INSTITUTE FOR ENVIRONMENTAL MONITORING AND RESEARCH

RESEARCH HIGHLIGHTS

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SUPERSONIC NOISE DISTURBANCE AND WATERFOWL BEHAVIOR

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Program Overview

During 2004, the IEMR and DND initiated investigations of the potential effects of supersonic flight training on environmental components, including wildlife, aquatic habitat, and slope stabilities. During this time, Minaskuat and the IEMR designed a study to learn how individual waterfowl respond during supersonic noise events (sonic booms). Representatives from the IEMR, Labrador Inuit Association (LIA), the Innu Nation, the Métis Nation and the Mamit Innuat, all participated as field observers during this study.

Prior to the start of the Supersonic Trials in July 2004, three observation stations were established in areas of known high waterfowl concentrations, near Naskaupi and Seal Lakes [approximately 100 km northwest of Happy Valley-Goose Bay and within the 130,000 km^2 Low-Level Training Area (LLTA)]. During field observations, individual waterfowl were monitored continuously over a 5-minute period. Activities such as feeding, resting, alert, flight, diving, vocalization, and swimming, were recorded using a spotting scope, binoculars, and video camera. Control observations (no jet activity) took place on 16 July and supersonic trials occurred on 19 July. Supersonic flights occurred along pre-determined flight paths, at 15,000 and 10,000 feet above ground level (agl). Responses of waterfowl (*e.g.* prolonged agitation, wing flapping, flight response, and/or displacement from the area) to sonic boom events were (cont'd pg 2)

Inside this issue:

CF-18 pilot and flight engineer who participated in this study.

SUPERSONIC NOISE DISTURBANCE AND WATERFOWL BEHAVIOR (CONT'D)

documented, in addition to resultant noise and overpressures. Temperature, precipitation, and wind speed/direction data were also gathered using a solar-powered weather station, positioned on the Naskaupi River, south-east of the observation locations.

Research Findings

During the study, a total of seven sonic booms were generated, over an approximate 2-hour period. At speeds of 1.26-1.27 times the speed of sound (Mach speed) and at altitudes of approximately 15,000 feet agl., peak sound levels of 137.2 dB were recorded. At 10,000 feet agl., peak sound levels of 137.3 dB were recorded (Mach speed 1.27-1.29). Six species of waterfowl were observed throughout the study, with three species observed during one or more sonic booms. While other factors may affect waterfowl behaviour, such as time of day, weather parameters, and the presence of a predator, the following general points summarized our observations of waterfowl reactions to these supersonic trials (note, however, that most information is based on observations of Mergansers):

1) As a result of the supersonic activity, waterfowl significantly changed their behaviour from resting or feeding to locomotion and/or flushing from the area.

2) Reactions were immediate, and often caused flushing/diving (flightless birds) or flight from the area.

3) Reactions of some waterfowl, Mergansers in particular, appeared to increase with each boom event during short intervals (< 5 minutes), indicating a sensitization (heightened response) to supersonic activity.

4) Reactions were temporary, with birds returning to normal behaviour within 5 minutes.

5) Strategies may be put in place to prevent or minimize potential effects (e.g. restrict supersonic training activities to areas of low waterfowl density), consistent with the precautionary principle.

Weather Wizard set-up along the Naskaupi River, Labrador.

Final Note

Research regarding the effects of supersonic flight (sonic booms) on waterfowl in their natural habitat has been limited (R. Kull, personal communication). This study was therefore important in developing an understanding of the reactions of waterfowl for the future design of environmental effects monitoring related research.

References

Kull, R. Parsons, Norfolk, Virginia. Personal communication.

CARIBOU RECOVERY TEAM

Isabelle Schmelzer, Ph.D.
Government of Newfoundland and Labrador

On August 3, 2004 Environment and Conservation Minister Tom Osborne released a recovery strategy for three boreal woodland caribou herds in Labrador. In releasing the strategy Minister Osborne said government is committed to the conservation and protection of the province's species that are at risk. The Lac Joseph, Red Wine Mountain, and Mealy Mountain caribou herds were listed as 'Threatened' under the Endangered Species Act in July 2002. This status means that these herds are likely to become endangered if they continue to decline, and if none of the factors limiting their population growth are addressed. These 3 herds occur in a continuum across central Labrador and north-eastern Québec (see map), and are bounded to the north by the migratory George River caribou herd. Herd range adjacencies and the absence of topographical barriers between the herds result in range overlap.

The majority of the caribou in Labrador belong to the George River Caribou herd, a 'migratory' ecotype (a population adapted to living in a different environment or landscape, in this case the tundra). Migratory caribou travel thousands of kilometres per year and aggregate onto calving grounds during spring. In contrast, less than 3500 'sedentary' caribou remain in Labrador. Caribou belonging to the sedentary ecotype remain within the same general area in the boreal forest throughout the year, are relatively solitary, and disperse during calving. Each sedentary herd has declined substantially over the past 30 years, and thus are not distributed as widely as they once were throughout their ranges. While they behave very differently, both types of caribou look very similar.

During the winter, migratory forest-tundra caribou enter the northern portion of all three southern herds and the animals from different herds become mixed together. As a result, some threatened sedentary caribou are accidentally killed during the legal hunt of the George River caribou. Unfortunately, threatened caribou from all three herds are also illegally hunted each year. Consequently, mortality of adult caribou is one of the most significant factors limiting the recovery, and contributing to the decline, of these herds. Other threats include habitat loss or change as a result of hydro-electric and mineral development, and commercial forestry; disturbance (such as low-level-flying); weather and climate conditions such as snow depth and ice cover, and predation. Most threats are interdependent and differ in terms of their relative historical and current impact on the herds.

Despite these threats however, there are some positive signs that the herds could recover. Regular monitoring suggests that the recruitment rates (the proportion of caribou calves that survive to adulthood) and calving rates (the percentage of female caribou that give birth to a calf each year) in the Lac Joseph and Red Wine Mountain herds are high enough to allow the population(s) to grow, even in the face of current amounts of predation by wolves and bears. Additionally, large portions of the herd's historical ranges remain intact and could provide habitats for the herds as they recover. However, while these signs are encouraging, their effects will not be realized unless mortality of adult caribou due to hunting ceases.

A Recovery team consisting of wildlife biologists, representatives from aboriginal organi-

(cont'd page 4)

CARIBOU RECOVERY (CONT'D)

zations, resource managers, researchers and other stakeholders was formed to develop a recovery strategy outlining the goals and objectives of recovery, and how they are to be achieved, for each threatened herd. The primary goal of the recovery strategy is to outline a course of action that will prevent the extinction of these herds and promote recovery such that each herd is a self-sustaining wild population distributed throughout their available habitat. To this end, four main approaches are outlined in the document: stewardship and education, habitat protection, research and monitoring, and management and protection. The Strategy also summarizes actions that are currently taking place in support of recovery, and describes the approach that will be used to identify critical habitat. A detailed action plan outlining specific steps, their priority and their costs is currently being developed by the recovery team, and will be released by July 2006.

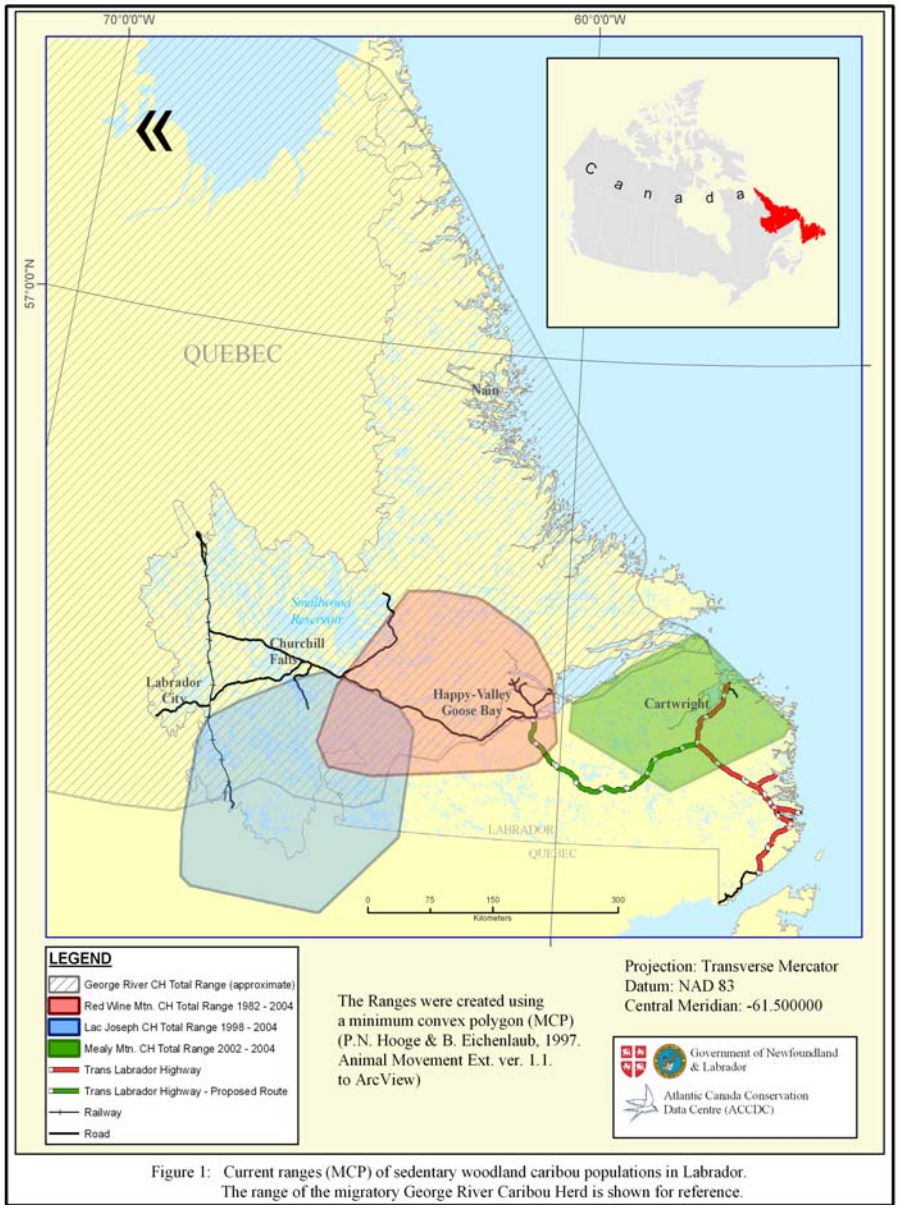

Figure 1: Current ranges (MCP) of sedentary woodland caribou populations in Labrador. The range of the migratory George River Caribou Herd is shown for reference.

The recovery strategy can be obtained from the Department of Environment and Conservation website at www.gov.nl.ca/env/wildlife/wildlife_at_risk.htm .

JET AIRCRAFT EFFECTS ON NESTING CANADA GEESE (BRANTA CANADENSIS)

Karen Gosse and Perry Trimper (Minaskuat)

Introduction

Disturbances resulting from low-flying military aircraft have the potential to influence waterfowl behaviour and habitat use. To date, population studies in Labrador have not detected an effect from this activity on waterfowl (Chaulk and Turner 2000, 2001, 2002; Turner and Hicks 2002). This indicates that a strong reaction by nesting Canada geese (*Branta canadensis*) to military noise disturbances is unlikely. Nevertheless, DND, in consultation with the Canadian Wildlife Service (CWS), agreed to place exclusion zones to low-level flying around locations with relatively high numbers of nesting Canada Geese.

Typical of the study area: Canada Goose nesting on a small island within a large wetland complex.

This study, a combined effort between the IEMR, DND, and the CWS, was one of the first controlled experiments in the wilderness that addressed the issues related to the potential and the degree of disturbance to nesting Canada Geese. Specifically, this study addressed whether the imposed exclusion zones are required, and whether there were any potential impacts of low-level flying to waterfowl during the critical incubation period.

Field Program

Five active nests were located in three wetland areas near Lac Mercier and the Kenamu River, for a total of 15 nests. Each area was studied for a period of two days between 11-16 June 2004 - one day with no military aircraft activity and one day when military aircraft were encouraged to fly over the nesting areas. Note that the study area is also located en route to the Practice Target Area, and was thus expected to result in a greater number of aircraft flying over the area.

Observers monitored each nest using a video camera, binoculars/spotting scope, and hand-held sound level meter. Observers recorded the total time when incubation was not occurring, and when the nest was 'unprotected' by an adult (>20 m from the nest). Aircraft noise events were recorded in terms of aircraft type, direction, maximum sound level (L_1), noise event duration, and the average sound level over the course of the noise event (L_{eq}). The study team recorded all noise levels and approximate distances of aircraft from each nest under observation, including random noise levels in the absence of any aircraft.

Research Findings

A total of 88 military aircraft flights were recorded over 98 hours of observation at the 15 nests. Peak sound levels of 97.5 dB were recorded but varied depending on nest location, location of aircraft in relation to the nest, and wind speed and direction. One or both adults were generally present at or near (<20m) the nest throughout observations. However, the study team did record periods of up to 2 hours when the female had left the nest, leaving eggs exposed to the relatively cold air temperatures. Such exposures were observed only in response to predators and/or the presence of a helicopter. In addition, eggs were only exposed during an overflight when the pair had initially flushed from the nest due to helicopter disturbance.

The following points summarize the results of this study:

1) The most observable response was on two occasions when 2-10 minutes after an aircraft overflight,

(cont'd pg 6)

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2004 PHOTO CONTEST WINNERS

The results have been tabulated, and the winners of the 2004 IEMR Photo Contest have been determined.

1st Place Richard Cayouette
Protection de la faune,
Chibougamau, QC
Photo: Rivière Brodback

2nd Place Kristy Osmond
Student, College of the North Atlantic
Happy Valley - Goose Bay
Photo: Snowshoe Hare

3rd Place Leroy Metcalfe
Land and Resource Manager Officer
Labrador Inuit Association
Happy Valley – Goose Bay
Photo: Nachvak Fjord

Thank you to those companies who provided prizes for this contest and to all of those who entered photos.

CANADA GEESE (CONT'D)

the nesting female stood in the nest to rotate the eggs. It is possible that these reactions may have been related to an aircraft event, however the same activity had been observed in the absence of any aircraft. No other notable reactions to low-flying aircraft were noted.

2) The greatest time spent off the nest, with eggs left exposed to predators and cold temperatures, related to helicopter disturbance. This was despite attempts to distance helicopter landing areas as far as possible from nests during drop-off/pick-up of field observers.

3) The presence of predators resulted in a change in behaviour of the nesting geese. Predators observed in this study included Bald Eagle (*Haliaetus leucocephalus*) and other Canada Goose. However, the greatest change in behaviour was observed when red (*Vulpes vulpes*) or silver (*Vulpes fulvus)* fox approached a nest.

4) The study team believes that if a stronger reaction to aircraft had been observed, the frequency of naturally occurring threats, such as predation, could result in a more significant effect.

References

Chaulk, K. and Turner, B. 2000. Waterfowl use of spring staging areas in the eastern portion of the low-level flight training area of Labrador and Quebec. Report prepared for PMO Goose Bay, National Defense Headquarters, Ottawa, Ontario. 27 pp + Appendices.

Chaulk, K. and Turner, B. 2001. Waterfowl use of spring staging areas in the western and central portion of the low-level flight training area of Labrador and Quebec. Report prepared for PMO Goose Bay, National Defense Headquarters, Ottawa, Ontario. 17 pp + Appendices.

Chaulk, K. and Turner, B. 2002. Waterfowl use of spring staging areas in the south-western portion of the low-level flight training area of Labrador and Quebec. Report prepared for PMO Goose Bay, National Defense Headquarters, Ottawa, Ontario. 13 pp + Appendices.

Turner, B. and Hicks, A. 2002. Breeding population trends of waterfowl in the Labrador low level flight training area. Report prepared for PMO Goose Bay, National Defense Headquarters, Ottawa, Ontario. 30 pp + Appendices.

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Research Highlights

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