Environmental Influences of Oil and Gas Development in the Arctic Slope and Beaufort Sea

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Fish and Wildlife Service
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Introduction

Long a haven for gradual acculturation of Eskimos and for casual scientific inquiries by visiting sabbatical professors, Arctic Alaska and its adjacent seas recently felt the impact of technological man bent on developing and exporting enormous oil and gas resources. Those responsible for guiding new developments in a manner to avoid unnecessary environmental disturbance recognized an urgent need for information that would help them comprehend the problems at hand and serve as a basis for early decisions. In response to this, personnel from both the Bureau of Sport Fisheries and Wildlife and the Bureau of Commercial Fisheries were charged with assembling all available pertinent information and with conducting field studies to keep apace of rapid developments and their ecological implications.

The results of initial studies are presented both in this report, concerned with the Arctic Slope and the Beaufort Sea, and in a second report dealing with the Trans Alaska Pipeline System and the marine terminal sites ("A reconnaissance report on the impact on fish and wildlife resources of the North Slope oil development, the Trans Alaska Pipeline System, and the marine terminal sites." Typewritten report, U.S. Fish and Wildlife Service, Juneau, Alaska, 1970. 57 p.)

ABSTRACT

This report describes the environmental characteristics and renewable resources of the Arctic Slope and the Beaufort Sea in relation to oil and gas development. Problems associated with industrial activities are identified, and recommendations for avoiding or minimizing environmental and resource damage are advanced. It is noted that the simplicity of the ecosystems, the slow rate of organic processes, and the presence of permafrost create unique problems in connection with pollution, waste disposal, restoration of vegetation, and all activities which disturb the vegetated surface. In the Beaufort Sea, the shallowness of the continental shelf and the presence of pack ice represent serious physical obstacles to oil development and transportation and heighten the probability of potentially harmful accidents. The risk of serious environmental and resource damage in the Arctic will be greatly lessened by the imposition of high operational and safety standards. There is need for strengthening legal authority to promulgate essential regulations. As an interim substitute, close and effective cooperation between Government and industry must be developed. Both Government and industry have an obligation to support research aimed at providing an adequate understanding of numerous environmental and technical questions.

Wolverines

Wolverines occur throughout the Arctic Slope, but never appear in the abundance common to other small carnivores. Their naturally low population levels and low rate of reproduction are compensated by a remarkable endurance, toughness, and ability to survive in a wide range of habitat types. On the tundra, however, the animals suffer the disadvantage of being highly visible, slow afoot, and active at all seasons of the year. They could quickly be extirpated over all tundra regions where they are hunted by man employing snow machines. For example, Eskimo hunters now employing snow machines concede a wolverine to the man who sees it first. Actually bagging it is anticlimactic.

Rigid protective regulations that are enforced adequately might be successful in preserving a few wolverines on the tundra, but the outlook is not promising. It is simply a fact that this truly wilderness species is unable to cope with modern man unless extended special consideration.

Foxes

The arctic fox, in its white color phase, is common on the Arctic coastal plain. Its abundance from year to year is related to the abundance of lemmings, although harvest figures do not show the same classical fluctuations. Many arctic foxes spend the winter on the sea ice where they live on seals that are killed but not totally consumed by polar bears. In midsummer they have even been observed on the ice pack over a hundred miles from land, but such animals cannot reproduce. The arctic fox is completely dependent on denning locations ashore for successful reproduction. Because of permafrost and the low flat character of the terrain along the coast, suitable fox denning sites are scarce, and the good ones have been used year after year—perhaps for centuries.

Records of arctic fox harvests extend back nearly two centuries. It is apparent that these animals have traditionally been important in commerce, and they remain the most valued fur resource in the Arctic today. However, harvests have declined from several thousand annually a few decades ago to little more than 1,000 in recent years. This decline reflects a changing livelihood pattern of the Eskimos rather than a decline in the availability of foxes.

The red fox appears to be invading the Arctic Slope and impinging on the environment of the arctic fox. This trend has become apparent to the northern Eskimos in recent years, and it is probably due to gradual climatic changes. Precisely the same phenomenon has been noted in Arctic Canada.

Rodents

The hoary marmot, the arctic ground squirrel, the collared lemming, the brown lemming, the tundra vole, the singing vole, and the red backed vole are all found on the Arctic Slope. While each is important in its own community, the brown lemming stands out as the most important faunal element in the tundra ecosystem. Populations of brown lemmings typically build up until the food supply (several species of grasses) is exhausted, and then they decline sharply. In a given region, the reproductive success and abundance of arctic foxes, weasels, snowy owls, and jaegers are directly related to the abundance of lemmings.

Any of man's activities which disturb the tundra surface should have only local and ecologically insignificant influence on vegetation-rodent-predator associations.

ANTICIPATED DEVELOPMENTS

New communities

The principal new oil-related population centers are ARCO's Prudhoe Bay facility and the private staging center called Sagwon. ARCO's Prudhoe Bay development includes a traffic-controlled airport, a composite office-residence building accommodating over 200 persons, a 1,000-barrel-per-day diesel topping refinery, garages, warehouses, sewage treatment plant, incinerator, and other support structures. The Sagwon facility includes a controlled airport, small hotel, restaurant, and other minor structures. Sagwon will remain a relatively minor center, becoming more important logistically during the period of pipeline construction and oil exploration in the adjacent areas and then declining to near its present size.

It seems probable that small company communities will be built in the future, but several oil companies queried on this point indicated that such plans must await additional exploratory drilling. Even if major producing structures are found in areas distant from Prudhoe Bay, the

least possible disturbance commensurate with essential activities by humans.

Grizzly bears

Grizzly bears are sparcely distributed throughout the Brooks Range and the Arctic Slope right to the beaches. The absence of escape habitat over most of this region makes the animals quite vulnerable to hunters. However, the scarcity of hunters and the habit of hibernating from fall until spring afford the animals considerable security. The harvest by sport hunters has been quite low in the past, but is certain to increase as more humans find hunting opportunities. Illegal, promiscuous killing of bears will also increase in relation to an increasing human population. Natives invariably kill any grizzlies they encounter; however, they generally make some use of the meat.

Proper regulations can control the legal harvest of bears and minimize the illegal kill. As it is elsewhere, the attraction of garbage to bears is proving to be a source of trouble, and the strictest possible rules governing garbage disposal will be necessary to avoid serious problems. Nothing less than good regulations adequately enforced and the fullest cooperation of industry can save the bears on the coastal plain from extirpation within a relatively few years.

Polar bears

Polar bears inhabit the ice pack adjacent to the Arctic coast, and occasionally come ashore when the ice pack touches the beaches or landfast ice. Evidence from morphological and hematological research suggests that the population of bears available to Alaskans is distinct from that occupying the regions north of the Atlantic. There are even indication from recent marking and morphometric studies that two populations may exist in the Alaska area. One might be termed the Chukchi Sea population, which is associated with the Wrangel Island denning and nursery area, and the other the Arctic Ocean population which is found from the Barrow region eastward and is associated with denning areas on Banks Island or other Canadian islands. No precise division between these stocks is apparent. This may be partly due to the behavior of some pregnant females in this region: they den and give birth to young on the ice pack (heavy, multiyear ice) rather than retiring to traditional land areas for these purposes as seems generally typical.

Polar bears are being exploited at or near t maximum level consistent with good conservati in both Canada and Alaska. In recent years, t harvest by Alaskan Eskimos has declined sharp while the take by sportsmen who hunt by aircra has greatly increased. However, males now repr sent about 75 percent of the harvest as against percent in years before the early 1950's.

Oil and gas development and an increased h man population on the Arctic Slope will pose tv threats to polar bears—oil spills at sea and attra tiveness as game trophies. The harmful effects oil spills at sea would be dependent upon tl amount of oil, its location, and the time of ye that it was released. Oil could be expected to m the hair and cause chilling of the animals whi come in contact with it. Eventually, massive c spills might affect bears by disturbing food chain It is probable, however, that relatively few bea would be involved unless a truly massive pollutic situation existed for an extended period of tim Nevertheless, even a single oil-soaked bear coul create a significant public furor if its picture plight were given extensive publicity.

The second threat to bears would result fro their great attraction as trophies. The ease of tal ing bears with light aircraft will draw the intere and attention of many people in the Arctic wh will have the means and opportunity to hunt then More restrictive harvest regulations will be r quired to avoid overharvesting bear stocks whic are already sustaining heavy hunting pressure.

Wolves

The wolf population on the Arctic Slope ha never recovered from control activities carried o by Government agents and bounty hunters in th 1950's. At this time, wolves are quite scarce ove most of the Arctic Slope. The lack of escape hab tat, except in the mountainous regions, makes th animals extremely vulnerable to hunters employ ing snow machines and aircraft for transportatio Denning areas, however, are located in the foothill and mountains where they are safe from disturb ance by man.

Habitat changes caused by oil and gas develop ment are not apt to influence the wolf populatio in a serious way. The presence of more people wit mechanized equipment on the Arctic Slope will re sult in more wolves being taken. Only rigid protec tion measures imposed early can save the wolf fro extirpation in those areas frequented by humans.