

STUDY TITLE: Beaufort Sea Development Scenarios: Natural Physical Environment Impacts (TR-21).

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BACKGROUND: The Alaska Outer Continental Shelf (OCS) Social and Economics Studies Program was initiated by the U.S. Department of the Interior, Bureau of Land Management (now the Minerals Management Service) to attempt to predict and evaluate the effects of Alaska OCS petroleum development upon the physical, social, and economic environments within the State. The OCS development scenarios were formulated to provide a reasonable range of technological, economic, and geographic options so that both minimum and maximum development impacts could be estimated.

OBJECTIVES: (1) To identify and assess natural physical environment impacts associated with petroleum development on the North Slope of Alaska; (2) To provide a baseline scenario projecting impacts upon water resources, waste discharges, mineral resources (mainly sand and gravel), and fish and wildlife on the North Slope of Alaska under the scenario where OCS development does not occur; and (3) To predict impacts upon the natural physical environment based upon projections where varying levels of OCS development do occur.

DESCRIPTION: Scenarios covering a range of locations and of reasonably expected resource deposit sizes were analyzed to provide the most realistic predictions for socioeconomic and environmental impact. For each scenario, three environmental impact areas were discussed, including: (1) fish and wildlife; (2) water quality, water resources, and sanitation; and (3) sand and gravel resources.

A baseline (i.e., non-OCS development) scenario was developed for the North Slope by predicting impacts of forecasted population and employment increases and changes in the man-made environment upon local natural resources, subsistence hunting and fishing, water resources, water quality, and sanitation. Contrasting scenarios described OCS development of the North Slope within the context of varying levels of resource find. The Camden-Canning scenario (1.3 billion barrels [Bbbl] of oil), two Prudhoe scenarios (Prudhoe-Small [0.8 Bbbl of oil] and Prudhoe-Large [1.9 Bbbl of oil]), and a Cape Halkett scenario (0.8 Bbbl of oil) were based on OCS exploration and production, while a Smith-Dease scenario was based on exploration only. Tract assumptions, physical setting, environmental considerations, and facilities were discussed for each scenario.

SIGNIFICANT CONCLUSIONS: The baseline scenario described changes that would take place in the natural physical environment if OCS development did not occur. Fish and wildlife resources would be impacted by current and future subsistence hunting and fishing as well as by an increase in sport hunting and fishing. Lack of community water supplies, distribution systems, and sanitation facilities would impact water quality, water resources, and sanitation. Current and future needs of local communities and the petroleum

industry would impact sand and gravel resources. Scenarios based on OCS development described expected conflicts with the natural physical environment due to population increases and changes in the man-made environment. Fish and wildlife resources would be impacted similarly to the baseline scenario, but additional impacts such as disturbance of critical wildlife habitats or breeding areas could occur. Increased population and industry would further impact water quality, water resources, and sanitation, and demands on sand and gravel resources would increase due to increases in community and industrial demands.

STUDY RESULTS: In the absence of future OCS development, major impacts upon fish and wildlife resources were identified as subsistence hunting and fishing, sport hunting and fishing, and wildlife habitat disturbance. Subsistence hunting has decreased since the 1960s when snow machines were introduced in the Arctic, reducing greatly the number of game animals harvested by Arctic residents to feed their sled dogs. However, subsistence hunting remains an activity of major importance to native North Slope residents as a way to preserve traditional culture and village life. Sport hunting greatly increased between 1965 and 1975 and is expected to continue to increase. Wildlife disturbance has occurred in the case of caribou being displaced from calving areas, and habitat disturbance may be the most serious impact on fish and wildlife in the future.

Assuming no OCS development occurs, impacts on water resources will be a result of population growth and planned improvements in water treatment facilities and waste disposal practices. Even without further OCS development, gravel and sand resources of the North Slope may be significantly impacted by local and construction demands. Sand and gravel mining may also impact fish populations through a siltation of feeding and spawning areas as a result of the mining process.

In the case of OCS development in the Camden-Canning area, direct disturbance from motorized vehicles may affect seals, caribou, and waterfowl. Foxes and wolves will be attracted by direct feeding and incorrect garbage disposal, and increased mortality from motor vehicles could result. Polar bears, musk oxen, and whales show minimal potential for disturbance. Fish may be impacted by modification of groundwater flow to overwintering areas and siltation of feeding and spawning areas caused by gravel mining. Water quality and sanitation should only experience minor disturbances if State and Federal disposal regulations are followed. Water resources may be stressed by further development and create conflict between village and industry needs. Increased water withdrawal from rivers may affect overwintering fish. Gravel requirements for the Camden-Canning development are estimated at 13,353,211 m³. Although sufficient onshore borrow exists, waterfowl and shorebird habitats as well as fish overwintering areas need to be avoided.

In both Prudhoe-Large and Prudhoe-Small scenarios, seals, waterfowl, and caribou calving may experience direct disturbance. Foxes and wolves will again be attracted to the area, increasing mortality. Polar bears and whales should be minimally impacted. Impacts on fish would be very similar to those described by the Camden-Canning scenario. Water quality and sanitation will be only minimally impacted, however, the possibility exists of increased turbidity and contaminants. Although minor conflicts may arise between village and industry water needs, the proposed Webster reservoir may provide sufficient water. Increased water withdrawal from the Sagavanirktok River could impact both the river and the fish that overwinter there. Gravel requirements for the Prudhoe-Large and Prudhoe-Small scenarios were estimated to be 5,100,223 m³ and 4,986,733 m³, respectively. It was estimated that sufficient onshore borrow exists. The Sagavanirktok River has already been heavily mined and important waterfowl, shorebird, and fish habitats need to be avoided.

In the final development scenario, seals, whales, caribou, and waterfowl in the Cape Halkett area will all potentially experience direct disturbance from human and vehicular activity. Increased mortality of foxes and wolves attributed to vehicular traffic is probable. Fish may be impacted by siltation and habitat loss. In turn, local fisherman could be affected by reduced harvests, and whales, waterfowl, and caribou used by natives may be displaced from traditional hunting areas.

STUDY PRODUCT(S): Dames & Moore. 1978. Beaufort Sea Petroleum Development Scenarios: Natural Physical Environment Impacts. Final Report. A final report for the U.S. Department of the Interior, Bureau of Land Management Alaska OCS Office, Anchorage, AK. NTIS No. PB-291917. Social and Economic Studies Program Technical Report No. 21. Contract No. 14-12-0001-29002. xiv + 100 pp.

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