

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

**Project Title (SDJV Project #93): Completing the Picture: Spring  
Body Condition and Breeding Propensity of Surf Scoters along  
the Pacific Coast**

**A Single Year Study**

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## **Project Description**

Pacific Surf Scoters have been the subject of a growing body of research during winter, however very little is known about their spring migration ecology, and even less about breeding ecology. Spring migration conditions have important implications for waterfowl productivity, and nutrient reserve levels and body condition during spring migration have been identified as potentially important factors affecting broad-scale and long-term population declines.

To assess spring body condition and breeding propensity of Pacific Surf Scoters collections were conducted during late spring 2005 and 2006 along the coast of southeast Alaska. Specific field study locations that were used in the study included: West Behm Canal and the southern end of Annette Island in the Ketchikan area; Gastineau Channel, Stephens Passage, and Berners Bay near Juneau, and several areas around the northern end of Lynn Canal; including Sullivan Island, Chilkoot Inlet, Chilkat Inlet, and Taiya Inlet. Collections were also conducted in the greater Yellowknife area, Northwest Territories, Canada. These sites were chosen based on use and residency of Pacific Surf Scoters marked with satellite or VHF transmitters. These birds had been previously marked in one of four wintering areas from Baja, Mexico to the Strait of Georgia, Canada.

## **Objectives**

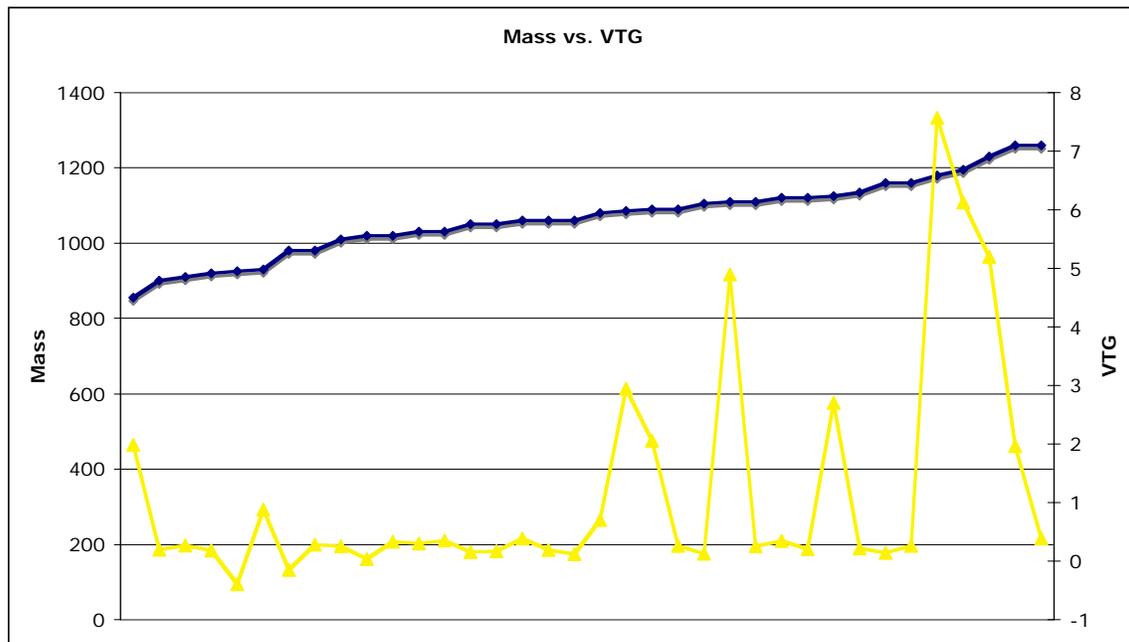
Our objectives are to 1) determine how body condition and nutrient acquisition changes during spring migration and how that relates to wintering areas, 2) identify the reproductive strategy of Pacific Surf Scoters, and 3) what proportion of the population is capable of breeding, and if this potential can be measure on spring staging grounds. Spring migration condition has important implications for waterfowl productivity. It is widely recognized that nutritional status of individuals upon arrival at breeding areas has important effects on reproductive performance, including timing of nesting, clutch size, re-nesting propensity, and growth and survival of young. Our studies will have direct implications for understanding the biology of scoters during their annual cycle and identify factors affecting production and population changes – a high priority in the SDJV Strategic Plan. We are completing a collaborative and highly successful effort to quantifying Surf Scoter spring migration strategies started under SDJV project #65 (Spring Migration of Surf Scoters Along the Pacific Coast: Important Habitats and Energetic Implications).

## **Preliminary Results**

Laboratory work has been contracted with Bird Studies Canada, Port Rowan, Ontario. Final body composition data is nearly complete and a full analysis will be conducted at that time. Somatic macronutrient content will be determined as organ specific and remaining carcass based on standard proximate analysis procedures. Total somatic macronutrients will be estimated by adding individual organ and carcass values. Principal components analysis on morphometric variables measured on all females will be used for correction of body size variation in somatic macronutrient measurements.

In addition, reproductive organs including ovaries, oviducts, and oviductal eggs were dissected. Ovaries were weighed, and if rapid follicle growth had begun, a single follicle was collected, weighed, and stored frozen for stable isotope analysis. Oviducts were frozen along with the remaining carcass and any oviductal eggs were subsequently dissected for contaminant analysis.

Preliminary analysis has been conducted on blood samples taken at the time of collection and processed in field. These samples were then worked at Simon Fraser University, British Columbia, Canada. These samples were analyzed for the egg yolk precursor vitellogenin (VTG) as a possible indicator of reproductive status.



**Figure 1. VTG levels increased overall during the collection period as mass increased.**

Mass of females increased during the collection period both years, from 850 grams to nearly 1300 grams. Over the collection period of 45 days there was steady linear trend in increasing mass, due in large part to pre-breeding fattening strategies employed in southeast Alaska by staging Surf Scoters. The extreme abundance and availability of preferred prey items for Surf Scoters in staging areas likely allows any individual to obtain a maximum mass to size ratio. The results of individual VTG levels does not indicate a breeding potential in scoters that have otherwise passed an energetic threshold based on mass. These results will be compared with actual measurements of reproductive organs to determine if VTG blood levels are an accurate indicator of reproductive potential.

### **Project Status**

We have evaluated indicators of breeding propensity in Surf Scoters using the same staging areas and summer breeding areas as marked individuals from wintering sites with

ongoing projects endorsed by the SDJV. With the body condition results this project will add greatly to the understanding of what proportion of Surf Scoters breed and what energetic requirements must be met.

In addition to an annual report, we expect production of a peer-reviewed journal publication addressing Surf Scoter body condition and implication for breeding propensity. We will deliver our findings to SDJV as well as appropriate federal, provincial, and state agencies to facilitate management decisions as well as future research priorities.