Sea Duck Joint Venture
Annual Project Summary for Endorsed Projects
FY 03 – (October 1, 2002 to Sept 30, 2003)

Project Title: No. 27: Effects of selenium exposure in common eiders

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Partners: Alaska SeaLife Center, USFWS, SDJV, USGS, Maine Department of Inland Fisheries and Wildlife.

Project Description: The effects of excess selenium exposure are well known in freshwater birds and include multiple embryonic deformities, adverse physiological changes, emaciation, and death with a variety of histopathologic lesions. Selenium concentrations that are commonly considered toxic for freshwater birds have been reported in tissues of some marine birds, and the threatened spectacled eider (*Somateria fischeri*) and Steller's eider (*Polysticta stelleri*) are among the Alaskan sea ducks and waterfowl found with high selenium levels. Because experimental studies of selenium toxicity in marine birds are lacking, little information is available to evaluate the threat represented by the selenium concentrations found in tissues of these species.

Objectives *(should identify how the project addresses SDJV priorities*): To determine if (1) Selenium exposure has adverse effects on the physiology and immune function of common eiders and to evaluate the histopathological effects of exposure; (2) Tissue selenium thresholds associated with toxicity are higher in eiders than freshwater birds; (3) Eiders accumulate more selenium in their tissues than freshwater birds when dietary selenium concentrations are similar; and (4) If a longer period of time is required to clear selenium from the blood of eiders than is required for freshwater birds.

Preliminary Results: A preliminary range-finding study was conducted at the NWHC with four (one adult and one juvenile male; one adult and one juvenile female) common eiders. Ducks were started on selenium at 10 ppm mixed in Mazuri® (PMI Nutrition International, Brentwood, MO) #5681 sea duck diet and fed *ad libitum.* The selenium concentration was increased to 80 ppm over a period of 2.5 months, when the eiders were euthanized. Blood samples (for analysis of selenium and enzymes associated with glutathione metabolism) were collected after each increase in selenium concentration, and blood and tissues (for chemical and enzyme analysis and histopathology) were collected at the end of the preliminary study.

Project Status: Analysis of samples is in progress. These findings and other data from the range-finding study will be used to determine the concentrations of selenium that will

be used in feed in a larger study that will be carried out at PWRC in common eiders hatched and reared there. This study will be carried out in early 2004.

Project Funding Sources (US$) (complete only if funded by a SDJV partner e.g., USFWS, CWS, DU, USGS, or Flyway rep; this is used to document how SDJV appropriated funds are matched):

SDJV (USFWS) Contribution	Other U.S. federal contributions	U.S. non-federal contributions	Canadian federal contributions	Canadian non-federal contributions	Source of funding (agency or organization)
$7,500		$24,118			Alaska SeaLife Center

Total Expenditures by Category (US$) (complete only if project is funded by a SDJV partner e.g., USFWS, CWS, DU, USGS, or Flyway rep; dollar amounts should include all partner contributions):

ACTIVITY	BREEDING	MOLTING	MIGRATION	WINTERING	TOTAL
Banding					
Surveys					
Research					$31,618
Communication					
Coordination					