

Monitoring Beaufort Sea Waterfowl and Marine Birds Aerial Survey Component

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ABSTRACT

The U.S. Department of Interior investigated potential disturbance effects of human activities on the distribution and density of Long-tailed Ducks (*Clangula hyemalis*), and eiders (*Somateria spp.*) in lagoons and offshore waters of the south-central Beaufort Sea. The primary objectives of this study were to compare Long-tailed Duck population trends between “industrial” and “control” areas, describe the relationship between bird density and human activities, and document distribution patterns of eiders and other marine birds in the south-central Beaufort Sea. We used existing protocol (OCS-MMS 92-0060) to conduct 12 replicate Near-shore aerial surveys in Beaufort Sea lagoons between Oliktok Point and Brownlow Point. These data were collected in 1999 and 2000 and were compared with historic data collected in 1990-1991. We also modified the survey protocol to conduct 6 Offshore aerial surveys between Cape Halkett and Brownlow Point, Alaska.

We observed 33 marine bird taxa on Near-shore and Offshore surveys combined. A comparison between 1990 and 2000 revealed a significant negative trend in density of Long-tailed Ducks within the Near-shore survey area. Although densities decreased overall, trends in density were the same among “Industrial” and “Control” transects. Similarly, distribution patterns were not significantly related to sources of potential disturbance such as boat traffic, low-level aircraft over-flights, or human activities on shore adjacent to survey transects. Statistical tests may fail to detect effects of human activities on bird densities even if they exist due to inherent stochasticity in sea duck populations, high standard errors associated with aerial survey techniques, long-term changes in barrier island habitat, intrusion of human activities into the “Control” site, and unidentified components of variation.

We identified several areas that appear to be important to marine birds. King (*Somateria spectabilis*) and Spectacled Eiders (*S. fischeri*) were concentrated in Harrison Bay, where high densities of Scoters (*Melanitta spp.*), and Red-throated (*Gavia stellata*) and Yellow-billed Loons (*G. adamsii*) were also observed. High densities of Common Eiders (*S. mollissima*) and Long-tailed Ducks were found in Barrier Island Habitat, particularly among the Stockton Islands. Finally, Scoters were concentrated in Mid-lagoon habitat in western Simpson Lagoon.

As an alternative to aerial surveys for evaluating effects of human activities, we suggest measuring behavioral responses of individual birds to disturbances of known size and duration. This direct measure could document immediate changes in distribution in a controlled setting. This approach may also identify what activities have measurable effects and predict the potential duration of these effects. Further, we suggest future surveys employ a sampling design that includes systematic transects with random starting points to provide an unbiased sample of multi-species distribution, abundance, and habitat preference.

KEY WORDS: Beaufort Sea; marine birds; sea ducks; lagoons; Long-tailed Duck; *Clangula hyemalis*; Common Eider; *Somateria mollissima*; King Eider; *Somateria spectabilis*; Spectacled Eider; *Somateria fischeri*; Northstar; aerial survey; OCS, offshore.

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