of riparian boreal forests – Catherine Landry, M.Sc. student in forest science (UL and DUC), has begun her project in 2005. It involved fieldwork at Lake Duparquet Research and Teaching Forest, in Abitibi, and in the Manic 5 area, in the Manicouagan region. Using statistical techniques for ecological boundary detection, Catherine has measured the mean width of forested and non-forested riparian strips edging lakes and stream shorelines in the study area. Catherine plans to submit her thesis in December 2009.

Modelling beaver habitat use at the landscape scale in the Quebec forest – Julie Labbé's M.Sc. research project (UQAT and DUC) started in September 2007. It aims at understanding spatial distribution of beaver dams in Quebec forested landscapes. Following the beaver dams regional abundance cartography, beaver dam chain density (per 25 km²) has been modeled using habitat data extracted from forest inventory maps. Results showed that mean stream gradient was the first factor influencing dam building, followed by habitat factors related to beaver foraging. Indeed, at this landscape scale, particularly in the northern regions of the study area, habitat use by beaver was mainly influenced by foraging factors. Julie has submitted her thesis for revision in September 2009.

Modelling waterfowl nesting habitat in Quebec forested landscapes – Marie-Hélène Ouellet D'Amours started her M.Sc. research project (UQAT and DUC) in May 2007, following the results from a previous study on waterfowl nesting habitat (Lemelin 2007, M.Sc. thesis). This project aims at assessing the effects of other types of habitat alterations on nesting waterfowl abundance, such as road networks, buildings, surface waters' acidity, reservoirs, as well as habitat modifications caused by beavers. The models will also include fish communities, which is a factor extensively documented as influencing waterfowl abundance. The study area covers over 280,000 km^2 and is surveyed since 1990 by the Black Duck Joint Venture and the Canadian Wildlife Service. Marie-Hélène will submit her thesis for revision in November 2009.

Modelling riparian forest use by cavity-nesting ducks in the eastern boreal forest of North America – Christian Roy's Ph.D. research project (UL and DUC), started in September 2008, aims at four objectives: (1) to investigate the population dynamics of beaver and its impact on goldeneye and bufflehead populations, (2) to characterize the spatiotemporal trends of goldeneye and bufflehead populations in the boreal forest, (3) to investigate habitat selection by goldeneyes and bufflehead in the northern Clay belt of Quebec and Ontario; and (4) to model the impact of different strategies of riparian buffer strip management on goldeneyes, bufflehead and beaver habitat. Christian' s research proposal was submitted and accepted in October 2009. Christian is currently working on chapters 1-2 of his thesis.

Modelling potential climate-induced changes in wetland plant distributions in Quebec – In her M.Sc. research, initiated in January 2009, Natalie James (McGill University and DUC) aims to develop a predictive model of suitable climate-space for selected wetland plants species, and to project the potential changes in the geographic extent of the suitable climate-space in response to future climate change scenarios. Natalie has compiled a list of approximately 55 wetland plants to model which represent the biological diversity of wetland vegetation in Quebec and which have sufficient data to support the requirements of the models. She has begun running preliminary models using the BIOMOD framework powered by interpolated weather station data and climate model simulations provided by OURANOS. The next step will be to refine these models by integrating edaphic data.

Factors affecting plant community composition of marshes managed for waterfowl in southern Québec – Geneviève Courchesne's M.Sc. research project (UL and DUC) which started in January 2009, aims at a better understanding of the plant diversity and dynamics of enhanced wetlands in order to manage them more adequately. Vegetation sampling was performed this summer in nearly thirty inland marshes enhanced by DUC in the Eastern Townships, Montérégie, Chaudière-

Appalaches and Lanaudière regions. A total of 291 plots have been sampled to characterize vegetation composition and structure. The next step of the project will be to obtain historical data of marsh enhancement (age of the enhancement, previous uses of the site, size of the marsh and landscape setting) that will be linked with the vegetation data. The beginning of statistical analysis is planned for January 2010.

Axis 2 : Development of integrative conservation tools

Wetland mapping and waterfowl abundance modelling in Quebec forested landscapes – In April 2008, a project aimed at mapping wetlands and potential waterfowl abundance in Quebec forested landscapes (south of 51st degree of latitude north) has been initiated. The project aims at two deliverables: (1) cartographic wetland inventory derived from forestry maps and (2) predictive abundance maps for the eight dominant waterfowl species in the study area, based on predictive waterfowl-habitat statistical models. The two geomatic products are completed and will be published at the end of November 2009. A technical report describing wetland mapping methodology and providing statistics on their regional abundance is in preparation. As to waterfowl models, a scientific manuscript will be submitted soon to The Journal of Wildlife Management: L.V. Lemelin, T. Yerkes (Ducks Unlimited Inc [DUI]), M. Darveau, J.M. Coluccy [DUI], and D. Bordage [CWS]. Predicted Breeding Waterfowl Distribution in Boreal Forest, Québec, Canada. Finally, a Web tool allowing the public to access the maps has been developed by three students in geomatic sciences at Université de Sherbrooke and we foresee to implement it on a DUC map server.

Breeding waterfowl distribution in the Quebec taiga – An atlas of the waterfowl breeding between the 51st and 58th degrees of latitude north has been published in 2009 following the initial work of the late Alisa Guérette Montminy. Data came from the waterfowl breeding population and habitat survey, produced by the U.S. Fish and Wildlife Service (USFWS) since 1990 in Quebec and from other surveys conducted in the study area, but on smaller areas by Quebec-Hydro and its partners. Nicole Barker, who will begin a Ph.D. in January 2009, will give some continuation to this work through a project aimed at modelling waterfowl temporal and spatial trends, distribution, and habitat in the Canadian boreal forest.

Axis 3 : Conservation and management

International Boreal Conservation Campaign – DUC boreal team actively participates to this campaign with the Canadian Boreal Initiative (CBI) and several other partners who signed the Boreal Forest Conservation Framework (2003). In May 2007, more than 1,500 scientists worldwide called for the protection of the boreal forest and the implementation of the framework. In Quebec, following a commitment by Prime Minister Jean Charest to protect at least 50 percent of northern Quebec, a Quebec campaign (*Gardons le Nord!*) was initiated by the Pew Environnement Group, CBI, and several other organizations. DUC, which wants to collaborate with Charest's government to protect at least 50% of northern Quebec, is involved in the campaign, particularly through the science committee. In September 2009, a letter signed by more than 500 scientists has been sent to Prime Minister Charest to reiterate the support by the scientists and remind the necessity of science-based conservation and development planning.

DUC strategic plan for conserving Quebec boreal wetlands – The boreal team is currently updating its wetland conservation program for the Quebec boreal forest (5-year strategic plan). In order to define our objectives and strategies, we interview researchers and professionals to get their general opinion on the situation of boreal wetlands as well as on different conservation approaches. We would like to thank everybody that answered our survey and/or referred us to colleagues. A preliminary version of the strategic plan is expected for December 2009.

Hydrosystems and protected areas – Since its beginning in 2003, the Quebec boreal team has been focusing on the protection of freshwater ecosystems in Quebec, in relation with the Quebec

Strategy on Protected Areas. One scientific paper and two technical reports have been published; they addressed the applicability of the coarse filter concept in conservation planning, and then used coarse filter approaches to identify watersheds of high conservation value for aquatic and wetland ecosystems. In December 2007, a scientific paper has been submitted to VertigO, an online journal (L.V. Lemelin, F. Gervais et M. Darveau. MS. Y a-t-il une place pour les bassins versants dans les aires protégées au Québec?) This paper, that is still (sic!) under review, demonstrates that the protection of watersheds is incomplete and unevenly distributed across the province of Quebec. Currently, the few large (>1,000 km²) protected watersheds are only located in the northern half of the province. The ecosystems located in the lower sections of watersheds, such as river floodplains, could entail a loss of their ecological integrity.

Freshwater, wetland and riparian ecosystems of the Forêt Montmorency: description, ecological issues, and zoning approach – The Forêt Montmorency is a 67-km² territory managed by Université Laval as a teaching, demonstration and research forest. DUC has proposed its expertise to the Forêt Montmorency project in order to develop a management approach inspired from the triad, including the classification and cartography of its freshwater, wetland and riparian ecosystems based on numerical forest maps. A Réserve de biodiversité projetée de la Forêt-Montmorency has been established and it now includes several freshwater, wetland and riparian ecosystems; some others could become High conservation value forests within the FSC certification process (*Forest Stewardship Council*). A conservation agreement is also being planned for this purpose. For more information about this project, see the technical report (available in French only).

Aquatic, wetland, and riparian ecosystem zoning at the Lake Duparquet Research and Teaching Forest (FERLD). – The FERLD, managed by the UQAT and the UQAM (Université du Québec à Montréal), is currently developing an innovative ecosystem management approach. DUC shares its expertise with the FERLD in contributing to the management plan for the aquatic, wetland, and riparian ecosystems. Last August, we presented the results of this project at the *5th North American Duck Symposium and Workshop (NADS5)* in Toronto. Some results have also been used to make an interpretive sign on beavers installed last summer along a hiking trail close to the FERLD research station headquarters. The preliminary version of the report (G. Meunier, M.C. LeBlanc, M. Darveau, C.M. Bouchard [UQAT] et L. Imbeau [UQAT]. Les milieux d'eau profonde, humides et forestiers riverains de la Forêt d'enseignement et de recherche du lac Duparquet) is still under revision. The final report should be published in November 2009.

Recent publications

Note: In the last six months, all our publications consisted in oral and poster presentations at scientific conferences. Most of the Abstracts of these presentations are accessible online on conference websites. The posters are available directly from authors.

James, N., M. Darveau & S. de Blois. 2009. Predicting the spatial distribution of suitable conditions for wetland plant species in response to climate change. (Poster presentation at the ISEM [International Society for Ecological Modelling] 2009 Conference, 6-9 October 2009, Quebec, Canada.

Darveau, M. 2009. Is the Eastern Boreal Forest a Low Priority Habitat for Waterfowl? (Invited oral presentation at the 5th North American Duck Symposium, 17-21 August 2009, Toronto, Canada).

Ouellet D'Amours, M.H., L. Imbeau, M. Darveau & D. Bordage. 2009. What is Currently Driving Nesting Waterfowl Abundance in the Eastern Canadian Forest: Natural or Human-driven Processes? (Oral presentation at the 5th North American Duck Symposium, 17-21 August 2009, Toronto, Canada).

Labbé, J., M. Darveau & L. Imbeau. 2009. Factors Affecting Landscape-scale Abundance of Beaver Dams in Forested Québec. (Poster presentation at the 5th North American Duck Symposium, 17-21 August 2009, Toronto, Canada).

Lemelin, L.V., T. Yerkes, M. Darveau, J.M. Coluccy, D. Bordage & M.C. LeBlanc. 2009. Mapping

Wetlands and Predicted Breeding Waterfowl Abundance in Quebec Forests. (Poster presentation at the 5th North American Duck Symposium, 17-21 August 2009, Toronto, Canada).

Meunier, G., M.C. LeBlanc, M. Darveau & L. Imbeau. 2009. How Can We Take into Account Waterfowl Habitat in Forest Management Plans in the Boreal? The Case of Duparquet Forest, Quebec. (Poster presentation at the 5th North American Duck Symposium, 17-21 August 2009, Toronto, Canada).

Roy, C., S.G. Cumming & M. Darveau. 2009. Spatial Trends of Bufflehead Populations. (Poster presentation at the 5th North American Duck Symposium, 17-21 August 2009, Toronto, Canada).

Calendar

On November 29th, 2009, Natalie James will present her M.Sc. research proposal at the Department of plant science at McGill University.

From November 10-13, 2009, Natalie James and Marcel Darveau will attend the 3rd Annual Effects of Climate Change on Quebec Biodiversity (CC-Bio) Colloquia in Montreal. Natalie will present her progress to the partners of the project whereas Marcel will present about DUC and climate change.

From November 13-15, 2009, Christian Roy will participate to the 34th annual meeting of the Société québécoise pour l'Étude biologique du comportement, to be held in Trois-Rivières. He is preparing a poster presentation about spatio-temporal population trends in the bufflehead across the Canadian boreal forest.

On November 20th, 2009, Marie-Hélène Ouellet-D'Amours will present her M.Sc. seminar at the Université du Québec en Abitibi-Témiscamingue.

The International Symposium on Responsible Peatland Management and Growing Media Production will be held in Quebec City from June 13-17, 2011.

The *Boreal Bulletin*, published twice a year, is distributed to all the collaborators and the partners of the boreal program of Ducks Unlimited Canada – Quebec region.

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