LONG-TERM STUDIES OF RINGED SEAL (PHOCA HISPIDA) DISTRIBUTION IN ALASKA

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Aerial surveys of ringed seals, Phoca hispida, have been conducted intermittently in Alaska since 1970. In 1985, we began a 3-year study to evaluate historical data and to determine the feasibility of long-term monitoring of ringed seal distribution and abundance through aerial surveys. Objectives were to develop a survey protocol which could be duplicated in future years; to identify trends in abundance; and to determine the effects of industrial activity on distribution and abundance. Pre-1985 surveys were conducted by flying lines over the fast ice approximately parallel to the shore or the edge of fast ice. In 1985-1987, surveys were flown according to a stratified random transect design, with transects 2 nm apart and extending approximately from shore to the edge of the fast ice. Results from 1985-1987 surveys produced density estimates with 95% confidence limits equal to the mean plus or minus 10%-16%. Density estimates from surveys flown at 300 ft were approximately 1.3 times higher than estimates from 500 ft. For long-term studies this indicates that altitude must be constant, or that surveys at different altitudes must be calibrated. Replicate surveys of the same area, flown 3-4 days apart, within the prescribed weather window and with similar ice conditions resulted in statistically similar density estimates. However, surveys of those same areas after the ice began to break up resulted in significantly different densities, attributable mostly to seals aggregated at cracks, particularly within 2 nm of the fast ice edge where increases of 25% to over 100% occurred. Within 6 nm of land, density increased only 9%, suggesting that the nearshore zone can be used in year-to-year comparisons when surveys are flown after seals have already begun to aggregate. Coordinated ground studies of seal haul-out behavior are needed in order to help interpret aerial survey data. Complimentary information from aerial and ground-based studies should provide the basis for long-term monitoring of changes in ringed seal distribution and abundance.

SEVENTH BIENNIAL CONFERENCE ON THE BIOLOGY OF MARINE MAMMALS

A B S T R A C T S

Hosted by The University of Miami

December 5 - 9, 1987
Miami, Florida
USA

Sponsored by
The Society for
Marine Mammalogy