

# RESEARCH HIGHLIGHTS

June 2006

**NIGHT STRIKE 2006 – FREEDOM OF FLIGHT  
AEROSPACE CONFERENCE AND EXHIBITION  
HAPPY VALLEY- GOOSE BAY  
12-14 SEPTEMBER 2006**

During the past year, the steering committee for the Freedom of Flight Conference merged its efforts with those of the Shephard Group who had been secured by Serco to organize a conference to update participants on the latest developments in night strike platforms, sensors and weapons. Shephard Group is an event organizing company and a leader in the international aerospace and defence markets.

This prestigious conference and exhibition will showcase the capabilities and facilities available at 5 Wing Goose Bay and will be the first of its kind in the Province of Newfoundland and Labrador. In conjunction with this conference and exhibition, the Department of National Defence has planned a pre-conference workshop to be held on September 12 to brief potential clients for Exercise Night Strike, a two-week international air combat exercise to be held for the first time at 5 Wing Goose Bay in September 2007.

**12 September - Exercise Night Strike  
Planning Workshop**

The Canadian Air Force has designed a new, large-force tactical night flying exercise dedicated to conventional strike operations that will meet the dynamic training requirements of today's air forces. In preparation for a major multi-national training exercise, the Canadian Air Force is holding a day-long exercise planning workshop in Goose Bay on September 12, 2006. The workshop will bring together representatives of nations planning to participate in Exercise Night Strike 2007 to learn more about the exercise plan. This workshop is open to representatives from exercise participants and to nations who are considering participation. Also invited are nations considering requesting observer status at the exercise.

<i>Inside this issue:</i>	
Aerospace Conference	1-2
Joir River Caribou	3
Ecology of three caribou ecotypes	4-5-6
Economic Development Director	6
IEMR Staff	6
Contact Information	6



## NIGHT STRIKE 2006 – FREEDOM OF FLIGHT AEROSPACE CONFERENCE AND EXHIBITION (CONT'D)

### 12 September - Conference Welcome Reception

All delegates, VIPs, and guests are invited to a relaxed and informal reception to meet and greet before the conference starts. This reception is being held at Bentley's Sports Bar and is the ideal place to unwind from the days events.

### 13-14 September - Night Strike 2006

Night Strike 2006 aims to bring delegates up to date on the latest developments in night strike platforms, sensors and weapons, and to consider how to best maintain the combat edge in night operational capability. Main conference sessions will include:

- The Operational Requirement for Night Strike Capability
- Recent Experience in Night Strike Operations
- Developments in Night Strike Platforms and Sensors
- Night Strike Weapons of Choice
- Meeting the Night Strike Training and Exercise Requirement
- Briefing on Future Goose Bay Facilities

### 13 September Evening Events

#### **Official Cocktail Reception - 5pm**

The first day will culminate with a cocktail reception to be held at the main exhibition hall and is a great place to network and discuss the issues of the day.

#### **VIP Dinner - 7pm**

Hosted at the Canuck Club, the VIP Dinner will close the day's proceedings and will provide a forum for invited guests to discuss the day's main issues. Attendance at the dinner is strictly by invitation only.

### 14 September Freedom of Flight

The objective of the Freedom of Flight sessions is to highlight the community's numerous military and commercial aviation opportunities. Organizers will showcase the facilities and support infrastructure available for military training, commercial aviation, and aerospace. Over the coming weeks presentation abstracts and updated speaker information will be provided at the conference website ([www.night-strike.net](http://www.night-strike.net)).

net). The Freedom of Flight agenda will be facilitated by Dr. Ron Sparkes, Director of Memorial University's Labrador Institute, and will feature presentations from a distinguished panel of guest speakers including:

#### Human Resources

- **John MacLennan**

Union of National Defence Employees

- **Patrick White**

Gander Flight Training Centre

- **Brian Tobin**

College of the North Atlantic

#### Industry and Aerospace

- **Derek Scott**

Provincial Aerospace

- **Spencer Fraser**

Meggitt Defence

- **Iain Glenn**

UVS Canada

#### Community and Aerospace

- **Richard Garson**

Halifax International Airport Authority

- **Paul Shelley, MHA**

Minister of Human Resources, Labour and Employment  
Minister Responsible for Labrador Affairs

**Information on any of the sessions associated with**

**Night Strike 06 Freedom of Flight**

**Conference and Exhibition**

**can be obtained at**

**[www.night-strike.net](http://www.night-strike.net)**

**or from the local Coordinator's office in Goose Bay**

**at [coordinator@goosebayaerospace.com](mailto:coordinator@goosebayaerospace.com)**

**or 709-896-4469**

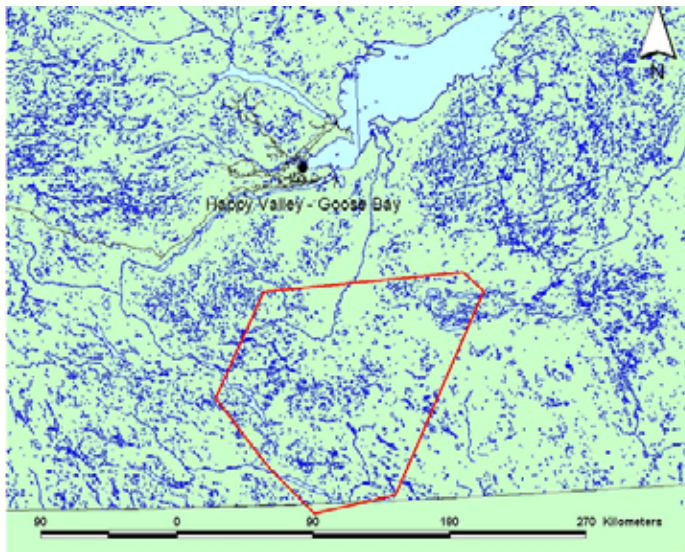
**As space is limited, you are encouraged to register early.**

## JOIR RIVER CARIBOU POPULATION

**Rebecca Jeffery**

Department of Environment and Conservation, Government of Newfoundland and Labrador

In 2000, a small group of woodland caribou were located in the Joir River area of southern Labrador during a study of the Low Level Training Area (LLTA). The little studied Joir River Caribou (JRC) occurred outside of the known ranges of the other woodland caribou herds; the Lac Joseph, Mealy Mountain and Red Wine Caribou Herds. This raised the question: are the JRC part of an existing herd, or are they a separate population? As there was very little known about these animals, which occur within the LLTA, it became very important to determine the range and movement of these animals.



To try and address this question, the Department of National Defence (DND) purchased three satellite collars for the JRC. With the Wildlife Division (WD), one was deployed in 2002 and two were deployed in 2004. The data generated by the collars indicated that although some Joir River animals were near Red Wine Caribou range, the JRC did not seem to overlap with Red Wine Caribou.

In March 2005, 48 animals were identified in this area, a much larger group than previously realized. As part of a large collaring effort in April 2005, five more satellite collars were added to the population. The additional data indicate that there may be some mixing

between the JRC and the Mealy Mountain Caribou Herd. In the fall of 2005, a collared JRC travelled northwest and spent several weeks in an area with two collared Mealy Mountain Caribou. Movements at this time of the year could indicate that there could be some breeding between the populations.

During the 2006 winter season, DND and WD deployed an additional two satellite collars. As there are concerns associated with animals living within military training areas, the IEMR was interested in monitoring the movements of the JRC as well. Therefore, the IEMR purchased and with the WD deployed two newly developed satellite/GPS hybrid collars on JRC in April 2006. These collars record daily GPS locations in addition to the satellite locations and transmit them via satellite. This will give a much greater resolution to the data being received and will allow monitoring of much smaller movements.

Despite being a protected population, there was a considerable amount of caribou hunting in southern Labrador this winter. Unfortunately, one of the animals collared in 2005 was shot. This means there are currently nine satellite collars and two hybrid collars on the JRC. The data provided by the collars will have to be analysed to determine the range of these animals and if there is further mixing with other populations. Furthermore, a population estimate needs to be completed as well as a classification to determine the productivity of the population.



## ECOLOGY OF THREE CARIBOU ECOTYPES

**Serge Couturier**

Ministère des Ressources naturelles et de la Faune, Gouvernement du Québec

**Robert Otto**

Department of Environment and Conservation, Government of Newfoundland and Labrador

When the Institute for Environmental Monitoring and Research (IEMR), in which we are honoured to be involved, was established, caribou was identified as the most important animal resource to be protected in the context of military activities. Caribou users and managers could appreciate the cultural, social, and economic significance of this species for the Nord-du-Québec region and Labrador. All agreed that caribou should be placed on the IEMR's list of subjects of primary interest. Despite the research efforts of managers and universities, several aspects of caribou ecology remained poorly understood, and that impeded conservation efforts targeted at the various populations. For example, it was becoming difficult to determine the effects of military activities on caribou because the database on the ecology of the herds was incomplete. A caribou research program was therefore carried out with the participation of the following partners: Government of Quebec, Government of Newfoundland and Labrador, Department of National Defence, Hydro-Québec, IEMR, Fondation de la faune du Québec, Université Laval, and Caribou Québec. That research program could not have been completed without the personal involvement of Steeve D. Côté, Marylène Boulet, Jean Huot, Shane P. Mahoney, Robert B. Weladji, Glenn Luther, and Louis Bernatchez. Some of the results of that research program will be presented below, but first, a few aspects of caribou ecology need to be described.

Caribou are found from the boreal forest through the taiga and the tundra, up to the Arctic Archipelago. This species has had to adapt to very different habitats, and as a result, it has become the most variable of all the cervids. In view of the profound ecological differences that existed between the various caribou populations, biologists came up with the concept of ecotypes to describe them more effectively. They identified the migratory ecotype, which applied to the large populations making spectacular migrations between the taiga and the tundra. The sedentary ecotype referred to small caribou populations that lived in the boreal forest year-round and traveled only short distances. The montane ecotype was used to better describe populations living in the high mountains.

The need to use ecotypes for caribou conservation is another unique characteristic of this type of cervid. However, for the general public, the caribou ecotypes are all the same, and a caribou is still a caribou. Yet if we take a closer look, we realize that they are so different that conservation efforts are greatly complicated. Indeed, it is sometimes hard to carry out intensive harvesting activities aimed at reducing large overabundant populations of migratory caribou while engaging in absolute protection actions targeting precarious



populations of sedentary or montane caribou. In this context, where scarcity often goes hand in hand with abundance, it becomes difficult for the public to understand the objectives of caribou conservation. In a region such as James Bay or Labrador, where migratory and sedentary caribou frequent the same areas, the situation is even more ambiguous and can lead to unfortunate situations if the harvest does not address the population targeted by managers. It therefore becomes important to gain a better understanding of the ecological differences between the caribou ecotypes in order to be able to explain the conservation issues.

In the context of protecting caribou from anthropic impacts, such as military activities or energy development, some may question the relevance of protecting a few dozen or a few hundred sedentary caribou such as those in the Jamésie, Lac Joseph, Mealy Mountains, and Red Wine Mountains herds, when more than a million migratory caribou (Couturier et al. 2004) visit the same region every winter. In order to be able

## ECOLOGY OF THREE CARIBOU ECOTYPES (CONT'D)

to answer this crucial question, we must have adequate scientific knowledge. One of the objectives of our research program was to investigate the variations in the genetics, space use, and physical condition across three caribou ecotypes in seven distinct populations: George River, Leaf River, Tornгат, Jamésie, Lac Joseph, Red Wine Mountains, and Mealy Mountains.

The results of our study of the genetics and space use of caribou were published in Boulet et al. (2005)<sup>a</sup>. That study showed that the George River and Leaf River migratory herds were not genetically different from each other but were genetically different from the four sedentary populations studied (Jamésie, Lac Joseph, Mealy Mountains, Red Wine Mountains), which confirms the genetic differences between the ecotypes as observed by Courtois et al. (2003). The Tornгат montane herd was not different from the George River and Leaf River migratory herds, but it was different from the four sedentary populations. Exchanges of genes and individuals between the two migratory herds were documented with the help of genetic analysis and satellite telemetry. In fact, we showed that there were overlaps in the ranges used during the breeding season in October, which explains the possible exchange of genes between the two herds. Our study also documented that females were not absolutely philopatric to calving grounds and that some individuals had changed herds temporarily or permanently. As a result, one female who had calved for four years on the George River calving grounds then calved for the next four years with the Leaf River females, nearly 1,000 km to the northwest. Emigration between the two herds was clearly asymmetrical, and it was mainly individuals from the George River herd that emigrated to join the ranks of the Leaf River herd, which would probably explain some of this herd's rapid growth (Couturier et al. 2004). That was the first time the exchange of both genes and individuals between the caribou herds had been documented so precisely (see Boulet et al. 2005).

In a study that is about to be published, we did an analysis of the body size of adults from the same seven populations in an effort to determine whether genetic characteristics and movement rates were reflected in caribou morphology. In a bidimensional graph that resulted from a factorial analysis of morphological variables, we obtained a clear differentiation between the three ecotypes. Our study showed that the migratory ecotype is currently smaller than



the sedentary ecotype, whereas the montane ecotype holds an intermediate position on the body size and shape graph. The differences in the size of adults inversely reflect the differences observed in the movement rates of ecotypes and populations. The caribou of the Leaf River herd, which has the highest movement rate, has the smallest body size, whereas the caribou of the Lac Joseph herd, which moves around the least, grows to the largest size.

The size of the adults varies over time and responds to factors related to population demographics and environmental factors such as climate. The body size of the George River herd caribou, as estimated by mandible length, decreased between the 1960s and the late 1980s, after which it increased again in the 1990s. Mandible length in the Leaf River herd also decreased as the population grew in the

1990s. Adult body size therefore varies according to the size of the herds, although it appears that movement rate has a major impact as well. The movement rate (km/day) of the George River herd declined between 1986 and 2003, whereas that of the Leaf River herd rose between 1993 and 2003. The Leaf River herd moves around more than the George River herd, and the body size of its individuals is smaller. The movement rate of sedentary caribou is much lower, while that of montane caribou falls between the other two ecotypes, reflecting the differences in body size.

In another component of our research program that was recently published in Couturier et al. (2006), we examined the causes of variations in fawn mass in the two migratory herds on the basis of data gathered over more than 25 years. Our study showed that fawns become lighter when the herd approaches its historical peak. We also showed that fawn mass is positively influenced by summer habitat quality, as estimated by the satellite index known as the Normalized Difference Vegetation Index (NDVI) and by the continental climate estimated by the North Atlantic Oscillation (NAO) index. Furthermore, fawn mass is negatively influenced by snow fall, hot July temperatures (harassment by insects?), and the herd's movement rate. Fawn mass at birth is correlated to population recruitment, not only the following fall, but also three and four years later, which suggests a delayed quality effect mechanism. The larger fawns would produce adults of better quality three or four years later, which would improve recruitment.

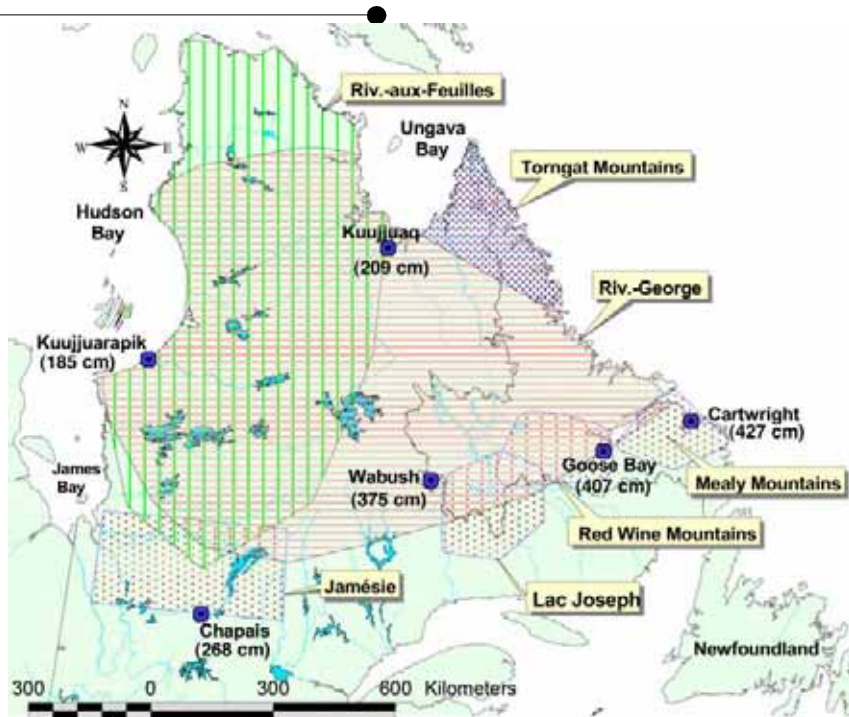


Figure 1. Québec-Labrador Peninsula map showing the annual ranges of migratory George River caribou herd (horizontal shading, from 1991 to 2003), migratory Leaf River herd (vertical shading, from 1993 to 2003), four sedentary herds (Mealy Mountains, Red Wine Mountains, Lac Joseph, and Jamésie), and montane Torngat herd. Snowfall averages (cm, Nov.-April) from 1962 to 2002 are shown under the weather station name.

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### CONT'D

Fawn mass monitoring could become a management tool for migratory caribou populations in North America.

Our results suggest that the two migratory herds form a metapopulation but that they are relatively isolated from the sedentary ecotype with which, however, they share a portion of the wintering grounds. The results of this research program carried out in collaboration with several partners will be used in the management and conservation of caribou populations. This new information will be added to the database on this world-class natural resource, which will be facing a growing number of anthropic impacts in a changing environment and climate.

<sup>a</sup> The documents cited in this text can be obtained upon request from the first author listed ([serge.couturier@fapaq.gouv.qc.ca](mailto:serge.couturier@fapaq.gouv.qc.ca)).

### TOWN OF HAPPY VALLEY GOOSE BAY NEW ECONOMIC DEVELOPMENT DIRECTOR

**BETTY COLLINS-MENNE** grew up and spent her entire life in Happy Valley-Goose Bay. She has had ample opportunities to leave but chooses to stay; her heart and soul belongs to Labrador. Her education consists of a two year Secretarial Science program at Cabot Institute of Applied Arts and Technology, and a two year Paralegal program at Keyin Technical Institute. Betty's previous employment was of a seven year duration with Wells Fargo Financial Canada, where she managed two branches one in Happy Valley-Goose Bay and the other located in Labrador City. Betty took on the entry level position of customer service representative with Wells Fargo Financial Canada formally known as Trans Canada Credit and over a period of less than two years she worked her way up through the ranks and became manager; making history within the company as one of the fastest employees to do so. She and her husband Jeff Menne have 3 beautiful daughters, Amber age 15, Jade age 10, and Kearley age 2. Betty has accepted the position of Economic Development Director with the Town of Happy Valley-Goose Bay effective May 18, 2006.

### Research Highlights

Information for this issue of Research Highlights was compiled by Institute staff. If you have any comments or if you have information you would like to see included, please contact the Institute's office.