

**Sea Duck Joint Venture  
Annual Project Summary for Endorsed Projects  
FY 2007 – (1 October 2006 to 30 Sept. 2007)**

**Project Title:** No 41: Survival and reproduction of Pacific Common Eiders (*Somateria mollissima v-nigrum*) on the Yukon Kuskokwim Delta, Alaska.



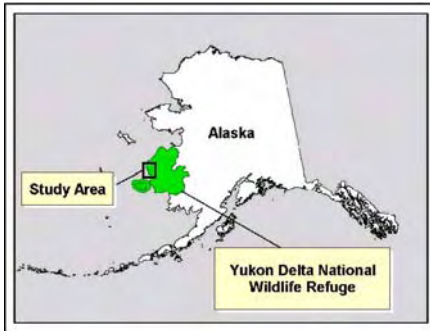
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**Partners:**

U.S. Fish and Wildlife Service, Yukon Delta National Wildlife Refuge  
U.S. Geological Survey, Alaska Science Center

**Project Description:**

Populations of Pacific common eiders (*Somateria mollissima v-nigrum*) on the Yukon-Kuskokwim Delta (YKD) in western Alaska declined by 50-90% from 1957 to 1992 and then stabilized at reduced numbers from the early 1990's to the present. This study investigated the primary underlying processes affecting population dynamics of Pacific common eiders, with the goals of understanding factors that may have led to the observed decline and subsequent stabilization, and providing tools from which conservation, management, and recommendations for future research could be drawn. Analyses included data collected from 2002 to 2004, in addition to historical data collected from 1991 to 2001.



**Objectives:**

1. Assess annual and geographic variation in apparent survival of adult females, clutch initiation dates, clutch size, daily nest survival, nest success, and productivity of Pacific common eiders at three study sites across the YKD using current and historical data.
2. Determine concentrations and estimate exposure rates to lead and selenium in common eiders on the YKD, and examine variation in components of reproduction and annual survival in relation to contaminant burdens.
3. Develop population models to examine the relative influence of components of survival and reproduction on population dynamics, in order to facilitate prioritization of management strategies, and identify future research needs.

**Results:**

Apparent survival of adult females was high (0.892, SE = 0.022), and relatively invariant ( $\sigma^2 = 0.005$ ), while components of reproduction were low and variable, both within and among

individuals. Timing of nesting and seasonal declines in clutch size and nest survival indicated that females in the early and mid parts of the breeding season produced the highest numbers of offspring; suggesting directional selection favoring early nesting. Probability of a nest containing  $\geq 1$  nonviable egg was positively related to blood selenium concentrations in hens, but no other contaminant-related reductions to life history variables were found. All estimates of population growth ( $\lambda$ ) indicated that the YKD population was stable to slightly increasing during the years of the study (range  $\lambda$ : 1.02-1.05 (CI: 0.98-1.11)), and would respond most dramatically to changes in adult female survival. However, historical fluctuations in  $\lambda$  were primarily explained by variation in reproductive parameters, particularly duckling survival. We suggest that practical options for increasing adult survival currently may currently be limited. Thus, enhancing productivity, particularly via methods with simultaneous positive effects on adult survival (e.g., predator removal), may offer a more plausible starting point for management aimed at increasing population growth.

**Project Status:**

The project has been completed. However, the Yukon Delta National Wildlife Refuge is continuing to monitor nesting of Pacific common eiders at Kigigak Island (SDJV Project #59).

**Current Products:**

- Wilson, H. M. 2007. Population Ecology of Pacific common eiders on the Yukon-Kuskokwim Delta, Alaska. Dissertation, University of Alaska, Fairbanks: 204 pp.
- Wilson, H. M., P. L. Flint, and A. N. Powell. 2007. Coupling contaminants with demography: effects of lead and selenium in Pacific common eiders. *Environmental Toxicology and Chemistry* 26(7):1410-1417.
- Wilson, H. M., P. L. Flint, T. L. Moran, and A. N. Powell. 2007. Survival of breeding Pacific common eiders on the Yukon-Kuskokwim Delta, Alaska. *Journal of Wildlife Management* 71(2):403-410.