Institute for Environmental Monitoring and Research, an innovative approach to effective monitoring of EIA recommendations

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by

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Abstract

The Institute was established in 1995 in response to a recommendation by an independent Environmental Assessment Panel appointed to review military flight training activities from the Canadian Forces Base at Goose Bay, Canada. Its purpose is to oversee the environmental effects of Allied flight training conducted over Labrador and north-eastern Quebec, and to conduct effects research on issues raised during the EIA. The Institute is governed by a Board of Directors representing aboriginal and municipal groups having interests in military training activities operated from 5 Wing Goose Bay. The Institute is funded by the Federal Government and it is directed by an independent Chair and non-voting members representing federal and provincial governments. As an advisory body to the Canadian Ministers of Environment and National Defense, the Institute's mandate is to:

- *Focus on the protection of the environment and, within the concept of sustainable development, support the viability of the military flight-training program;*
- *Provide independent verification of environmental effects as well as expertise and advice on structuring adequate monitoring and mitigation measures; and*
- *Foster a level of trust amongst all groups affected by the military training program.*

Over the past six years, the Institute has succeeded in developing with DND and the approval of the Institute board members a comprehensive mitigation program to ensure the protection of the Osprey within the low-level training area.

The EIS indicated a wide distribution of osprey in Labrador with densities varying according to habitat and ecoregions with the highest densities being situated along transmission lines. Although a complete census has not been completed, an annual nest distribution database was maintained since 1994. A review of the data for 1998 showed 287 active nests within the 150,000 km^2 training area. Trends since 1994 indicated that nest activity/occupation appeared relatively consistent with reproductive success peaking every 4-5 years.

In 1994 behavioural studies were initiated to assess reaction to jet aircraft activity and no significant differences were documented before and after overflights. The results of a 1996 study found no relationship between exclusion zone size and reproductive success. In 1997 and 1998, reproductive success was measured by manipulating block treatments in control and treatment areas with no significant differences demonstrated.

The impact of natural factors such as weather, nest stability, predation and human influences such as DDT, military activity, forest harvesting, road construction, and hydroelectric development were collated and analysed in this study.

Conclusions

As a results of the concerns expressed by the aboriginal communities, the EIS indicated that osprey nests within the training area should be protected by a 2.5 nm avoidance criteria; due to the large number of nests this caused some serious problems in terms of delivering the training

program. Following a review of the data which had been collected since 1994, the IEMR board agreed that:

a) *The 2.5 nm avoidance criteria closures could be lifted as the data demonstrated that there is a stable, healthy osprey population both within and outside the training area.*

b) *IEMR will ensure an annual monitoring of a representative sampling of active nests both within and outside the training area in order to detect any variances.*

Introduction

Since 1981, low-level flight training in military jets has taken place over large areas of Labrador and adjacent parts of Quebec. An environmental impact assessment (EIS) of these activities was finally completed in 1994 (DND 1994), at which time environmental effects monitoring on several wildlife species in the overflown area had already commenced. Raptors were considered a "valued ecosystem component" or VEC in the EIS and so were one focus of impact assessment studies sponsored by the Department of National Defense (DND). The Osprey *(Pandion haliaetus) is* the commonest breeding raptor in the low-level training area and are of particular interest.

Since 1991, several studies have been conducted on the effects of low-level flying on Ospreys in Labrador. Early studies identified nest-site locations, around which were established 2.5 nautical-mile (nm) radius, circular exclusion zones to mitigate the possible negative effects of low-level flying. Later studies were designed to test hypotheses that low-level flying was negatively impacting selected behaviors and breeding success parameters.

The behavioral study area comprised a 350 km^2 area along the Naskaupi River, approximately 90 km northwest of Goose Bay, Labrador. The study area, typical of the forested sections of the LLTA, has long, severe winters with heavy snow accumulation and short summers. The lower Naskaupi River valley lies within the High Boreal Forest-Lake Melville ecoregion encompassing the Churchill River valley and the coastal plain surrounding Lake Melville. The area consists of undulating upland topography and a productive forest of black spruce *(Picea marianna),* balsam fir *(Abies balsamea),* and white birch *(Betula papyrifera)* forest types. Fifteen species of fish

have been reported for the Naskaupi River. Mean average daily temperatures are -14 to -18 ° C in February, and 13 ° C or higher in July. Annual precipitation is between 1,000 to 1,100 mm with an average snowfall of 4 m. The Naskaupi River area was selected due to its proximity to Goose Bay, alignment and position regarding entry/exit of LLF aircraft between the LLTA and 5 Wing Goose Bay, and availability of nest sites with suitable points of observation. Historically, Osprey have been recorded in this area since early exploration and have occupied the LLTA prior to the commencement of LLF in 1980. Wetmore and Gillespie (1976) found that osprey were first observed at Northwest River (80 km southeast of our study area) from 29 April to 12 May (four year period) when most water bodies remained ice-covered.

DND recorded behavioural and noise information for 139 individual events over 240.3 hrs of observation. Reactions during low-level overflights varied from alertness by the adults, focused observation of the aircraft, to adjustments in incubation posture. They observed no overt reaction as a result of a LLF jet overflight. Adult osprey appeared to perceive the approach of an aircraft before it was audible to the observers. When other ospreys or raptors approached the nest, fixed-wing aircraft approached within 3 km, or the appearance of observers outside the blinds adult osprey reacted strongly. The study did not observe evidence of habituation as agitation, temporary vacation of the nest and displays of aggressive behaviour to these non-experimental stimuli continued throughout the study. Early nestlings crouched following any disturbance (including jet overflights) until the Pre-fledging period in mid-August when they would remain standing. Usually, overt behaviour diminished within 5 minutes of the event.

These studies have concluded with one exception that there is no evidence of negative impacts. Annual surveys of Osprey nests in the LLTA have revealed an unexpectedly high number of nest locations (JWEL 1999), and the 2.5 nm radius exclusion zone around each is compromising low-level flight training activities. In view of this, and the apparent absence of negative impacts on Ospreys, it has been recommended that the exclusion zones be eliminated (JWEL 1999).

The Institute for Environmental Monitoring and Research in Labrador conducted an independent review of DND-sponsored studies of the impacts of low-level flying on Ospreys which included:

1. A peer review of the scientific merits of those studies to include an assessment of the use of proper statistical study design, application of appropriate statistical treatment of data, and validity of subsequent results, discussion and recommendations;
2. An overall assessment of the Osprey monitoring and research studies along with an assessment of the effectiveness of that program in accurately measuring the impacts of the low-level training program on breeding Osprey populations in the LLTA;
3. Recommendations to the Institute board which identified which studies, if any may would be required to adequately measure/estimate the impact of the training program. As well as providing recommendations on the maintenance of the 2.5 nautical mile closures.

Conclusions and recommendations by IEMR

- The conclusions from the studies are generally statistically valid and should be accepted.
- There appear to be no measurable effects from the LLTP on overt behavior of nesting osprey or on reproductive success.
- Large impacts on behavior or breeding success, if they existed, would have been detected by these studies.
- Evidence to date thus justifies DND in removing the 2.5 nm buffer zones around active osprey nests within the LLTA.
- Given the above, IEMR agreed to a reanalysis of the data provided in the 1999 DND report (Study GB 875-00) be conducted to examine whether a Type 11 error may have been made due to the possibility that confounding variables masked trends related to low-level flying. This reanalysis needs to match nests in experimental and control groups before there can be absolute confidence that the 2.5 nm exclusion zones should be eliminated. If this is not possible, then a new study should be considered which randomly selects nests and compares nest occupancy rates, number of chicks in nest (index of hatching success), and number of pre-fledging chicks in nest (index of fledging success) between treated (overflown) and control nests. Confounding variables such as nest type (artificial or tree), habitat and ecoregion should be included in sampling design.
- A program to monitor nest occupancy and breeding performance of osprey within the LLTA was established. The design of the monitoring program included matched control and treated (overflown) nests. Control nests were positioned outside the LLTA. The treated nests are located within the LLTA and do receive a varying degree of overflights. Some of the treated nests do receive a maximum disturbance (e.g. frequently flown river valleys).

- If changes in reproductive success are detected through the monitoring (programs which are not directly related to topographic or environmental variables, more in-depth studies of nesting or behavioral studies may be required by IEMR. Such studies should avoid further documentation of overt behavior of adults and concentrate on more subtle effects, such as adult heart rate and egg temperature.
- The IEMR has initiated a long-term monitoring of osprey populations which focuses on obtaining additional information on confounding effects such as habitat, topography and ecoregion.

References

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