

20 Aircraft Control

The adverse effects of aircraft on mammals and birds have been described strongly and unequivocally by many biologists who presented evidence to the Inquiry. Their concerns centre on the critical habitats and life stages that make individuals of rare species or concentrated populations of other species sensitive to disturbance. They spoke of harassment by aircraft that swoop or circle over mammals or birds, but their overriding concern focused on the effects of low-level flight by helicopters and fixed-wing aircraft. The elevation, frequency, routing and timing of such flights and the location of airstrips all have the potential to cause disturbance.

The use of aircraft at low altitudes and under visual flight rules (VFR) is an important and integral part of life and commerce in the North today. The use of aircraft is increasing and will continue to increase with even greater activity by government, industry, sportsmen, tourists and others. The heavy volume of air traffic, and particularly of helicopter flights, that construction activities can generate along the pipeline route and at gas gathering facilities can lead to seriously adverse effects on the birds and mammals of the region.

Disturbance caused by aircraft is one of the basic environmental concerns described in Volume One of my report. I said:

It is often thought that, because of the immense geographic area of the North, construction of a gas pipeline or establishment of a corridor could not cause major damage to the land, the water or the wildlife. But within this vast area are tracts of land and water of limited size that are vital to the survival of whole populations of certain species of mammals, birds and fish at certain times of the year. Disturbance of such areas by industrial activities can have adverse biological effects that go far beyond the areas of impact. This concern with critical habitat and with critical life stages lies at the heart of my consideration of environmental issues. [p. xi]

Uncontrolled aircraft flights are probably the most serious form of disturbance to mammals and birds. In a recently published article, Calef *et al.* outlined the effects of aircraft on barren-ground caribou:

Aircraft disturbance is merely one of many results of human

activity which could have a variety of deleterious effects on caribou. These effects can be divided into three categories:

1. Those causing immediate physical injury or death.
2. Those resulting in increased expenditures of energy, or changes in the physiological condition of the animals, which reduce their rates of survival or reproduction.
3. Those resulting in long-term changes in behaviour, including, especially, the traditional use of ranges.

Low-level flight or "buzzing" elicits panic responses from caribou, which may then injure themselves by stumbling or colliding with one another. Cows just before parturition, and young calves, are particularly susceptible to such injury. Sustained running results in an unusual depletion of energy reserves which could be particularly harmful during periods of stress such as late winter or when the caribou are being harassed by insects. Running during cold weather promotes pulmonary disorders in reindeer ... and therefore presumably in caribou. These are the obvious and immediately injurious consequences to caribou of their making sustained escape responses.

The long-term and more subtle effects of aircraft disturbance cannot be predicted at present. Some species such as wolves can become completely habituated to aircraft according to G. Haber who studied wolves in McKinley National Park, Alaska. ... On the other hand, repeated disturbance by aircraft could cause animals to abandon a range, as automobile and railway traffic apparently have caused them to in Norway. ... Furthermore, little is known of the long-term effects of disturbance on the physiology of ungulates. Geist ... has cited several examples of long-term deleterious effects on metabolism and hormone balance of ungulates exposed to disturbance. [Calef *et al.*, 1976, p. 210]

These kinds of concerns about aircraft disturbance also apply to other wildlife species including Dall's sheep on their wintering and lambing ranges, snow geese during spring and fall staging, waterfowl and falcons while nesting, and ducks, geese and swans while moulting.

The pipeline companies recognize these concerns to be valid and serious, and they propose measures to avoid or mitigate disturbance during the critical life stages of various species. They emphasize, quite rightly, that most of their construction activities, including air traffic, will be confined to the winter

season, and they will therefore avoid the most sensitive times of the year for most species. They say that aircraft under their control will maintain minimum altitudes wherever and whenever there might be disturbance to wildlife, and they outline plans to limit the impact of patrol flights along the right-of-way during operation of the pipeline by modifying the mode, pattern and frequency of flights.

It is uncertain what the total amount of air traffic will be because, although the requirements of the pipeline for air support can be defined generally, it is not possible to forecast the amount of air traffic that other activities will generate. The volume of traffic associated with continued exploration for oil and gas in the Mackenzie Delta region is potentially very large, and much of it could be made up of the repeated point-to-point flights that, at certain times of year, could have devastating effects on wildlife populations. The considerably increased use of aircraft in connection with the pipeline, added to the substantial volume of other air traffic throughout the Mackenzie Valley, has the potential for seriously adverse effects on mammal and bird populations.

Although my discussion concentrates on the environmental effects of aircraft flights that are related to the pipeline project, these flights cannot be considered in isolation from all other air traffic. Controls on project-related flights will help to reduce adverse impact, but, if other flights should be allowed to operate without restraint, it is questionable whether or not the impact on wildlife by aircraft can be reduced to a tolerable level.

1. The government should devise and enforce measures to protect birds and mammals from aircraft disturbance. To ensure the ongoing health of wildlife populations, consideration should be given to applying controls not only to air traffic associated with construction and operation of the pipeline, but also to other air traffic in the North.

Restraints on Aircraft Flights

Measures to Limit Disturbance from Project-related Flights

The sensitivities of various species change with the time of year and the stages of their annual cycle. Nonetheless, a considerable degree of protection could be achieved by establishing flight corridors selected to avoid sensitive wildlife, by adhering to minimum-altitude restrictions outside the designated corridors, and by carefully selecting the locations of airfields.

The information that is available on the sensitivity of various species of wildlife to the noise of aircraft is inadequate for an objective determination of minimum flight altitudes that will limit or avoid such disturbance. However, a

guide is necessary and from the evidence before the Inquiry, 1,500 feet seems to be appropriate.

Airfields are centres of low-altitude aircraft movements that can be particularly disturbing to mammals and birds during sensitive periods in their annual cycles.

2. All aircraft flights connected with the pipeline project shall be flown at no less than 1,500 feet above ground level between take-off and landing except for flights along designated corridors in which lower minimum heights may be permitted.

3. A number of aircraft corridors, in both time and space, shall be established so that a certain number of flight paths will be available at all times without reference to the regulatory authorities. All such corridors shall have a minimum flight altitude of 500 feet unless specifically designated otherwise. In general, a corridor two miles wide and centred on the pipeline right-of-way should be designated and, as far as possible, it should avoid areas occupied by sensitive bird or mammal populations. To the degree that sensitive areas and times cannot be avoided, the corridor shall be subject to site- and time-specific routing and altitude flight restraints as designated by the Agency.

4. Airfields related to the pipeline project should be located to avoid areas in which there are bird or mammal populations that are sensitive to disturbance by noise and shall be at least three miles from such areas, unless specifically authorized by the Agency. Runways should be oriented so that landing and take-off paths avoid overflight of sensitive areas.

DELIBERATE HARASSMENT

The "buzzing" or chasing by aircraft of individual animals or groups of birds or mammals can be exceedingly harmful to them. For example, disturbance of nesting birds can lead to death of the young and it can cause mammals to abort or to be separated from their young. The Company should ensure that pilots know that such actions, including flights at low levels, are prohibited and subject to disciplinary action.

5. Deliberate harassment of wildlife by aircraft shall not be permitted within pipeline system lands or in any other areas. Pilots, in the direct or indirect employ of the Company, who harass wildlife shall be immediately suspended from any further flying on the project and they shall be reported to the Agency for prosecution.

The effect of harassment on wildlife is so severe that this recommendation should be extended to cover all aircraft in the region.

Measures to Limit Disturbance to Specific Species from Project-related Flights

Many specific proposals for the protection of mammals and birds from disturbance by aircraft were presented to the Inquiry. In addition to the restrictions on altitude, flight

frequency and airstrip location, they included recommendations that aircraft should avoid certain areas at certain periods of time. The problems will persist into the operation phase of the pipeline because monitoring flights will be most numerous in the spring during and immediately following break-up when many bird species are most sensitive.

In Volume One of my report, I proposed a wilderness park in the Northern Yukon: it will achieve some of the desired protection. Similarly, the bird sanctuaries I recommended in the Mackenzie Delta and Mackenzie Valley will provide the Canadian Wildlife Service with authority to apply the controls that are needed there. In this volume, I outline, in the chapter on Wildlife, measures that are needed to protect birds and mammals from disturbance in general. I now make recommendations to protect specific species from aircraft disturbance.

RAPTORS

6. *Airstrips and helicopter pads should be located so that all approaches and take-offs will avoid Raptor Protection Zones (as defined in Wildlife: Birds).*

7. *Aircraft should maintain an altitude of at least 3,000 feet above ground level while over any Raptor Protection Zone during a sensitive period. Lower level flights shall be routed around the zone. Pipeline surveillance flights at less than 3,000 feet above ground level and helicopter landings shall be prohibited within a Raptor Protection Zone during any sensitive period, except as specifically authorized by the Agency.*

WATERFOWL

8. *Air traffic over critical staging and nesting sites shall be subject to specific altitude and frequency restrictions during periods of occupancy.*

9. *During the periods in spring and fall when islands in the Mackenzie River are used as staging areas by flocks of waterfowl, aircraft shall avoid areas occupied by birds, and any flights within 2 miles of such areas shall maintain an altitude of 2,000 feet above ground level.*

10. *During fall staging of flocks of snow geese, aircraft shall avoid areas occupied by these birds and any emergency flights within 2 miles of such areas shall maintain altitudes of 5,000 feet.*

MAMMALS

11. *Aircraft shall maintain a minimum altitude of 2,000 feet above ground level wherever there are calving caribou or lambing Dall's sheep.*

Control, Implementation and Enforcement

The above recommendations are, in effect, operating standards that should be complied with if disturbance to wildlife is to be minimized. But the setting of standards is only part of the solution. We must also assess the effectiveness of those standards in individual cases, and devise means of enforcing them.

At present, the only attempt to restrain aircraft operation is within the migratory bird sanctuaries, where the Canadian Wildlife Service requires that aircraft should fly at a minimum altitude of 1,500 feet above ground level. Transport Canada has informed pilots of this limitation in its Notices to Airmen (NOTAMS), but takes no responsibility for enforcing this limitation, and the Canadian Wildlife Service has very limited means of enforcement. In evidence before the Inquiry, Harold Heacock of Transport Canada emphasized the difficulty of enforcing minimum flight altitudes and other environmental controls on aircraft using visual flight rules, particularly while flying during bad weather conditions.

Thus, despite the alarm with which biologists regard the effects of disturbance on birds and mammals by aircraft, only limited and relatively ineffective measures can now be taken to protect them, even in the geographical areas that are of the greatest concern.

My objective is to recommend terms and conditions that will limit the impact of a pipeline and energy corridor along the Mackenzie Valley. However, as I explained at the beginning of this chapter, the problems created by the air traffic generated by the pipeline project cannot be considered in isolation from those created by all other aircraft in the area.

Flight Control Group

Because aircraft disturbance poses an immediate threat to wildlife, and because there is a general lack of regulatory control in this regard, it is essential that government implement a flight control program. Flights associated with the pipeline project are only one small part of the overall problem: the program created to control flights should, therefore, be broad enough to regulate all aircraft activity that poses a threat to wildlife in the area. I recognize that such controls will be unpopular and an inconvenience during certain times of the year, but we must understand that the benefits derived from industrial development in the North carry a price. In a case like this, we must now make a choice: either we develop some means of regulating disturbance or we will suffer the loss of a substantial portion of our greatest northern wildlife resources. No one has seriously suggested that all aircraft activities be stopped: rather, they must be controlled so that critical areas and critical life stages of wildlife are protected. I think that a flight control group is the means to do this. The following recommendation for setting

up this group is one of critical importance for the control of aircraft related to the pipeline project. But its implementation would be of value in protecting wildlife from any aircraft disturbance in the North. I have therefore written the recommendation for general application, whether there is a pipeline project or not.

12. To control the environmental effects of all air traffic in the region, including project-related air traffic, a Flight Control Group should be established immediately. To minimize inconvenience to pilots, this Group should be the only point of contact for flight operators. To be effective and comprehensive this group must coordinate closely with Transport Canada, which controls flying from a safety point of view.

The Flight Control Group shall be the basic mechanism for ensuring that environmentally hazardous flying does not occur. In this regard, it should prepare specific measures to protect birds and mammals. The Flight Control Group should involve the federal and territorial governments, and during pipeline construction the Company and the Agency, in identifying the locations and in monitoring the movements of wildlife. On the basis of local observations, field staff of all those involved should be used to predict when and where conflict with human activities might occur and to advise the Group that flight plans may have to be modified to avoid these times or areas.

The Flight Control Group should set up and administer procedures that will include a daily preview of the flight plans of all project-related flights and other flights as required to ascertain whether or not the flights are likely to disturb wildlife populations unduly. The group shall approve flight plans on a case-by-case basis taking into account changing environmental conditions, and the effectiveness of various degrees of restrictions.

In view of the particular wildlife sensitivities in the Mackenzie Delta and recognizing that a great deal of oil and gas activity is concentrated there, the Flight Control Group shall pay particular attention to that area.

Enforcement

Although the Flight Control Group, as recommended, would regulate flights to limit disturbance on wildlife, it will face the same problems of enforcement that exist today. This is a difficult problem that requires careful consideration by government. Although no solutions have been advanced before this Inquiry, it is apparent that measures could be devised. For example, provisions such as those that exist in Air Navigation Order Series V, Number 10, which restricts take-off and landing in designated park areas, may be appropriate.

13. A means of enforcing the regulations and directives prepared by the Flight Control Group regarding aircraft

movements should be devised. This enforcement mechanism should be in operation before pipeline construction begins.

14. To ensure comprehensive protection of the environment, compliance with the directions of the Flight Control Group should be made a condition of every drilling licence, land use permit, or similar authorization to carry out work in the area involving aircraft flights.

Company Plans for the Use of Aircraft

To protect birds and mammals, it is necessary to identify problems and to ensure timely planning for the regulation of flights.

15. Before the final design phase, the Company shall submit for approval by the Agency an overall plan for the use of project-related aircraft during the period of construction. Final plans shall be submitted six months in advance of each season's construction. Both the overall plan and the final plans shall detail such items as the routing and frequency of flights, the time of year, the type of aircraft and their flying heights; the landing areas and the pattern of aircraft movement into and out of those areas; and the corridors to be used for low-altitude flights. They shall also describe the potential disturbance of aircraft flights to sensitive wildlife populations, and the measures that are proposed to mitigate this kind of disturbance.

16. Six months before construction is completed, the Company shall submit for approval by the Agency plans for the use and control of aircraft during the operating life of the pipeline.

Pilot Education

The implementation of all the recommendations above should ensure that use of aircraft in the region is compatible with the protection of critical habitats and of wildlife during critical life stages. However, it will always be difficult to protect widely dispersed wildlife populations. General protection can probably be accomplished best through the education of pilots.

In evidence presented to the Inquiry on behalf of Transport Canada, Heacock suggested that one way to reduce possible adverse effects by aerial activities on wildlife would be to:

Mount an extensive publicity campaign to impress on all pilots, contractors, etc., the importance of protection of wildlife in the area and the serious consequences that may result from any unnecessary disturbance of birds or mammals.

Most pilots flying in the north country realize the importance of all mammals in relation to native welfare, and that policing action would be most difficult. Obtaining their full cooperation would appear to be the most likely means of minimizing disturbance to wildlife. If such a publicity program is considered desirable, Transport Canada could provide a nation-wide coverage through [its] air information publications. [F21186]

17. The Agency shall complement its restraints on low-level

aircraft movements with a comprehensive campaign to educate all aircraft personnel involved in the project that they may fully understand and accept the importance of these protective regulations. As part of such a program, Transport Canada's Notices to Airmen should be used to remind aircraft operators of the importance of the wildlife populations, of their susceptibility to aircraft disturbance and of the protection they are given by the Flight Control Group and by legislation, such as the Migratory Bird Regulations.

Wildlife—Aircraft Impact Research

The level of noise and disturbance generated by aircraft varies between types and model, and the disturbance created by one model may differ significantly from that made by another of similar capabilities. However, there has been little research on the comparative levels of disturbance created by the many sorts of aircraft that are available. Such research is

necessary to allow proper selection of aircraft to reduce the disturbance of wildlife. In addition, we need to know more about the sensitivity of various species of wildlife under different conditions and at different stages in their life cycles so that we can gauge the short-term and long-term effects of aircraft disturbance.

18. *The government should establish research to evaluate the impact of air traffic disturbance on various species of wildlife. This research should investigate and classify the degree of disturbance generated by different models of aircraft used in northern transportation, and assess the short-term and long-term impacts of aircraft disturbance on wildlife and the effectiveness of flight restrictions. The government should review the results of this research and modify existing regulations where necessary to provide the best protection possible for wildlife. (See Wildlife: Wildlife Management and Research.)*