Sea Duck Joint Venture
Annual Project Summary for Endorsed Projects
FY 04 – (October 1 to Sept 30)

Project Title: No. 25: Breeding biology and habitat use of King Eiders on the Coastal Plain of Northern Alaska

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Partners: Coastal Marine Institute, North Slope Borough, Conoco/Phillips Alaska, Inc.

Project Description: Little is known about the breeding biology of King Eiders (*Somateria spectabilis*), partly because they typically nest in remote areas in low densities. The western North American population of King Eiders declined by more than 50% between 1979 and 1996 for unknown reasons. Additionally, NPR-A is being leased for oil and gas exploration and may potentially be developed. Within the northeast planning area of NPR-A is the highest known density of nesting King Eiders on the north slope of Alaska. During the summers of 2002 and 2003 we studied King Eiders in an area to the southeast of Teshekpuk Lake and in the Kuparuk oilfields on the North Slope of Alaska to evaluate the potential impacts of development and to provide information on their basic breeding biology and habitat use. We will examine and compare timing of nesting, clutch size, reproductive success, and habitat use between a relatively undisturbed site at Teshekpuk Lake and an area with considerable human activity at Kuparuk.

Objectives: Our primary objectives are to document basic breeding biology of King Eiders in a developed and undeveloped site. This includes documenting arrival and departure dates, and timing of nest initiation on the North Slope over multiple years. In addition, we are estimating nest success and documenting apparent causes of failure, brood survival, and movement of broods. Finally, we will compare nest site characteristics between the two study areas.

Preliminary Results: We found 37 active king eider nests in the study area at Teshekpuk Lake in 2004. We also found 22 nests post depredation that were likely king eider nests. However, because spectacled eider (*Somateria fischeri*) nests look very similar they were not included in estimates of apparent nest success. Initiation of incubation ranged from 14 – 27 June. Apparent nest success was 24.3% in 2004 (Table 1); however, three of the hens abandoned after camera placement, probably due to the presence of a camera at the nest. Excluding these females from the analysis raised the apparent nesting success to 26.5%. King eider nests at Teshekpuk hatched between 12 - 20 July. Mean clutch size was 4.25 ± 0.2 (SE, n = 28). Egg length was 65.5 ± 0.21 (mm, n = 121), width 43.6 ± 0.13 (mm, n = 121) and mass of fresh eggs 67.6 ± 0.6 (g, n = 90). In general, nests at Teshekpuk occurred in low marshy areas or on islands (n = 37) and not on the

barren, dry ridges. Only three of the nine successful nests occurred on islands (33.3%), although 45.9% of nests found (n=37) occurred on islands. This pattern is the opposite of that seen in previous years (Table 1).

We found 31 active nests at Kuparuk in 2004, and 23 more nests were found post-depredation. Initiation of incubation ranged from 9 - 29 June (Fig. 1). The period of time in which hens began incubating is similar between Kuparuk and Teshekpuk; however the peak is a few days later at Teshekpuk. Apparent nest success was 25.8% (n =31, Table 1). King eider nests at Kuparuk hatched between 6 - 20 July. Mean clutch size was 4.67 ± 0.21 (SE, n = 24). Egg length was 66.3 ± 0.27 mm (n = 83) and width 44.5 ± 0.14 mm (n = 84). Fifty-eight percent of nests found (n = 31) occurred on islands (Table 1).

Table 1. Summary of sample size, apparent nest success and percentage of total and successful nests that occurred on islands at Kuparuk and Teshekpuk from 2002 through 2004.

Site	Year	No. Nests	Apparent nest success	Percent of all nests on islands	Percent of successful nests on islands
Teshekpuk	2002	44	33.3%	68.2%	92.9%
	2003	40	17.5%	52.5%	85.7%
	2004	37	24.3%	45.9%	33.3%
Kuparuk	2002	42	42.9%	44.7%	72.2%
	2003	39	35.1%	51.3%	61.5%
	2004	31	25.8%	58.0%	62.5%

Project Status: Additional funding was obtained through U.S. Geological Survey to extend this study (PhD dissertation) at no cost to CMI. The work on nesting success will continue through the field season of 2005.

Program MARK will be used to estimate nest success (± SE) and to test for site-, year-, and island/mainland-specific differences in nest survival and to investigate the importance of three spatial covariates (distance to the nearest conspecific nest, distance to the nearest larid nest, and distance to the mainland) and habitat covariates on daily nest survival rates. We will investigate any effects of nesting associations between king eider and associated nesting larids, both within and between the two sites. The data from the HOBO temperature recorders will be analyzed for incubation constancy.

We intend to use landcover databases (National Petroleum Reserve- Alaska Landcover Inventory database of the Bureau of Land Management and Ducks Unlimited and the Beechy Point Landcover Inventory database of the U.S. Army Cold Regions Engineering and Research Laboratory) and the random sites to investigate distribution and availability of habitats within the study areas and thus determine if selection of particular habitats has occurred and how the study sites compare.