

**Sea Duck Joint Venture
Annual Project Summary for Endorsed Projects
FY 2004 – (October 1, 2003 to Sept 30, 2004)**

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



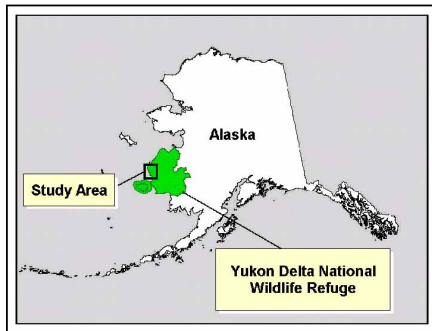
Principal Investigator(s): Abby N. Powell (ffanp@uaf.edu) and Heather M. Wilson (fhmw@uaf.edu), Alaska Cooperative Fish and Wildlife Research Unit, Department of Biology and Wildlife, University of Alaska, Fairbanks, 209 Irving I, Fairbanks, Alaska 99775.

Partners:

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

Project Description:

Pacific Common Eiders (*Somateria mollissima v-nigrum*) have undergone a dramatic population decline over the past 50 years. Currently, only sparse information exists on the ecology and demography of this population and little research has explored factors that may contribute to its decline.



This study (University of Alaska, Fairbanks 2002-2004) encompasses seven years of intermittently collected data (USGS Alaska Science Center and USFWS Yukon Delta National Wildlife Refuge) with three seasons of current, replicated sampling effort at two historical sites. Current methodologies include replicate nest searching and monitoring, mark-recapture/resighting, and blood sampling of nesting Common Eiders at Kigigak Island and Tutakoke River study sites.

Objectives:

Our study examines the population biology of Common Eiders on the YKD, Alaska. Objectives include: estimating adult female annual survival, reproductive success, reproductive output, and contaminant exposure at two breeding areas on the YKD, and describing annual and geographic variation in these life history parameters using historical and current data. Estimated demographic parameters will be used to develop a simple Common Eider population model for the YKD. This model will demonstrate the effects of variation in life-history characteristics on expected Common Eider population size and growth rate. Additional sensitivity analyses will examine the relative importance of various demographic parameters on population dynamics.

Preliminary Results:

Survival and Reproduction

We have completed three years (2002 - 2004) of Ph.D. research on Pacific Common Eiders on the YKD. As of 2004, 600 breeding adult (ASY) female Pacific Common Eiders were banded, consisting of 288 birds at Tutakoke River (1994, 1997-2004), 260 at Kigigak Island (1994, 1997, 2001-2004), and 52 at Hock Slough (1994-2002). Our preliminary estimate of apparent annual survival for adult females (recapture rate varying by site and year) is 0.8697 (95% CI: 0.7892 to

0.9225). Each year we found 100 to 200+ nests at each of the two main study areas and monitored these nests through the breeding season to determine nest success rates (Table 1).

Table 1. Total number of nests found, preliminary nest success estimates (assuming constant daily survival rate), and number of ducklings banded at Kigigak Island and Tutakoke River study sites, Yukon Kuskokwim Delta, 2002-2004.

Location	No. Nests			Nest Success			Ducklings banded	
	2002	2003	2004	2002	2003	2004	2003	2004
Kigigak	203	184	248	61%	23%	57%	93	160
Tutakoke	131	93	145	42%	<1%	31%	0	13

Contaminants

We collected blood samples in all three years from nesting females (5 mL each) to examine exposure to contaminants. In 2003 and 2004 we expanded this sampling to include pre-nesting males and females, as well as nesting females at all stages of incubation. Our goal was to examine the temporal dynamics of contaminant burdens during the breeding season. Results from the 2002 and 2003 blood samples demonstrated that 50-90% of individuals had background levels of blood lead and approximately 11% had elevated lead concentrations (> 0.2 ppm). However, concentrations and frequencies of lead exposure in this population were not as high as those of sympatrically nesting Spectacled Eiders (*Somateria fischeri*). Selenium was detected in 100% of the Common Eiders sampled and most individuals had drastically elevated levels compared to freshwater birds. Our 2003 results suggest that in the YKD population of nesting Common Eiders, selenium appeared to be strongly linked to body condition, such that blood selenium levels tended to increase as body condition worsens through the incubation period. During this academic year we will strive to address the mechanisms of increasing selenium concentrations with declining body condition. During the 2004 field season we placed data-logging scales under a sub-set of active nests of blood-sampled females to record nest attentiveness and weight loss during incubation. We will relate these parameters to blood selenium concentrations during various stages of incubation.

Nesting associations and recruitment

In 2003 and 2004 we collected nesting association data by recording GPS locations of all conspecific and interspecific nests (i.e. gulls, geese, and other eiders species) within 25 meters of every Common Eider nest at Kigigak Island. We will use this information to examine the effects of nesting associations on Common Eider nesting success. In 2003 and 2004 we also initiated banding of Common Eiders ducklings encountered at the nest, using plasticine-filled leg bands. Although we will not be able to estimate juvenile recruitment during the course of this graduate project, (given that adults do not return to breed until 3 years of age), we began marking ducklings in anticipation of future studies of recruitment and population age-structure. Thus far 266 ducklings have been banded (Table 1).

Project Status

As of fall 2004, field work for the project has been completed and analyses of the data are currently underway.

Project Funding Sources (US\$): (2004 only)

SDJV (USFWS) Contribution	Other U.S. federal contributions	U.S. non-federal contributions	Source of funding (agency or organization)
\$29,383			
	\$18,000		USFWS Yukon Delta NWR
	\$18,500		USGS Alaska Science Center
		\$10,437	University of Alaska Foundation, Angus Gavin Memorial Bird Research Grant

Total Expenditures by Category (US\$): (2004 only)

ACTIVITY	BREEDING	MOLTING	MIGRATION	WINTERING	TOTAL
Banding	0				
Surveys	0				
Research	\$76,320				
Communication	0				
Coordination	0				