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Short-Term Impacts of Low-Level Jet Fighter Training on Caribou in Labrador

FRED H. HARRINGTON[1] and ALASDAIR M. VEITCH[2]

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ABSTRACT. The short-term impacts on caribou (*Rangifer tarandus*) of low-level jet fighter training activity at Canadian Forces Base Goose Bay (Labrador) were investigated during the 1986-88 training seasons (April-October). Visual observations of low-level (30 m agl) jet overpasses indicated an initial startle response but otherwise brief overt reaction by woodland caribou on late-winter alpine tundra habitat. Between 1986 and 1988, daily effects of jet overflights were monitored on 10 caribou equipped with satellite-tracked radiocollars, which provided daily indices of activity and movement. Half the animals were exposed to jet overflights; the other 5 caribou were avoided during training exercises and therefore served as control animals. In 1988, the control caribou were from a population that had never been overflown. Level of exposure to low-level flying within the exposed population did not significantly affect daily activity levels or distance travelled, although comparison with the unexposed population did suggest potential effects. The results indicate that significant impacts of low-level overflights can be minimized through a program of avoidance.

Key words: caribou (*Rangifer tarandus*), low-level flying, jet aircraft, helicopters, disturbance, activity, movements, Labrador

RÉSUMÉ. Durant les mois de la saison d'entraînement (d'avril à octobre), de 1986 à 1988, on a étudié les retombées à court terme sur le caribou (*Rangifer tarandus*) de l'entraînement à basse altitude des avions de combat à la base des Forces Armées canadiennes de Goose Bay au Labrador. Des observations visuelles du vol des avions à réaction à basse altitude (à 30 m du sol) ont indiqué que, vers la fin de l'hiver, dans son habitat de toundra alpine, le caribou des bois avait une réaction initiale de surprise, nettement perceptible mais qui ne durait pas. Entre 1986 et 1988, on a surveillé les effets quotidiens du vol des avions sur 10 caribous équipés de colliers-radios suivis par satellite, qui fournissaient quotidiennement des indices de l'activité et du déplacement des animaux. La moitié de ces derniers étaient exposés au vol des avions, les cinq autres étant évités à dessein au cours de l'entraînement pour pouvoir servir d'animaux témoins. En 1988, les caribous témoins provenaient d'un groupe qui n'avait jamais été survolé. Le niveau d'exposition aux vols à basse altitude n'a pas affecté de façon significative le niveau d'activité ou la distance parcourue quotidiennement par la population exposée aux vols, bien qu'une comparaison avec la population non exposée aux vols ait laissé entrevoir des effets potentiels. Les résultats indiquent que des retombées significatives de vols à basse altitude peuvent être minimisées si l'on adopte un programme visant à éviter les animaux.

Mots clés: caribou (*Rangifer tarandus*), vol à basse altitude, avion à réaction, hélicoptères, perturbation, activité, déplacement, Labrador.

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INTRODUCTION

The continuation and expansion of military low-level flight training activities in northern Canada have increased concern regarding their impact on caribou (*Rangifer tarandus*). Northwest of Goose Bay, Labrador, NATO forces stationed at Canadian Forces Base (CFB) Goose Bay started the present era of low-level jet fighter training in 1981. The number of aircraft flights (sorties) has increased from approximately 1500 in 1981 to over 6000 in 1988 and is projected to reach a maximum of 18 000 per year by 1996.

The potential effects of this training can be conveniently divided into two classes: short-term behavioural responses that indicate the energetic costs and the potential for injury resulting from individual overflights, and long-term population responses that indicate the cumulative effects of overflights on population demographics and habitat use. The impacts of jet aircraft have only been assessed indirectly through the demographics and habitat use patterns of caribou frequently exposed to jet activity (Davis *et al.*, 1985). The short-term effects of jet activity have not been systematically investigated.

The present study was designed to investigate the potential short-term effects of low-level flying activity by fighter-type jet aircraft on caribou. It was hypothesized that disturbance due to low-level flying would be reflected in increased activity levels and by greater daily distances travelled, as animals engaged in escape-related behaviours (running, walking) more frequently following overflights. These effects were measured by watching the behavioural reactions of caribou to low-level overflights and by determining the relationship between an animal's daily exposure to low-level flying activity and its daily movement and activity levels, remotely monitored by satellite telemetry. Our adoption of satellite telemetry — a relatively new technology in wildlife studies (Fancy *et al.*, 1988) — is one of its first applications to remotely monitor caribou behaviour and movements.

STUDY AREA

Within the two areas currently used for low-level training (Fig. 1), flights to within 30 m above ground level (agl) are permitted. Training exercises consist of navigation, evasion and simulated attacks on ground targets, using terrain features to provide cover from radar. Flight speeds are subsonic (typically 775-825 $km \cdot h^{-1}$). The two training areas and CFB Goose Bay are connected by transit corridors, where minimum altitudes of 80 m agl are permitted. The exposure of different sites to low-level flying activity varies substantially within the training areas, ranging from up to 250 flights per month in the southeastern section of the northern low-level training area (LLT1) to fewer than 10 sorties per month in the outer two units.

Our study area included the ranges of three woodland caribou (*R.t.* caribou) populations (Fig. 1). Two small, sedentary populations inhabit the southern portion of the study area. The Red Wine Mountain (RWM) population of about 700 animals inhabits a 23 000 km^2 area, which includes the heavily overflown southern portion of LLT1, as well as range to the south. During winter, most members of the population can be found within LLT1, whereas a portion of the population migrates out of LLT1 prior to calving and remains to the south or west of

[1]Mount Saint Vincent University, Halifax, Nova Scotia, Canada B3M 2J6
[2]Department of Fisheries and Wildlife, University of Minnesota, St. Paul, Minnesota 55108, U.S.A. (present address: Department of Zoology, University of Alberta, Edmonton, Alberta, Canada T6G 2E7)