THE IMPACT OF OIL DEVELOPMENT ON WILDLIFE POPULATIONS IN NORTHERN ALASKA

Robert Hinman

Regional Game Supervisor, Alaska Department of Fish and Game

The discovery of oil in vast quantities on Alaska's North Slope in 1968 and the subsequent announcement of a pipeline to transport this oil nearly 800 miles across Alaska to the port of Valdez propelled Alaska into the lime-light of an environmentally conscious generation. It is likely that 20 years ago people would have merely marvelled at the scope of the proposed engineering feat. Throughout the nation today, a heightened awareness of the finite quantities of remaining wilderness and wilderness wildlife has increased concern over the effects of oil exploration and development in the Arctic. Much of this concern, perhaps to a mistaken degree, has been focused on the actual construction of the Alyeska Pipeline from Prudhoe Bay to Valdez.

Inspired by adverse public opinion and by the necessity for answering certain key questions concerning the effect of oil development on wildlife and the environment, the oil industry itself has sponsored research on animal vs. pipeline problems (Child, 1973). A number of other authors have attempted to predict the probable effects of oil development in the Arctic (McKnight and Hilliker, 1971; Klein, 1972 and 1973; Bartonek et al., 1972; Weeden and Klein, 1971). The purpose of this paper is to comment on the observed and anticipated impact of oil exploration and development in northern Alaska from the standpoint of the state agency responsible for the management of wildlife resources. Comments are further limited to effects of development on terrestrial species; Burns and Morrow (1973) have addressed some of the problems associated with oil development in adjacent marine environments.

In a sense it is presumptuous to address the subject of impact of oil development in the Arctic upon wildlife, because much of the impact has not yet occurred. Some of the following, therefore, is speculative, based upon our knowledge of the wildlife resources and the probable effects on them that can be foreseen. Unfortunately, some of the effects will be difficult to quantify and may be undocumented for many years in the future.

Present Status of Oil Development

After a delay of almost four years, the Federal permit to build the Alyeska Pipeline was issued on 23 January 1974 and the corresponding state permit was issued 18 April 1974. Construction on the pipeline haul road from the Yukon River to Prudhoe Bay began in the spring of 1974 and is scheduled for completion in early 1975. Construction of the actual pipeline and its pumping stations will begin in 1974.

Following the initial flurry of activity in 1969 and 1970 when wells were drilled, facilities established on the North Slope, and camps constructed along the pipeline route, there was a period of relative inactivity. This lull in activity was caused largely by problems involved in developing environmental safeguards sufficient to comply with the National Environmental Policy Act, and in settling land ownership claims with the Alaska Native Claims Settlement Act.

Some seismic exploration was conducted during this period, however, and this activity, too, has seemingly increased in 1974 concomitant with the beginning of pipeline haul road construction. Seismic exploration, however, is not limited to areas directly to be served or affected by the pipeline. For example, it has been conducted in the Yukon Flats, Kotzebue Sound, Naval Petroleum Reserve #4, and other areas of Interior and Arctic Alaska. Seismic work has also initiated in the shallow waters of Bering and Beaufort Seas adjacent to western and northern Alaska. On land, much seismic activity has resulted from interest by natives in potential oil on Regional Corporation land selection alternatives.

Effects on Wildlife: Problem Situations

It is difficult to isolate and discretely identify all known and probable impacts of oil development on wildlife because the economic and social changes, as well as the physical and biological effects, are likely to be profound and far reaching. I would like to discuss here some of the situations that might affect wildlife.

Development in River Valleys

In considering development's impact upon wildlife, one cannot too readily compare the situations in the Arctic and the Interior or sub-Arctic. For example, an important fact that must be kept in mind in the area north of the Brooks Range (the North Slope) is that many wildlife species are largely confined to river valleys for food, escape cover and areas in which to bear their young. This generalization applies to most large mammals except caribou (*Rangifer tarandus granti*), and, to a considerable extent, to raptors and carnivores. In traversing the North Slope one is struck by the abundance of large wildlife adjacent to rivers and the relative paucity of wildlife in the tundra areas between. Moose (*Alces alces gigas*) are largely confined to the willow bottoms of the relatively narrow river valleys and sometimes occur, as along the Sagavanirktok and Colville Rivers, in surprising densities. Grizzly bears (*Ursus arctos*) are most commonly found immediately adjacent to the river valleys, particularly in spring. Bluffs along many of these rivers provide the most important nesting habitat for raptors, notably the gyrfalcon (*Falco rusticola*) and Arctic peregrine falcon (*Falco peregrinus tundrius*).

Man in his development activities also finds need to utilize the river valleys on the North Slope. They provide the transportation corridors, campsites, and sources of all-important gravel for road and

other construction. The result, then, is a magnification of the effect of man's presence by concentrating it in some of the most vulnerable and critical areas of wildlife habitat in the Arctic.

In the forested subarctic of interior Alaska operation in river valleys is not nearly as critical as in the Arctic. Wildlife habitat is more widespread in distribution and the effects of development, though important, are not as critically confined.

Human-Wildlife Interactions

During the pre-construction phase, one of the chief impacts upon wildlife has been the problem of animal-people confrontations. Although Alyeska Pipeline Service Company (ALPS) policies ban the feeding of wild animals and dictate garbage disposal aimed at minimizing attraction to animals, both practices continue to be a problem and contribute to nuisance animal problems. Solid waste disposal is extremely difficult under Arctic conditions and while Alyeska has made strong efforts to see that all garbage is properly incinerated or otherwise disposed of, improperly cared for garbage continues to attract wild animals, particularly Arctic and red foxes (Alopex lagopus and Vulpes fulva) and grizzly and black bears (Ursus americanus), into camps. In some camps the deliberate feeding of wild animals, particularly for the purpose of photography is widespread even though officially banned. Possession of firearms in the pipeline camps is either forbidden or severely curtailed, but one suspects at times that the "Kodak syndrome" might be an even greater danger to wildlife than is the gun.

Construction personnel (particularly, now, survey crews), as well as seismic crews, are transecting bear habitat and it is inevitable that men and bears will come into contact. The degree to which a bear is considered a menace often depends upon the unfamiliarity with bears of workers brought in from areas outside the state and, to many of them, any bear in sight constitutes cause for alarm. ALPS and its subcontractors have conducted environmental briefings to acquaint personnel going out on pipeline construction with the conditions that will be encountered, including contacts with wild animals, but these briefings seem to have been ineffectual so far in preventing animal-man interactions.

Although pipeline construction surveillance personnel have been added to the Department of Fish and Game, animal nuisance problems are considered an extension of the normal management activities of the Department. These problems have, therefore, added considerably to the work load of the Department management staff. To cope with nuisance animals, particularly bears, the Department has established the policy that, upon receipt of a complaint, we will dispatch a biologist to take appropriate action. The complaining company, however, is required to provide 1) transportation for our man to the problem area, 2) helicopter support if needed to capture the animal and transport it to a remote

location and 3) transportation for our man to his normal duty station. We realize that capturing bears by use of dart guns and transplanting them is not an entirely satisfactory answer because of the bears' strong tendency to return to the point of capture. Regardless, transplanting is considered highly preferable to action which might injure or kill the bear. Fish and Game personnel are working with Alyeska officials to develop new and better methods of preventing bear-man confrontations.

In the Arctic particularly, camps seem to attract animals from considerable distances and therefore have the potential of affecting wildlife, especially grizzlies, over a rather large area. Grizzly bears are scattered in relatively low densities across the Arctic Slope, but a large percentage of them may be attracted to a camp for a radius of perhaps 50 miles. We have moved bears as far as 100 miles from a problem site only to have them return within a week.

Animal Harassment

The harassment of animals, both deliberate and inadvertent, by oil construction and seismic personnel may constitute one of the major impacts upon wildlife, and it may also be one of the more difficult effects to quantify. As noted by Klein (1972, 1973) and Weeden and Klein (1971) we are at the present time ill-prepared to fully evaluate the impact of harassment by aircraft on the behavior of animals, particularly large ungulates. Seismic explorations, as well as certain aspects of pipeline construction, are heavily dependent upon the use of helicopters and fixed-wing aircraft, particularly along the pipeline route. Helicopters produce a much more pronounced behavioral reaction by big game and raptors than do fixed-wing aircraft. To compound the problem, helicopters are a more effective means of transporting curious sightseers or photographers closer to an interesting animal than is the fixed-wing aircraft. Although the practice of flying helicopters close to animals to observe or photograph them is forbidden by state regulation and by the contracting companies, it is still a widespread practice which is very difficult to control.

Another type of aerial harassment of animals, largely grizzly and black bear, occurs when field crews are threatened with the presence of bears. Helicopters are often used to haze the bear away from the workers, a procedure which may be only minimally harmful if conducted properly, but which lends itself to abuse. We have documented instances of bears being harassed an unreasonable distance from field crews and for an excessive period of time in the name of personnel safety. The presence of wolves (Canis lupus) in the vicinity of crews and camps has caused concern on several occasions, but none have been subjected to "protective harrassment" to date.

Nesting raptors, particularly gyrfalcons and peregrines, are vulnerable to harassment during the breeding season. Special efforts are necessary to protect these species, including control of aircraft and vehicular

use close to known raptor nesting areas, especially in the period April 15 to July 30. In one instance, in spring 1974, the haul road near Sagwon Bluffs along the Sagavanirktok River was diverted away from the top of the bluff to prevent disturbance by vehicles and sightseers.

Impedence of Animal Movements

The potential for blocking animal movements by construction of the pipeline is a subject which has received widespread attention (Child, 1973). It has been widely hypothesized that the pipeline would present a physical, visual, and perhaps auditory barrier to the free movement of animals. The species potentially most affected is the barren ground caribou, although other big game species, such as moose and bison (Bison bison), might be affected to a lesser degree. This problem was recognized early in the planning process for pipeline construction. Technical Stipulation 2.5.4.1 of the Department of the Interior and State of Alaska right-of-way leases states: "Lessees shall construct and maintain the pipeline, both buried and above ground sections, so as to assure free passage and movement of big game animals."

The problem of allowing "free passage" is complex; no one is sure what type of facilities will allow free passage to all species, or indeed if any facility will fully comply with this stipulation. Research by Child (1973) indicated that the majority of caribou approaching a simulated pipeline showed a tendency to avoid the structure; only 17.6 percent used ramps over the pipeline and 4.9 percent used underpasses, the rest did not cross. The degree to which crossing facilities were utilized depended somewhat on the age and sex composition of the groups, the degree of insect harassment, and chronology. There was some indication that caribou might become accustomed to using crossings with experience.

Movement of moose may also be impeded by the pipeline in areas where it is erected above ground. This could be important in locations in central Alaska where seasonal altitudinal movements of moose might be affected, particularly where the pipeline crosses valleys at points intermediate between summer and winter ranges. Some indications of the behavior of moose to obstructing pipelines have been obtained from observations on moose trails where inverted siphons made of 40-45 inch pipeline connecting portions of the Davidson Ditch near Fairbanks intersect moose travel routes (Burris, 1973). Moose trails tend to parallel the pipe but some crossings do occur under the pipe when it is supported six feet or more above the ground on a trestle. These observations, however, may reflect largely movements of cows and calves and the degree to which bulls may be affected is not known. These movements may also reflect adaptation of the animals to the presence of the pipe over a long period of time (the Davidson Ditch was completed in 1928). The degree of use of a crossing may also be affected by the physical surroundings and location of the underpass (LeResche and Lynch, 1973).

Pipeline construction design changes as the project evolved has increased the potential restrictions of large mammal crossings. Originally

it was anticipated that of the 796 miles of pipeline, approximately 600 miles would be buried. Construction difficulties and environmental concerns, chiefly involving the effect of a hot oil pipeline on permafrost soils, have modified construction plans and, at the present time, plans call for 426 miles to be buried with the remaining 370 miles constructed above ground.

Full compliance with stipulation 2.5.4.1 would require burial of pipeline in all areas utilized by big game. However, the state has recognized that the elevated construction mode might provide accomodation for some species of big game and aid in optimizing total environmental protection for the pipeline system. The Department has therefore recommended that in areas occupied by moose or bison, pipe should be elevated to a minimum of 10 feet at intervals of about 1,000 feet. In known caribou crossing areas we are recommending that pipe be buried; the Department contends that elevated crossings will not meet the stipulations regarding caribou movement. In a few areas, notably Atigun Canyon in the Brooks Range, there is concern that the presence of the pipeline might interfere with movements of Dall sheep between their winter and summer ranges.

Further Development

Perhaps the most profound effect of the Alyeska Pipeline and oil development in the North in general will be the degree to which this development acts as a catalyst for further development. Construction of the pipeline haul road, which will become a State highway, through a vast area that previously had no road access will obviously allow and encourage further development. Additional airfields have been constructed at various points along the pipeline route and at least three of these will be turned over to the State for use as public airfields following the construction period. The pipeline haul road will inevitably encourage the development of additional roads, particularly to other areas of the south slope of the Brooks Range for the purpose of tapping rich mineral resources in these areas. The State Department of Highways is presently proposing a road from Prospect (on the pipeline) west to Kobuk, on the south side of the Brooks Range. It is likely that road access will also encourage development of timber harvest in the central portion of the State. With increased access and increased familiarity with the Far North, additional recreational and commercial use of the game resources is a certainty.

Development means people. All development activities bring more people to the State, particularly the remote areas of central and northern Alaska. Many of these will be present only during the construction period, but certainly the population of the State will increase and the number of people in remote areas will remain much higher than it has been in the past. Increased hunting pressure, increased animal-people problems and some degree of animal displacement and habitat destruction will inevitably be the ultimate result.

Effects of Development on Land Ownership and Use

One further effect of oil and other industrial development of the North should be mentioned. Before the pipeline permit could be issued, it was necessary that the native land claims issue be settled by the passage of the Alaska Native Claims Settlement Act of 1971. National concern regarding oil and pipeline development in Alaska undoubtedly contributed directly to the inclusion in this Act of very large Federal withdrawals for the purposes of national forests, wild and scenic rivers, national wildlife refuges, and national parks. These Federal withdrawals, particularly those for national parks, will have profound effects on the availability of land and wildlife for public hunting and other appropriative uses of renewable resources. For example, proposed park withdrawals in the Wrangell Mountains and central Brooks Range would remove two of the best areas in the State for public hunting of Dall sheep, thereby concentrating increasing numbers of hunters elsewhere. It may seem strange to attribute withdrawal of large areas for parks and refuges to oil development, but I believe there is a direct cause and effect relationship in this instance.

In addition, the advent of oil development in the Arctic has caused a change of attitude in wildlife management to a more conservative approach among people both within Alaska and outside the State. A ten-mile wide corridor along the pipeline from the Yukon north has been closed to hunting and pressure is being received for further restrictions on hunting of many species throughout the Interior and Arctic.

Summary

1) Now that a permit for the oil pipeline from Prudhoe Bay to Valdez has been issued, construction of the haul road is underway with pipeline construction to follow shortly.

2) On the North Slope, river valleys constitute critical habitat for many species. Exploration and development activities tend to be concentrated in these valleys, thereby magnifying the effect on wildlife.

3) One of the chief impacts on wildlife of oil development activities to date has been the problem of animal-man interactions, largely involving black and grizzly bears.

4) Inadvertent and deliberate harassment of animals by the use of aircraft, particularly helicopters, may have an important effect on big game and especially on nesting raptors.

5) The effect of the pipeline in interrupting or preventing animal movements has attracted much attention and study. Effects of such impedence will be very difficult to quantify.

6) One of the most profound effects of oil development will be the degree to which present development will act as a catalyst for further development of oil, road access, mining, timber production and increased use of game.

7) Petroleum developmental activities in the Arctic and subarctic result in increased human activity in areas that previously had very little. The degree to which additional human population may affect wildlife is difficult to predict.

8) Oil development, particularly in the Arctic, contributed to the withdrawal of large areas for Federal management. These withdrawals will have a profound negative effect upon the availability of game for public hunting and the distribution of hunters within the State.

LITERATURE CITED

Bartonek, J. C., J. King, and H. K. Nelson. 1971. Problems confronting migratory birds in Alaska. Trans. N. Am. Wildl. and Nat. Resour. Conf. 36:345-361.

Burns, J. J., and J. E. Morrow. 1973. The Alaskan Arctic marine mammals and fisheries. 5th Int. Congr., Fondotion Francaise D'Etudes Nordiques. Arctic Oil and Gas: problems and possibilities. (In press.)

Burris, O. E. 1973. Letter of September 12, 1973 to Morris J. Turner. Alaska Dept. Fish and Game files, Fairbanks.

Child, K. N. 1973. The reactions of barren-ground caribou (Rangifer tarandus granti) to simulated pipeline and pipeline crossing structures at Prudhoe Bay, Alaska. Alaska Coop. Wildl. Res. Unit, College. 51pp.

Klein, D. R. 1972. Problems in conservation of mammals in the North. Biol. Conserv. 4(2):97-101.

_____. 1973. The impact of oil development in the northern environment. Petrolio e Ambiente (109-121). Proc. 3rd Interpetrol Congr., Rome.

LeResche, R. E., and G. M. Lynch. 1973. A trap for free-ranging moose. J. Wildl. Manage. 37(1):87-89.

McKnight, D. E., and B. L. Hilliker. 1970. The impact of oil development on waterfowl populations in Alaska. Proc. 50th Conf. Western Assoc. State Game and Fish Comm., Victoria, B. C. July 13-16, 1970. 12pp.

Weeden, R. B., and D. R. Klein. 1971. Wildlife and oil: a survey of critical issues in Alaska. The Polar Record 15(97):479-494.

WESTERN PROCEEDINGS

Fifty-fourth Annual Conference
of the

Western Association of State Game and Fish Commissioners

Albuquerque, New Mexico
July 16-19, 1974